2200 Energy Drive | Canonsburg, PA 15317
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

Ms. Anita Walthall
Air Permit Writer
Virginia DEQ – Blue Ridge Regional Office
901 Russell Drive
Salem, VA 24153

September 16, 2020

Re: MVP Southgate Project – Lambert Compressor Station Minor New Source Article 6 Permit Application – Revised Application – Supplemental Information on Environmental Justice

Dear Ms. Walthall:

Mountain Valley Pipeline, LLC ("Mountain Valley") filed a revised minor new source review Article 6 permit application for the proposed Lambert Compressor Station on July 1, 2020. At that time, Mountain Valley indicated that it was preparing an analysis and report on Environmental Justice related issues consistent with Va. Code §10.1-1307.E and legislation enacted by the 2020 Session of The Virginia General Assembly. Enclosed is a complete hard copy of Supplemental Information on Environmental Justice report. A complete hard copy also is being delivered to Lauren Stewart in the VADEQ Central Office, with hard copies of the report and select appendices being delivered to the remaining Central Office recipients. Access to an electronic copy has also been provided.

We look forward to continuing working with you and your staff on this project. If you have any questions or comments regarding this supplement or any other information provided in support of the proposed air permit application, please contact me at 561-691-7065 or christina.akly@nee.com.

Sincerely,

Christina Akly

Enclosures

cc: (w/enclosures as specified)
Paul Jenkins, VADEQ – Blue Ridge Regional Office
Jeff Steers, VADEQ – Central Office
Mike Dowd, VADEQ – Central Office
Tamera Thompson, VADEQ – Central Office
Stanley Faggert, VADEQ – Central Office
Lauren Stewart, VADEQ – Central Office

Return to "What Pages Do I Fill Out For My Facility?"
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AIR PERMIT APPLICATION
CHECK ALL PAGES ATTACHED AND LIST ALL ATTACHED DOCUMENTS

___ Local Government Certification Form, Page 5
___ Application Fee Form, Pages 6-8
___ Document Certification Form, Page 9
___ General Information, Pages 10-11
___ Fuel Burning Equipment, Page 12
___ Stationary Internal Combustion Engines, Page 13
___ Incinerators, Page 14
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___ BAE for Criteria Pollutants, Page 29
___ BAE for GHGs on Mass Basis, Page 30
___ BAE for GHGs on CO_2e Basis, Page 31
___ Operating Periods, Page 32

___ ATTACHED DOCUMENTS:
___ Map of Site Location
___ Facility Site Plan
___ Process Flow Diagram/Schematic
___ MSDS or CPDS Sheets
___ Estimated Emission Calculations
___ Stack Tests
___ Air Modeling Data
___ Confidential Information (see Instructions)
___ BACT Analysis
1 Supplemental Information on Environmental Justice

Check added form sheets above; also indicate the number of copies of each form in blank provided.

DOCUMENT CERTIFICATION FORM

I certify under penalty of law that this document and all attachments [as noted above] were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering and evaluating the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I certify that I understand that the existence of a permit under [Article 6 of the Regulations] does not shield the source from potential enforcement of any regulation of the board governing the major NSR program and does not relieve the source of the responsibility to comply with any applicable provision of the major NSR regulations.

SIGNATURE: _____ DATE: 9-2-2020

NAME: Jack Mackin REGISTRATION NO: _____

TITLE: VP of Operations COMPANY: Mountain Valley Pipeline, LLC

PHONE: 412-395-3576 ADDRESS: 2200 Energy Drive

EMAIL: jmackin@equitransmidstream.com Canonsburg, PA 15317

References: Virginia Regulations for the Control and Abatement of Air Pollution (Regulations), 9VAC5-20-230B and 9VAC5-80-1140E.

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SUPPLEMENTAL INFORMATION ON ENVIRONMENTAL JUSTICE

Supplement to Application for Article 6 Air Permit for the Lambert Compressor Station MVP Southgate Project

Mountain Valley Pipeline, LLC

September 2020

TABLE OF CONTENTS

I. INTRODUCTION

On July 1, 2020, Mountain Valley Pipeline LLC ("Mountain Valley") submitted to the DEQ a revised application for a minor new source permit for the Lambert Compressor Station ("Station").[1] The Station is a part of the MVP Southgate Project ("the Project"), and is proposed for location next to a long-existing Williams Company-owned compressor facility ("Transco Compressor") near the Town of Chatham in Pittsylvania County.

Section 7.0 of the Revised Application provided information related to compliance with Va. Code §10.1-1307.E., which requires consideration of the following:

1) Character and degree of injury to, or interference with, safety, health, or the reasonable use of property which is caused or threatened to be caused;

2) Social and economic value of the activity involved;

3) Suitability of the activity to the area in which it is located; and

4) Scientific and economic practicality of reducing or eliminating the discharge resulting from such activity.[2]

That information included Section 7.3, addressing site-suitability, including the benefits of the use of the site, alternatives considered, and compliance with local ordinances.[3] Mountain Valley did not include information at that time pertaining to environmental justice, which must be considered under Va. Code §10.1-1307.E and new environmental justice statutes[4] that became effective July 1, 2020. As noted in the Revised Application, some necessary fieldwork was delayed as a result of the COVID-19 pandemic and civil unrest.

Generally, there are three steps to an environmental justice analysis:

1) Identify whether an environmental justice community is implicated; and if so,

2) Provide enhanced public participation to ensure environmental justice communities have meaningful involvement in the process; and

[1] *See* Letter from Christina Akly to Anita Walthall dated June 30 and attachments ("Revised Application").
[2] Revised Application at 67-76.
[3] *Id.*at 74-75 and relevant attachments.
[4] These include the Virginia Environmental Justice Act, Va. Code § 2.2-234, *et seq*. ("VEJA"), which is applicable to all agencies, and two statutes directed specifically at the Department of Environmental Quality ("DEQ"), Va. Code § 10.1-1182 (defining "Environmental Justice" consistent with the VEJA definition) and §10.1-1183 (making it a purpose of DEQ to "further environmental justice" in regulatory and permitting processes and to "ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, faith, disability, or income with respect to the administration of environmental laws, regulations, and policies").

3) Ensure no environmental justice community bears a disproportionate share of any negative environmental impacts, considering any mitigation and enhancement measures.

Mountain Valley is committed to environmental justice and has taken a comprehensive and proactive approach here that not only satisfies the applicable requirements, but exceeds what the statutes require and what others have done in Virginia. To ensure that the environmental justice analysis for the Station would be expansive and inclusive, Mountain Valley invited Alexa Sutton Lawrence, Ph.D. of Land and Heritage Consulting LLC to assist with the process. Dr. Lawrence has prepared a far-reaching analysis of environmental justice principles[5], and she has expanded on the community outreach that Mountain Valley has conducted and is continuing to conduct. Dr. Lawrence's curriculum vitae and Environmental Justice Report are provided as Appendix A to this Supplemental Information. This Supplemental Information and all its Appendices should be incorporated into and considered part of the Revised Application submitted July 1, 2020.

This Supplemental Information demonstrates compliance with environmental justice requirements and principles, and it provides information to make the necessary findings under Va. Code § 10.1-1307.E. and VEJA. It includes:

1) Applicable criteria under VEJA, the State Air Pollution Control Law, and *Friends of Buckingham* decision.

2) Summary of work performed and conclusions reached on environmental justice and cultural resources in the proceeding before the Federal Energy Regulatory Commission ("FERC");

3) Identification of environmental justice communities as defined in VEJA within a radius of 1-mile from the proposed Station;

4) Discussion of Mountain Valley's community engagement to enhance meaningful involvement by environmental justice community members;

5) Evaluation of impacts from the proposed Station, and confirmation that no environmental justice community bears a disproportionate share of any such impacts;

6) Summary of supplemental work performed by Land and Heritage Consulting, LLC to expand the investigation of potential environmental justice communities beyond the specific requirements of VEJA at radii of 3, 5, and 10 miles from the proposed Station (plus additional analyses out to 30 miles), and to engage with all the environmental justice communities to identify any additional potential and perceived impacts and possible mitigation measures;

7) Proposal to further facilitate meaningful involvement of environmental justice communities in the Station's permitting process; and

[5] For instance, Dr. Lawrence did not limit herself to actual impacts from the Station, but also perceived impacts of the Station, the Project as a whole, and pipelines generally at distances out to 30 miles from the Station.

8) Commitment for additional, practicable mitigation and community enhancement.

The analysis concludes that environmental justice communities exist in the vicinity of the Station, but that no environmental justice community—indeed, no community—bears a disproportionate share of any negative environmental consequences.

II. APPLICABLE CRITERIA UNDER VIRGINIA ENVIRONMENTAL JUSTICE ACT, STATE AIR POLLUTION CONTROL LAW, AND *FRIENDS OF BUCKINGHAM* DECISION.

VEJA expressly establishes environmental justice as the Commonwealth's policy and, for the first time in Virginia, provides critical definitions relevant to environmental justice. The Air Pollution Control Board ("Board") has not yet adopted regulations to implement VEJA. The recent changes to the State Air Pollution Control Law also expressly make it a purpose of DEQ to "further environmental justice" in permitting actions.[6] In addition to VEJA and Va. Code § 10.1-1183, Va. Code §10.1-1307.E establishes certain factors the Board is required to consider when issuing permits. Site suitability and the potential for impacts on health are among these factors. Environmental justice has come to be considered in conjunction with the site suitability analysis.

Here, Mountain Valley has gone beyond the literal requirements of VEJA and Va. Code §10.1-1307.E in its assessment of environmental justice issues.

A. Summary of Recent Virginia Environmental Justice Legislation

VEJA states that, "[i]t is the policy of the Commonwealth to promote environmental justice and ensure that it is carried out throughout the Commonwealth, with a focus on environmental justice communities and fenceline communities."[7] Other new Code sections reiterate the Commonwealth's commitment to, and DEQ's responsibility for, environmental justice.[8]

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[6] Va. Code § 10.1-1183.

[7] Va. Code §2.2-235. Although environmental justice literature speaks at times of "fenceline communities," VEJA defines the term more narrowly than some common usages of the term. *See* Va. Code § 2.2-234 ("'Fenceline community' means an area that contains all or part of a low-income community or community of color *and that presents an increased health risk to its residents due to its proximity to a major source of pollution*.") (emphasis added).

[8] *See* Va. Code §§ 10.1-1182, 1183 (one of the purposes of DEQ is to "further environmental justice and enhance public participation in the regulatory and permitting processes"). Other statutory and policy directives require consideration of environmental justice principles. The Energy Policy of the Commonwealth ("Energy Policy") seeks to develop "energy resources and facilities in a manner that does not impose a disproportionate adverse impact on economically disadvantaged or minority communities…." Va. Code § 67-101.12. In turn, the Virginia Energy Plan must propose actions to implement the Energy Policy, and must include, among other things, "[a]n analysis of siting of energy resource development, refining or transmission facilities to identify any disproportionate adverse impact of such activities on economically disadvantaged or minority communities…." *Id*. § 67-201.B.7. The current Energy Plan states that "Virginia is dedicated to ensuring that there are not disproportionate impacts on economically-disadvantaged or minority communities during the siting of energy resources. Ensuring that certain populations are not disproportionately impacted during energy development is critical to Environmental Justice efforts." Office of the Secretary of Commerce and Trade, Dept. of Mines, Minerals and Energy, The Commonwealth of Virginia's 2018 Energy Plan at 58 (Oct. 2018). It further states that "DEQ's

"Environmental justice" is defined as

> the fair treatment and meaningful involvement of every person, regardless of race, color, national origin, faith, disability, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies.[9]

VEJA provides a series of cascading, additional definitions to implement environmental justice.[10]

> "*Community of color*" means any geographically distinct area where the population of color, expressed as a percentage of the total population of such area, is higher than the population of color in the Commonwealth expressed as a percentage of the total population of the Commonwealth. However, if a community of color is composed primarily of one of the groups listed in the definition of "population of color," the percentage population of such group in the Commonwealth shall be used instead of the percentage population of color in the Commonwealth.
>
> "*Environment*" means the natural, cultural, social, economic, and political assets or components of a community.
>
> "*Environmental justice community*" means any low-income community or community of color.
>
> "*Fair treatment*" means the equitable consideration of all people whereby no group of people bears a disproportionate share of any negative environmental consequence resulting from an industrial, governmental, or commercial operation, program, or policy.
>
> "*Fenceline community*" means an area that contains all or part of a low-income community or community of color and that presents an increased health risk to its residents due to its proximity to a major source of pollution.
>
> "*Low income*" means having an annual household income equal to or less than the greater of (i) an amount equal to 80 percent of the median income of the area in which the household is located, as reported by the Department of Housing and Urban Development, and (ii) 200 percent of the Federal Poverty Level.
>
> "*Low-income community*" means any census block group in which 30 percent or more of the population is composed of people with low income.
>
> "*Meaningful involvement*" means the requirements that (i) affected and vulnerable community residents have access and opportunities to participate in the full cycle of the decision-making process about a proposed activity that will affect their environment or

existing obligations to ensure that all regulated entities comply with health-based standards [e.g., NAAQS, state air toxic requirements] will continue in all permitting activities to reduce public health burdens on all populations." *Id*.

[9] Va. Code §2.2-234.

[10] *Id.*

health and (ii) decision makers will seek out and consider such participation, allowing the views and perspectives of community residents to shape and influence the decision.

"*Population of color*" means a population of individuals who identify as belonging to one or more of the following groups: Black, African American, Asian, Pacific Islander, Native American, other non-white race, mixed race, Hispanic, Latino, or linguistically isolated.

B. *Friends of Buckingham v State Air Pollution Control Bd.*, 947 F.3d 68 (4th Cir. 2020)

Before these principles of environmental justice were expressly codified in Virginia law, the United States Court of Appeals for the Fourth Circuit considered environmental justice in the context of site suitability under Va. Code §1307.E. As relevant here, the Court found that the Board had failed to explain its permitting decision regarding site suitability and environmental justice.[11] Remanding an air permit for a compressor station proposed in a historic area of descendants of enslaved people, the Court directed the Board to "make findings with regard to conflicting evidence in the record, the particular stud(ies) relied on, and the corresponding local character and degree of injury from PM [particulate matter] and toxic substances threatened" by the compressor station.[12]

In conjunction with the Revised Application, this Supplemental Information provides information to allow the agency to make the necessary findings for the Station's air permit, including (i) the presence or absence of environmental justice communities, (ii) the local character and degree of injury from the Station's air emissions, (iii) compliance with other aspects of Va. Code § 10.1-1307.E, and (iv) compliance with VEJA.

C. Virginia Department of Transportation ("VDOT") Environmental Justice Guidelines

VDOT has long implemented environmental justice principles in its work, and VDOT has issued Guidelines that are informative here.[13] The VDOT Guidelines are based on federal guidance. While not binding on DEQ, the VDOT Guidelines represent a reasonable approach used by a sister agency to implement environmental justice.

Several aspects of the VDOT Guidelines are especially pertinent here. To identify an environmental justice community, VDOT recognizes that census data is only a starting point to "flag" potential environmental justice communities.[14] VDOT notes that local site visits and/or calls should be conducted to identify localized pockets of minority or low-income persons overlooked by census data.[15] VDOT further suggests contacting specific sources to refine demographic information.[16]

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[11] 947 F.3d at 86.

[12] *Id.*

[13] Appendix B; available at: https://www.virginiadot.org/business/resources/Civil_Rights/ENVIRONMENTAL_JUSTICE_GUIDELINES.pdf.

[14] *Id.* at 7.

[15] *Id.*

[16] *Id.* at 9.

The VDOT Guidelines further address how to determine whether an environmental justice community will suffer disproportionate impacts, including impacts to historic, religious, and cultural resources that are "especially important" to the community. The guidelines provide a list of specific items and questions to consider when performing this evaluation.

Mountain Valley has conducted local site visits and calls with local leaders to refine the demographic analysis. Moreover, as discussed in Section VII below, Dr. Lawrence expanded the investigation of environmental justice communities and conducted interviews of community members to address details that census data alone might not uncover.

D. Framework for Environmental Justice Assessment

In light of the applicable criteria above, the following three-part framework is an eminently reasonable approach to implement environmental justice that complies in all respects with the statutory mandates:

1) Conduct a demographic survey, both desk-top and in the field to identify "environmental justice communities" – both "communities of color" and "low income communities," using the definitions provided in VEJA and considering other available information, including but not limited to census data. Characterize and evaluate any site-specific health issues in those populations using available information. Include fieldwork to validate and ground truth that information, as well as fill in gaps in the data and characterize the information in appropriate cultural context so the perspectives offered by the environmental community are fully and properly understood.

2) Provide meaningful involvement of those environmental justice communities in the entire permitting process. In addition to the traditional opportunities for public participation, promote engagement of the environmental justice community through active notice, education and discussion by the applicant, agency staff, and permit decision-makers. Examples include publishing notices in foreign languages as appropriate, offering additional workshops for such communities, outreach to community leaders, and other accommodations to foster active participation by environmental justice community members such that their views are reflected in the decision.

3) Ensure fair treatment in the decision making process and the decision itself so that environmental justice communities do not bear greater negative impacts from the permitted activity compared to non-environmental justice communities.

III. SUMMARY OF ENVIRONMENTAL JUSTICE CONSIDERATIONS IN FERC PROCEEDINGS

Environmental justice was considered by FERC for the Project as a whole, as well as the Station individually, as required under federal law. Although the details of the federal standards are different from VEJA, the fundamental principles of environmental justice are the same. As a result, Mountain Valley developed substantial information and implemented procedures to

address environmental justice principles in FERC proceedings. Information and analysis provided by Mountain Valley and further analyses independently conducted by FERC Staff**,** supported FERC's completion of the Final Environmental Impact Statement ("FEIS") and issuance of a Certificate of Convenience and Necessity ("CPCN") for MVP Southgate Project.[17]

While the information was developed and considered in the context of federal criteria for environmental justice, the FERC data and analyses are relevant to DEQ's consideration of environmental justice under VEJA and Va. Code §10.1-1307.E. Likewise, while FERC's conclusions are not dispositive here and DEQ must reach an independent determination, the conclusions of a sister agency support a finding that environmental justice principles have been satisfied.

A. Context of Federal Evaluation of Environmental Justice

President Clinton issued Executive Order 12898 *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations* ("EO12898").[18] Its purpose is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities. EPA has continually developed and updated guidance and tools for the implementation of EO 12898. EPA requires federal agencies to consider if impacts on human health or the environment (including social and economic aspects) would be disproportionately high and adverse for minority and low-income populations and appreciably exceed impacts on the general population or other comparison group. Consistent with EO 12898, the EPA's environmental justice policies focus on agencies seeking out and providing enhanced and effective opportunities for those potentially affected to participate in decision-making about a proposed activity that will affect their environment and/or health, and ensuring that agencies consider those comments in the decision-making process.

B. FERC's Evaluation and Findings Regarding Environmental Justice

FERC conducted a thorough investigation of environmental justice as it pertains to the Project, including the Station. It concluded that federal justice principles and requirements were satisfied.

In evaluating the environmental justice issues related to the Project, FERC considered if impacts on human health or the environment (including social and economic aspects) would be disproportionately high and adverse for minority and low-income populations and appreciably exceed impacts on the general population or other comparison group.[19] To this end, FERC considered whether:

1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health;

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[17] *See* Resource Report 5 (Appendix C); FEIS (Appendix D); CPCN (Appendix E).
[18] 59 Fed. Reg. 7629 (Feb.26, 1994).
[19] FEIS at 40140.

2) the public's contributions can influence the regulatory agency's decision;

3) the concerns of all participants involved will be considered in the decision-making process; and

4) the decision-makers seek out and facilitate the involvement of those potentially affected.

Procedurally, there were many opportunities for and forms of public involvement during FERC's environmental review process. FERC issued multiple notices regarding the Project that were posted on public dockets, published in the Federal Register, and sent to FERC's environmental mailing list that included local libraries (such as the Pittsylvania County Public Library in Chatham) and newspapers (such as the Chatham Star Tribune) and posted on the Project website. FERC also held multiple public scoping meetings in the Project area, including a meeting in Chatham at 5:30 p.m. on June 28, 2018. FERC also conducted a public meeting in Chatham on August 20, 2019, to take comment on the draft Environmental Impact Statement ("draft EIS"), which addressed environmental justice considerations.[20] Any comments received, whether in writing or in person, were treated equally and considered by the agency.[21]

FERC identified potential environmental justice communities by reference to census data.[22] Within one mile of the Station, FERC identified two census block groups containing environmental justice populations under federal standards.[23] In response to a general comment on the draft EIS regarding siting of compressor stations near environmental justice populations, FERC concluded the siting of compressor stations is based on engineering factors associated with the design of a pipeline system. It further explained compressor stations are anchored by the pipeline corridor and hydraulically bound to a specific segment of the pipeline, with some flexibility within the segment (depending on project-specific conditions). Additionally, the co-location of natural gas pipelines and associated facilities with existing rights-of-way is frequently a consideration to avoid and minimize impacts on the environment. The siting of the Station specifically, FERC found, was based on engineering constraints of the pipeline system as well as co-location with existing facilities.[24]

FERC considered other comments from the public, including those concerning potential disparate health impacts on more vulnerable environmental justice populations.[25] FERC concluded for all of the reasons laid out in the FEIS that impacts would not be significant.[26] Specifically, although FERC found that vulnerable populations (*i.e.* groups with high asthma rates) may exist within environmental justice populations near the Project and/or Station, FERC concluded that the Project would not result in high and adverse impacts on any vulnerable

[20] FEIS at 4-141.
[21] *Id.*
[22] *Id.* at 4-141 through 4-142.
[23] *Id*.
[24] *Id*.
[25] *Id.*
[26] *Id.* at 142-43.

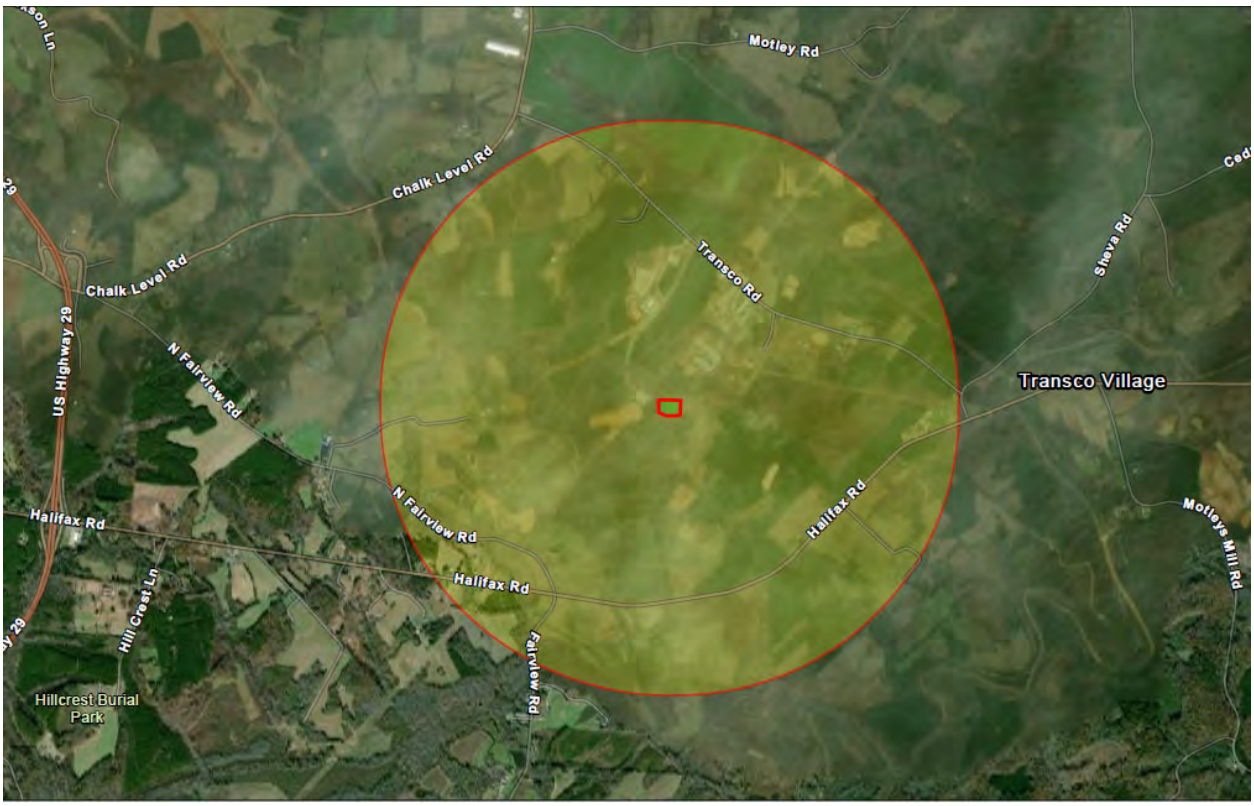
populations and would not have a disproportionately high and adverse impact on the remaining environmental justice populations.[27]

IV. IDENTIFICATION OF ENVIRONMENTAL JUSTICE COMMUNITIES UNDER VEJA WITHIN RADIUS OF 1-MILE OF THE PROPOSED STATION.

Applying the definitions in VEJA, Mountain Valley evaluated the presence of an environmental justice community within proximity to the compressor station, as shown in Figure 1.[28] A 1-mile radius around the facility was selected as the study area because it encompasses the population most likely to be impacted, if at all, by this minor source of air emissions. Air modeling confirms that use of a 1-mile radius is reasonable and appropriate.[29]

FIGURE 1

1-Mile Radius Study Area



To determine if there was an environmental justice community in the area around the compressor station, Mountain Valley looked to the latest census block group data.[30] The area around the

[27] *Id.* at 4-153.

[28] EJSCREEN Report for 1-mile area around the facility. Appendix F.

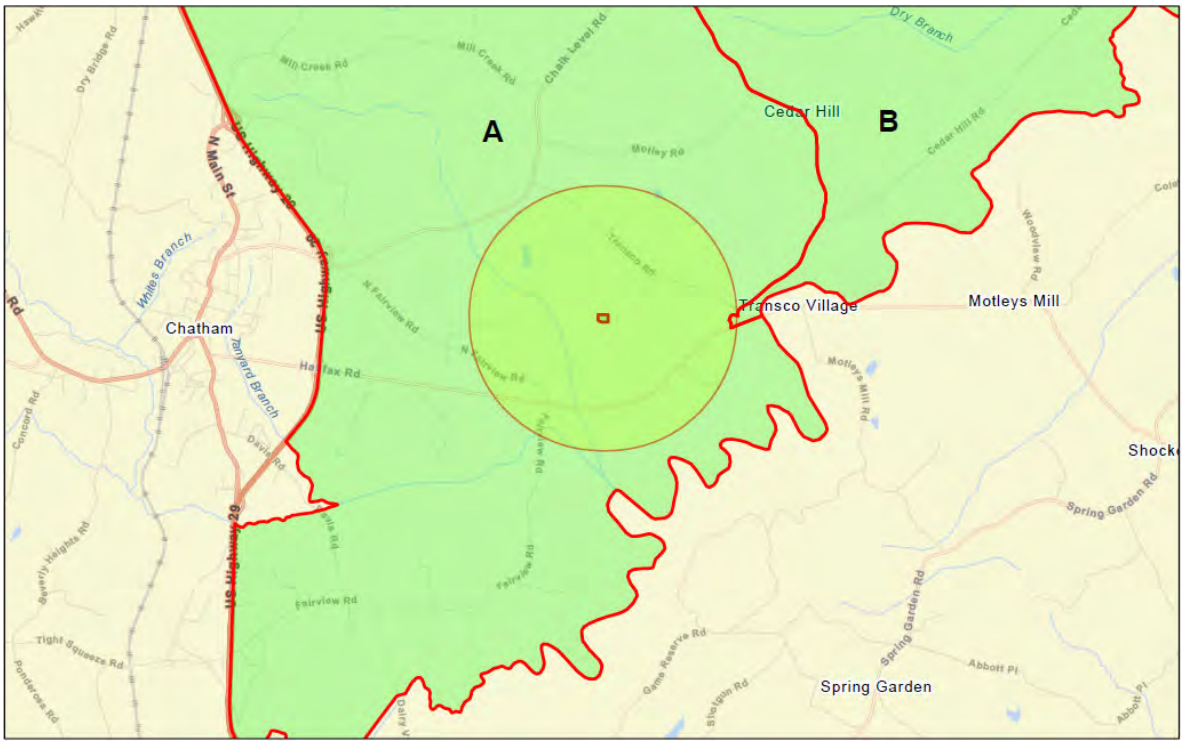
[29] *See* § VI.A below.

[30] A "census block group" is a subset of a "census tract." A census tract is composed of multiple census block groups. Census block groups therefore give a more localized perspective on community demographics than the larger census tracts. Hence, VEJA uses census block groups in its definition of low-income environmental justice community. Va. Code § 2.2-234. *See also* EPA "Technical Guidance for Assessing Environmental Justice in

compressor station is primarily located within one census block group, 511430105001, with a very small area east of the facility in a second census block group, 511430107001, as shown in Figure 2 and labeled A and B, respectively.[31]

FIGURE 2

1-Mile Radius Census Block Groups[32]



The demographics for the 1-mile radius study area are provided in Table 1, below.

TABLE 1

EJSCREEN 1-Mile Radius Demographic Indicators

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Demographic Indicators							
Demographic Index	28%	32%	49	30%	57	36%	46
Minority Population	22%	37%	34	32%	50	39%	41
Low Income Population	33%	26%	67	28%	66	33%	56
Linguistically Isolated Population	4%	3%	76	3%	78	4%	66
Population With Less Than High School Education	3%	11%	22	11%	20	13%	19

Regulatory Analysis" (June 2016) (outlining particular technical approaches and methods to help Agency analysts analyze potential EJ concerns for regulatory actions including use of census block group data and interpreting EJSCREEN); available at https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf.

[31] EJSCREEN (version 2019) available at https://ejscreen.epa.gov/mapper/.

[32] Figure 2 is taken directly from EJSCREEN.

Population Under 5 years of age	3%	6%	25	6%	26	6%	24
Population over 64 years of age	25%	14%	88	16%	87	15%	88

As explained below, the vast majority of the 1-mile study area is not a "community of color" environmental justice community as defined by VEJA; the study area contains one very small part of a census block group that qualifies as a community of color under VEJA. The study area does qualify as a "low-income" environmental justice community.

Additionally, the population in the study area has a higher percentage over the age of 64 at 25% as compared to the state average of 14%, while there is a lower percentage under the age of 5 at 3% as compared to the state average of 6%. There are no known schools, community centers or retirement homes located within the 1-mile radius of the facility. The closest school is a private all-girls high school, Chatham Hall, approximately 2.5 miles west of the facility. The study area also has a lower percentage of the population with less than a high school education at 3% as compared to the state average of 11%.

A. Community of Color Evaluation

Mountain Valley evaluated whether there was community of color within the study area using the following VEJA definitions.

- "Community of color" means any geographically distinct area where the population of color, expressed as a percentage of the total population of such area, is higher than the population of color in the Commonwealth expressed as a percentage of the total population of the Commonwealth. However, if a community of color is composed primarily of one of the groups listed in the definition of "population of color," the percentage population of such group in the Commonwealth shall be used instead of the percentage population of color in the Commonwealth.

- "Population of color" means a population of individuals who identify as belonging to one or more of the following groups: Black, African American, Asian, Pacific Islander, Native American, other non-white race, mixed race, Hispanic, Latino, or linguistically isolated.

To determine if there was a community of color, Mountain Valley compared the minority populations in the study area and the two census block groups to both the total minority percentage and the population of color group (e.g., Black) percentages in the Commonwealth using census data obtained from EPA's Environmental Justice Screening and Mapping Tool ("EJSCREEN").[33] Under both scenarios, census block group A does not meet the criteria of VEJA for a community of color, while census block group B qualifies. Relevant data are presented in Table 2 below.[34]

[33] The EJSCREEN materials for the study area and census block groups are provided in Appendix F. EJSCREEN data are provided for census block groups within a 5-mile radius of the compressor station although the evaluation presented here focuses on the 1-mile study area.

[34] According to EJSCREEN, the study area and both census block groups are below 80% of the percentile in Commonwealth for total minorities and for Black.

TABLE 2

Community of Color Data for 1-Mile Study Area

ID	Census Block	Minority Group	Percent Minority	Percentage in Commonwealth	Community of Color?
Site	1-mile Radius	Total	22	37	No
		Black	18	19	No
A	511430105001	Total	22	37	No
		Black	18	19	No
B	511430107001	Total	46	37	Yes
		Black	38	19	Yes

As can be seen in Figure 2, only a tiny portion of the study area (the extreme southwestern tip of census block group B) qualifies as a community of color according to census data.

Going beyond the census data (and consistent with VDOT Guidelines), Mountain Valley has communicated with local leaders to determine whether any "localized pockets" of minority persons have been overlooked by census data. According to this additional investigation, the African-American population present within the 1-mile study area is less than reflected in the census block groups as a whole, possibly as low as five to seven percent, and no distinct geographic areas within that area contain localized pockets of African-Americans or other populations of color.[35] That is, no "distinct geographic area" contains a community of color that will be disproportionately impacted when compared to non-minorities.

B. Low-Income Community Evaluation

Mountain Valley also evaluated whether a low-income community exists within the study area using the following VEJA definitions.

- "Low-income community" means any census block group in which 30 percent or more of the population is composed of people with low-income.

- "Low-income" means having an annual household income equal to or less than the greater of (i) an amount equal to 80 percent of the median income of the area in which the household is located, as reported by the Department of Housing and Urban Development, and (ii) 200 percent of the Federal Poverty Level. .

The Department of Housing and Urban Development ("HUD") median family income ("MFI") for FY 2020 for Pittsylvania is $58,900.[36] Applying the VEJA definition, the HUD-based low-income population threshold is 80 percent of the MFI, or $47,120. The 2020 Federal Poverty Level ("FPL") depends on the number of people in the household. Assuming a four-person

[35] Dr. Lawrence has identified dispersed African-American Freedman descendants in and around Chatham who are connected to a larger community centered in Blairs, Virginia approximately 14 miles from the Station. Appendix A at 37. The dispersed nature of the group in areas near the Station is consistent with Mountain Valley's separate communications with community leaders and with the census block group percentages.

[36] HUD, Estimated Median Family Incomes for Fiscal Year (FY) 2020, Notice PDR-2020-01 (Apr. 1, 2020).

household, the 2020 FPL is $26,200.[37] Applying the VEJA definition, the FPL-based low-income population threshold is 200 percent of the FPL, or $52,400. The appropriate income threshold to evaluate whether there is a low-income population is the greater of the two, or $52,400 based on the FPL.

For the low-income population analysis, Mountain Valley evaluated the same 1-mile radius study area. The study area and both census block groups qualify as low-income populations according to census data in EJSCREEN, which uses the 200 percent of the FPL threshold as shown in Table 3. Compared to the rest of the Commonwealth, all are below the 80th percentile.

TABLE 3

Low-Income Community Data for 1-Mile Study Area

	Census Block	Percent Low Income	Percentile in Commonwealth	Low-Income Population?
Site	1-mile Radius	33	67	Yes
A	511430105001	33	67	Yes
B	511430107001	41	78	Yes

Mountain Valley's conclusion that these two census bock groups qualify as low-income environmental justice communities is consistent with FERC's conclusion as to those same census block groups.[38] Mountain Valley also went beyond the census data and communicated with local leaders regarding the low-income communities within the study area. According to this additional investigation, the study area contains one of the more affluent pockets within the affected census blocks.

V. MOUNTAIN VALLEY'S COMMUNITY ENGAGEMENT TO ENHANCE MEANINGFUL INVOLVEMENT

To facilitate public involvement, Mountain Valley has been actively involved in community engagement efforts for several years. During the FERC process, Mountain Valley developed a Public, Stakeholder, and Agency Participation Plan for the entire Project, including the Station. The plan was submitted to and accepted by FERC.[39] This plan outlines a commitment to engage proactively with environmental justice communities and other stakeholders throughout the life cycle of the Project and provides the steps Mountain Valley identified to ensure successful ongoing communication with stakeholders. Among many other things, Mountain Valley established a Project website (www.mvpsouthgate.com), a toll-free phone line (833-MV-SOUTH), and email mail@mvpsouthgate.com. Examples of information available on the website are provided in Appendix H. The Project continues to meet and communicate with stakeholders to discuss the developments associated with the Project, including the Station.

Mountain Valley has provided regular updates to all local residents within 0.5 miles of the Station via direct mailings and newsletters since 2018. Sample copies of these are provided in

[37] 85 Fed. Reg. 3060 (Jan. 17, 2020).
[38] FEIS at 4-142.
[39] *See* Appendix G ("Public, Stakeholder, and Agency Participation Plan").

Appendix I. These newsletters (1) apprise the community of the status of the Project and next steps; (2) list where community members can access documents from FERC and otherwise; (3) include a Frequently Asked Questions section; and (4) reiterate that public input is important, with ways to communicate comments about the Project to Mountain Valley. In December 2019, the fifth newsletter notified community members that Mountain Valley had applied for an air permit for the Station. The sixth and seventh newsletters note the ongoing permitting process at DEQ.

In addition, Mountain Valley remains in regular contact with elected and appointed officials representing constituents in Pittsylvania County, and with local community leaders.

Mountain Valley has also actively engaged with tribes and Indigenous Peoples about the Project and the Station specifically. During the FERC process, Mountain Valley conducted outreach consistent with EPA's Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples. Mountain Valley coordinated with federal tribes that are cooperating agencies in the FERC process. In addition, Mountain Valley has conducted outreach with state tribes and has been actively coordinating with interested tribal representatives.

As part of its efforts, Mountain Valley communicated with 41 federally-recognized and state-recognized Indian tribes and Native Americans organizations in Virginia and North Carolina.[40] Twelve responded back to Mountain Valley. Mountain Valley was providing information to the tribes as early as May 2018, and sent an email dated November 2, 2018 to tribes and Native American organizations with information about the Project. Mountain Valley provided copies of cultural resources survey reports to Indian tribes and Native American organizations that requested them. Information on tribal contacts through August 2020 is provided in Appendix J.

For the Station specifically, Mountain Valley has commissioned additional outreach to tribes and Indigenous Peoples by Dr. Lawrence. These additional efforts are discussed in Section VII below. Dr. Lawrence further recommended additional outreach to the community surrounding the Station, and Mountain Valley is following that recommendation. These efforts are described in Section VIII below.

VI. EVALUATION OF IMPACTS FROM THE PROPOSED STATION, AND CONFIRMATION THAT NO ENVIRONMENTAL JUSTICE COMMUNITY BEARS DISPROPORTIONATE SHARE OF ANY SUCH IMPACTS.

As an initial matter, the environmental justice community will bear no adverse disproportionate health risks because *no* community will face any appreciable health risk as a result of the facility's emissions, notwithstanding any particular sensitivities or vulnerabilities in the environmental justice community. This is apparent from graphic representations of the modeling overlaid on the aerial photographs of the surrounding communities. Likewise, the Station will cause no cumulative overburdening effect in combination with other sources of pollution.

The siting and design of the Station are meant to minimize impacts, including impacts to environmental justice communities. The location and surrounding area are not densely

[40] *See* FEIS Appendix E.3, Table 4.10-3.

populated. The Station is located just off the proposed pipeline route supporting co-location with the pipeline corridor and existing compressor facilities. The property is sufficient in size to provide a significant buffer, and the nearest residences are over a half mile away (more than 3,000 feet). For all members of the community, this distance reduces or eliminates impacts from air emissions and noise, as well as potential impacts on views and historic and cultural resources. From a landscape perspective, construction and operation of a compressor station in this area will not be foreign to community members as it will be adjacent to the long-existing Transco Compressor. And from a design perspective, the Station is a minor source that will have state-of-the-art controls and stringent permit conditions to minimize air emissions.

With that background, Mountain Valley turns to a specific discussion of the potential and perceived impacts from the Station.

A. Air Emissions and Health Impacts

For the Station's air permit, potential adverse impacts from air emissions must be considered. Mountain Valley conducted and presented computer modeling analyses of projected ambient concentrations for criteria pollutants of the Station alone and the Station in conjunction with other air emission sources, including the adjacent Transco Compressor.[41] Mountain Valley also conducted modeling of relevant air toxics. The results of the modeling were compared to approved and well-accepted health-based standards, including those that specifically take into account sensitivities or vulnerabilities associated with environmental justice communities.[42] These analyses demonstrate that the facility will not cause injury to any surrounding community, including the environmental justice community.

Sources considered include standards approved by regulatory agencies specifically to assess and protect against potential health impacts in all populations, including sensitive populations. The analyses include:

1) Consideration of National Ambient Air Quality Standards ("NAAQS") as compared to modeled impacts[43];

2) Air toxics screening as compared to Virginia's state regulatory levels and other risk-based screening levels; and

3) Assessment showing that the area is not overburdened with cumulative exposures

[41] *See* Revised Application §6.0.

[42] EPA, *Environmental Justice Research Roadmap*, EPA 601/R-16/006, iv (Dec. 2016) ("…these population groups tend to be most burdened with adverse health conditions that either have environmental triggers or affect similar physiological systems as environmental pollution, such as cardiovascular disease, preterm birth, low birth weight, and asthma.").

[43] While the *Friends of Buckingham* decision appeared to criticize the Board for "falling back on the NAAQS" in the evaluation of potential health impacts, the Board had not made any written findings explaining why it was relying on the NAAQS and why the NAAQS are persuasive in the context of Environmental Justice. *See* 947 F.3d at 90. Thus, the Court had no record on which to determine whether reliance on the NAAQS was arbitrary and capricious. Here, the agency should make specific findings that the NAAQS and state air toxics Significant Ambient Air Concentration ("SAAC") standards are protective of public health, including the health of vulnerable populations such as asthmatics, with an explanation why reliance on the NAAQS and SAACs is appropriate.

from other sources of pollution.

These analyses are summarized below, and they demonstrate that no environmental justice community bears a disproportionate share of any adverse environmental impacts from the Station.

1. NAAQS

Compliance with the NAAQS has traditionally been the methodology used to evaluate the potential for health impacts from concentrations of pollutants in the air, specifically including potential impacts on sensitive environmental justice populations in state and federal regulatory proceedings and related appeals. As health-based standards specific to air concentrations, NAAQS have been expressly accepted for this purpose in Virginia policy.[44]

a. The Fundamental Purpose of NAAQS is Protection of Human Health and the Environment

As discussed below and in Appendix F of the Revised Application, the NAAQS are promulgated to protect sensitive populations at the local level and only after a comprehensive, science-driven process that includes substantial public participation. EPA sets the NAAQS after extensive review of the latest scientific studies, including studies of the most sensitive populations such as asthmatics.

The Clean Air Act requires EPA to set NAAQS for pollutants considered harmful to public health with an "adequate margin of safety."[45] While the NAAQS are national standards, they are applied on the local level to protect everyone. This is illustrated by EPA eliminating the option of using spatial averaging to assess compliance with the $PM_{2.5}$ NAAQS when it realized the technique could result in averaging away locally higher s in areas with larger populations of minorities or with lower socioeconomic status.[46]

More generally, EPA sets the primary NAAQS to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, wherever they may reside.[47] Congress "emphasize[d] that among those persons whose health should be protected by the ambient standard are particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment."[48] The standard is to be set at "… the maximum permissible ambient air level…which will protect the health of any [sensitive] group of the population," and that for this purpose "reference should be made to a representative sample of persons comprising the sensitive group rather than to a single person in such a group."[49]

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[44] *See* 2018 Energy Plan at 58 (directing DEQ to continue to use health-based standards in permitting).

[45] 42 U.S.C. §§ 7408(a); 7409(b).

[46] 78 Fed. Reg. 3086, 3126-27 (Jan. 15, 2013).

[47] *See id.* § 7409(d), § 7408.

[48] S. Rep. No. 91:1196 at 10, reprinted in 1 S. Comm. on Pub. Works, 93d Cong., *A Legislative History of the Clean Air Act Amendments of 1970*, at 410 (1974).

[49] *Id.*

The NAAQS are based on the best available science. The Clean Air Act directs EPA to set NAAQS based on criteria that "accurately reflect the latest scientific knowledge."[50] The primary NAAQS must be set "at a level that avoids unacceptable risks to public health, including the health of at-risk populations."[51] The standards take into consideration that risks from exposure to a pollutant may be influenced by intrinsic factors such as pre-existing disease, genetic factors, life stage, or extrinsic factors such as sociodemographic status, which may be present alone or in combination. For instance, subsets of the population may be at increased risk due to socioeconomic status and also have a pre-existing condition. EPA sets the NAAQS to be protective for even these sub-populations.

b. NAAQS Are Widely Accepted for Environmental Justice

The 2018 Energy Plan directs DEQ to apply health-based standards, such as the NAAQS, when evaluating environmental justice: "DEQ's existing obligations to ensure that all regulated entities comply with health-based standards will continue in all permitting activities to reduce public health burdens on all populations."[52] Thus, it is the policy of Virginia to use the health-based NAAQS to ensure that environmental justice communities do not bear disproportionate health burdens from energy facilities.

The use of the NAAQS for this purpose is consistent with EPA's long-term policy. EPA and the Environmental Appeals Board ("EAB"), in its role of adjudicating permit appeals, have long accepted that compliance with the NAAQS demonstrates no negative impacts on environmental justice communities. The EAB has found that the NAAQS are "the most reliable source of scientific information on which to base decisions" because of the "rigor of review" in setting them.[53]

The EAB recognizes that it is inherently reasonable and appropriate to use the NAAQS to determine whether environmental justice communities are protected. The following are examples where EAB has upheld agencies' use of NAAQS for that purpose:

- *In re Pio Pico Energy Ctr.*, 16 E.A.D. 56 (EAB 2013) ("NAAQS are standards designed to protect public health, including the health of 'sensitive' populations such as asthmatics, children, and the elderly, with an adequate margin of safety,

[50] 42 U.S.C. §§ 7408(a)(2), 7409(b)(1)-(2).

[51] Health and Envtl. Impacts Div., Office of Air Quality Planning and Standards, EPA, EPA-452/R-16-005, *Integrated Review Plan for the National Ambient Air Quality Standards for Particulate Matter* 6-1 to 6-2 (2016), *available at* https://www.epa.gov/naaqs/particulate-matter-pm-standards-planning-documents-current-review ("IRP"). For example, when reducing the level of the annual $PM_{2.5}$ NAAQS from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ in 2013, EPA was "mindful" that the Act required the standard be set "at a level that reduces risk sufficiently so as to protect public health, including the health of at-risk populations, with an adequate margin of safety." 78 Fed. Reg. 3086, 3161 (Jan. 15, 2013). EPA rejected 13 $\mu g/m^3$ because it "would not appropriately take into account the more limited evidence of effects in some at-risk populations (e.g., low birth weight)." *Id*. at 3162. EPA decision was based in part on quantitative health risk and exposure assessments. IRP at 4-1 to 4-5. EPA recently proposed to retain the current $PM_{2.5}$ NAAQS after reviewing thousands of studies, identifying populations at increased risk of pollution-related health effects, and considering analyses by agency experts and input from the Clean Air Act Scientific Advisory Committee. https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm.

[52] 2018 Energy Plan at 58.

[53] *In re Shell Gulf of Mex. Inc.*, 15 E.A.D. 103, 156 (EAB 2010) (citing 75 Fed. Reg. 6474, 6478 (Feb. 9, 2010)).

and to protect public welfare, including protection against visibility impairment and damage to animals, crops, vegetation, and buildings. Because NAAQS are health-based standards, the Agency often uses compliance with the NAAQS in the context of environmental justice as an indicator that Agency action will not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations residing near a proposed facility.") (citing *In re Avenal Power*, 15 E.A.D. 384, 399 (EAB 2011); *In re Shell Offshore*, 13 E.A.D. at 404-05 (EAB 2007); *In re Knauf Fiber Glass, GmbH*, 9 E.A.D. 1, 16-17 (EAB 2000); *In re Ash Grove Cement Co.*, 7 E.A.D. 387, 417-18 (EAB 1997)).

- *In re Sutter Power Plant*, 8 E.A.D. 680, 692 (EAB 1999) (describing the NAAQS as the "bellwether of health protection").

- *In re Energy Answers Arecibo, LLC*, 16 E.A.D. 294, 326 (EAB 2014) (NAAQS are appropriate to use in environmental justice analysis because they "are designed to protect public health with an adequate margin of safety, including sensitive populations such as children, the elderly, and asthmatics.").

- *In re Shell Gulf of Mex. Inc.*, 15 E.A.D. at 156 ("In the context of an environmental justice analysis, compliance with the NAAQS is emblematic of achieving a level of public health protection that, based on the level of protection afforded by a primary NAAQS, demonstrates that minority or low-income populations will not experience disproportionately high and adverse human health or environmental effects due to exposure to relevant criteria pollutants.").

Courts have also upheld the use of NAAQS as reasonable when evaluating environmental justice impacts: "The Coast Guard's determination that air quality in the communities immediately adjacent to the Project would comply with NAAQS even during the construction phase further supports its conclusion that such local adverse impacts would not be significant."[54]

c. Concentrations are Below NAAQS

The air modeling shows that the facility will not cause or contribute to an exceedance of any of NAAQS anywhere, including within the study area where the highest impacts are seen.[55] Since the NAAQS are set to protect even the most sensitive populations with an adequate margin of safety, modeled concentrations below the NAAQS further support that the low-income environmental justice community is protected.[56] Even to the extent that other possible

[54] Co*alition for Healthy Ports v. U.S. Coast Guard*, 2015 WL 7460018, *25 n.33 (S.D.N.Y. Nov. 24, 2015).

[55] As discussed in the modeling report provided in Appendix G of the Revised Application, Mountain Valley performed two cumulative modeling runs for the Station to address the neighboring Transco Compressor. One run was for receptor locations except for those located on Transco property: that run included the project sources as well as all the offsite sources provided by DEQ. The other run was for receptor locations on the Transco property: it included the project sources and offsite sources except for the Transco sources. The maximum impacts were modeled at receptors located outside of the Transco property.

[56] *See In re Energy Answers Arecibo, LLC*, 16 E.A.D. at 329 (agreeing that where modeled concentrations are far below the NAAQS, emissions do not pose a disproportionate or adverse impact); *In re Ecoelectrica*, L.P., 7 E.A.D. 56, 68-69 (EAB 1997) (same).

environmental justice communities may exist outside the 1–mile study area, the impacts would be even less.

As Table 4 below shows, the highest total cumulative modeled concentrations will not just be below the NAAQS, but far below them, except for the 1-hour NO_2 concentration, little of which is attributable to the Station.[57]

TABLE 4

Maximum Cumulative Modeled Impacts[58]

Pollutant (Averaging Period)	Highest Modeled Concentration (Facility and Other Sources) ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration (Modeled plus Background) ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2 (1-hour)	178.8[a]		178.8	188
NO_2 (Annual)	21.8	13.2	35.0	100
CO (1-hour)	2151	2300	4,451	40,000
CO (8-hour)	1106	1380	2,486	10,000
$PM_{2.5}$ (24-hour)	5.8	17	23	35
$PM_{2.5}$ (Annual)	1	7.2	8.2	12
PM_{10} (24-hour)	9.1	31	40.1	150

[a] Season and hour of day variable background values were used for the 1-hour NO_2 modeling.

As shown in Table 5, Mountain Valley's contribution is less than three percent of the NAAQS for all pollutants and averaging times except for the 1-hour NO_2, which is less than ten percent.[59]

[57] The 1-hour NO_2 results are driven by one source (an old engine) at the Transco facility. It is Mountain Valley's understanding that Transco intends to use the old engine as a backup for the new equipment which was recently permitted. As shown in the DEQ's Engineering Analysis for the Transco permit, the NOx potential to emit after the project will decrease by over 3,000 tons per year, more than enough to offset the Station's NOx potential to emit of 12.37 tons per year. *See* DEQ Engineering Analysis for Transcontinental Gas Pipeline Company, LLC (Station 165), at 12 (January 28, 2020). This is supported by Transco's modeling which resulted in a 1-hour NO_2 highest modeled concentration of 178.3 $\mu g/m^3$, only 0.5 $\mu g/m^3$ less than the Station's highest cumulative modeled concentration that included the Transco sources. *Id*. at 13. Additionally, as part of its recent permit, Transco is required to install an NO_2 ambient air monitor upon startup of its new turbines to ensure the NAAQS are met. Transco Permit Condition 49 (January 28, 2020).

[58] *See* Revised Application, Appendix G, Table 4-2, for the complete cumulative modeling table, which shows the results for all the modeling scenarios (various operating loads, startup, shutdown).

[59] *See* Revised Application, Appendix G, Table 4-3, for the complete Station-only modeling table, which shows the results for all the modeling scenarios (various operating loads, startup, shutdown).

TABLE 5

Maximum Facility Modeled Impacts

Pollutant (Averaging Period)	Facility Design Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of Standard
NO_2 (1-hour)	17.48	188	9.3%
NO_2 (Annual)	1.36	100	1.4%
CO (1-hour)	156.37[a]	40,000	0.4%
CO (8-hour)	47.74	10,000	0.5%
$PM_{2.5}$ (24-hour)	0.8	35	2.3%
$PM_{2.5}$ (Annual)	0.14	12	1.2%
PM_{10} (24-hour)	1.27	150	0.8%

[a] Based on startup scenario

Isopleths for the 1-hour NO_2 results are provided on pages 65 and 66 of the Revised Application. As shown, the highest cumulative modeled impacts are located northeast of Transco Compressor, where the Station's impacts are negligible (less than 2 $\mu g/m^3$).[60] The isopleths confirm that potential impacts from the facility are confined to areas very close to the facility where there are no residences, schools, senior care facilities, churches, or other historical or cultural resources of special importance to the environmental justice community.

For $PM_{2.5}$, the facility-alone design concentrations are more than 40 times less than the 24-hour NAAQS and more than 85 times less than the annual NAAQS. Indeed, they are even less than the concentrations that EPA determined would not be detectable. In recommending the $PM_{2.5}$ SILs for PSD modeling analysis, EPA used a statistical approach to derive levels that are "indistinguishable from the inherent variability in the measured atmosphere [that] may be observed even in the absence of the increased emissions," – annual concentration of 0.2 $\mu g/m^3$ and a 24-hour concentration of 1.5 $\mu g/m^3$.[61] The highest modeled concentrations attributable to the Station are well below those levels at 0.14 $\mu g/m^3$ annual and 0.8 $\mu g/m^3$ 24-hour.

[60] Although of a different form and not directly comparable to the NAAQS results shown on the isopleth, EPA' recommended interim significant impact level (SIL) of 7.5 $\mu g/m^3$ (based on the highest of the five-year averages of the maximum modeled 1-hour concentration, instead of the eighth highest like the NAAQS) illustrates the Station's minimal contribution to the modeled cumulative impact for the 1-hour NO_2 NAAQS. Memorandum from Anna Marie Wood, Acting Dir., Air Quality Policy Div., to Regional Air Division Dir., *General Guidance for Implementing the 1-hour NO2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO2 Significant Impact Level* (June 28, 2010); available at https://www.epa.gov/sites/production/files/2015-07/documents/appwno2.pdf.

[61] Memorandum from Peter Tsirigotis, Dir., Office of Air Quality Planning & Standards, EPA, to Regional Air Div. Dirs., Regions 1-10, Attachment at 10-11 (Apr. 17, 2018) available at https://www.epa.gov/nsr/guidance-significant-impact-levels-ozone-and-fine-particles-preventionsignificant-deterioration; Air Quality Assessment Division, Office of Air Quality Planning & Standards, EPA, EPA-454/R-18-001, Technical Basis for the EPA's Development of the Significant Impact Thresholds for $PM_{2.5}$ and Ozone 8-22 (2018), *available at* https://www.epa.gov/nsr/significant-impact-levels-ozone-and-fine-particles.

2. Air Toxics

Virginia regulates toxic air pollutants under the "state toxics rule."[62] This rule sets health-based criteria for toxic emissions. DEQ has established both exemption rates (i.e., screening thresholds below which no additional analysis is necessary) and SAACs for toxics.

The exemption rates and SAACs are based on published Threshold Limit Values ("TLVs") for toxic compounds. TLVs are based solely on health factors without consideration to economic or technical feasibility.[63] They represent an exposure level that "does not create an unreasonable risk of disease or injury."[64] DEQ went further and set the exemption rates and SAACs at a fraction of the health-based TLVs.

If emissions are below the exemption rates, no further action is required. If the exemption rates are exceeded, then modeling is required to demonstrate compliance with the SAACs. For the Station, only formaldehyde exceeded the exemption rates and thereby was subject to modeling. Although below the exemption rates, Mountain Valley also modeled hexane emissions.[65] The modeled air concentrations for formaldehyde and hexane emissions from the compressor station are well below the SAACs as shown in the following table.

TABLE 6

Toxic Air Pollutants Modeled Concentrations[66]

Pollutant (Averaging Period)	Highest Modeled Concentration (Facility) ($\mu g/m^3$)	SAAC ($\mu g/m^3$)	% of Standard
Formaldehyde (1-hr)	2.8 / 9.9[a]	62.5	4% / 16%
Formaldehyde (annual)	0.050	2.40	2%
Hexane (1-hr)	1,295 / 5,435[b]	8800	15% / 62%
Hexane (annual)	0.28	352	0.1%

[a] The modeled hourly formaldehyde concentration of 2.8 $\mu g/m^3$ represents routine operations, whereas the 9.9 $\mu g/m^3$ is for hours that include startup of the turbines.

[b] Two conservative scenarios were modeled for hexane as described in the Revised Application, Appendix G at 2-2, neither of which are expected to occur with any frequency if ever. The modeled hourly hexane concentration of 1,295 represents facility-wide individual unit blowdown with concurrent startup or shutdown of the other unit along with pigging activities. The highest modeled hourly hexane concentration of 5,435 represents a true emergency shutdown event along with pigging activities.

In addition to showing that the ambient air concentrations will be well below the Virginia health-based standards, the modeling also shows that no receptors have concentrations at or above risk-based concentrations ("RBCs"), which are set to protect sensitive populations and to provide

[62] 9 VAC 60-300, et seq.

[63] https://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/overview

[64] *Id*.

[65] As described in Section 3.3 and 7.4 of the Revised Application, Mountain Valley is voluntarily proposing controls that will limit toxic emissions, particularly hexane which will be reduced by approximately 78 percent.

[66] *See* Revised Application, Appendix G, Table 4-4 for the complete Lambert Station only table, which shows the results for all the modeling scenarios (various operating loads and startup and shutdown).

margins of safety to account for uncertainty.[67] As shown on the following isopleths, the offsite concentrations drop off precipitously, with all below a tenth of the SAACs and RBCs at less than a quarter mile from the Station boundary. There are no residences within that area.

Thus, no group, including the environmental justice community, should suffer any appreciable health risks from the compressor station air toxic emissions. Indeed, for all pollutants, there can be no adverse disproportionate impacts on an environmental justice community, because the Station's emissions are not expected to have adverse health impacts on *any* community, including sensitive populations. With no adverse impacts on anyone, the "fair treatment" requirement of VEJA is satisfied because "no group of people bears a disproportionate share of any negative environmental consequence."

[67] The formaldehyde inhalation cancer RBC of 0.22 µg/m^3 corresponds to an excess lifetime cancer risk of 1 x 10^{-6}. The inhalation non-cancer chronic RBC for formaldehyde of 10 µg/m^3 and hexane of 730 µg/m^3 corresponds to a hazard quotient of 1. EPA, *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites* (May 2020); available online at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (last accessed on September 2, 2020). The formaldehyde inhalation acute RBC of 55 µg/m^3 and chronic RBC of 9 µg/m^3 correspond to a hazard quotient of 1. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment ("OEHHA"), *Acute, 8-hour and Chronic Reference Exposure Level (REL) Summary* (2018); available online at https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary (last accessed August 28, 2020). The hexane inhalation acute RBC of 910,000 µg/m^3 is the DOE Protective Action Criteria ("PAC")-Revision 29 (May 2016).

FIGURE 3

Isopleth for 1 Hour Formaldehyde

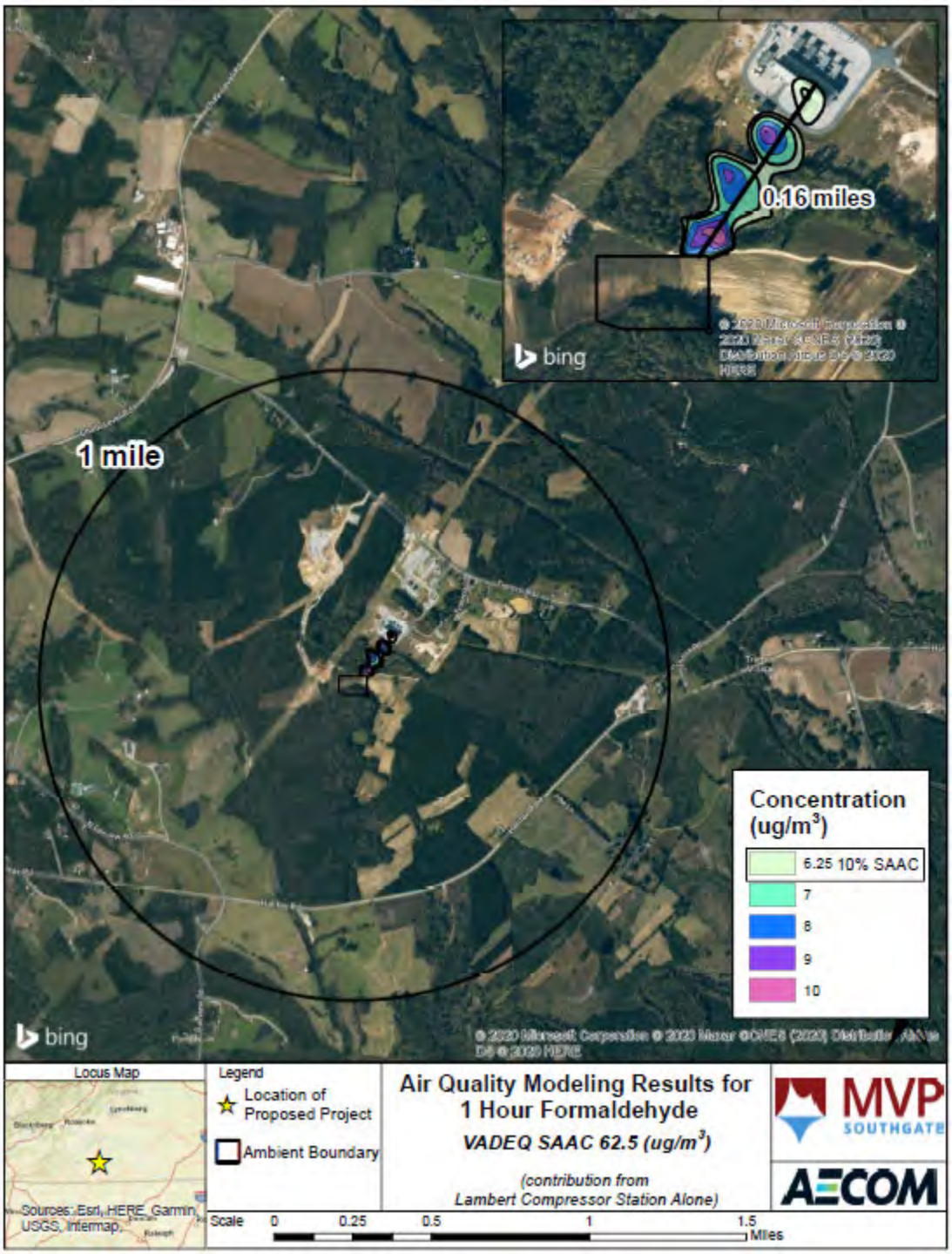


FIGURE 4

Isopleth for Annual Formaldehyde

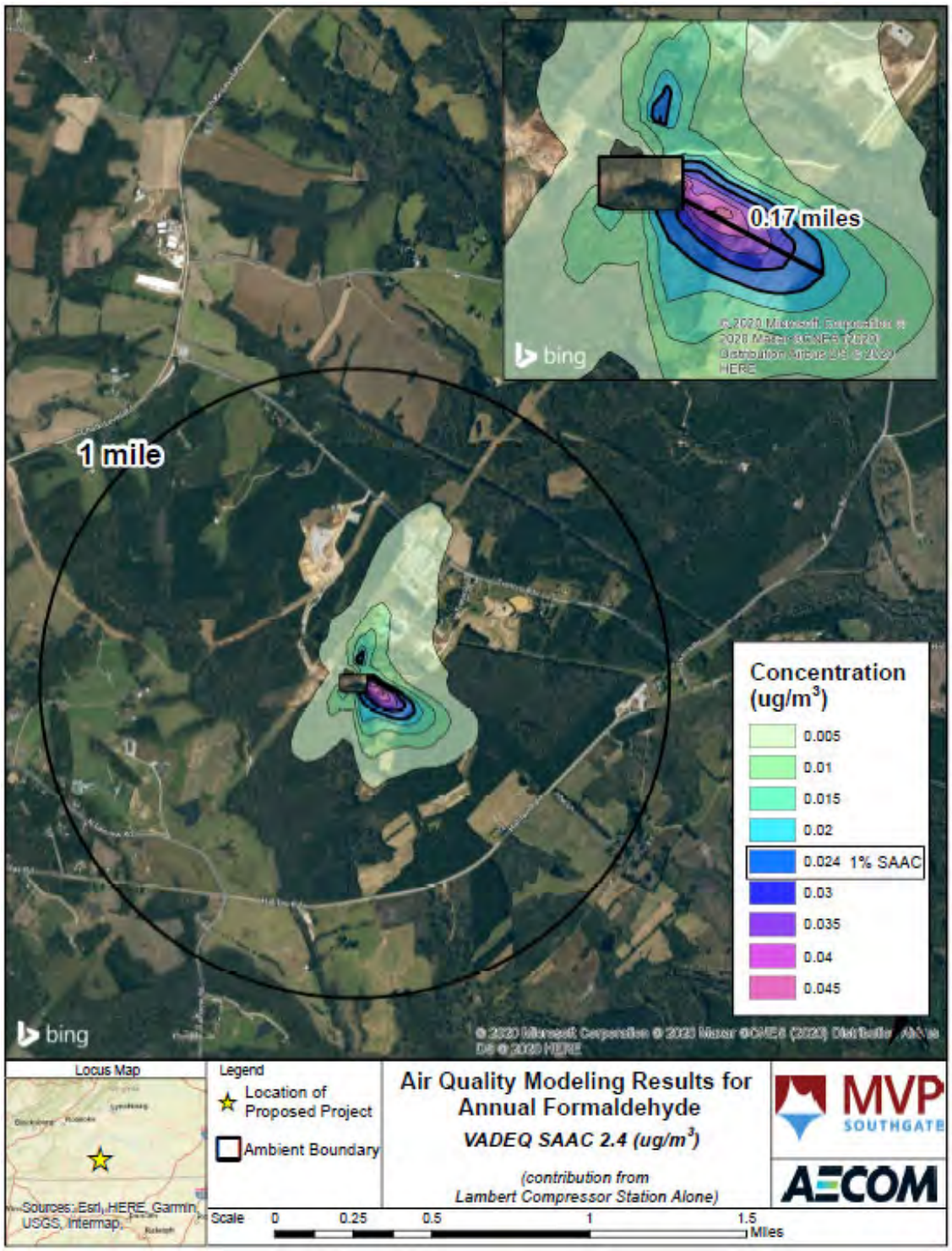


FIGURE 5

Isopleth for 1 Hour Hexane

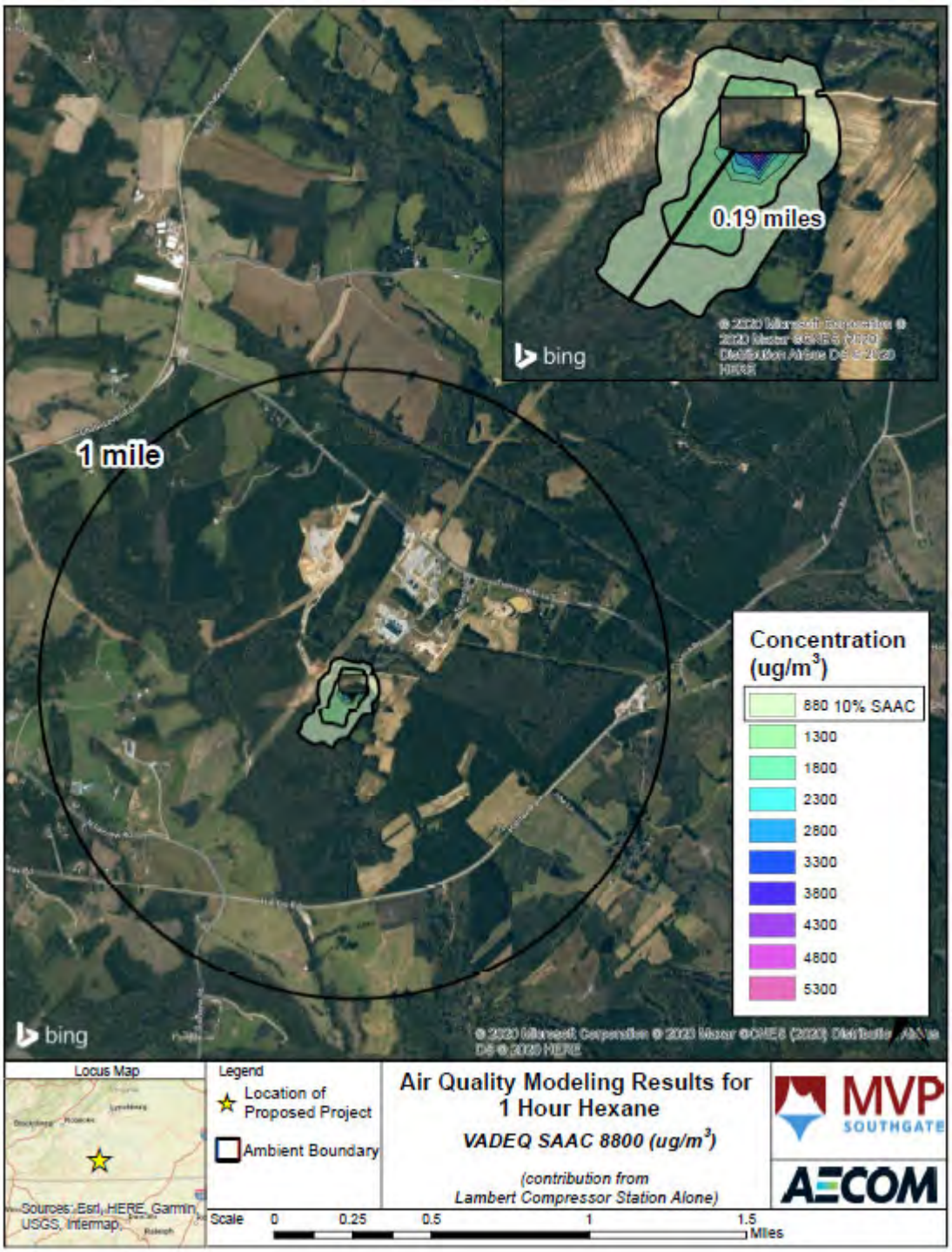
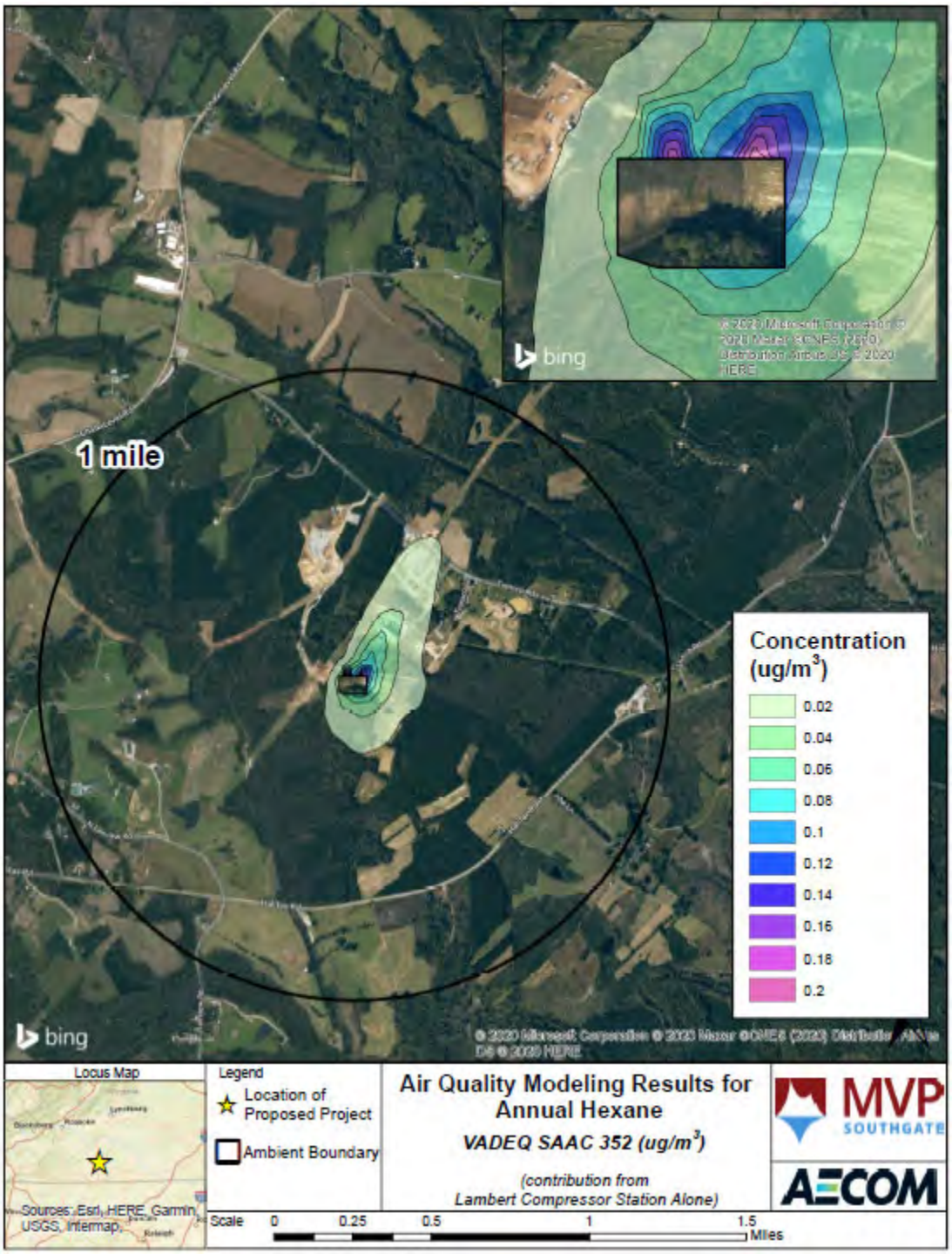


FIGURE 6

Isopleth for Annual Hexane



3. Consideration of cumulative exposures from other sources of pollution

The environmental justice communities are also not overburdened by other sources of pollution.[68] Within the 1-mile study area, there are no hazardous waste sites, and none is closer than approximately 5 miles away. Dr. Lawrence's analysis found no communities within a 5-mile radius that are subject to pre-existing cancer risk exceeding the state or national averages.[69]

Moreover, recent reductions in pollution will inure to the benefit of local residents. The Station will be located adjacent to the Transco Compressor comprising two compressor stations, Stations 165 and 166. Transco recently received a permit to install two new turbines with air pollution controls at Station 165. Contemporaneous with that project, Transco is shutting down ten of its old uncontrolled engines at that location. The potential emission decreases from shutting down those ten pre-1972 vintage engines more than offset the combined emissions of both Transco's new turbines and the Station, such that overall emissions should be significantly less.[70]

As previously discussed, the NAAQS analysis assessed cumulative impacts by including other sources such as the Transco facilities in air modeling (i.e., cumulative modeling) along with background concentrations. In addition to the NAAQS modeling, Mountain Valley used EJSCREEN to evaluate various indicators of cumulative burdens. As shown in Table 7, of the 11 indicators, only two were above the state average ($PM_{2.5}$ and lead paint), while all were less than the 80th percentile in the state.[71]

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[68] *See, e.g., Environmental Justice: Research Roadmap* at 4 (EPA Dec. 2016) ("'Overburdened'" describes ethnic minority, low-income, Tribal, and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards. This increased vulnerability may be attributable to an accumulation of both negative and lack of positive environmental, health, economic, or social conditions within these populations or communities, including the inability to participate meaningfully in the decision-making process."), *available at* https://www.epa.gov/sites/production/files/2017-01/documents/researchroadmap_environmentaljustice_508_compliant.pdf.

[69] *See* Appendix A, Attachment A, Data Table 3.

[70] The total potential criteria and hazardous air pollutants (HAP) emissions from the Transco Compressor will decrease by 4,050 tons per year, while the Station's annual potential criteria and HAP emissions are less than 50 tons per year, resulting in a potential decrease of approximately 4,000 tons per year in the community. *See* DEQ Engineering Analysis for Transcontinental Gas Pipeline Company, LLC (Station 165), at 12 (January 28, 2020) and Revised Application Table 3-3 at 17.

[71] Although the $PM_{2.5}$ exposures are slightly higher than the state average, they are less than the regional and national averages of 8.64 and 8.3 $\mu g/m^3$, respectively. *See* Appendix F, EJSCREEN for 1-mile radius. The highly localized air impacts from the Station, as a minor source, are negligible (i.e., non-measurable) beyond the fence boundary. The analysis by Dr. Lawrence revealed no communities within a 5-mile radius of the Station with pre-existing exposure rates greater than the national average for $PM_{2.5}$. *See* Appendix A, Attachment A, Data Table 3. If the radius from the Station is increased to 10 miles, then communities are found that are subject to exposures in excess of national averages for $PM_{2.5}$ and increased cancer risk. *Id.* Thus, consistent with environmental justice principles, siting the plant farther away from those communities avoids burdening community members already burdened by other sources of pollution.

TABLE 7

EJSCREEN 1-Mile Radius Environmental Indicators

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	8.05	7.79	64	8.64	29	8.3	40
Ozone (ppb)	41.2	42.5	33	44.9	11	43	35
NATA* Diesel PM (µg/m³)	0.174	0.425	11	0.477	<50th	0.479	<50th
NATA* Cancer Risk (lifetime risk per million)	30	31	43	31	<50th	32	<50th
NATA* Respiratory Hazard Index	0.39	0.41	41	0.4	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	53	570	30	640	25	750	25
Lead Paint Indicator (% Pre-1960 Housing)	0.24	0.21	68	0.36	46	0.28	56
Superfund Proximity (site count/km distance)	0.055	0.11	44	0.15	34	0.13	45
RMP Proximity (facility count/km distance)	0.041	0.38	2	0.62	2	0.74	3
Hazardous Waste Proximity (facility count/km distance)	0.23	0.66	47	1.3	34	4	38
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.8	N/A	30	22	14	37

B. Cultural and Historic Resources

In coordination with the Virginia Department of Historic Resources ("VDHR"), Mountain Valley conducted extensive review of possible historic and cultural resources that could be impacted by the Station.[72] This analysis encompassed impacts to historic and cultural resources that are or may be significant to the environmental justice community. The Station is not likely to impact any such known resources.[73] As discussed below, to the extent there may be currently unknown or unidentified resources, an approved plan is in place to address those unforeseen impacts.[74]

The entire Mountain Valley Southgate Project, including the Station, has been reviewed under Section 106 of the National Historic Preservation Act ("NHPA"). Section 106 requires federal agencies, including FERC, to take into account the effect of the Project on cultural resources listed or eligible for listing in the National Register of Historic Places ("NRHP") and to afford the Advisory Council on Historic Preservation ("ACHP") an opportunity to comment. The Section 106 compliance process is coordinated at the state level by the State Historic Preservation Officer ("SHPO"), represented in Virginia by VDHR. Federally-recognized and state-recognized Native American tribes were also consulted.[75]

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[72] *See* Resource Report 4 (Appendix K). As of the date of submittal this Supplemental Information, Mountain Valley has continued to expand upon the investigation. Phase I archaeological surveys and architectural history surveys have been completed for all but less than 0.5 acre of the proposed construction areas at and within a one-mile radius of the Lambert Compressor Station; the remaining area will be surveyed and reported prior to construction.

[73] *See* Appendix L (VDHR correspondence).

[74] Appendix M (Plan for Unanticipated Discoveries of Historic Properties and Human Remains).

[75] FERC consulted with tribes in accordance with its policy "to address the effects of proposed projects on tribal rights and resources though consultations; and [to] ensure that Tribal resources and interests are considered whenever the Commission's actions or decisions have the potential to adversely affect Indian tribes or Indian trust

The primary goals of cultural resources investigations conducted as part of the Section 106 review are to locate, document, and evaluate buildings, structures, objects, landscapes, and archaeological sites that are listed, or eligible for listing, in the NRHP; to assess potential effects of the Project on those resources; and to provide recommendations for subsequent treatment of the resources, if necessary.

Here, Mountain Valley went beyond the Section 106 process for the Station and applied the VDOT Guidelines on Environmental Justice, which ask whether the project will impact any "especially important social, religious, or cultural function" for the environmental justice community.[76] Dr. Lawrence inquired about important historic and cultural resources during her interviews of Indigenous communities.[77] Those concerns were considered and are addressed below.[78]

Distance plays a large role in avoiding impacts to historic and cultural resources. The Station will be well outside the viewshed of identifiable resources, and conditions in the FERC certificate and the air permit will protect against air and noise impacts to such resources. Trees and buffers provide additional protection against impacts. Moreover, the Station is co-located with an existing industrial site, the Transco Station. Thus, the Station is not disturbing an untouched site or pristine landscape.

VDHR has reviewed the potential archaeological sites or finds within a mile of the Station. VDHR has determined that those sites are either not eligible for listing on the NRHP or not impacted by the Project, with one exception. A mid-twentieth century farm complex sits immediately across Transco Road from the Transco Compressor, which remains unevaluated due to inaccessibility.[79] VDHR has previously determined the farm eligible for the NRHP listing for environmental review purposes. Although the Transco Compressor site is located directly between the Station and the farm complex (thereby subsuming any relative impact from the Station), Mountain Valley will complete and report an effects assessment for that property prior to construction.[80]

To protect against impairing unforeseen historic or cultural resources, Mountain Valley developed a Plan for Unanticipated Discoveries of Historic Properties and Human Remains outlining the steps to be taken if currently unknown resources are later discovered during construction or otherwise (e.g., unmarked gravesites).[81] VDHR approved the Plan on September

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resources." FEIS at 4-157. FERC contacted tribes that may attach religious or cultural significance to sites in the region or may be interested in potential Project impacts on cultural resources. *Id.* This included consulting with, among others, state-recognized tribes, namely the Sappony Tribe, Occaneechi Band of the Saponi Nation, and Nottoway Indian Tribe of Virginia, as requested by commenters. *Id*. at 4-158–4-159. Government-to-government consultations also occurred with the Monacan Indian Nation, Nansemond Indian Tribe, and Upper Mattaponi Indian Tribe. *Id.* In total, FERC coordinated with 26 federally-recognized tribes and 11 state-recognized tribes. *Id.* at 4-160.

[76] Appendix B, VDOT Guidelines at 12.

[77] *See* Appendix A at 41-47 and Section VII below.

[78] *See* Section VI.C.5 below.

[79] *See* Letter from R. Kirchen, VDHR, to P. Webb at 2 (January, 15, 2020) (Appendix L).

[80] FERC CPCN Environmental Condition 20, at 76-77 (June 18, 2020).

[81] Appendix M ("Plan for Unanticipated Discoveries of Historic Properties and Human Remains").

14, 2018, and Mountain Valley addressed comments on the plan that the Monacan Nation filed with FERC.[82]

The Plan for Unanticipated Discoveries is based on, among other sources, the following[83]:

- Secretary of the Interior's Standards for Archeology and Historic Preservation[84];
- ACHP's Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects (February 23, 2007);
- FERC Office of Pipeline Regulations Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017);
- VDHR's Guidelines for Conducting Historic Resources Survey in Virginia (2017); and
- Virginia Antiquities Act, Va. Code § 10.1-2305, "Permit required for the archaeological excavation of human remains."

Mountain Valley's employees and contractors are required to have a basic understanding of the nature of cultural resources, and all inspectors and construction contractor personnel will receive basic training in recognition of cultural resource sites. The cultural resource training will review the Project's commitments regarding cultural resources compliance and provide examples of the types of archaeological resources that may be encountered during construction. In addition, the training program will emphasize the procedures to be followed in the event of a significant site discovery or a discovery of human remains during construction.[85]

The Plan for Unanticipated Discoveries requires, among other things, immediate cessation of work and prompt notification of the Project Archaeologist upon a discovery. Any human remains and/or funerary items will be left in place and treated with dignity and respect. All efforts will be made to exclude the general public from viewing any gravesites and/or funerary objects. Depending on the nature of the discovery, notifications will be made to FERC, VDHR, the Virginia State Police, and potentially interested tribes. Again depending on the nature of the discovery, plans will be developed in consultation with, among others, interested tribes.[86]

In sum, the Station will have no impacts on known cultural and historic resources, and the Plan for Unanticipated Discoveries will provide protection in the event of discovery of unforeseen resources.

[82] FEIS at 4-172.
[83] Appendix M at 1.
[84] 48 Fed. Reg. 44716-42.
[85] Appendix M at 2.
[86] *Id.* at 2-5.

C. Other Potential or Perceived Impacts

To ensure that all possible environmental justice communities have a meaningful voice in the process, Dr. Lawrence elicited concerns over potential or perceived impacts during her investigation and interviews.[87] Mountain Valley has addressed those additional concerns as follows.

1. Noise

A number of environmental justice community members raised the issue of noise from construction and operation of the Station on various community facilities (e.g., child care & senior facilities, churches, food banks and community gardens, community service groups).[88]

Mountain Valley will employ noise mitigation measures, such as compressor building walls, roof, doors, and ventilation systems designed to reduce noise emissions, along with turbine exhaust and air intake with insertion loss silencers, compressor unit venting silencers, and underground suction and discharge piping.

Both FERC and Pittsylvania County have their own noise standards that the Station must meet. FERC's regulations are based on EPA's comprehensive evaluation of the impact of noise on public health and welfare.[89] Mountain Valley will comply with all the applicable standards, thus ensuring that all communities will be protected from unacceptable noise impacts. In addition, FERC is requiring a plan in the event of any nighttime construction to achieve even lower levels at night.

To confirm that the Station will be able to comply with all standards, Mountain Valley performed detailed noise studies for both construction and operations.[90] The study expressly identified and evaluated Noise Sensitive Areas ("NSA"), all four of which were determined to be residences.[91] No child care centers, schools, senior care facilities, or other sensitive receptors were found within the study area.

As a general matter, distance tends to mitigate potential noise concerns from operations. The nearest residences are over 3,000 feet away from the Station. Moreover, the distance is significant between the Station and the facilities identified by community members. The closest church is the Cornerstone Church of Christ, which is more than a mile away. The other facilities are even farther away. During operation of the Station, FERC concluded that, at the NSA, noise "increases over the existing ambient noise levels of 0.0 dBA to 3.7 dBA would range from not

[87] *See* Section VII below and Appendix A at 37-47.

[88] *See* Appendix A at 38-39.

[89] EPA's Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (available at https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html).

[90] *See* Section 9.3, Resource Report 9 (Appendix N) (describing both federal and County noise requirements).

[91] *See* Figure 4.11-1, FEIS at 4-191 (showing 4 identified NSAs and distances).

detectible to barely detectible to the human ear."[92] To confirm, Mountain Valley will conduct and file a noise survey with the Secretary within 60 days of placing the Station in service.[93]

For these reasons, noise from the Station will not impose disproportionate impacts on environmental justice communities.

2. Dust

Dust at the site should not have any significant impact on environmental justice communities. Dust is highly localized, and is expected to be temporary during construction. There are no homes or major roadways within 0.5 mile of the station. The closest residence is about 0.6 miles southeast of the compressor station site, opposite the planned construction entrance. In addition, during construction, Mountain Valley will employ proven construction-related practices to control fugitive dust, such as application of water or other commercially approved dust control, as well as potentially other optional mitigation measures as necessary to control dust.

3. Traffic and Emergency Services

Members of environmental justice communities expressed concerns about possible impacts of increased traffic, especially on emergency services such as fire and police.[94] Mountain Valley has worked with the relevant agencies, as well as directly with Pittsylvania County emergency services, to ensure that traffic will not impede emergency services. Mountain Valley has taken a proactive approach to ensure that local emergency services will not be negatively impacted.[95]

Mountain Valley representatives made a formal presentation on November 6, 2019, to the Tunstall Fire/Rescue, Blairs Fire/Rescue, Brosville Fire/Rescue, Bachelors Fire Hall, Mount Hermon Fire/Rescue, as well as representatives of the Virginia State Police, Virginia Department of Hazardous Materials, and the Pittsylvania Department of Public Safety. There were more than twenty attendees and command staff present. Because Pittsylvania County has hosted a compressor station owned and operated by Transco for many years, the County has trained first responders capable of addressing any hazardous situations that might arise.

In addition, Mountain Valley has had regular communications with the Pittsylvania Director of Public Safety, and there have been no concerns raised by him or EMS personnel about the Station.

Mountain Valley has developed and will implement a traffic control plan accepted by FERC that applies during construction of the Station, as well as during operation.[96] It should be noted that

[92] FEIS at 4-209.

[93] FERC CPCN Environmental Condition 22, at 77 (June 18, 2020).

[94] *See* Section VII below and Appendix A at 39-40.

[95] It should be noted in interviews by Mountain Valley's environmental justice consultant, community members cited investments that Mountain Valley had already made in the community surrounding the proposed Station as reasons to anticipate future benefits ("I think they are good stewards of the community. They have always been very receptive to help fire and rescue. Always been open about issues."). Appendix A at 38.

[96] *See* Appendix O (Traffic and Transportation Management Plan).

little to no traffic impacts are expected during operation of the Station. During the construction phase, any traffic impacts will be temporary, localized, and minor.[97]

In short, environmental justice communities will not bear a disproportionate share of negative environmental consequences as a result of traffic.

4. Safety

Some community members have expressed concerns about the safety of pipelines generally. Safety is a priority for Mountain Valley. Regarding compressor stations, some of the concerns are related to the potential natural gas leaks from the station as well as blowdowns related to maintenance. Mountain Valley is committing to the following measures and procedures to prevent and minimize any planned or unplanned releases of natural gas at the compressor station. Additional specific safety measures that will be implemented at the Station were provided in Appendix H of the Revised Application.

- Audio, visual, olfactory (AVO) surveys will be conducted periodically at the facility to check for any potential leaks throughout the site. These inspections ensure equipment is operating properly and any potential failures can be detected long before they become an issue.

- Leak detection and repair (LDAR) surveys also will be conducted periodically using specialized equipment to visually detect any potential equipment fugitive emissions. Detected leaks will be timely repaired to minimize fugitive emissions

- Maintenance related blowdowns for the compressors will be conducted using a vent gas recovery system (VGRS) to minimize the amount of natural gas that is released to the atmosphere.

- After the initial emergency blowdown test, subsequent emergency blowdown tests will be capped, i.e., they will be conducted using an emergency blowdown valve with block valve in series that will prevent the release of natural gas to the atmosphere during the emergency blowdown test.

Furthermore, while likely beyond the scope of this air permit proceeding for the Station, Mountain Valley has sought to educate the community about pipeline safety by sharing facts via mailers, newsletters, the Project website and other sources.[98]

Among these facts are the following:

- The natural gas pipeline network has the best safety record of any energy delivery system according to the National Transportation Safety Board and the U.S. Department of Transportation ("U.S. DOT").

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[97] *See* Letter from Douglas K. Iles, TRC Engineers, Inc., *Lambert Compressor Site Traffic Impacts and Mitigation* (September 14, 2020) (Appendix P).

[98] *See, e.g.,* Appendix I (landowner welcome packet enclosure).

- Federal and state regulations govern the design, construction, operations, and maintenance of natural gas pipelines.

- Pipelines are the safest way to transport natural gas over long distances.

- Natural gas pipelines are built according to rigorous safety standards and have an outstanding safety record.

- According to the U.S. Energy Information Administration, the U.S. natural gas pipeline network consists of more than 300,000 miles of interstate and intrastate transmission pipelines.

- Mountain Valley will meet or exceed all U.S. DOT safety requirements during construction.

- Safety will be engineered into all facets of pipeline design, construction, and operation.

- The project will utilize trained and experienced inspectors who will carefully monitor pipeline construction to ensure compliance with safety standards and construction specifications.

- High quality steel pipe will be used in the construction of Mountain Valley Pipeline, including adding protective coatings to the pipe during manufacturing.

- All pipe will be carefully inspected before it is installed to ensure it meets quality standards.

- After installation all pipeline field welds will be tested and inspected.

- Before being placed into operation, the line would be pressure tested to certify integrity.

- Once in service, the pipeline would be patrolled, monitored, inspected, and maintained by the pipeline operator.

- No construction of buildings or other structures would be permitted on the permanent right-of-way.

- No planting of trees or other deep-rooting plants that may obstruct the permanent right-of-way would be permitted.

- No excavation or impounding water within the permanent right-of-way would be permitted without permission from the company.

- Mountain Valley would ensure safe operation by maintaining the right-of-way to provide ready access and operate the pipeline in accordance with U.S. DOT and FERC regulations.

- Regular inspections will occur to ensure pipeline integrity. The pipeline will be monitored 24-hours-a-day, 365-days-a-year using sophisticated computerized systems and around-the-clock personnel.

Analyzing pipeline safety for an interstate pipeline project falls under FERC's purview. After a comprehensive review, FERC found that "Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety."[99]

5. Other Comments from Community about Perceived Impacts

In addition to the potential impacts discussed above, members of communities out to 10 miles expressed the following general comments to Dr. Lawrence about perceived impacts, all of which have been considered. Among those already familiar with the Project, a majority of non-Indigenous respondents expressed comfort with the Station's proposed location, citing its proximity to the Transco Compressor, and they appreciated Mountain Valley's use of existing corridors and already-impacted landscapes.[100] Others cited investments in the community that Mountain Valley had already made as reasons to expect positive impacts in the community from the Project. Where comments were negative, many reflect sincere misperceptions or misconceptions about pipelines, compressor stations, or the scope of Station impacts. Consequently, education is an important aspect of the ongoing community engagement process to address and allay unfounded concerns.

Included in Table 8 below is how Mountain Valley has considered and/or addressed each perceived impact of the Station.

TABLE 8

Consideration of Perceived Impacts

Perceived Impact	How Considered/Addressed
Child care, senior facilities, or churches could be forced to move as a result of land use changes, noise, or reduced air quality; internet capacity could be degraded.	No land use changes, water or soil impacts are expected from the Station that would affect these facilities, the closest of which is 1.1 miles from the Station.[101] The Station is being located adjacent to the existing Transco Compressor, which has been in operation since 1957. There are no known child care or senior care facilities, churches, or schools within a 1-mile radius of the facility. The closest school is Chatham Hall approximately 2.5 miles west

[99] FEIS at 5-13.
[100] Appendix A at 37.
[101] *See* FEIS at 5-2 through 5-5.

Perceived Impact	How Considered/Addressed
	of the facility. Cornerstone Church of Christ is approximately 1.1 miles to the west of the facility, while Mill Creek Baptist Church is approximately 1.8 miles to the north north-west. Likewise, the air permit and compliance with air quality standards will protect against significant air impacts from this minor source. Indeed, air quality (which is already good) should be no worse than in the recent past even after adding the Station. The combined maximum air emissions for both the Station and the adjacent Transco Compressor are lower than Transco's past maximum emissions alone for most pollutants (Transco recently modified its facility). Furthermore, the maximum potential emissions from the modified Transco site and the Station combined will be lower than the actual emissions reported by Transco alone in 2018 for most pollutants. Air impacts will be limited to a small area around the Station. Noise impacts will be prevented via compliance with federal and Pittsylvania County standards, and none of these facilities (which would represent "Noise Sensitive Receptors") were identified within the impact area for noise in noise studies.[102] Internet capacity will not be affected by presence of the Station because the Station will not be using the local internet service providers. In addition, as a good partner during the COVID-19 pandemic, Mountain Valley has been financially supporting community efforts in Pittsylvania County by the Rotary Club of Chatham and the Boys & Girls Clubs of the Danville Area. The Rotary Club teamed with Pittsylvania County Public Schools to fund meal deliveries to families of students in need,

[102] *See* § VI.C.1 above.

Perceived Impact	How Considered/Addressed
	while the Boys & Girls Clubs staffed and maintained food supplies at drive-through pick-up areas. Because environmental justice communities are most acutely affected by COVID, Mountain Valley's support is benefitting community members.
Food banks and community gardens could be forced to move as a result of reduced water or soil quality as a result of land use changes or catastrophic failures at the Station.	No land use changes, water or soil impacts are expected from the Station that would affect these community resources. No food banks have been identified within 2 miles of the Station.[103] Fear of catastrophic failure is addressed by strict federal safety requirements.[104] FERC reviewed the safety issues and concluded that "Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety."[105] As mentioned above, Mountain Valley has been financially supporting the Rotary Club of Chatham and the Boys & Girls Clubs of the Danville Area, both of whom are involved in providing food to the communities.
Community service groups could be forced to reduce or change activities (e.g. outdoor recreation activities, gatherings) as a result of land use changes, noise, or reduced air quality that impeded their ability to operate; internet capacity could be degraded.	No land use changes, water or soil impacts are expected from the Station that would affect these groups.[106] *See* above regarding how perceived noise, air quality, and internet capacity impacts have been considered and addressed.
Outdoor recreation activities could be impacted.	No land use changes, water or soil impacts are expected from the Station that would affect outdoor activities.[107] As previously mentioned, the Station is being located adjacent to Transco

[103] *See* FEIS at 5-2 through 5-5.
[104] *See* §VI.C.4 above.
[105] FEIS at 5-13.
[106] *See* FEIS at 5-2 through 5-5.
[107] *See* FEIS at 5-2 through 5-5.

Perceived Impact	How Considered/Addressed
	Compressor, which has been in operation since 1957. *See* above regarding how perceived noise and, air quality impacts have been considered and addressed.
Landscape and way of life could degrade views/landscapes, reduce access to hunting/fishing opportunities, or impact rural way of life as a result of land use changes, noise, or reduced soil or air quality; sick animals or impacts on local agriculture as a result of land use changes, noise, or reduced soil or air quality.	Incremental view and landscape impacts will be negligible to non-existent from the Station. There will be limited, if any, visibility of the Station, and the existing Transco Compressor has long been part of the overall landscape. The Station will be surrounded by trees on three sides shielding it from public view. There are no homes or major roadways within 0.5 miles. The closest residence is about 0.6 miles southeast of the compressor station site, and it will have no direct views of the site during construction or operation due to existing vegetation around the site and near the residence. There are several other homes southwest of the Station, and the Station will not be visible from these residences due to natural vegetative screening.[108] No water or soil impacts are expected from the Station that would affect outdoor activities such as hunting, fishing, animals, or agriculture.[109] *See* above regarding how perceived noise and, air quality impacts have been considered and addressed.
For indigenous respondents, concerns about landscape degradation, ecological integrity of soil and water, impeding cultural practices such as ceremonies and tribal medicine, and improper handling of artifacts	*See* above regarding lack of landscape degradation by Station. Also, the Station will have no impact on ecological integrity of soil or water, or on cultural practices and ceremonies involving use of water or land. The Station is located adjacent to site of existing Transco Compressor. Under the NHPA Section 106 process and consultations, no specific cultural

[108] *See* FEIS at 4-129.
[109] *See* FEIS at 5-2 through 5-5.

Perceived Impact	How Considered/Addressed
	practices were identified in the area near the Station that would be impacted by the limited view of the Station. The cultural resource investigation discovered no sensitive historic or cultural sites at or in the vicinity of the Station that are likely to be impacted by the Station, as confirmed by VDHR.[110] To address the possibility of discovering unforeseen or unknown artifacts during construction or operation of the Station, Mountain Valley has developed a Plan for Unanticipated Discoveries of Historic Properties and Human Remains that has been approved by DHR.[111] In addition, Mountain Valley addressed specific concerns that the Monacan Nation filed with FERC.[112]
Fear for Indigenous women's safety due to influx of out-of-state or nonlocal workers in 'man camps'; over-policing affecting community members who are of mixed African-American and Indigenous heritage	This concern is based on accounts of violence against Indigenous women at residential "man camps" for thousands of male workers used during construction of pipelines in western parts of the country. No such camps or living arrangements will be used for construction of the Station. Fear of "over-policing" by private security will be addressed by ensuring proper training and monitoring of security officers. To lessen concerns of "over policing", Mountain Valley uses only unarmed security agencies. Per their protocol, they report any crimes to local law enforcement for investigation. All security personnel have undergone a pre-hire background check and have received the following training:

[110] *See* Appendix L (VDHR correspondence).
[111] *See* § VI.B above.
[112] FEIS at 4-172.

Perceived Impact	How Considered/Addressed
	Sexual Harassment Training: enables employees and employers to identify and avoid and/or correct behavior which might harm others and lead to liability. Culture Diversity Training: Cultural diversity training is an important component of an overall inclusion and diversity strategy. Diversity training provides the knowledge, skills and tools to assist team members for behaving differently. Sensitivity Training: Sensitivity training is a form of training with the goal of making people more aware of their own goals as well as their prejudices, and more sensitive to others and to the dynamics of group interaction. De-escalation Techniques: Recognizing, defusing and controlling aggressive behavior through the use of crisis intervention techniques, communications in conjunction with an understanding of attitudes, emotions and behavior.
Fear of impact on intertribal relations if Mountain Valley introduces cash subsidies or cash payments to tribes that are unevenly distributed	This is beyond the scope of this permitting. Nevertheless, Mountain Valley does not anticipate cash subsidies or payments to certain tribes.
For indigenous respondents, concerns about impacts on native language	The Station should have no impacts on teaching or reviving native languages. The Station is being located adjacent to existing compressor stations, which have had no documented impact on native languages.

VII. ADDITIONAL INVESTIGATION BY ENVIRONMENTAL JUSTICE EXPERT COMMISSIONED BY MOUNTAIN VALLEY.

Dr. Lawrence's work promotes three elements of environmental justice. First, to ensure identification of all potential environmental justice communities, she expanded both the geographic and definitional scope of the analysis beyond the criteria of VEJA. Second, Dr. Lawrence engaged personally with a wide range of community members to solicit their varied

viewpoints on the Station and its perceived impacts.[113] Finally, Dr. Lawrence gathered ideas from the communities about potential mitigation and community enhancement measures.

In light of Dr. Lawrence's report and recommendations, Mountain Valley in Section VIII below proposes a plan to encourage additional community involvement.

A. Expanded Identification of Environmental Justice Communities

As an initial phase of her work, Dr. Lawrence performed desktop census reviews to identify potential environmental justice communities located within 3-mile, 5-mile, and 10-mile radii of the Station. In addition to the definitions in VEJA, she considered definitions and policies from North Carolina DEQ, EPA, and FERC. Dr. Lawrence supplemented these criteria with environmental justice principles from the academic literature and professional experience. These expanded criteria ensure identification of all potential environmental justice communities that may perceive impacts from or may have concerns about the Station.

Within radii of 3 and 5 miles of the proposed Compressor Station, Dr. Lawrence identified four census tracts (105, 106, 107, and 109) under VEJA's "environmental justice community" parameters,[114] as expanded to include criteria used by NCDEQ, EPA, and FERC. These census tracts are low-income (all four) or have high minority concentrations (census tracts 105 and 107). Some are further made vulnerable by pre-existing negative environmental exposure due to the proximity of hazardous waste sites or brownfields (census tract 109); and the co-location of hazardous waste sites with populations made exceptionally vulnerable due to reduced mobility (i.e. public housing, incarceration facilities).

Dr. Lawrence also identified ten census tracts (101, 103, 104, 105, 106, 107, 108.01, 108.02 109, and 114) within a broader concentric radii of study – 10 miles from the Station – under VEJA's "environmental justice community" criteria, as expanded to include criteria used by NCDEQ, EPA, and FERC. These include census tracts adjacent to the city of Danville, and are also low-income or have high minority concentrations. The identified census tracts further include established communities of linguistically isolated households, as well as members of the indigenous Yesàh community. Within this radius, Dr. Lawrence determined that these specific communities could be vulnerable to impacts from industrial development, or could require assistance in participating meaningfully in the public comment process, due to either (1) their historic connections to place and reliance on landscape for conducting essential cultural practices; (2) their isolation from resources (including linguistically appropriate information and geographically convenient meeting points/times) that would be essential to fair opportunity for

[113] Not surprisingly, Dr. Lawrence's interviews of community members as far away as 10 miles from the Station elicited perspectives not just about the Station at issue in the permit proceeding, but also on the Mountain Valley Pipeline mainline, the Southgate pipeline, and pipelines generally. *See* Appendix A at 37. Those facilities are beyond the scope of this air permit, but Dr. Lawrence's report includes those comments for completeness.

[114] VEJA (and FERC) prescribe use of "census block groups" for low-income communities, and Dr. Lawrence used "census tracts" for her analysis, choosing not to use "census blocks." Appendix A at 5-6. "Census blocks" are the smallest units of analysis in the census data. "Census block groups," however, are combinations of census blocks and are often used for environmental justice analyses. Both EPA and VEJA prescribe use of census block groups, not tracts. Block groups are subsets of census tracts (i.e., tracts are composed of multiple block groups). Some have argued that census tracts can be too large for environmental justice purposes. *See, e.g., Friends of Buckingham*, 947 F.3d at 88.

participation in the public process of infrastructure siting; or (3) their pre-existing health vulnerabilities due to historic overexposure to negative environmental factors (e.g. hazardous waste sites, brownfields, high particulate matter concentrations, etc.).

In the broadest analysis at a scope of 30 miles, Dr. Lawrence noted the presence of the Yesàh tribes of the region: primarily, the Monacan and Saponi (listed in separate bands as the Sappony Tribe, Occaneechi Band of the Saponi Nation, Haliwa-Saponi Tribe, and Saponi Nation of Ohio) who descend from the original Eastern Siouan inhabitants of the region, and who possess historic connections to place and rely on this landscape for conducting essential cultural practices.

B. Solicitation of ideas about possible mitigation and community enhancement

Dr. Lawrence interviewed individuals in the communities at radii of 3, 5, and 10 miles, including tribe members, to ground-truth the desktop work and to identify perceived potential impacts. During her interviews, Dr. Lawrence also solicited ideas from the community on possible mitigation or community enhancement to address perceived impacts. While some of the ideas are infeasible or unrelated to the Station itself, Mountain Valley has carefully considered the community input, and either has already implemented or will implement a number of the ideas. This section summarizes the ideas received from the community.

TABLE 9

Consideration of Community Ideas for Mitigation/Enhancement

Community Idea	Comment
Make additional donations to support critical service providers in the immediate Station area and nearest towns, including Chatham, throughout the period of construction and after initial operation begins.	Mountain Valley supports the communities in which it operates, and where its employees live, work, and play. It has already demonstrated its support for critical service providers in Pittsylvania County and will continue to do so.
Be willing to avoid construction in or around areas currently used for critical service provision.	Mountain Valley has coordinated with local first responders and will continue to do so. In addition, Mountain Valley will follow its approved traffic plan to minimize impacts on critical service providers.
Maintain current investment practices to support local civic needs & organizations, including community colleges, fire & rescue services, community service groups, etc.	Mountain Valley supports the communities in which it operates, and where its employees live, work, and play. It has already demonstrated its support for critical service providers in Pittsylvania County and will continue to do so.
Retain mediators or Community Liaisons with authority to speak on behalf of Mountain Valley to de-escalate conflicts between	Mountain Valley does not expect conflicts at the Station during or after construction. In addition, it has land agents whose main role

Community Idea	Comment
security forces, employees, and local community members	during construction is to act as an interface between landowners and Mountain Valley. There are multiple ways for landowners and the public to contact Mountain Valley (e.g. dedicated email and phone number). Additionally, FERC has a complaint resolution procedure which includes the ability for landowners and the general public to file comments directly on the FERC docket.
Be willing to avoid construction in or around areas currently used for recreation	The Station will be adjacent to Transco Compressor, so construction and operation should not impact any areas currently used for recreation.
Train security forces to reduce conflict with local community members and avoid contributing to the over-policing of low-income, African-American, and Native American community members	As discussed previously, the security personnel hired by Mountain Valley are trained to reduce conflict and avoid over-policing.
Donate to support the establishment or formalization of localized recreation opportunities, including low-cost options and green/open space recreation such as sports fields	Mountain Valley supports the communities in which it operates, and where its employees live, work, and play. It has already demonstrated its support for residents in Pittsylvania County and will continue to do so.
Thoughtfully avoid impactful activities that could create negative impacts on the rural landscape and way of life; hiring practices that support local benefit via jobs and job training opportunities	The Station should not impact on the rural landscape or way of life, as discussed in comments above and Table 8. The Station is adjacent to an existing compressor facility, and thereby will not disturb a pristine landscape. Mountain Valley will avoid or minimize impacts where possible. Mountain Valley has adopted hiring practices that support the local community and anticipates working with local workforce unions.

Community Idea	Comment
For Indigenous respondents,[115] divert pipelines' routes in response to the discovery of sensitive artifacts or remains, as well as in response to notification from tribal leadership of sensitive cultural or historical sites.	Routes of pipelines are beyond scope of the Station's air permit proceeding, and have already been approved by FERC. Nonetheless, Mountain Valley has engaged in the NHPA section 106 process in regards to the Station; no cultural or historic resources were identified near the Station; and Mountain Valley has adopted and will follow the approved plan for any unforeseen or unknown historic or cultural resources that may be discovered.[116]
Be willing to act in good faith to assist tribes in acquiring uncovered artifacts or human remains (even if these were held by private landowners) so that such artifacts or remains could be protected, appropriately honored, and if appropriate, reburied in alignment with cultural beliefs around land, ancestors, and sanctity.	Mountain Valley has adopted and will follow the comprehensive approved plan for any unforeseen or unknown historic or cultural resources that may be discovered.[117]
Provide direct financial support to existing tribally-led efforts toward the preservation of historical artifacts and material culture (e.g. the Monacan Museum; the Haliwa-Saponi History Legacy Project)	This is beyond the scope of the Station's air permit proceeding, and goes beyond any expected impacts.
Establish endowment for a Yesàh Archaeological Preservation & Cultural Arts Revitalization Program at a major university (chosen collectively by the members of the Yesàh Land Trust) with the space and capabilities to archive materials under the best available preservation measures, while ensuring continued access to tribal preservation officers or designated safekeepers for study + research.	This is beyond the scope of the Station's air permit proceeding, and goes beyond any expected impacts.
Establish a process to work with private landowners to encourage/incentivize the donation of artifacts uncovered during Project	Mountain Valley has adopted and will follow the comprehensive approved plan for any

[115] Indigenous respondents' ideas focused primarily on the MVP mainline and MVP-Southgate pipelines, not the Station. *See, e.g.,* Appendix A at 48-49.

[116] *See* § VI.B above.

[117] *Id.*

Community Idea	Comment
or pipeline construction to tribal preservation officers or designated safekeepers; or to the above-described Preservation Program to prevent artifact loss or destruction.	unforeseen or unknown historic or cultural resources that may be discovered.[118]
Support local economies and employment in all hiring practices and processes; prioritize local employees over out-of-state or non-local hires, and create training programs to move local employees into management positions.	Mountain Valley has adopted hiring practices that support the local community and anticipates working with local workforce unions.
Donate to support construction of proposed African-American Leaders Memorial in downtown Chatham	Mountain Valley supports the communities in which it operates, and where its employees live, work, and play. It has already demonstrated its support for residents in Pittsylvania County and will continue to do so.

VIII. PLAN FOR FURTHER COMMUNITY ENGAGEMENT

Dr. Lawrence will continue her engagement with the community.[119] She has also recommended further outreach by Mountain Valley.[120]

Mountain Valley is supplementing the original Public, Stakeholder, and Agency Participation Plan to assist Dr. Lawrence and to further engage the rural community where the Station is proposed. Mountain Valley is sending an informational packet and response card by certified mail to every residence within 1.5 miles of the Station. This mailer, included in Appendix I, provides additional detailed information about the Station, encourages community members to offer comments, and notifies them of the pending application before DEQ. The mailer augments the previous outreach as follows:

- Describes the Project and Station, including a map and fact sheet;
- Informs the community of opportunities to get meaningfully involved via DEQ's public participation process;
- Solicits questions and comments through MVP's website or toll-free phone number;

[118] *Id.*
[119] *See* Appendix A at 36.
[120] *Id.*

- Explains the basic principles of environmental justice and Mountain Valley's ongoing efforts to satisfy environmental justice through Dr. Lawrence's work; and

- Provides three additional options to learn more about or comment on the Station, including the opportunity (i) to ask questions directly to Mountain Valley, (ii) to schedule a confidential interview with Dr. Lawrence; and (iii) to provide written comments on a stamped response card.

In conjunction with prior outreach efforts and with DEQ's public participation opportunities, this additional engagement helps to ensure that environmental justice communities are able to have meaningful involvement in the process.

IX. CONCLUSIONS

This supplement and supporting material demonstrate that the application for the Station satisfies all legal requirements for environmental justice, whether under VEJA or Va. Code § 10.1-1307.E. The information provides ample basis for DEQ and the Board both to find that the principles of environmental justice are satisfied and to issue detailed findings.

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Appendix B – VDOT, *Environmental Justice Guidelines*

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Appendix H – Examples of Information on MVP Southgate Project Website

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Appendix P – TRC Engineers, Inc., *Lambert Compressor Site Traffic Impacts and Mitigation* (September 14, 2020)

Appendix A

Land & Heritage Consulting, LLC

Community Impact Assessment of Lambert Compressor Station

(September 2020)

Community Impact Assessment of Lambert Compressor Station

Prepared by: Land & Heritage Consulting, LLC

Executive Summary

As part of the MVP Southgate Project ("Project"), Mountain Valley Pipeline, LLC ("Mountain Valley") proposes to construct the Lambert Compressor Station ("Station") in Pittsylvania County, Virginia. Land & Heritage Consulting, LLC was invited to act as a third party consultant, and has prepared this Community Impact Assessment of the Station to identify potential environmental justice communities and the issues they might face as a result of the proposed Station. As the primary author, my curriculum vitae and that of my co-author, Christy Hyman, are provided in Attachment B.

Our intention in this assessment was to identify communities who might be impacted by the proposed Station and to subsequently conduct outreach to those communities to clearly identify (a) ways in which community members anticipated impact that had not been identified by past research, and (b) potential actions that community members felt Mountain Valley could take to ensure distributive justice in the impacts and outcomes of the proposed Station.

Our outreach was impacted by (1) the timeline (April – August) to complete this assessment; (2) restrictions on travel and in-person outreach imposed by the emergent coronavirus pandemic (beginning in March 2020, and ongoing); and (3) restrictions on in-person outreach imposed by the acute period of community protests against racial injustice following the killing of George Floyd (May – July 2020). As a result of these restrictions, this report presents findings based on a finite number of informative community interviews. While the number of interviews may not be consistent with an academic study without any time constraints, the information gained reflects a hard look at the environmental justice communities, the perceived potential impacts of the compressor station on them and possible approaches to mitigating those impacts.

The Station is located in the eastern portion of census tract 105 (*see Figures 1 - 10*). Our initial desktop work identified environmental justice communities located within a fenceline area of 3 miles, as well as within 5-mile and 10-mile radii of the proposed Station. Rather than limit the areal extent of our review to the immediate 3-mile "fenceline community"[1] radius reflected in currently published literature (e.g., air modeling or noise studies), we identified environmental justice communities at a broader scale, extending our review to connected communities even beyond the points of expected direct impact. MVP agreed to assess impacts at this distance,

[1] White, R. "Life at the Fenceline: Understanding Cumulative Health Hazards in Environmental Justice Communities." *Coming Clean, The Environmental Justice Health Alliance for Chemical Policy Reform, The Campaign for Healthier Solutions*. (2018).

not because they affirm the expectation of direct impacts at this range, but rather because they sought to (1) avoid missing environmental justice communities based on any preconceived notions of where impacts occur; and to (2) identify and facilitate early engagement *(i.e.,* before the normal public participation process) with environmental justice communities.

We used definitions from the Virginia Environmental Justice Act, supplemented by criteria from the North Carolina Department of Environmental Quality ("NCDEQ"), the United States Environmental Protection Agency ("EPA") and the Federal Energy Regulatory Commission ("FERC") to identify the maximum number of environmental justice communities. We implemented this expanded criteria to ensure we broadly identified environmental justice communities consistent with past and future work on this topic in this region (Virginia & North Carolina: the Southern Appalachian Basin). As explained below; however, we used census tract information rather than census block group information.

Within a 3-mile fenceline radius, and within a broader radius of 5 miles of the proposed Station, we have identified four communities (census tracts 105, 106, 107, and 109) that meet the "environmental justice community" parameters as defined in the Virginia Environmental Justice Act, as well as the criteria used by NC DEQ, EPA or FERC using census tract information. These communities are disproportionately low-income or have high minority concentrations, or are made vulnerable by pre-existing negative environmental exposure (due to proximity to hazardous waste sites, degraded landscape conditions, or limited access to healthy and affordable food (i.e. "food deserts")).

The primary adverse impacts to "fenceline communities" associated with the construction of compressor station include temporary noise, dust/particulate matter, and traffic impacts; the primary impacts from operations include air emissions and noise[2]. However, some community members have reported or publicly expressed concerns relating to additional perceived risks; these include negative health impacts, cultural or historic site/artifact destruction (including but not limited to enslaved persons' burial grounds; Native American sacred sites, artifact deposits, and gravesites; and other historic and archaeological sites), and negative economic impacts.

Within a radius of 10 miles of the proposed Station, we have identified ten communities (census tracts 101, 103, 104, 105, 106, 107, 108.01, 108.02 109, and 114) that meet the same "environmental justice community" criteria. These communities include census tracts adjacent to the city of Danville, and are also disproportionately low-income or have high minority concentrations; the identified areas further include established communities of linguistically isolated households. Within this 10 mile radius, we have determined that these identified communities could be vulnerable to impacts, or could require assistance in participating meaningfully in the public comment process, due to either (1) their historic connections to place and reliance on landscape for conducting essential cultural practices; (2) their isolation from resources (including linguistically appropriate information and geographically convenient

[2] Page ES-8, Federal Energy Regulatory Commission. "Southgate Project Final Environmental Impact Statement." FERC/EIS-0297F (February 2020)

meeting points/times) that would be essential to fair opportunity for participation in the public process of infrastructure siting; or (3) their pre-existing health vulnerabilities due to historic overexposure to negative environmental factors (e.g. hazardous waste sites, brownfields, high particulate matter concentrations [from agricultural sources], etc.).

At all radii, the project overlaps with traditional and current home lands of the related Native American tribes of the Yesàh diaspora, a language/culture grouping which includes the Monacan Indian Nation, Sappony Tribe, Occaneechi Band of the Saponi Nation, Haliwa-Saponi Tribe, Saponi Nation of Ohio, Catawba Indian Nation, and New River Band of Catawba. The members of these tribal communities descend from the original Eastern Siouan inhabitants of the Virginia Blue Ridge & foothills region, possess historic connections to place, and continue to rely on this landscape for conducting essential cultural practices.

Within our analyzed 3, 5, and 10 mile radii and at our broader review range of 30 miles, we also noted the presence of an extensive and continuous African-American community composed of Freedmen descendants, connected to a larger community centered in Blairs, Virginia (also known as 'the Blairs'), located approximately 14 miles from the proposed Station site[3] [4]. However, we were unable to interview any members of that community for this report. We strongly recommend that targeted outreach to that community continue so that the specific and unique needs and concerns of its members are explicitly understood.

A preliminary set of community outreach interviews were performed to ground-truth the desktop work, identify impacts to the environmental justice communities resulting from the construction and operation of the Station, and ask community members to propose additional actions that they believe should be taken to mitigate those impacts.

Background

The 2020 Session of the Virginia General Assembly enacted The Virginia Environmental Justice Act,[5] intended to "promote environmental justice and ensure that it is carried out throughout the Commonwealth, with a focus on environmental justice communities and fenceline communities."[6] That Statute defines "environmental justice" as "the fair treatment and meaningful involvement of every person, regardless of race, color, national origin, income, faith, or disability, regarding the development, implementation, or enforcement of any environmental law, regulation, or policy."[7] "Fenceline community" is defined as an area that "contains all or part of a low-income community or community of color and that presents an increased health risk to its residents due to its proximity to a *major* source of pollution."[8] We

[3] Virginia Department of Historic Resources. "071-5820 Southside High School" (2020).

[4] Jackson, Lawrence P. My Father's Name: A Black Virginia Family After the Civil War. University of Chicago Press, 2012.

[5] Va Code §§ 2.2-234 et seq.

[6] Va Code § 2.2-235.

[7] Va Code §2.2-234

[8] Va Code §2.2-234 (emphasis added).

use the term “fenceline communities” in this report as referring to communities within a 3-mile radius of the station, consistent with definitions found in the environmental justice literature.[9]

In our approach, we employed distributive justice theory, a framework that extends the critical analysis of traditional environmental justice approaches to holistically assess the equitable allocation of costs and benefits throughout communities.[10] [11] In our case, the communities of interest were those who might be impacted by the construction and operation of the proposed Station (here defined to include the Station and all laydown/contractor yard/additional workspace areas directly associated with the construction of the Station) within a 3-mile (fenceline) radius, 5-mile radius, or 10-mile radius.

To further ensure we identified any environmental justice communities potentially affected by the proposed Station; and in order to ensure the fair treatment and meaningful involvement of all Station neighbors, we undertook a community impact assessment from May 2020 through August 2020 that included a desktop geospatial analysis and an outreach and interview campaign.

Geographic Context: Pittsylvania County

Pittsylvania County is located in the southern part of Virginia, bordering North Carolina. The county seat is Chatham. As of July 1st 2019, the estimated population of Pittsylvania County is 60,354, a 4.9% decrease from the census of April 1st 2010.[12] By land area, Pittsylvania is the largest county in Virginia, covering 968.94 sq mi.[13] 76.2% of Pittsylvania County residents describe themselves as white alone, and 21.5% identify as Black or African-American alone.[14] Those who identify as Hispanic or Latino make up 2.7% of the population.[15] The median age is 46.7 years in Pittsylvania County, almost 9 years higher than the national average of 37.9.[16]

Methods: Parameters & Scope

We used a mixed-methods approach to identify potential environmental justice communities and potential impacts of the proposed Station.

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[9] White, Ronald. "Life at the Fenceline: Understanding Cumulative Health Hazards in Environmental Justice Communities.: 2018. Coming Clean, The Environmental Justice Health Alliance for Chemical Policy Reform, The Campaign for Healthier Solutions.

[10] Clough, Emily, and Derek Bell. "Just fracking: a distributive environmental justice analysis of unconventional gas development in Pennsylvania, USA." *Environmental Research Letters* 11.2 (2016): 025001.

[11] Kuehn, Robert R. "A taxonomy of environmental justice." *Envtl. L. Rep. News & Analysis* 30 (2000): 10681.

[12] United States Census Bureau, www.census.gov/quickfacts/pittsylvaniacountyvirginia

[13] Virginia Land Area County Rank. www.usa.com/rank/virginia-state--land-area--county-rank.htm

[14] United States Census Bureau.

[15] Ibid.

[16] Virginia Demographics Data.

This approach consisted of two major parts: first, we conducted a geospatial baseline assessment with metrics adherent to the criteria of the Virginia Environmental Justice Act, as well as criteria used by NC DEQ, EPA, or FERC. We conducted this assessment over concentric circles of radii of 3, 5, and 10 miles from the Station. We applied these expanded criteria over the larger area to ensure we identified environmental justice communities in the area and to ensure consistency with past and future work related to the Project conducted by and for other agencies. We further added a set of expanded criteria that we believed could indicate vulnerable communities who would not be captured by the current VADEQ criteria; these expanded criteria included food desert status, landscape degradation, and pre-existing exposure to health hazards or other conditions of social vulnerability.

Second, we conducted a cultural impact assessment built on a literature review and a series of semi-structured interviews with members of communities within ten miles of the Station site, as well as with members of the more geographically dispersed Yesàh Indigenous community. By not limiting the scope of our interviews to the narrow areas where impacts would typically be expected by project proponents, we were able to identify potential issues related to the Station through the eyes of the environmental justice communities themselves.

Geospatial Baseline Assessment

Scale of Analysis: Census Tract

Because of the rural nature of Pittsylvania County, and the desire for comparisons at scale smaller than the county level, we used census tracts as the areal unit of analysis for certain metrics.

Census tracts are made of census block groups (which are composed of several census blocks which are typically the size of a block in a city or suburb).[17] Census tracts were used for our analysis as the smallest areal unit of scale that could provide the most robust information at the sub-county level. Generally, a census tract contains between 2500 and 8000 people.[18] The use of census tracts for analysis of socioeconomics reveal inequities that are not always observable at a scale finer than the tract level in sparsely populated rural counties. Data available at the census tract level with regard to race, poverty and language in Pittsylvania County provided a more effective spatial representation. Thus to maximize overall data availability and rural data accuracy,[19] we used census tract as the scale of analysis for this assessment.

Census tracts in Pittsylvania County & the City of Danville vary from 'micropolitan area core' to 'rural' in the United States Department of Agriculture Economic Research Service Rural-Urban

[17] US Census Bureau. "Census tracts and block numbering areas." (2000).

[18] US Census Bureau. "Census Tracts and Block Numbering Areas." (2000). https://www2.census.gov/geo/pdfs/reference/GARM/Ch10GARM.pdf

[19] Cromartie, John B., and Linda L. Swanson. "Census tracts more precisely define rural populations and areas." *Rural America/Rural Development Perspectives* 11.2221-2019-2634 (1996): 31-39.

Commuting Area (ERS-RUCA) codes.[20] The United States Census Bureau has historically defined any non-metropolitan area as 'rural,' [21] [22] but now defines two types of non-rural urban area: (1) "urbanized Areas" have a population of 50,000 or more, and (2) "urban Clusters" have a population of at least 2,500 and less than 50,000 [23] (nearly overlapping the USDA 'micropolitan area core' designation for regions with populations up to 49,999).

Thus, by US Census Bureau standards, Pittsylvania County is a rural county with no urbanized areas or urban clusters (despite containing several USDA Economic Research Service Rural-Urban Commuting Area ("ERS-RUCA") micropolitan commuting areas),[24] while the independent City of Danville is an 'urban cluster' (a 'micropolitan area core' by ERS-RUCA standards), whose tracts contain both rural and urban components. Ground truthing conducted on August 26, 2020 confirmed that the rural nature of the area surrounding the proposed Station lent itself more appropriately to census tract level analysis than census block group level analysis for this report.

In 2019, the Natural Resources Defense Council reviewed the use of census tract level data to assess the potential impact of the proposed Atlantic Coast Pipeline and identified several ways in which this approach threatened environmental justice by overlooking, diluting, or erasing known minority communities.[25] We specifically addressed that concern in the second phase of our assessment, which included ground-truthing our desktop analysis through interviews with community members, to preclude these risks from our analysis of the proposed Station. In addition, as part of our ground-truthing, we also reviewed census block group level data, where available, and refined our analysis accordingly.

Baseline Environmental Justice Criteria Used for Analysis (Virginia Environmental Justice Act, Supplemented by Criteria From NCDEQ, EPA or FERC)

[20] These include tracts 51143010100, 51143010200, 51143010300, 51143010400, 51143010500, 51143010600, 51143010700, 51143010801, 51143010802, 51143010900, 51143011001, 51143011002, 51143011100, 51143011200, 51143011300, and 51143011400 in Pittsylvania County, and tracts 51590000100, 51590000200 51590000300, 51590000400, 51590000500, 51590000600, 51590000700, 51590000800, 51590000900, 51590001000, 51590001100, 51590001200, 51590001301, 51590001302, 51590001400, and 51590980100 in Danville City. Data from https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation/, using the 2010 RUCA codes, the most recent available data.

[21] Ratcliffe, Michael, et al. "Defining rural at the US Census Bureau." *American community survey and geography brief* 1 (2016): 8.

[22] Cromartie, John, and Shawn Bucholtz. *Defining the" rural" in rural America*. No. 1490-2016-127511. 2008.

[23] US Census Bureau. "2010 census urban and rural classification and urban area criteria." (2010).

[24] United States Census Bureau. "Rural America." (2020). https://gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01

[25] Cole, Montina. NRDC. "Pipeline Case Brief: FERC Enables Environmental Injustice." (April 15, 2019) https://www.nrdc.org/experts/montina-cole/pipeline-case-brief-ferc-enables-environmental-injustice

For this analysis, we used the definition of "environmental justice community" provided by the Virginia Environmental Justice Act (VEJA): which defined an "environmental justice community" as "*any low-income community or community of color."* We further used the definitions of "low-income community" and "community of color" as described in that same legislation.[26] The VEJA definition of "environmental justice" provided is consistent with the definitions under current usage by the the U.S. Department of Transportation (DOT), U.S Department of Housing and Urban Development (HUD), and the U.S Environmental Protection Agency (EPA), through the Partnership for Sustainable Communities (PSC).[27]

However, the Virginia Environmental Justice Act definitions and criteria led our analysis, as they were inclusive of, and more expansive than, the criteria recommended by other agencies. This expanded scope provides rigor to the analysis and ensures that we have accurately and fully identified environmental justice communities.

Parameters to Identify EJ Communities of Color

FERC: census block groups that have a minority population of more than 50 percent, or census block groups that have a minority population that is 10 percentage points higher than their respective county.

EPA: EJSCREEN's minority demographic indicator refers to "the percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial."

Virginia Environmental Justice Act: any geographically distinct area where the population of color, expressed as a percentage of the total population of such area, is higher than the population of color in the Commonwealth expressed as a percentage of the total population of the Commonwealth. However, if a community of color is composed primarily of one of the groups listed in the definition of "population of color," the percentage population of such group in the Commonwealth shall be used instead of the percentage population of color in the Commonwealth. "Population of color" means a population of individuals who identify as belonging to one or more of the following groups: Black, African American, Asian, Pacific Islander, Native American, other non-white race, mixed race, Hispanic, Latino, or linguistically isolated.

[26] Va Code § 2.2-234.

[27] Environmental Protection Agency. "Environmental Justice-Related Terms As Defined Across the PSC Agencies – 05/13/13" (May 13, 2013) https://www.epa.gov/sites/production/files/2015-02/documents/team-ej-lexicon.pdf

Parameters to Identify EJ Low-Income Populations

FERC: census block groups that have a household poverty rate of more than 20 percent or census block groups that have a household poverty rate that is 10 percentage points higher than their respective county.

EPA: EJSCREEN's low-income demographic indicator refers to "the number or percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."

Virginia Environmental Justice Act: census block groups in which 30 percent or more of the population is composed of people with low income; "low income" means having an annual household income equal to or less than the greater of:

i) an amount equal to 80 percent of the median income of the area in which the household is located, as reported by the Department of Housing and Urban Development, and
ii) 200 percent of the Federal Poverty Level.

In the Final Environmental Impact Statements ("FEIS") issued by FERC in February 2020 for the MVP Southgate Project, "English-Limited Households" were included as an additional data parameter. The Virginia Environmental Justice Act criteria includes linguistically isolated households as "communities of color," which would hold them to the same statistical parameters as other minority groups.

However, because of the extraordinarily small number of such households at our scale of analysis, we treated linguistically isolated (LI) households as a dichotomous variable in our analysis -- that is, census tracts were labeled as containing linguistically isolated households if even a single household that was linguistically isolated existed within the tract. This labeling will facilitate proper notice and other assistance for meaningful participation by such households.

Parameters to Identify EJ Linguistically Isolated[28] or English-Limited Households

Land & Heritage Consulting, LLC Criteria: Any geographically distinct region with any number of (i.e one or more) Linguistically Isolated or English-Limited households.

Virginia Environmental Justice Act: *Linguistically isolated households fall under the definition of "populations of color" linked to the parameters for communities of color; i.e. any geographically distinct area where the population of [linguistically isolated households], expressed as a percentage of the total population of such area, is higher than the population of [linguistically isolated households] in the Commonwealth expressed as a percentage of the total population of the Commonwealth. However, if a community of color is composed primarily of [linguistically isolated households], the percentage population of such group in the Commonwealth shall be used instead of the percentage population of color in the Commonwealth.*

Additional guidance received by Mountain Valley from the FERC in April 2019 highlighted concerns that "effects can be amplified in EJ communities due to factors such as cumulative impacts in the community, unique cultural practices and social determinants of health."[29] We addressed this by looking at two additional parameters: one assessing cumulative impacts on unique cultural practices, and another assessing potential amplification of impact due to social determinants of health -- which we added to those in the Virginia Environmental Justice Act to address overall health status, health inequality, and environmental health metrics.

Parameters to Identify Communities with Pre-existing Exposure or Elevated Health Risk [30]

Land & Heritage Consulting, LLC Criteria: EXPOSURE PARAMETERS

(i) Proximity to Hazardous Waste Facilities above national average;
(ii) Pre-existing Particulate Matter 2.5 Exposure above national average;
(iii) Pre-existing Ozone exposure above national average;
(iv) Cancer rates above national average OR in-county differences in cancer rates by race or ethnicity

Within communities identified by the above criteria, also specifically note:

(v) presence of Limited Mobility Individuals, defined as individuals who do not have the ability to adapt their location or daily routines to reduce or minimize exposure -- i.e. hospitals, schools, prisons, public housing.

Additional Criteria Used for Analysis (Land & Heritage Consulting, LLC Specific Framework)

At the outset of this assessment, Mountain Valley Pipeline, LLC expressed a strong desire to exceed the currently required and recommended environmental justice parameters in order to

[28] 2020 Acts of the Virginia General Assembly. Title§ 2.2-234 and 2.2-235. Section 1257. April 22, 2020.

[29] Correspondence between the Federal Energy Regulatory Council and Mountain Valley, LLC (February 2019).

[30] Correspondence between the Environmental Protection Agency and Mountain Valley, LLC (April 2019)

protect the well-being of neighboring communities. To that end, we identified a set of additional criteria in the environmental health & justice literature that would allow us to identify potentially overlooked environmental justice communities – food deserts, and landscape quality.

Food Deserts

"Food deserts" are areas characterized by reduced access to food or grocery items, at levels contributory to disparate health outcomes.[31, 32] In urban areas, this limitation often occurs due to the uneven distribution of grocery stores and grocery items; in rural areas, this reduced availability often manifests in the form of geographic distance to grocery stores.[33]

Dutko (2012) describes them as follows: "Relative to all other census tracts, food desert tracts tend to have smaller populations, higher rates of abandoned or vacant homes, and residents who have lower levels of education, lower incomes, and higher unemployment. Census tracts with higher poverty rates are more likely to be food deserts than otherwise similar low-income census tracts in rural and in very dense (highly populated) urban areas. For less dense urban areas, census tracts with higher concentrations of minority populations are more likely to be food deserts, while tracts with substantial decreases in minority populations between 1990 and 2000 were less likely to be identified as food deserts in 2000."[34]

To assist in identifying environmental justice communities, we used "food deserts" as a parameter possibly indicative of poverty and lack of access to resources, as well as potentially for geographic isolation and reliance on minimal, distant sources of food items (an indicator of both poor urban and isolated rural communities).

Landscape Quality

Landscape condition "refers to the state of the physical, chemical, and biological characteristics of natural ecosystems, and their interacting processes. Many human land uses affect ecological condition, through vegetation removal or alteration, stream diversion or altered natural hydrology, introduction of non-native and invasive species, and others."[35]

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[31] Beaulac, Julie, Elizabeth Kristjansson, and Steven Cummins. "Peer reviewed: A systematic review of food deserts, 1966-2007." *Preventing chronic disease* 6.3 (2009).

[32] Walker, Renee E., Christopher R. Keane, and Jessica G. Burke. "Disparities and access to healthy food in the United States: A review of food deserts literature." *Health & place* 16.5 (2010): 876-884.

[33] Morton, Lois Wright, and Troy C. Blanchard. "Starved for access: life in rural America's food deserts." *Rural Realities* 1.4 (2007): 1-10.

[34] Dutko, Paula, Michele Ver Ploeg, and Tracey Farrigan. *Characteristics and influential factors of food deserts*. No. 1477-2017-3995. 2012.

[35] NatureServe. "Modeling Landscape Condition: The Effects of Landscape Fragmentation on Biodiversity." (2020) https://www.natureserve.org/conservation-tools/modeling-landscape-condition

Landscape condition is a type of greenspace assessment of the ecological condition of the natural environment in an area, the degradation of which is associated with economic inequality and poorer mental and physical health outcomes for low-income communities.[36]

We used data from NatureServe as an indicator for lack of access to greenspace and ecosystem services, as well as for elevated health risks and elevated risk of asthma and respiratory conditions.

Cultural Community Identification Criteria

The statutory language of the Virginia Environmental Justice Act defines the term "environment" to include the "cultural… assets or components of a community."[37] To define the scope of the cultural communities present in the area of the Station, we drew on guidance from three sources: first, from the literature on Indigenous cultural impact assessment (and in particular, from recent conference proceedings from the International Association for Impact Assessment); second, from the Section 106 process as defined by 136 CFR Part 800 -- Protection of Historic Properties;[38] and third, from the State of Hawai'i, which is a leader in its state-mandated cultural impact assessments.

Indigenous Communities

Indigenous communities have uniquely long-lasting and impactful relationships to land and place; for that reason, we undertook a separate, additional process to identify potentially impacted Indigenous communities in our desktop work.

Our first task was to define the geographic extent of Indigenous experience that we would assess relative to the proposed Station. The State of Hawai'i uses the term "*ahupua'a*" as the typically appropriate geographical unit for assessing potential cultural impacts, particularly if the *ahupua'a* includes areas extending beyond the immediate project area, but in which cultural practices may be carried out that could be impacted by the proposed project.[39]

Although the *ahupua'a* is a specifically Hawaiian term for a traditional Indigenous land/territory delineation, we believe it can be extended analogously to identify appropriate cultural-linguistic areas as "language territories" – regions in which a shared language or set of mutually intelligible languages were spoken – based on preliminary data provided by native-land.ca[40] and verified by community outreach and literature review.

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[36] Cushing, Lara, et al. "The haves, the have-nots, and the health of everyone: the relationship between social inequality and environmental quality." *Annual Review of Public Health* 36 (2015): 193-209.

[37] 2020 Acts of the Virginia General Assembly. Title§ 2.2-234 and 2.2-235. Section 1257. April 22, 2020.

[38] Advisory Council on Historic Preservation. "Protection of Historic Properties." 36 CFR § 800.1

[39] Environmental Council, Office of Environmental Quality Control (OEQC), State of Hawaii. "Guidelines for Assessing Cultural Impacts." (November 7, 1997).

[40] *Native Lands Map*. https://native-land.ca/ Accessed 28 August 2020.

In the Blue Ridge/Ridge & Valley/Piedmont Region, the appropriate term for this traditional Indigenous language-territory delineation would probably be an 'amanīnechi' ("ah-my-ee-neh-chee"), meaning 'land/territory language' in Tutelo-Saponi/Yesànechi, the commonly shared language of the Eastern Siouan Yesàh tribes of this region.

Parameters to Identify Indigenous Cultural Communities

Land & Heritage Consulting LLC Criteria: Any Indigenous community demonstrating current residence within, or cultural-linguistic connection to the identified amanīnechi (language territory); or any Indigenous community demonstrating descent from historical Indigenous communities with cultural-linguistic connection to the amanīnechi.

"Indigenous community" is defined here to include any of the following:

(i) an Indigenous band, tribe, nation, or reservation;
(ii) a group of Indigenous individuals practicing some form of culturally-specific self-governance and operating in the manner of a tribe or nation;
(iii) a group of Indigenous individuals possessing a shared cultural identity and engaging in shared cultural practices; or
(iv) a set of Indigenous bands, tribes, nations, or groups collectively operating in the manner of a federation, confederacy, alliance, or union.

Non- Indigenous Cultural & Regional Communities

This literature on Indigenous cultural impact assessment provided a useful list of domains which could also be generalizable to non-Indigenous communities. However, for non-Indigenous communities, which are not defined in terms of shared languages, we applied these parameters in a narrower geographic scope (i.e. we restricted our identification and outreach to the region within a 30-mile radius of the proposed Station, and restricted interviews to those working or living within a 10-mile radius of the proposed Station).

To make any necessary cultural delineations within our narrowed geographic area, we rely on the definitions of "microcultures" found in the social psychology literature,[41] and adapted for our specific purposes as below.

[41] Neuliep, James W. *Intercultural communication: A contextual approach*. SAGE Publications, 2020.

Parameters to Identify Non-Indigenous Cultural Communities

Land & Heritage Consulting: Any identifiable groups of people who differ from the mainstream culture and:

(i) possess a distinct set of shared values, beliefs, and behaviors;
(ii) possess a common history; and
(iii) are bonded together by similar experiences, traits, values, or in some cases, histories.

Methods: Techniques & Approaches

Analysis of Spatial Data

We conducted a baseline assessment using GIS software and drawing on free, publicly-available data, in order to identify any potential environmental justice communities (low-income, minority, linguistically isolated, or pre-exposed) within concentric radii of three (3), five (5) and ten (10) miles surrounding the proposed Station.

To assess the geographic range of census tracts in Pittsylvania County, VA meeting the identified criteria as environmental justice communities, the team sought to gather data on the following metrics:

- Race – Data on race was analyzed from the American Community Survey of 2018 [42] and census tracts that had a minority population of more than 50 percent, or 10 percentage points higher than Pittsylvania County, or higher than the state of Virginia were flagged.
- Poverty – Data on poverty was analyzed from the American Community Survey of 2018 and census tracts that had a household poverty rate of more than 20 percent, or 10 percentage points higher than Pittsylvania County, or where 30% of the population within the tract were composed of people designated as low income were flagged. Low income was determined if a household income showed 80% of the median income for Pittsylvania County or if any census tract showed 30% of the population being designated at 200% of the Federal Poverty Level.
- English Language Speaking Proficiency – Data from the American Community Survey of 2018
- Mobility – Data on mobility was analyzed from the American Community Survey of 2018 in terms of people living in group quarters, people enrolled in school, and people residing in public housing. Additional data was collected from georeferencing institutions listed on public search engines.
- Access to Food – Data on the presence of food deserts was analyzed from the United States Food and Drug Administration Food Research Data Analysis.

[42] The Census Bureau's American Community Survey of 2018 provides statistics about people and housing for every community in the nation. It is the only source for local estimates of over 40 topics it covers.

- Landscape Condition – Data on landscape condition value was analyzed and rendered from a geospatial model compiled by NatureServe.

Additionally, the team sought data related to health risk parameters set forth by the EPA including:

- Ozone
- Wastewater Discharge Proximity
- Hazardous Waste Proximity
- Respiratory Hazard
- Atmospheric particulate matter

These data sources were collected from Census data, the American Community Survey of 2018, the EPA's Environmental Justice Screening and Mapping Tool, the Department of Housing and Urban Development, the United States Department of Agriculture, the Center for Disease Control Social Vulnerability Index Geodatabase of 2016, the NatureServe geospatial model of Landscape Condition Values, and the Virginia Department of Forestry. EPA and DEQ rely on census data for demographics in assessing environmental justice.

The geospatial unit on which the cartographic representations in this study rely are based on the Census TIGER/LINE shapefiles, analyzed at the level of census tract. TIGER/Line files are a digital database of geographic features, such as roads, railroads, rivers, lakes, political boundaries, and census statistical boundaries covering the entire United States. For the purposes of the area under investigation for this study, the Pittsylvania County and Danville City census tracts were selected for spatial querying. The data compiled from the range of sources used were "joined" with the TIGER/LINE file using ArcGIS Pro software. This process involves modifying the original TIGER/LINE file by adding a duplicate field that serves as the entity that connects new data to it. The data collected, usually in the form of a flat comma separated values file was also modified in order for the two sources to merge effectively. This results in a combined file that not only holds spatial data related to geographic boundaries but also the socioeconomic measures contained that are referenced to those areal units of inquiry. These data table modifications were required for the findings related to race, poverty, English Language Proficiency, access to food, and mobility.

For cartographic renderings of the EPA risk parameters, the information related to those data were already contained within a geodatabase provided by EJSCREEN. For those maps, the team analyzed the data measures for Ozone, Wastewater Discharge Proximity, Hazardous Waste Proximity, Respiratory Hazard, and Atmospheric Particulate Matter that exceeded state or national averages and identified those census tracts that fell into those risk categories. Similarly, for cartographic renderings related to the Center for Disease Control Social Vulnerability Index of 2016, data was contained within a geodatabase provided by the agency that compiled it. For that map, the team analyzed measures within the 90th percentile that demonstrated risk parameters related to the community's ability to respond to disaster and identified those census tracts that fell into those risk categories.

For the landscape condition values map, the NatureServe Landscape Condition Model dataset was used. The data was queried in ArcGIS for the study area and rendered on the map with the allocated land condition values for display.

Upon identifying the tracts with accompanying risk categories for analysis, the next step involved the use of a buffer, a geoprocessing tool that creates polygons around specified features to a certain distance. In this case the specified feature was the Station site and the distance parameters were three, five and ten miles. For each risk category, the census tracts contained within the buffers were identified.

To map the extent of the Indigenous language-territory (amanīnechi) with which the proposed Station overlapped, we used baseline language data from Native-Land.ca, then extended the Tutelo-Saponi (Yesànechi) language polygon to incorporate the modern-day homesites of two tribal communities who surfaced during our literature review (the Saponi Nation of Ohio and the Haliwa-Saponi Tribe).

Community Interview Collection

Ground-truthing the results of our desktop analysis is an essential part of completing a successful community impact assessment. Failing to do so could potentially result in the exclusion of local minorities/people of color from the planning process; increases in community opposition due to lack of understanding, engagement and opportunity for input; and unjust outcomes in the distribution of benefits and risks across adjacent communities.

In adaptation to the COVID-19 pandemic, we made the determination to shift to conducting interviews primarily via phone or Skype. Out of deference to the protests related to the killing of George Floyd, we postponed the beginning of our interview collection phase to June 15, following the conclusion of funerals and memorials for George Floyd over the June 6 weekend, and the passing of the anniversary of the June 10, 1963 “Bloody Monday” in Danville, when peaceful civil rights activists protesting segregation clashed with police.

Ongoing restrictions as a result of both crises led us to shift the entirety of our interviews to phone or Skype as of July 1, 2020. Our only physical visit to Pittsylvania County and the proposed Station site (and surrounding towns, etc.) took place on August 26, 2020 and did not entail any person-to-person contact. For purpose of the analyses below, we have equated the term “community” with “census tract,” so that environmental justice community means a census tract meeting the applicable criteria, and does not carry any implications regarding the presence or absence of any shared values or cultural cohesion within that area.

Results

GIS Baseline Summary: 3 Mile Fenceline

Within a radius of 3 miles of the proposed Station, we have identified four communities (census tracts 105, 106, 107, and 109) that meet the "environmental justice community" parameters as defined in the Virginia Environmental Justice Act, and expanded to include criteria used by NC DEQ, EPA or FERC and as further expanded by Land & Heritage Consulting. In all figures, the 3-mile buffer is indicated by the closest of the three concentric circles around the Station. The attachment number for the data tables are shown in the text for each criterion, as applicable.

GIS Baseline Summary: 5 Mile Buffer

Within a radius of 5 miles of the proposed Station, we have identified four communities (census tracts 105, 106, 107, and 109) that meet the "environmental justice community" parameters as defined in the Virginia Environmental Justice Act, and expanded to include criteria used by NC DEQ, EPA or FERC and as further expanded by Land & Heritage Consulting.

GIS Baseline Summary: 10 Mile Buffer

Within a radius of 10 miles of the proposed Station, we have identified ten communities (census tracts 101, 103, 104, 105, 106, 107, 108.01, 108.02 109, and 114) that meet the "environmental justice community" parameters as defined in the Virginia Environmental Justice Act, and expanded to include criteria used by NC DEQ, EPA or FERC and supplemented by Land & Heritage Consulting.

Geospatial Data

3-Mile Fenceline: Communities of Color & Social Vulnerability

We identified two communities (census tracts 105, 107) meeting the "communities of color" criteria, according to the criteria provided by the Virginia Environmental Justice Act (i.e. any census tract with a minority percentage exceeding the average for the Commonwealth of Virginia). *See Figure1, below; see also Data Table 1 in Attachment A.*

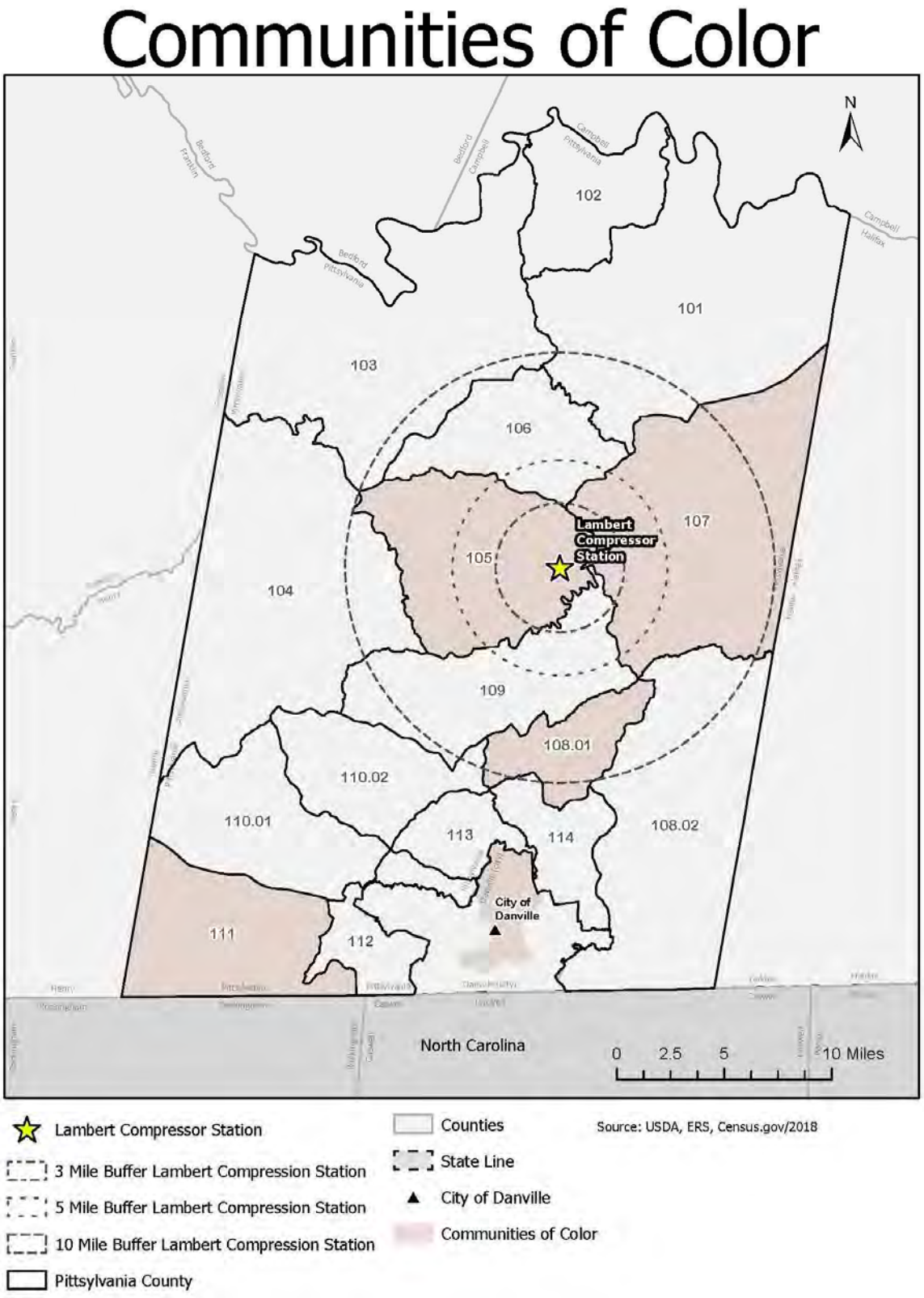
5-Mile Buffer: Communities of Color & Social Vulnerability

We identified two communities (census tracts 105, 107) meeting the "communities of color" criteria, according to the criteria provided by the Virginia Environmental Justice Act (i.e. any census tract with a minority percentage exceeding the average for the Commonwealth of Virginia). *See Figure1, below; see also Data Table 1 in Attachment A.*

10-Mile Buffer: Communities of Color & Social Vulnerability

We identified four communities (census tracts 104, 105, 107, and 108.01) meeting the "community of color" criteria of the Virginia Environmental Justice Act as expanded to include criteria used by NC DEQ, EPA or FERC (i.e. any census tract with a minority percentage exceeding the average for the Commonwealth of Virginia). *See Figure1, below; see also Data Table 1 in Attachment A.*

Figure 1. Map of Census Tracts Defined as "Communities of Color"



Because the VA DEQ definition of "communities of color" includes linguistically isolated households, we also identified census tract 109 as a "community of color;" however, because of the difference in the way that we analyzed linguistic isolation data (as a dichotomous rather than continuous variable), we have presented that data on a separate map below.

3-Mile Fenceline: Linguistically Isolated or English-Limited Households

We identified two census tracts (105, 109) within a five-mile radius of the proposed Lambert Compressor Station with at least one household identified as linguistically isolated. *See Figure 2, below as well as Data Table 8 in Attachment A.*

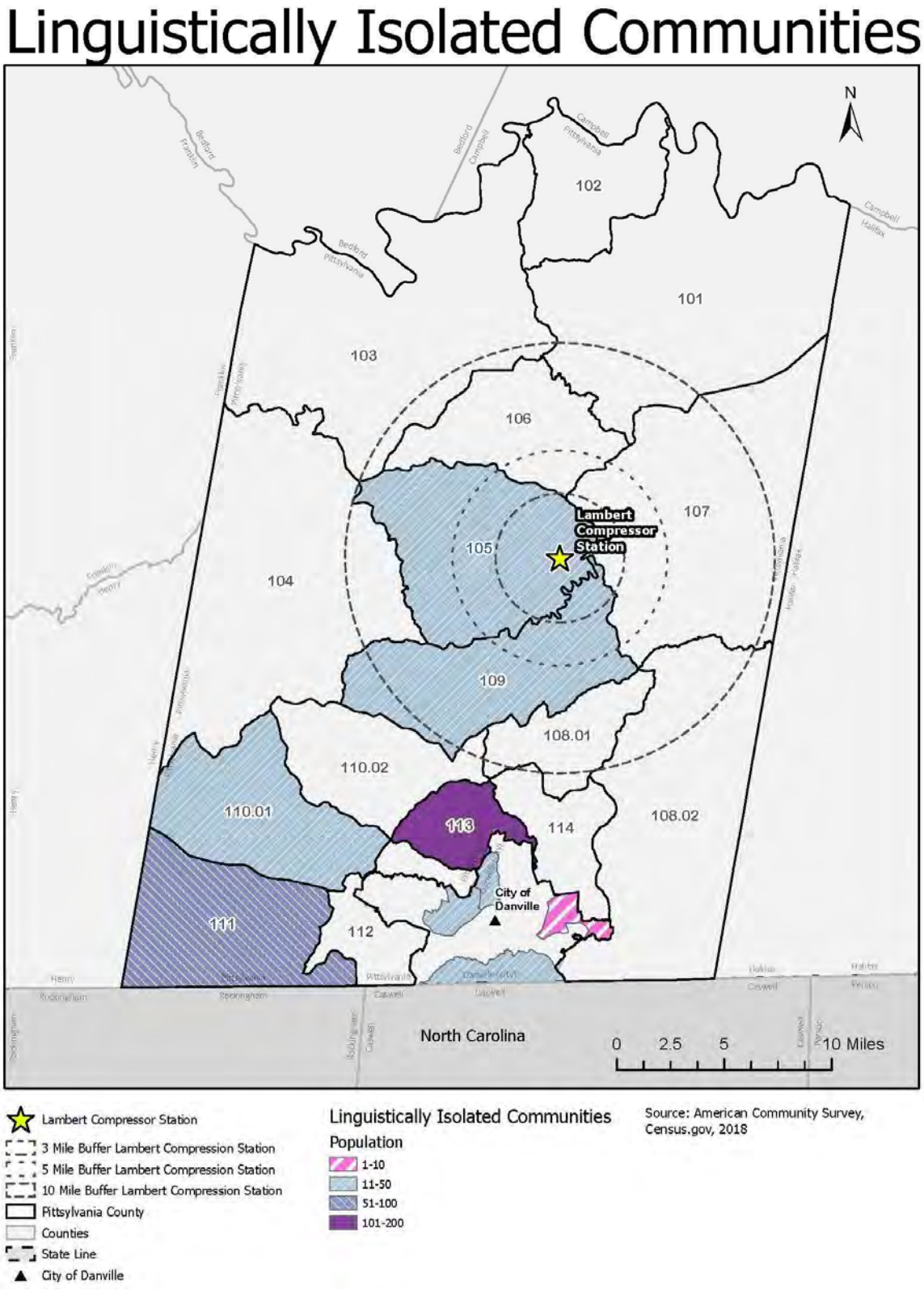
5-Mile Buffer: Linguistically Isolated or English-Limited Households

We identified two census tracts (105, 109) within a five-mile radius of the proposed Lambert Compressor Station with at least one household identified as linguistically isolated. *See Figure 2, below as well as Data Table 8 in Attachment A.*

10-Mile Buffer: Linguistically Isolated or English-Limited Households

We identified two census tracts (105, 109) within a ten-mile radius of the proposed Lambert Compressor Station with at least one household identified as linguistically isolated. *See Figure 2, below as well as Data Table 8 in Attachment A.*

Figure 2. Map of Census Tracts Defined as "Linguistically Isolated Communities"



3-Mile Fenceline: Low-Income Populations

All four of the census tracts we identified (105, 106, 107, and 109) as environmental justice communities within a 3-mile radius of the proposed Lambert Compressor Station met the Virginia Environmental Justice Act definition of "low-income communities;" specifically, under the provision that "'low income' means having an annual household income equal to or less than…200 percent of the Federal Poverty Level. 'Low-income community' means any census block group in which 30 percent or more of the population is composed of people with low income." *See Figure 3, below & Data Table 2 in Attachment A.*

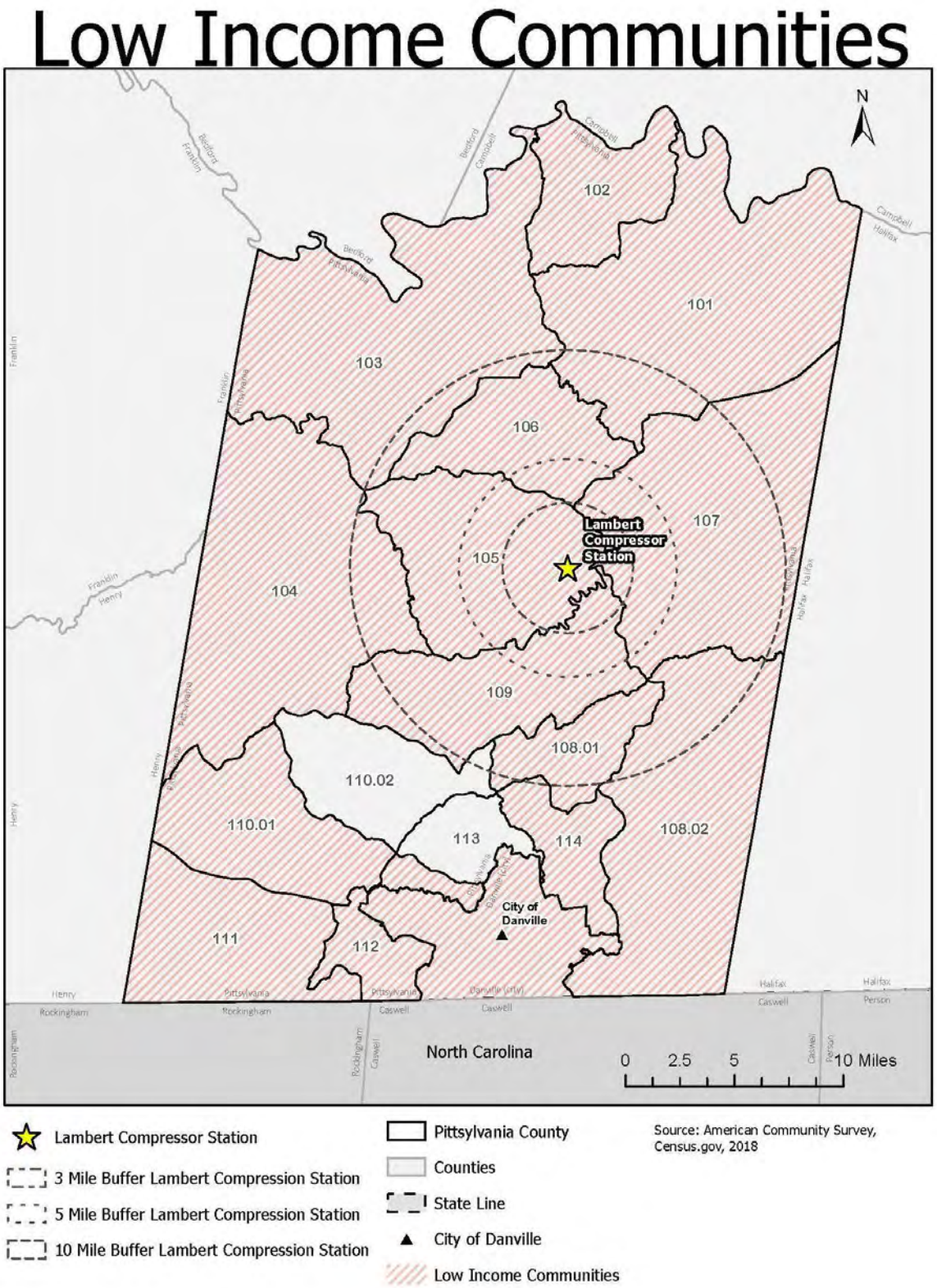
5-Mile Buffer: Low-Income Populations

All four of the census tracts we identified (105, 106, 107, and 109) as environmental justice communities within a 5-mile radius of the proposed Lambert Compressor Station met the Virginia Environmental Justice Act definition of "low-income communities;" specifically, under the provision that "'low income' means having an annual household income equal to or less than…200 percent of the Federal Poverty Level. 'Low-income community' means any census block group in which 30 percent or more of the population is composed of people with low income." *See Figure 3, below & Data Table 2 in Attachment A.*

10-Mile Buffer: Low-Income Populations

We also identified ten communities (census tracts 101, 103, 104, 105, 106, 107, 108.01, 108.02 109, and 114) within a broader concentric radii of study – 10 miles from the Lambert Compressor Station– meeting the "environmental justice community" criteria of the Virginia Environmental Justice Act as expanded to include criteria used by NC DEQ, EPA or FERC. All ten of these tracts were identified as "low-income communities" following the criteria provided by DEQ that includes households earning under 200% of the federal poverty threshold. *See Figure 3, below & Data Table 2 in Attachment A.*

Figure 3. Map of Census Tracts Defined as "Low Income Communities"



3-Mile Fenceline: Identified Communities with Pre-existing Exposure or Elevated Health Risk

We did not identify any communities within a 3-mile radius with pre-existing exposure rates greater than the national average for PM 2.5 or ozone. *See Figures 4 & 5, below & Data Table 3 in Attachment A.*

We did not identify any communities within a 3-mile fenceline radius who are subject to cancer risk that exceeds the state or national averages. *See Figure 6, below.*

We did identify one community within the 3-mile fenceline radius (census tract 109) with elevated proximity to Hazardous Waste Facilities. Although these facilities themselves are located closer to the 5-mile radius line, the census tract that is impacted extends through the 3-mile fenceline, and thus is considered here. We also identified limited mobility individuals (i.e., those with less control over their daily movements, habits and activities) within these communities, including residents of public housing, children enrolled in school, and incarcerated persons. *See Figures 7, 8a & 8b, below & Data Tables 4, 5, and 6 in Attachment A.*

5-Mile Buffer: Identified Communities with Pre-existing Exposure or Elevated Health Risk

We did not identify any communities within a 5-mile radius with pre-existing exposure rates greater than the national average for PM 2.5 or ozone. *See Figures 4 and 5, below & Data Table 3 in Attachment A.*

We did not identify any communities within a 5-mile radius who are subject to cancer risk that exceeds the state or national averages. *See Figure 6, below.*

We did identify one community (census tract 109) with elevated proximity to Hazardous Waste Facilities. We also identified limited mobility individuals (i.e., those with less control over their daily movements, habits and activities) within these communities, including residents of public housing, children enrolled in school, and incarcerated persons. *See Figures 7, 8a & 8b, below & Data Tables 4, 5, & 6, Attachment A.*

10-Mile Buffer: Identified Communities with Pre-existing Exposure or Elevated Health Risk

We identified two communities (census tract 108.02, 114) within a 10-mile radius with pre-existing exposure rates greater than the national average for PM 2.5. *See Figure 4, below & Data Table 3 in Attachment A.*

We also identified one community (census tract 114) within a 10-mile radius whose residents are subject to cancer risk that exceeds the state or national averages. *See Figure 6, below & Data Table 3 in Attachment A.*

We further identified five communities (census tracts 108.01, 108.02, 109, 110.2, and 114) with elevated proximity to Hazardous Waste Facilities. We also identified limited mobility individuals (i.e., those with less control over their daily movements, habits and activities) within these communities, including residents of public housing, children enrolled in school, and incarcerated persons. *See Figures 7, 8a & 8b, below & Data Tables 4, 5, and 6 in Attachment A.*

Figure 4. Map of Census Tracts w/ Exposure to Fine Particles (PM 2.5) Exceeding Nat'l Average

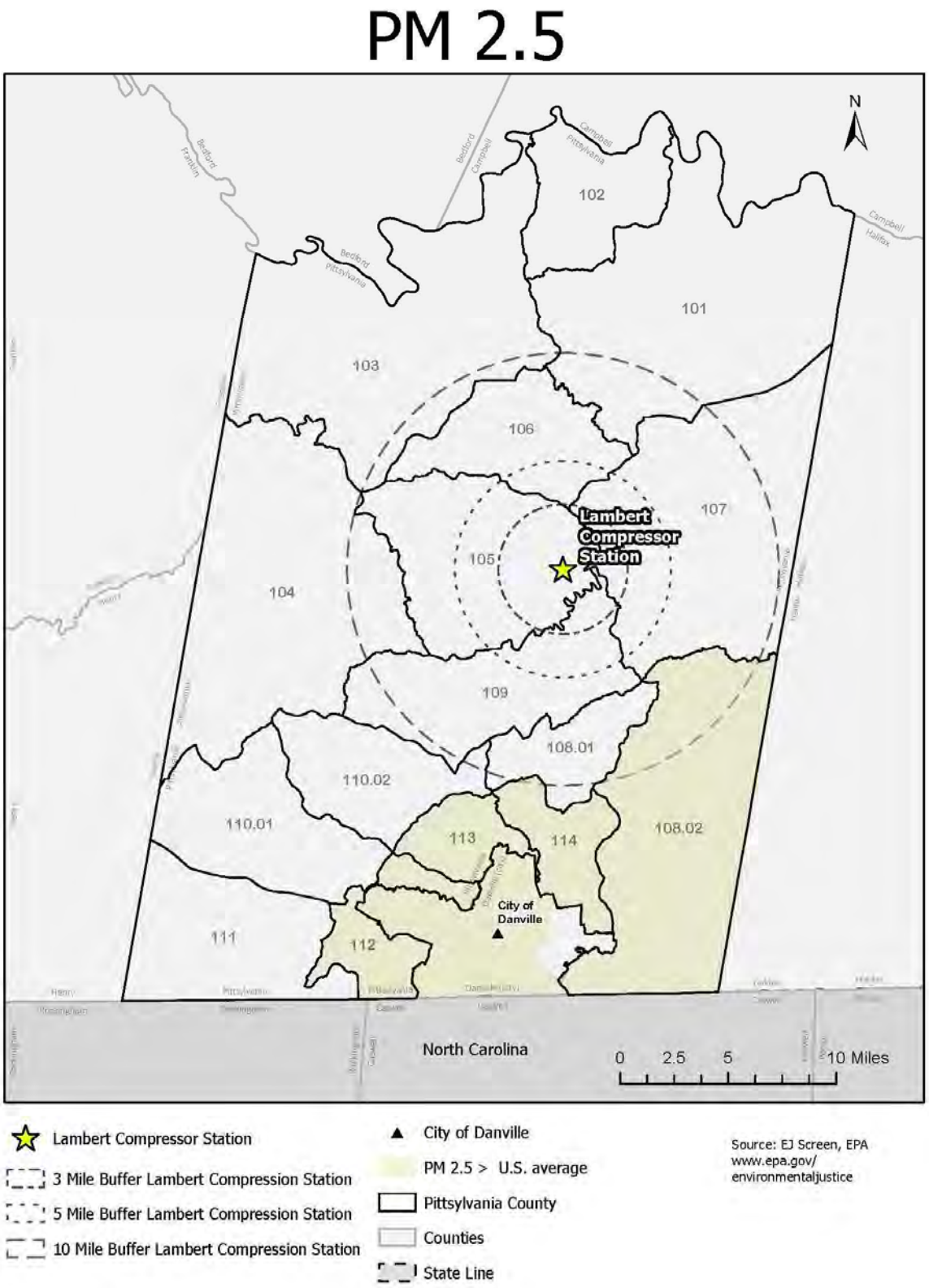


Figure 5. Map of Census Tracts with Exposure to Ozone Exceeding National Average

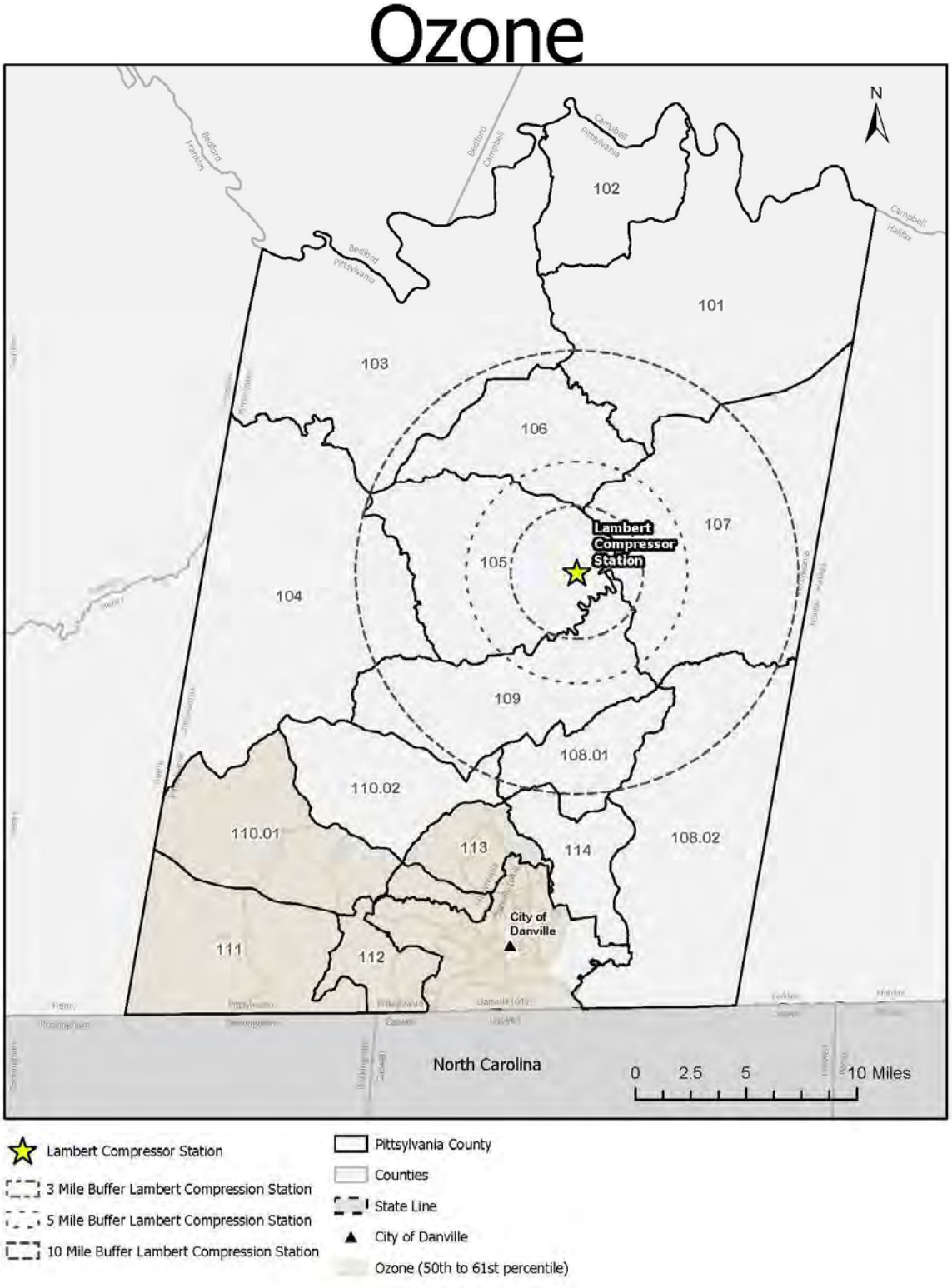


Figure 6. Map of Census Tracts with Cancer Risk Exceeding National Average

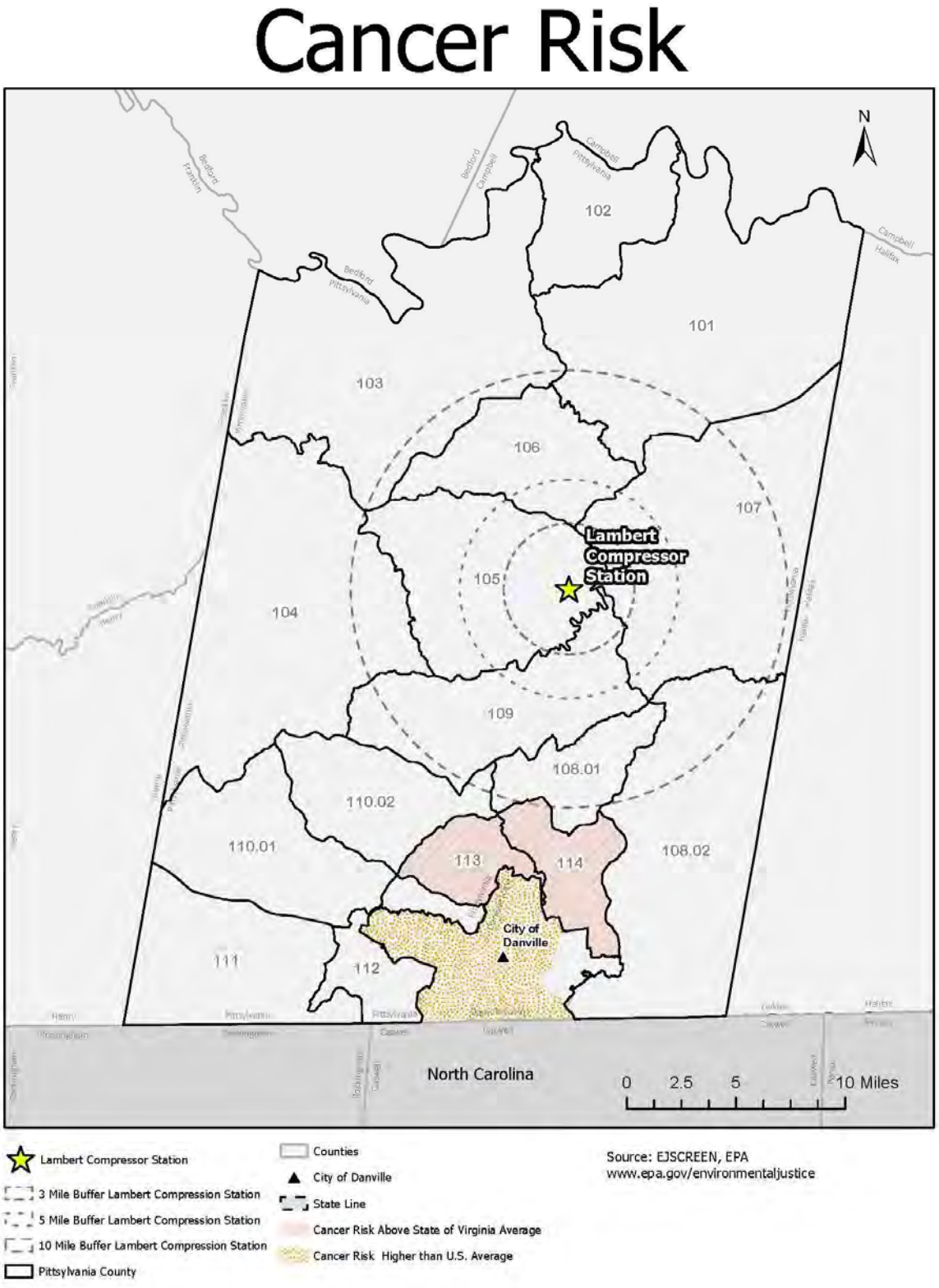


Figure 7. Map of Census Tracts with Hazardous Waste Proximity Exceeding Nat'l Average

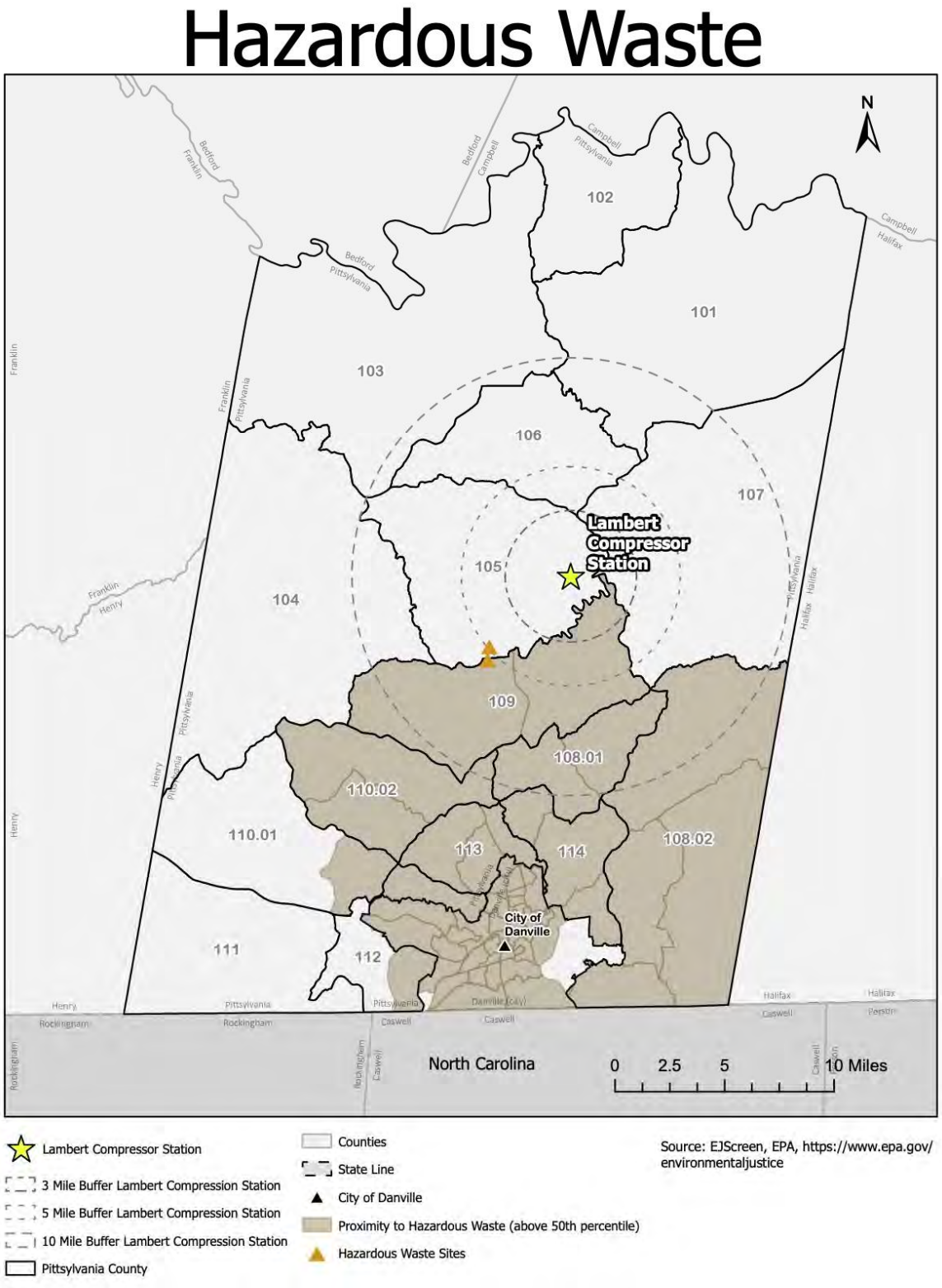


Figure 8a. Map of Census Tracts w/ Individuals Living in Group Quarters or Enrolled in School

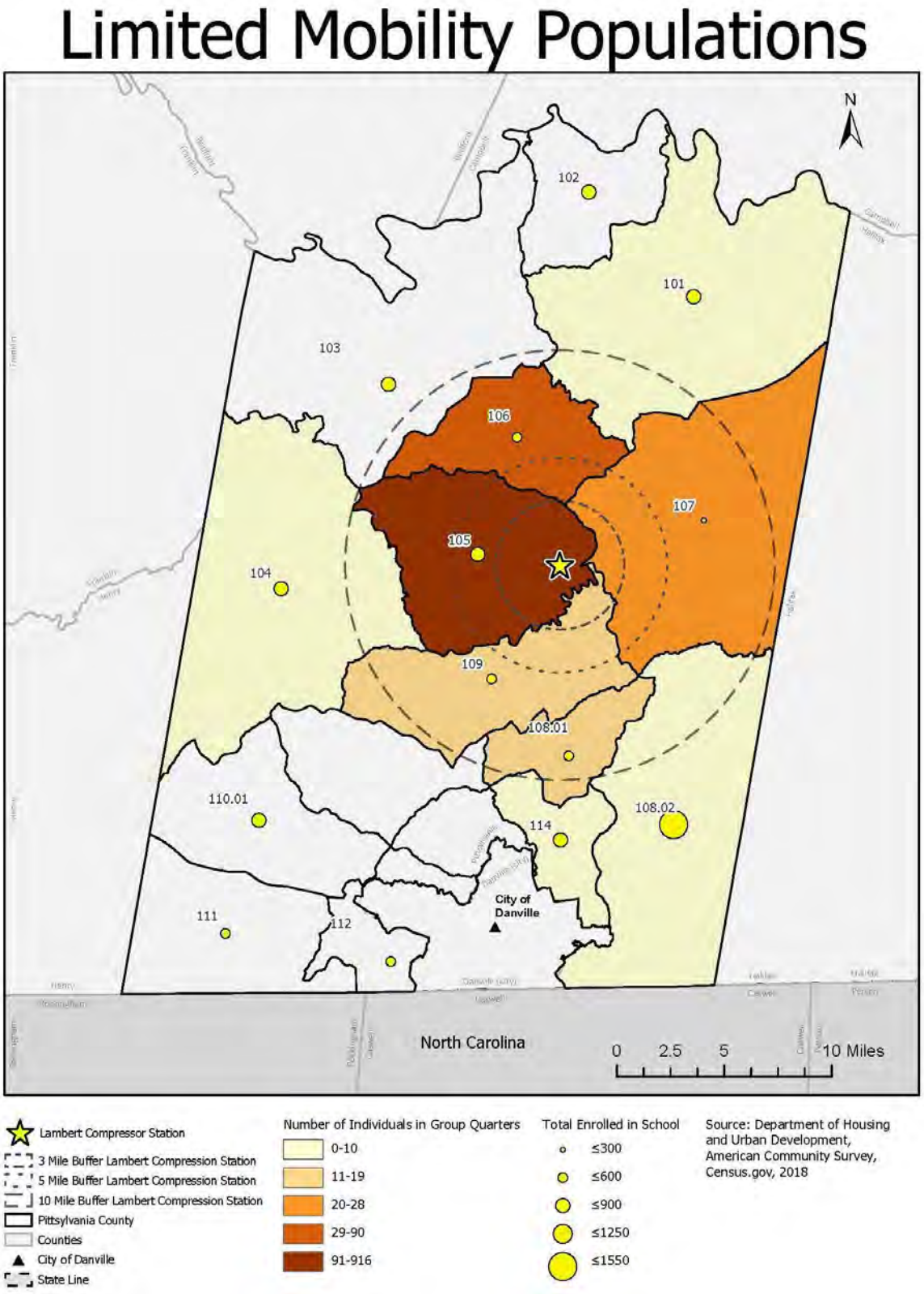
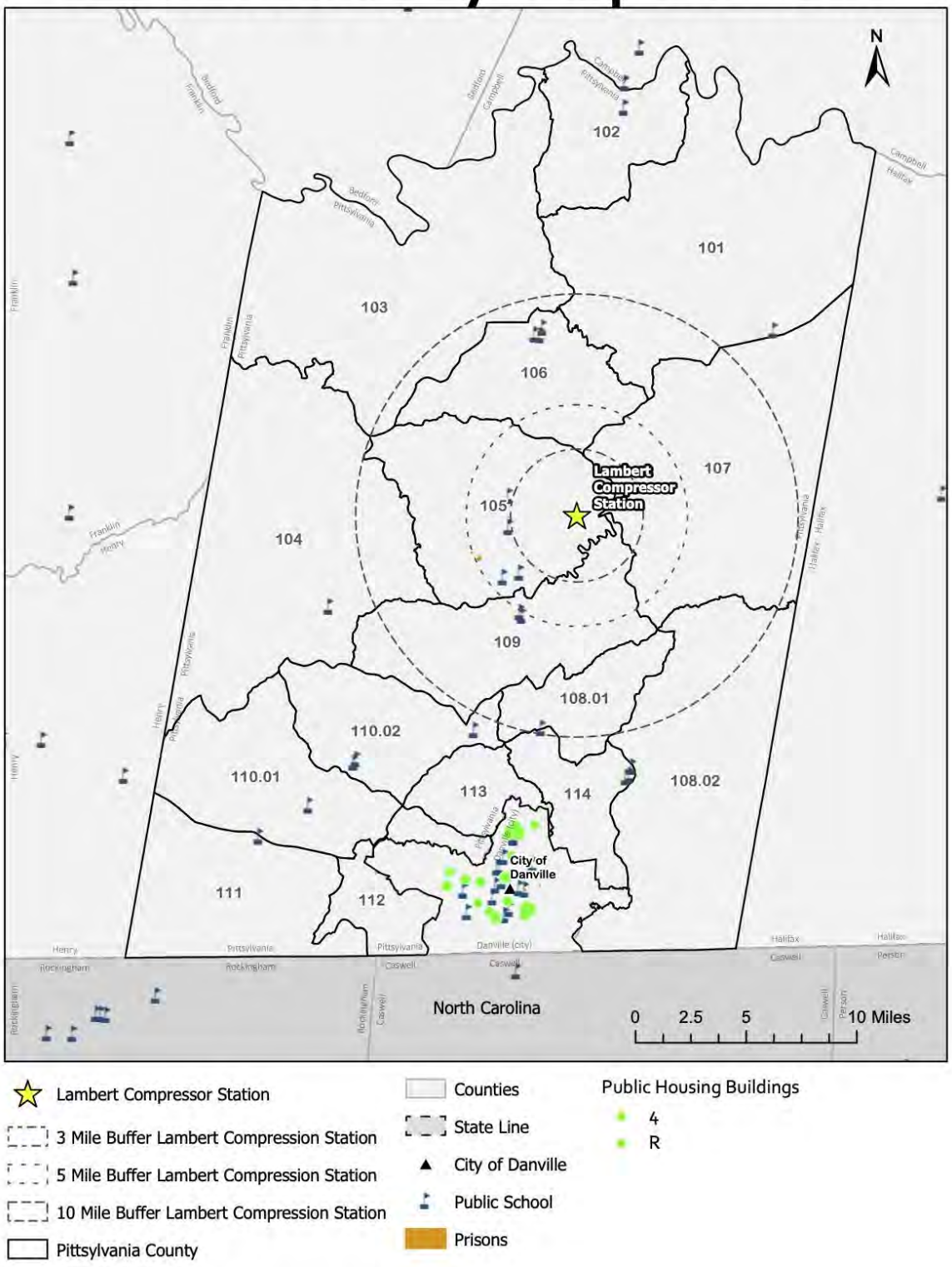


Figure 8b. Map of Census Tracts w/Limited Mobility Sites Identified

Low Mobility Population



3 Mile Fenceline: Additional Vulnerabilities

Food Deserts

As explained earlier in this report, while not a criteria for defining environmental justice communities, food deserts indicate low income and vulnerable populations. The USDA defines 'food deserts' as "census tract[s] that meet both low-income and low-access criteria including: (1) poverty rate is greater than or equal to 20 percent OR median family income does not exceed 80 percent statewide (rural/urban) or metro-area (urban) median family income; (2) at least 500 people or 33 percent of the population located more than 1 mile (urban) or 10 miles (rural) from the nearest supermarket or large grocery store."[43]

We identified four communities (census tracts 105, 106, 107, and 109) within a 3-mile fenceline that meet the definition of a "food desert" (communities with reduced access to healthy and affordable food) as given by the United States Department of Agriculture. This included (a) census tracts labeled by the USDA as "low-income and low-access (LILA) at 1 mile (urban) or 10 miles (rural)" – tracts where a significant number or share of residents are more than 1 mile (urban) or 10 miles (rural) from the nearest supermarket, as well as (b) census tracts labeled by the USDA as "low-income and low-access (LILA) using vehicle access" – tracts where more than 100 housing units do not have a vehicle and are more than ½ mile from the nearest supermarket, or a significant number or share of residents are more than 20 miles from the nearest supermarket. *See Figure 9, below & Data Table 7 in Attachment A.*

Degraded Landscapes

We further noted that the majority of the landscape (particularly census tracts 105 and 109) within a 3-mile radius of the proposed site is rated as "poor" or "low" condition value by NatureServe, via the model designed by Comer et al. (2017).[44] NatureServe is a preeminent entity for the collection and analysis of scientific data pertaining to ecological health and status, and this model is widely used for ecological impact and other related assessments. *See Figure 10, below.*

5 Mile Buffer: Additional Vulnerabilities

Food Deserts

We identified four communities (census tracts 105, 106, 107, and 109) that meet the definition of a "food desert" as given by the United States Department of Agriculture. *See Figure 9, below & Data Table 7 in Attachment A.*

Degraded Landscapes

We further noted that the majority of the landscape (particularly census tracts 105 and 109) within a 5-mile radius of the proposed site is rated as "poor" or "low" condition value by NatureServe, via the model designed by Comer et al. (2017).[45] *See Figure 10, below.*

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[43] Dutko et al. "Characteristics and Influential Factors of Food Deserts" (2012), USDA Economic Research Report Number 140

[44] Hak, John C., and Patrick J. Comer. "Modeling landscape condition for biodiversity assessment—Application in temperate North America." *Ecological Indicators* 82 (2017): 206-216.

[45] Hak, John C., and Patrick J. Comer. "Modeling landscape condition for biodiversity assessment—Application in

10 Mile Buffer: Additional Vulnerabilities

Food Deserts

We identified seven communities (census tracts 101, 103, 104, 105, 106, 107, and 109) that meet the definition of a "food desert" as given by the United States Department of Agriculture. *See Figure 9, below & Data Table 7 in Attachment A.*

Degraded Landscapes

We further noted that the majority of the landscape (particularly in census tracts 105, 106, and 109) within a 10-mile radius of the proposed site is rated as "poor" or "low" condition value by NatureServe, via the model designed by Comer et al. (2017). *See Figure 10, below.*

temperate North America." *Ecological Indicators* 82 (2017): 206-216.

Figure 9. Map of Census Tracts Meeting at least one USDA Definition of 'Food Desert'

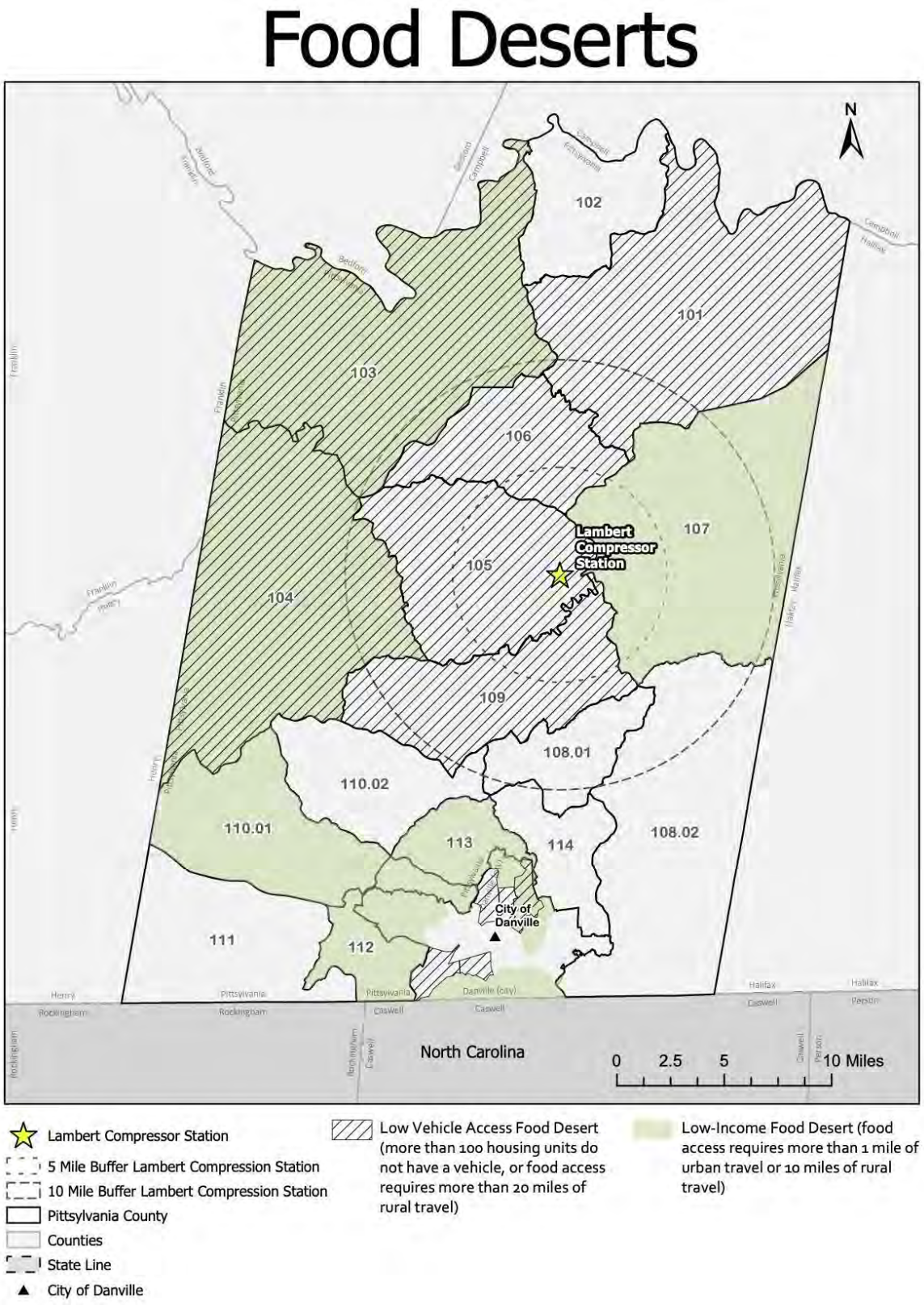
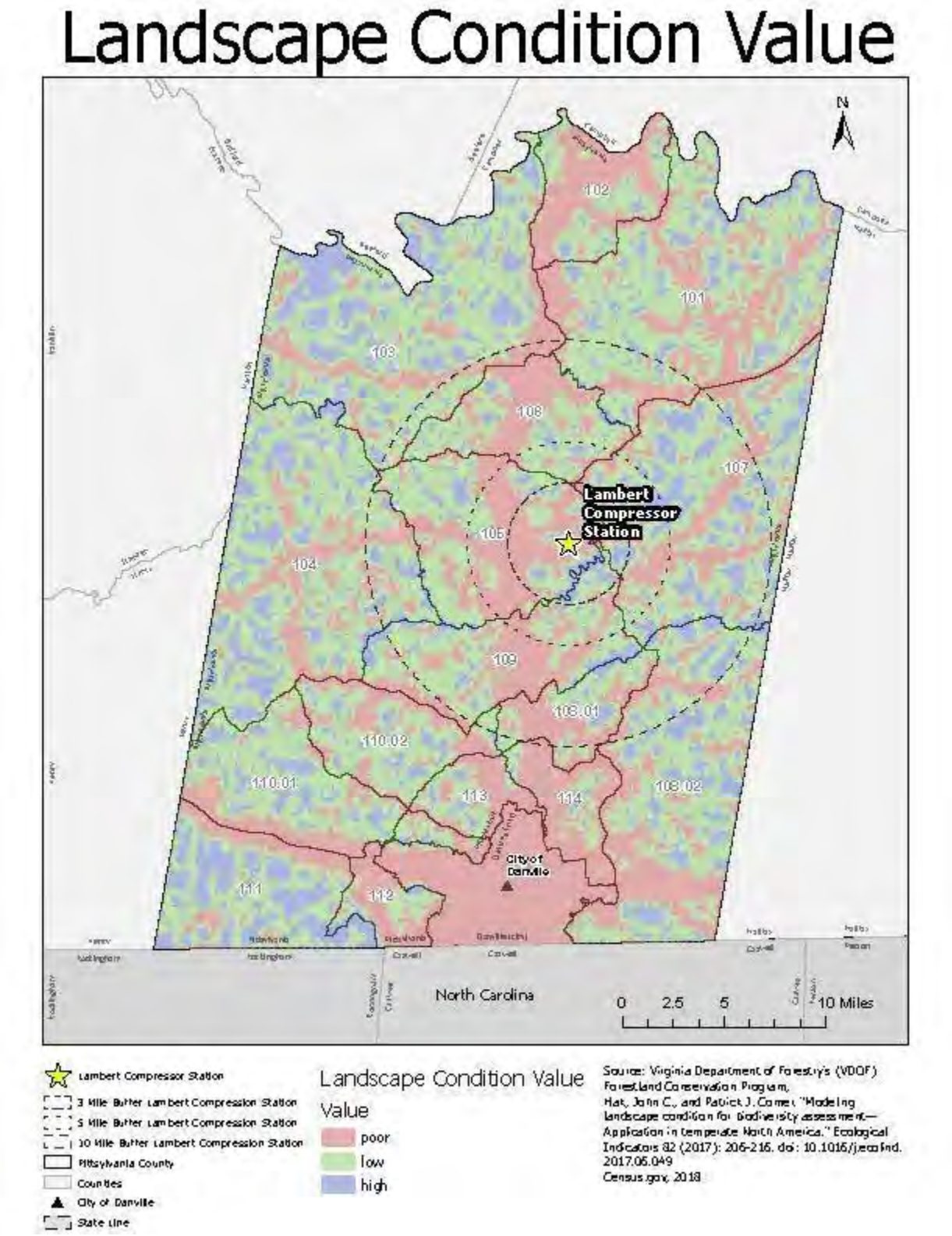


Figure 10. Map of Landscape Condition Indices, as given by NatureServe



Qualitative Interview Data

Limitations

Because of the restricted timeline in which we were operating, the results of community interviews shared here do not reflect sufficient practices to meet the standards of academic inquiry. The information provided herein is instead a rapid-praxis assessment of fenceline, frontline, and footprint communities -- and the potential impacts to them from the project, along with possible mitigation for those impacts.

We recommend strongly that Mountain Valley continue targeted and thoughtful outreach to impacted communities and individuals through the public participation, permitting and construction process.

Indigenous Community Identification Results

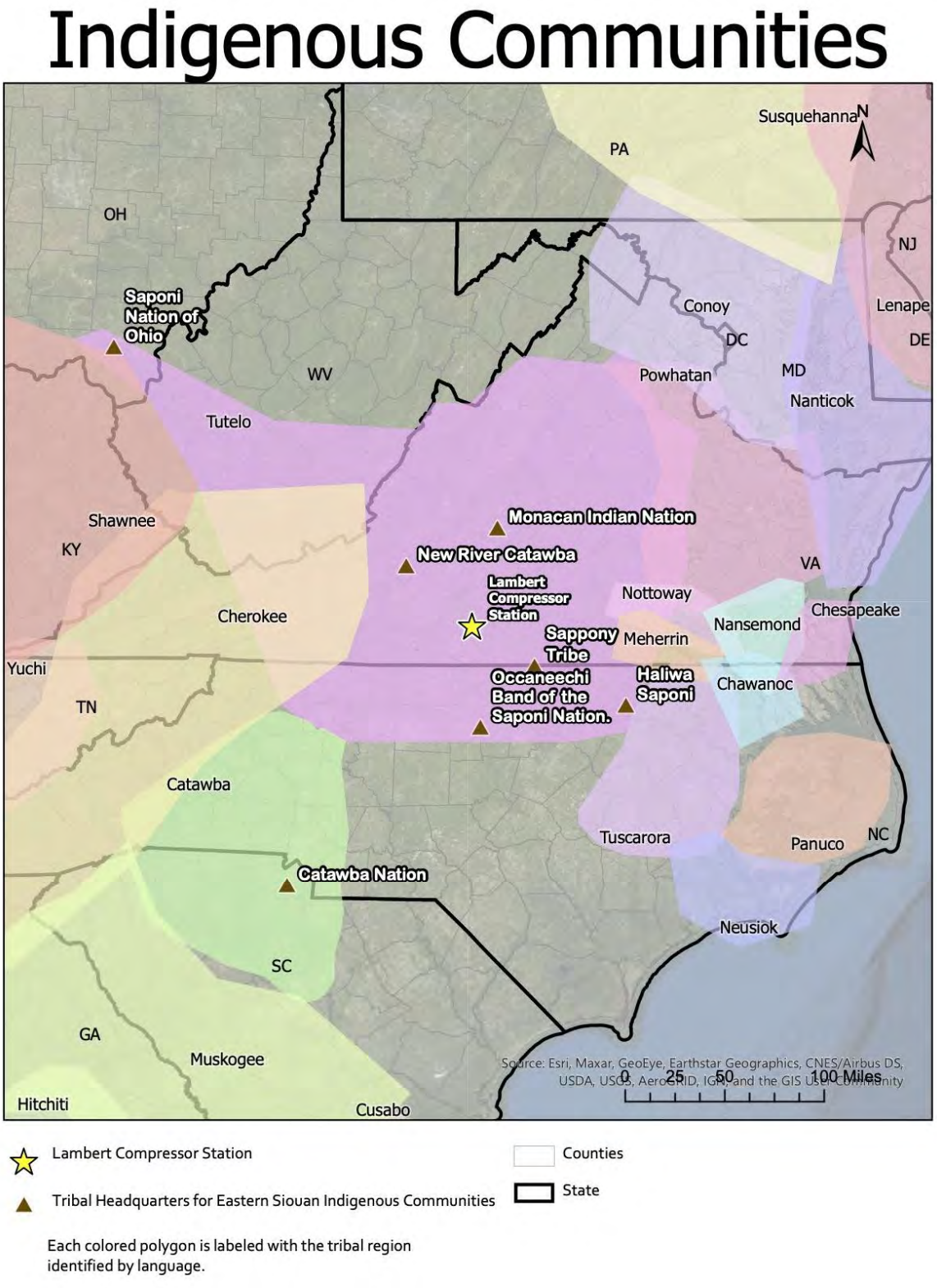
The proposed Station location overlaps with the ancestral lands of the Tutelo-Saponi speaking Eastern Siouan tribes (autonym: Yesàh/Essaw/Issaw). *See Figure 11, below.*

The members of these tribes and communities descend from the original Eastern Siouan inhabitants of the Virginia Blue Ridge & foothills region, possess historic connections to place, and continue to rely on this landscape for conducting essential cultural and religious practices.

This cultural/language group includes two (2) federal and six (6) nonfederal tribes; nonfederal tribes included a mix of three (3) state-recognized tribes and two (2) tribal communities acknowledged or identified by members of the federal and state recognized tribes as holding legitimate Indigenous identities through kinship ties and cultural practices. These included:

- Monacan Indian Nation (Federal)
- Catawba Indian Nation (Federal)
- Occaneechi Band of the Saponi Nation (Nonfederal; State)
- Sappony Tribe (Nonfederal; State)
- Haliwa-Saponi Tribe (Nonfederal; State)
- Saponi Nation of Ohio (Nonfederal)
- New River Band of Catawba (Nonfederal)

Figure 11. Map of Historic Indigenous Language Regions of the Tidewater



Non-Indigenous Cultural Community Identification Results

African-American Descendants of Freedmen

We identified at least one (1) additional special cultural community via the criteria we identified in our methods (whose experiences or history are distinct from the dominant culture within 10 miles of the proposed Project. Members of this community include persons whose African-descended ancestors were enslaved for agricultural labor (tobacco plantations) in Pittsylvania County, and who retain strong ties and community networks that were formed in the county post-Emancipation and persist through today.

This community is dispersed throughout Chatham and the broader census tracts within our radii of analysis, but literature reviews, reviews of current local media, and interviews indicate that many generational African-American community members have current or ancestral connections to Blairs, Virginia [46] [47] (also "the Blairs"), a community within the larger Chatham-Blairs Election District[48] that is located approximately 14 miles south of proposed Station.

Interviews Conducted & Plans for Further Outreach

Between June 22 and continuing through August 31, 2020 we conducted two types of interviews: (1) interviews with members of the identified Indigenous communities native to this *amanīnechi*; (2) interviews with non-Indigenous community members resident within a 10-mile radius of the proposed Lambert Compressor Station. We interviewed community members, asking them to share their opinions and experiences regarding potential or actual impacts of the proposed Station.

Response Rate

We sent recruitment emails either directly or through website contact forms to 264 individuals or organizations who are living or working within Pittsylvania County, with a primary focus on those within a 10 mile radius of the Lambert Compressor Station. Of those emails, thirteen (13) responded, and six (6) resulted in extensive interviews – a response rate of 4.9% and a completion rate of 2.3%.

We also sent messages of recruitment to twelve (12) individuals and six (6) organizations via Facebook Messenger, and posted recruitment messages in four (4) additional Facebook Groups. These contacts resulted in 14 responses and 10 interviews – with a response rate of 67% for individuals, 0% for organizations, and 50% for Groups.

Our response rates for email recruitment were expectedly low, and aligned with prior published research on response rates for recruitment of this type (rates varied between 2% and 5% in one

[46] Virginia Department of Historic Resources. "071-5820 Southside High School" (2020).
[47] Jackson, Lawrence P. My Father's Name: A Black Virginia Family After the Civil War. University of Chicago Press, 2012.
[48] Pittsylvania County, Virgina Board of Elections. "Chatham-Blairs District 2011" (2011) https://www.pittsylvaniacountyva.gov/DocumentCenter/View/268/Chatham-Blairs-District-PDF

study,[49] and up to 6.1% in another[50]). Our data and analyses are based solely on desktop information and these interviews with the resulting limitations.

Plans for Further Outreach

Outreach and inquiry will continue through September 2020 to members of impacted Indigenous communities, members of the African-American Freedmen descendant community, individuals who live within the 10-mile radius of the proposed Station, and organizations whose primary scope of activity overlaps the maximum 10-mile radius.

Participants were invited to participate in 30-minute interviews by phone or over Skype (or other appropriate online platform). The interviews had an expected duration of 30 minutes, with a maximum duration of 1.5 hours. Participants were identified through targeted research and snowball sampling methods, and invitations were extended by email, through website contact forms, or through the Facebook Messenger service (for the latter, this form of contact was only used when public pages were available for contact; no friend requests were made in order to access communication privileges through these means).[51]

Interview questions were guided by the parameters listed above, and asked participants to reflect on their experiences in their immediate surroundings, including the ways in which they use the landscape; their sense of place in relating to the landscape; any cultural practices or community rituals undertaken within the landscape; what they know already about the proposed Station; whether they anticipate any points of conflict between the Station and their communities; whether they anticipate any points of mutual benefit between the Station and their communities; what their attitudes are toward Mountain Valley Pipeline, LLC, the executor of the project; and what their attitudes are toward energy infrastructure in the United States, overall.

Due to the extremely sensitive nature of the project, the interviews we conducted are confidential, although they were not anonymous (both the interviewee and the interviewer remained aware of each other's identities), and were digitally recorded only when interviewees consented to recording. Any recordings are stored on a password-secured hard-drive, and have only been made accessible to the interviewer/interviewee pair (and a translator, if one was needed).

Respondent Data

From the respondents, we gathered the following preliminary information. Where possible, we have identified whether the impacts are the result of the Station or the pipeline. This discussion

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[49] Sinclair, Martha, et al. "Comparison of response rates and cost-effectiveness for a community-based survey: postal, internet and telephone modes with generic or personalised recruitment approaches." *BMC medical research methodology* 12.1 (2012): 132.

[50] Heerman, William J., et al. "Recruitment methods for survey research: findings from the mid-south clinical data research network." *Contemporary Clinical Trials* 62 (2017): 50-55.

[51] A full draft of the recruitment email is available in Attachment C.

of impacts is based on the interviews and reflects concerns of the community. The discussion does not indicate the likelihood of the impacts occurring or whether they will occur at all.

General Opinions on the Proposed Project

Relating to Energy Infrastructuring, Overall

In general, our respondents were not opposed to energy infrastructure overall, but expressed concerns about exclusion from planning processes and possible poor siting of infrastructure. Concerns further expressed below were specific to Mountain Valley and the Project. Where possible, comments relevant to the compressor station were identified as such.

Relating to the Proposed Compressor Station

A majority of our respondents were not familiar with the proposed Station, but of those who were familiar, a majority of non-Indigenous respondents expressed comfort with the proposed location, citing its proximity to another existing Compressor Station (the Transco Station, owned by Williams) and appreciated Mountain Valley's use of existing corridors and already-impacted landscapes. A majority of Indigenous respondents, who were focused on landscape-scale issues, expressed no opinion on the proposed Station, but expressed significant discomfort with the proposed pipeline, citing concerns about the risk of further degradation of community health, as well as ecosystem and water quality associated with this Project as part of the larger Mountain Valley Pipeline system.

Relating to Mountain Valley

All respondents expressed some level of discomfort, distrust or skepticism about the Mountain Valley Pipeline or its parent companies. Level of distrust varied, with responses varying from expressing oppositional distrust (i.e. "I will never work with Mountain Valley Pipeline; all they care about is money,") to pragmatic skepticism (i.e. "They're an oil & gas company, and I think they might make some mistakes while they're trying to do their jobs.") Distrust was especially high among respondents with more years of experience in either energy & environmental planning/advocacy, or in historical/archaeological preservation. Distrust was also high among Indigenous respondents. Distrust was lower among both Indigenous and non-Indigenous respondents who currently worked in fields related to construction, engineering, or transportation.

Parameters of Community Impact -- Non-Indigenous

Community members interviewed within the 10 mile radius of the proposed Station anticipated highly localized impacts as a result of the construction and operation of the Station.

The focus of these comments was on perceived potential indirect impacts related to traffic and real estate values, and on physical operation of networked community providers such as churches and other faith institutions, childcare providers, food banks and community gardens, fire & emergency services, libraries and other free education support providers, and community support non-profits such as the Boys & Girls Club, Lions Club, and fraternity/sorority service groups.

Broadly, non-Indigenous respondent comments split into three domains:

Domain 1 – Critical Service Provision

This domain included concerns about impacts on critical service provision, including the operation of food banks and childcare facilities that might be disrupted, either permanently or temporarily due to construction or operation activities (as listed above).
Respondents also cited investments that Mountain Valley had already made into the community surrounding the proposed Station as reasons to anticipate future benefits ("I think they are good stewards of the community. They have always been very receptive to help fire and rescue. Always been open about issues.")

Impacted Provider	Anticipated Impact
Child Care & Senior Facilities	***Direct:*** Facilities could be forced to move as a result of land use changes, noise, or reduced air quality that impeded their ability to operate.
	Indirect: Facilities could be impacted by disruptions in already-weak internet capacity as a result of reduced bandwidth due to additional Mountain Valley burdens or use.
	Cumulative: This could result in economic consequences (lost wages due to needing to stay home, additional costs of differing child care, additional transportation costs) for households with children or elderly adults requiring care.
Churches	***Direct:*** Could be forced to move as a result of land use changes, noise, or reduced air quality that impeded their ability to operate.
	Indirect: Movement or shifting of churches could result in loss of social cohesion and community identity, as well as reduced community wellbeing. Churches could be impacted by disruptions in already-weak internet capacity as a result of reduced bandwidth due to additional Mountain Valley burdens or use.
Food Banks & Community Gardens	***Direct:*** Could be forced to move as a result of reduced water or soil quality as a result of land use changes, or catastrophic failures in the Compressor Station or pipeline.

	Could be forced to move as a result of land use changes, noise, or reduced air quality that impeded their ability to operate. - Large spaces at low cost are often a necessary part of food bank storage + management; this can orient toward cheap real estate in marginal locations relative to town centers, which is also the type of real estate sought by large infrastructure projects - Food banks experience costs related to the distribution of food to communities in need; these costs can be increased as a result of local traffic or infrastructure changes
	Indirect: Negative impacts on food banks and community gardens could result in loss of social cohesion and community identity, as well as reduced community wellbeing
	Cumulative: Could experience secondary impacts due to loss of capacity by churches or community service groups (*see above*)
Fire & Emergency Services	***Direct:*** Additional burden, cost, or risk incurred as a result of temporary increases in traffic, local population, and/or potential protests or Mountain Valley conflicts with protestors. Additional risk and cost incurred as a result of a catastrophic failure of Compressor Station Additional risk and cost incurred as a result of catastrophic failure of pipeline leading to/from Compressor Station
Community Service Groups	***Direct:*** Could be forced to reduce or change activities (e.g. outdoor recreation activities, gatherings) as a result of land use changes, noise, or reduced air quality that impeded their ability to operate
	Indirect: Could be impacted by disruptions in already-weak internet capacity as a result of reduced bandwidth due to additional Mountain Valley burdens or use

Domain 2 – Safety & Policing

Respondents – particularly respondents of color – expressed concerns about over-policing in relation to the proposed Project, and several respondents cited specific examples of

harassment by security forces presumed to be working for Mountain Valley, including incidents where they were followed, surveilled, or verbally harassed after getting too close to a construction site (the respondent expressed that this had been an act purely of curiosity, and had not been part of any protest action); surveying regions near the pipeline site for uncovered Indigenous artifacts as part of a group interested in archaeology; or attending a protest at a construction site.

Respondents also expressed concerns about immediate safety and emergency response, should a catastrophic failure of the Station or pipeline occur.

Impacted Domain	Anticipated Impact
Policing	***Direct:*** Overzealous policing on part of private security of Mountain Valley, or by local police on behalf of Mountain Valley could pose physical or legal dangers to community members* through abusive and unnecessary arrests/detention ***Particularly acute dangers could be posed to African-American community members, due to nationwide, systemic biases in policing & justice that disproportionately impact Black, Indigenous, and People of Color (BIPOC) community members
Emergency Services, Health & Safety	***Direct:*** Catastrophic failure of the Station could create immediate physical risk to residents (e.g. of fire, explosion), as well as chronic physical risks (e.g. contaminated air, water, or soil).
	Indirect: Stress of risk could create psychological anxieties for residents living within the fenceline.

Domain 3 – Recreation, Landscape & Way of Life Preservation

Respondents expressed a desire to limit or avoid negative impacts to the rural landscape or way of life as a key point of concern about energy infrastructure construction, in general ("[Where I live], it's very rural, very calm. A good, healthy place to live.").

However, respondents also noted that there are minimal recreation opportunities in the immediate Station area, and expressed concern that pipeline construction might further reduce those opportunities by making some areas previously used for recreation (either formal or informal) unsafe or unavailable for use.

Impacted Domain	Anticipated Impact

Outdoor Recreation Sites or Opportunities	***Direct:*** Access to outdoor recreation could be reduced as a result of land use changes, noise, or reduced air quality
Landscape & Way of Life	***Direct:*** Could experience ruined views/landscapes, reduced access to hunting + fishing opportunities, or other diminishments of rural way of life as a result of land use changes, noise, or reduced soil or air quality Could experience sick animals/impacts on local agriculture as a result of land use changes, noise, or reduced soil or air quality

Parameters of Community Impact – Indigenous

First and foremost, Indigenous community members consistently expressed disappointment and frustration that Mountain Valley had not previously conducted appropriate or authentic outreach to their communities, and cited multiple failures and missed opportunities for in-depth communication.

Overall, Indigenous community members expressed broader landscape-level concerns about the well-being of the natural environment related to the proposed pipeline than did non-Indigenous community members. Indigenous communities living across the United States and within interior Indigenous Sovereign Territories ("Indian Country"[52]) retain uniquely enduring, multivariate, intensive, and well-documented relationships to the broad land bases which they have historically stewarded, used, or occupied.[53] [54] [55] [56] [57] For this reason, interviews with Indigenous community members often included information, assessments of concern, or references to regions outside of our 10-mile maximum analytical radius. We nevertheless included this information in our reported findings, with parenthetical notes to suggest where the interviewer had marked such information as being related to issues within the 10-mile radius (notation: "Station") or outside of it (notation: "Project").

[52] Environmental Protection Agency. "Definition of Indian Country." (Accessed September 3, 2020) https://www.epa.gov/pesticide-applicator-certification-indian-country/definition-indian-country

[53] United Nations Permanent Forum on Indigenous Issues. "Indigenous Peoples - Lands, Territories and Natural Resources." (Accessed September 3, 2020) https://www.un.org/en/events/indigenousday/pdf/Backgrounder_LTNR_FINAL.pdf

[54] Booth, Annie L. "We are the land: Native American views of nature." *Nature Across Cultures.* Springer, Dordrecht, 2003. 329-349.

[55] Simpson, Leanne Betasamosake. "The Place Where We All Live and Work Together." *Native Studies Keywords* (2015): 18.

[56] Goeman, Mishuana. "Land as life: Unsettling the logics of containment." *Native Studies Keywords* (2015): 71-89.

[57] National Museum of the American Indian. "IndiVisible: Native-African Lives in the Americas." (Accessed September 3, 2020) https://americanindian.si.edu/exhibitions/indivisible/land.html

Indigenous community members identified concerns relating to the preservation of cultural artifacts in the face of soil disruption; their opportunity to connect with ancestral and sacred places, potential negative impacts on the continuity of cultural and linguistic practices including visiting sites of importance in the region, and potential negative impacts on intertribal interactions, including increased antagonism due to differential compensatory schemes for impacts felt by federal and nonfederal tribes.

Broadly, Indigenous respondent comments split into the following four domains:

Domain 1 – Landscape, Artifacts, & Sense of Place

All Indigenous respondents identified or referred to a strong sense of place that extended beyond the immediate region of the Station, across the full breadth of the ancestral homelands or historic territory of their individual tribe and related tribal communities ("Looking out on the land, across the creeks and woods, you feel connected to that. The more disruption, that definitely affects your perception of your surroundings and yourself. It's like losing a part of yourself.").

All respondents identified specific risks to the ecological landscape from the pipeline rather than the station – in particular, to water quality and to water access for both utilitarian and ceremonial purposes (e.g. "the women need the [river] water for their ceremonies"). Concerns were raised about both construction and to operation, and in particular about potential catastrophic leakage ("Inevitably, these pipelines seem to leak. It's just a matter of time." "If there's a leak, it's going to impact the water…"), and a perceived lack of accountability ("If there's a leak, who's going to pay for it?").

All respondents also identified specific and severe risks to the archaeological-historical landscape ("There are untouched archaeological sites here…thousands of years of culture."), and the risk that the loss of critical archaeological artifacts might pose to a better understanding of their own cultural history ("Each site is a page in a book, a chapter of our history, and each time one is disturbed, a great deal of information is lost.") Some respondents cited specific failures of Mountain Valley to appropriately identify, transport, or protect artifacts previously uncovered ("I've seen them rotting away in bags in some basement."), as well as a failure to inform private landowners of the option/opportunity to turn found artifacts over to tribal preservation officers or designated safekeepers.

Impacted Domain	Anticipated Impact
Landscape (**Station**)	***Direct:*** Could experience ruined views/landscapes, reduced access to hunting + fishing opportunities, or other diminishments of rural way of life as a result of land use changes, noise, or reduced soil or air quality Could jeopardize continuation of cultural practices made meaningful by being contextualized in landscape (e.g. ceremony reliant on an unimpeded view of specific valleys and sacred places along ridgetops)
Ecological Integrity (*Project*)	***Indirect:*** Could experience water or soil contamination that prohibits direct human use for ceremonial or practical purposes; due to the cultural connection between water and women's ceremonies, this particularly impacts Indigenous women
	Cumulative: Could experience reduction in ecological functioning due to air, water or soil contamination that leads to loss of plant or animal species of practical (e.g. as food, medicine, or for physical elements in art or craftwork), spiritual (e.g. for ceremony), or cultural importance Could experience a reduction in ecological functioning due to water or soil contamination that violates ability of Indigenous communities to engage in traditional land use practices or stewardship
Archaeological Artifacts (**Station** & *Project*)	Artifacts could be unearthed on privately-owned or MVP-owned land during the construction phase and lost, broken, or mishandled in ways that violate cultural norms and spiritual ceremonial practices (esp. regarding reburial) Human remains could be unearthed on privately-owned or MVP-owned land during the construction phase and lost, broken, or mishandled in ways that violate cultural norms and spiritual ceremonial practices (esp. regarding reburial) Artifacts of unusual or delicate construction could be overlooked or inadvertently harmed by land disturbance processes

	Indirect: Language restoration efforts could be harmed by artifact destruction or losses Efforts toward federal acknowledgement for nonfederal tribes, or historical community acknowledgement of tribal continuity in place, could be harmed by artifact destruction or losses

Domain 2 – Identity, Livelihood & Sense of Community

Approximately a third of our seven Indigenous respondents expressed concerns about direct impacts on the livelihood of Indigenous community members in the impacted regions, particularly for those engaged in work related to construction or farming. For the former, anticipated impacts included potentially beneficial, but ultimately short-lived and dangerous employment; for the latter, concerns related to negative impacts on water quality and soil quality as a result of potential chemical contamination.

One respondent also expressed a general concern about negative impacts on identity as a result of physical-psychological division created by the pipeline ("We cross over these pipelines to get to one another"), which could exacerbate intertribal separation and harm to Indigenous communities.

Other respondents, particularly female respondents, expressed concern about the use of non-local workers for the construction and operation of the pipeline, citing increased violence against Indigenous women that had tracked with oil & gas construction projects in the western United States, and pointing out that the Southeastern Indigenous women face unique additional risks, due to endemic biases that fail to accurately record or investigate cases of missing and murdered Indigenous women.[58]

Impacted Domain	Anticipated Impact
Safety (**Station**)	***Direct:*** Indigenous women's safety could be put at risk due to influx of out-of-state or nonlocal workers, similar to the 'man camp' phenomenon; this is particularly acute because Indigenous women in the southeast already experience reduced reporting and investigation of violent crimes

[58] "Murdered And Missing Indigenous Women: Advocates Say NC Law Enforcement Ignores The Problem." (May 8, 2020). https://www.wunc.org/post/murdered-and-missing-Indigenous-women-advocates-say-nc-law-enforcement-ignores-problem

	Over-policing could put community members at risk, particularly community members who are of mixed African-American and Indigenous heritage
Livelihood (*Project*)	***Direct:*** Job opportunities arriving with the pipeline could be insecure and short-lived, and could weaken economic security for tribal members working in construction, transportation, etc.
	Indirect: Farmers could experience sick animals/impacts on local agriculture as a result of land use changes, noise, or reduced soil or air quality
Identity (**Station** & *Project*)	***Direct:*** Potential interruption of continuity of cultural practices or seasonal ceremonies as a result of impeded or impaired water bodies or local ecosystems
	Indirect: Potential loss of sense of self because of loss of familiar landscapes
	Cumulative: Potential reduction in intertribal unity as a result of new impediments to travel, contact, or psychological continuity of people in the landscapes

Domain 3 – Language & Governance

All Indigenous respondents identified potential risks to governance and language related to the proposed Project, which split into two subcategories of concern.

The first set of concerns were about language preservation, expressed as an urgent concern based on the fact that the Yesàh community is in the midst of a grassroots language revival effort (i.e. the Haliwa-Saponi Historic Legacy Project, and others), and that the delicate, critical process of relearning and contextualizing words in Yesànechi might be inhibited by drastic changes to the landscape. This had two components: (a) that the Station or the larger MVP construction might negatively impact archaeological sites which might hold evidence of material artifacts of communication (particularly any artifacts that might be of fragile construction but could hold critical communicative information or record-keeping); and (b) that the project might result in the permanent loss of landscape features critical to understanding past records of the language (e.g. a word meaning “the color of X fish when it’s swimming in Y river” ceases to have meaning if that fish disappears and that river is diverted).

One respondent also expressed a general concern (which relates to Domains 1 and 2 as well) about physical-psychological division as a result of the pipeline (“We cross over these pipelines to get to one another.”), which could exacerbate intertribal separation and harm to Indigenous communities.

Impacted Domain	Anticipated Impact
Language (**Station** & *Project*)	***Indirect:*** Language restoration efforts could be slowed or stopped by losses of artifacts; particularly any artifacts that might be of fragile construction but could hold critical communicative information Language restoration efforts could be slowed or stopped by changes in the contextual environment that made deciphering past texts more difficult (i.e. linguistic meaning that relies on relative landscape markers)
Intertribal Relations (**Station** & *Project*)	***Direct:*** Introduction of cash subsidies or cash payments could trigger intertribal conflict, particularly if these are unevenly received

Domain 4 – Spirituality, Ceremony & Traditional Knowledge

All of our Indigenous respondents identified specific impacts on spirituality, ceremony, and traditional knowledge that would be related to the Station. These included the loss or destruction of plant or animal species critical to traditional medicine; the disturbance of ancestral burial sites or remains without opportunity for ceremony or reburial; and the loss of access to clean water for ceremonial purposes ("When you want to connect, go down and touch the water. The water runs through all these areas and connects all things.")

Impacted Domain	Anticipated Impact
Ceremonial Practices (*Project*)	***Direct:*** Potential inability to use the water for essential ceremonies because of contamination and dangers to human health Potential inability to use sacred plant medicines for essential ceremonies because of contamination and dangers to human health
Traditional Knowledge (*Project)*	Potential inability to collect traditional medicine plants because of soil contamination Potential inability to hunt and fish in traditional ways, either because of environmental degradation or species loss

	Potential inability to use traditional animal medicines because of contamination due to air pollution, soil or water contamination

Distributive Expectations – Non-Indigenous

The following distributive expectations solely reflect discussions had during the interviews, and do not represent any existing agreement between Mountain Valley and any community member or entity. Non-Indigenous respondents generally identified mitigation or remediation that was highly localized, and supported existing community services or structures.

Recommendations for each domain included:

Domain 1 – Critical Service Provision

a) Additional donations to support critical service providers in the immediate Station area and nearest towns, including Chatham, throughout the period of construction and after initial operation begins
b) Willingness to avoid construction in or around areas currently used for critical service provision
c) Maintaining current investment practices to support local civic needs & organizations, including community colleges, fire & rescue services, community service groups, etc.

Domain 2 – Safety & Policing Provision

d) Intentional training of security forces to reduce conflict with local community members and avoid contributing to the over-policing of low-income, African-American, and Native American community members
e) Employment of mediators or Community Liaisons with authority to speak on behalf of Mountain Valley to de-escalate conflicts between security forces, employees, and local community members

Domain 3 – Recreation, Landscape & Way of Life Preservation

f) Donations to support the establishment or formalization of localized recreation opportunities, including low-cost options and green/open space recreation such as sports fields
g) Willingness to avoid construction in or around areas currently used for recreation
h) Thoughtful avoidance of impactful activities that could create negative impacts on the rural landscape and way of life; hiring practices that support local benefit via jobs and job training opportunities

Special Note -- African American Freedmen Descendants

In addition, although our community survey identified an extensive and continuous African-American community composed of Freedmen descendants, we were unable to interview any members of that community for this report. We strongly recommend that outreach continue until the needs and concerns of that community are explicitly understood.

In the meantime, we were made aware of an opportunity for Mountain Valley to initiate outreach to members of the community by:

i) Making a donation in support of the proposed African-American Leaders Memorial, to be sited in downtown Chatham.[59]

Distributive Expectations – Indigenous

Similar to the discussion of impacts, Indigenous respondents' discussion of distributive expectations focused broadly on the larger Project, and were not restricted to the proposed Station. The primary concern for almost all Indigenous respondents was that Mountain Valley be willing to divert its pipeline route in response to the discovery of sensitive artifacts or remains, as well as in response to notification from tribal leadership of sensitive cultural or historical sites – and that Mountain Valley be willing to act in good faith to assist tribes in acquiring uncovered artifacts or human remains (even if these were held by private landowners) so that such artifacts or remains could be protected, appropriately honored, and if appropriate, reburied in alignment with cultural beliefs around land, ancestors, and sanctity.

The second pressing concern for almost all Indigenous respondents was acting to ensure the continued wellbeing and functioning of the ecological systems essential for economic and cultural survival in the domains of livelihoods, traditional knowledge practices around food and medicine, spirituality and ceremony, and craft.

Indigenous respondents generally did not believe that any financial act could compensate for the harm caused to landscapes by major infrastructure projects conducted without appropriate consultation with local Indigenous communities – and all felt strongly that Mountain Valley Pipeline had not completed sufficient outreach to Indigenous communities before pipeline construction began. However, in light of the fact that Mountain Valley had already completed a significant portion of construction and impacts had already been felt by communities, respondents suggested mitigation or remediation that impacted the immediate Station, as well as the broader Project.

In addition, concerns related to intertribal relations and governance were particularly acute for the nonfederal tribal members surveyed. In this case, respondents expressed a worry that Mountain Valley might propose cash settlements with only some tribes of the region, exacerbating tribal divisions and augmenting inequality across differential statuses (i.e. federal

[59] "Fundraising begins for monument in Chatham to honor African American leaders." August 10, 2020. ABC13 News. Available online: https://wset.com/news/local/fundraising-begins-for-monument-in-chatham-to-honor-african-american-leaders

tribes might receive funds while nonfederal tribes would not). In doing so, respondents expressed that Mountain Valley would be exploiting community vulnerabilities first created by the federal government's unequal treatment of Indigenous peoples east of the Mississippi River, and doing significant harm to intertribal unity and the overall well-being of Indigenous peoples in the region ("Money triggers fighting." "There's a groundswell in reconnecting & healing past divisions…we are at the precipice of making some big progress [in intertribal unity].").

Further, respondents stated that compensation for past or ongoing harms should come in forms directly related to the harm done (e.g. land preservation to compensate for land damage and loss) and should last as long as the pipeline continued to operate and Mountain Valley continued to benefit. The suggestions included a Yesàh Land Trust and Legal Support Fund and funding for historical markers (Domain 1), and a Yesànechi Language Research and Reformation Program (Domain 2). These proposed suggestions, which refer more closely to the impacts created by the larger pipeline construction and operation Project, are explored further in a separate document (the larger, more detailed *Mountain Valley Pipeline Community Impact Assessment & Proposed Mitigation Draft Report*). Summarized here are some suggested forms of mitigation for potential impacts resulting from the proposed Station.

Domain 1: Landscape, Artifacts & Sense of Place

j) Provide direct financial support to existing tribally-led efforts toward the preservation of historical artifacts and material culture (e.g. the Monacan Museum; the Haliwa-Saponi History Legacy Project)
k) Establish an endowment for a Yesàh Archaeological Preservation, Crafts & Language Revitalization Program at a major university (chosen collectively by a communal body comprising representatives of each impacted tribe or community identified in this report) with the space and capabilities to archive materials under the best available preservation measures, while ensuring dedicated space for study + continued access by tribal preservation officers, spiritual leaders, or designated tribal safekeepers.
l) Establish a process to work with private landowners to encourage/incentivize the donation of artifacts uncovered during Project or pipeline construction to tribal preservation officers or designated safekeepers; or to the above-described Preservation Program to prevent artifact loss or destruction.
m) Provide direct financial support to forefronting Indigenous narratives in existing historic areas and public history markers, including around Bear Mountain; Amherst, VA; Occaneechi State Park; Fort Christanna Historic Site, and others.

Domain 4: Employment & Education

In this domain, the suggested activity included:

n) Support local economies and employment in all hiring practices and processes; prioritize local employees over out-of-state or nonlocal hires, and create training programs to move local employees into management positions.

o) Provide supportive funds to Indigenous students enrolled in local engineering, environmental science, geosciences, law, or other related programs

Discussion & Interpretation

Geospatial Baseline Data

3 Mile Fenceline Buffer

Based on the broad definitions of the Virginia Environmental Justice act, all census tracts within a 3-mile fenceline buffer are considered environmental justice communities. The vulnerability of these communities to disproportionate negative impacts will require special consideration in the planning and siting process that is sensitive to the needs and concerns of the communities. We recommend that Mountain Valley identify and plan to avoid or mitigate any disproportionate impacts resulting from compressor station construction and operation to domains of culture and lifeways, as well as to community health, food access, and critical service provision.

5 Mile Buffer

Our results at the 5-mile buffer did not differ from our results at the 3-mile buffer. All census tracts within a 5-mile radius are considered as environmental justice communities, and therefore require consideration in the planning and siting process.

10 Mile Buffer

All census tracts within a 10-mile buffer also met the criteria to be considered as environmental justice communities. Again, our recommendations are consistent across all radii.

Qualitative Interview Data

Non-Indigenous Communities

The impacted communities within the 10-mile buffer of the proposed Project were generally positive in orientation toward the proposed Project, but clearly identified key concerns and needs in specific domains, and had clear ideas of their distributive expectations and potentially valuable mitigations.

African-American Communities

As stated above, although we identified a present and thriving African-American community, many of whom are descendants of the original Freedmen families who labored as enslaved persons in Pittsylvania county prior to Emancipation (and are connected to the current Blairs, Virginia community), our outreach did not result in any interviews specifically with members of that community for this report.

Indigenous Communities

Because of their unique tie to land and place, Indigenous communities were considered separately and over a broader geographic region than non-Indigenous communities, and a single impacted diasporic community (Yesàh) was identified, which included two (2) federal and

five (5) nonfederal tribes; nonfederal tribes included a mix of three (3) state-recognized tribes and two (2) tribal communities acknowledged or identified by members of the federal and state recognized tribes as holding legitimate Indigenous identities through kinship ties and cultural practices.

Indigenous community members similarly identified key concerns and needs in specific domains, and also clearly identified distributive expectations and potentially valuable mitigations.

Conclusion & Recommendations

We have identified multiple communities throughout Pittsylvania County who meet the criteria for designation as Environmental Justice communities, and whose members report or anticipate perceived potential negative impacts as a result of the proposed Project. We have further identified multiple Indigenous communities, connected in a single cultural-linguistic diaspora (the Yesàh), whose ancestral and current homelands are impacted by the pipeline portion of the Project. These Indigenous communities not only meet the criteria for designation as environmental justice communities, but further possess a unique relationship to the land, and require additional, intentional, and thoughtful engagement and distributive compensation as a result of that unique relationship.

A distributive justice framework demands that communities bearing the greatest environmental or social costs should also receive greatest compensation for those costs. By choosing to engage with us and our work within this framework, Mountain Valley has a unique opportunity to set new industry precedents for community investment and outreach, and to establish best practices of corporate social responsibility that will contribute to, rather than diminish, the agency and well-being of communities – particularly vulnerable communities – throughout the regions in which it operates.

The new best practices would include ecological restoration and minimization of impact, and would also include specific culturally protective/preventative actions within regions of operation. Some of these actions include:

- Early, intentional, and respectful consultation with Indigenous communities tied to the language-territory (*amainechi)* in which any project takes place, including consultation with communities holding varying statuses of acknowledgement (i.e. both federal and nonfederal);
- Specific outreach to and consultation with African-American communities, who have been disproportionately affected by past exploitative energy and manufacturing projects, and who have historically been at the forefront of efforts pushing for greater environmental justice & fairer outcomes for all people;
- Coordination with local health services to ensure health care is made available to communities suffering potential health impacts, as well as to communities with pre-existing vulnerabilities.
- Ongoing consultation with communities and community researchers to identify any emergent points of concern and address them quickly, and with a distributive justice framework in mind.
- Sponsored education opportunities for impacted communities, with additional investments placed in communities made vulnerable by economic status, rurality, or ethnic identity; and
- Hiring practices that support local economic development and broader opportunities.

Attachment A

Data Tables

Tract	Total Population	White Alone	Black or African Descent	American Indian or Alaska Native	ASIAN	Native Hawaiian/Pacific Islander	Other Race	Two or more Races	2 or More Races	Three or more Races
Census Tract 108.02, Pittsylvania County, Virginia	6543	5580	648	0	0	0	207	108	0	108
Census Tract 110.01, Pittsylvania County, Virginia	4345	3732	551	0	0	0	20	42	0	42
Census Tract 110.02, Pittsylvania County, Virginia	4524	3779	542	3	16	13	0	171	0	171
Census Tract 111, Pittsylvania County, Virginia	2909	1518	1090	0	0	0	167	134	0	134
Census Tract 109, Pittsylvania County, Virginia	2643	2386	151	0	0	0	31	75	0	75
Census Tract 103, Pittsylvania County, Virginia	3964	3149	622	4	26	0	0	163	0	163
Census Tract 113, Pittsylvania County, Virginia	6424	5146	788	10	134	0	13	333	13	320
Census Tract 102, Pittsylvania County, Virginia	4320	3349	793	23	30	0	0	125	39	86
Census Tract 104, Pittsylvania County, Virginia	3932	3002	664	0	0	0	14	252	11	241
Census Tract 106, Pittsylvania County, Virginia	2970	1999	828	0	2	0	0	141	0	141
Census Tract 105, Pittsylvania County, Virginia	4870	2915	1700	0	43	0	112	100	0	100
Census Tract 101, Pittsylvania County, Virginia	3872	3098	693	0	0	0	0	81	12	69
Census Tract 114, Pittsylvania County, Virginia	3971	2542	1215	0	0	0	134	80	0	80
Census Tract 107, Pittsylvania County, Virginia	1603	833	650	0	0	0	113	7	0	7
Census Tract 112, Pittsylvania County, Virginia	2254	1752	360	0	0	0	142	0	0	0
Census Tract 108.01, Pittsylvania County, Virginia	2532	1430	1096	0	0	0	0	6	0	6
Census Tract 1, Danville city, Virginia	5543	2294	3124	0	54	0	29	42	0	42
Census Tract 2, Danville city, Virginia	4100	1848	2162	0	39	8	0	43	0	43
Census Tract 3, Danville city, Virginia	2840	635	2058	0	0	0	19	128	0	128
Census Tract 4, Danville city, Virginia	3300	1048	2126	0	0	19	0	107	29	78
Census Tract 5, Danville city, Virginia	1931	541	1262	2	0	0	10	116	0	116
Census Tract 6, Danville city, Virginia	1945	480	1383	0	54	0	0	28	0	28
Census Tract 7, Danville city, Virginia	3346	2349	760	10	85	3	23	116	0	116
Census Tract 8, Danville city, Virginia	2676	1570	972	5	92	0	0	37	0	37
Census Tract 9, Danville city, Virginia	3323	1788	1239	7	14	0	160	115	64	51
Census Tract 10, Danville city, Virginia	3944	1005	2490	0	0	0	79	370	19	351
Census Tract 11, Danville city, Virginia	1387	448	871	0	0	0	0	68	0	68
Census Tract 12, Danville city, Virginia	1866	1071	707	0	32	0	0	56	0	56
Census Tract 13.01, Danville city, Virginia	1406	637	614	0	19	0	102	34	0	34
Census Tract 13.02, Danville city, Virginia	893	467	401	0	0	0	0	25	22	3
Census Tract 14, Danville city, Virginia	3012	2613	275	0	64	0	60	0	0	0
Census Tract 9801, Danville city, Virginia	0	0	0	0	0	0	0	0	0	0

Data Table 1. Minority Populations in Pittsylvania County & Danville City, Virginia

TRACT	Population	200% Poverty Population	Percentage Population at 200% Poverty
Census Tract 101, Pittsylvania County, Virginia	3842	1714	44
Census Tract 102, Pittsylvania County, Virginia	4320	1858	43
Census Tract 103, Pittsylvania County, Virginia	3958	1535	39
Census Tract 104, Pittsylvania County, Virginia	3931	1701	43
Census Tract 105, Pittsylvania County, Virginia	3954	1402	35
Census Tract 106, Pittsylvania County, Virginia	2880	1343	47
Census Tract 107, Pittsylvania County, Virginia	1603	592	37
Census Tract 108.01, Pittsylvania County, Virginia	2532	953	38
Census Tract 108.02, Pittsylvania County, Virginia	6543	3198	49
Census Tract 109, Pittsylvania County, Virginia	2643	884	33
Census Tract 110.01, Pittsylvania County, Virginia	4333	1749	40
Census Tract 110.02, Pittsylvania County, Virginia	4503	1218	27
Census Tract 111, Pittsylvania County, Virginia	2909	1364	47
Census Tract 112, Pittsylvania County, Virginia	2254	1113	50
Census Tract 113, Pittsylvania County, Virginia	6395	1736	27
Census Tract 114, Pittsylvania County, Virginia	3958	1531	39
Census Tract 1, Danville city, Virginia	5543	2271	41
Census Tract 2, Danville city, Virginia	3751	1987	53
Census Tract 3, Danville city, Virginia	2840	1493	53
Census Tract 4, Danville city, Virginia	2982	2106	71
Census Tract 5, Danville city, Virginia	1612	1084	67
Census Tract 6, Danville city, Virginia	1872	789	42
Census Tract 7, Danville city, Virginia	2903	928	32
Census Tract 8, Danville city, Virginia	2676	863	32
Census Tract 9, Danville city, Virginia	3323	1567	47
Census Tract 10, Danville city, Virginia	3852	2403	62
Census Tract 11, Danville city, Virginia	1387	693	50
Census Tract 12, Danville city, Virginia	1866	831	45
Census Tract 13.01, Danville city, Virginia	1394	704	51
Census Tract 13.02, Danville city, Virginia	758	453	60
Census Tract 14, Danville city, Virginia	2970	981	33
Census Tract 9801, Danville city, Virginia	0	0	0

Data Table 2. Low-Income Populations in Pittsylvania County & Danville City, Virginia

CENSUS BLOCK GROUP	CANCER	PM25	Hazardous Waste	Percentile HazWaste
Block Group 1, Census Tract 101, Pittsylvania County, Virginia	34.99414791	9.232578	0.02 sites/km distance (23%ile)	64%ile
Block Group 2, Census Tract 101, Pittsylvania County, Virginia	34.99414791	9.232578	0.021 sites/km distance (24%ile)	41%ile
Block Group 3, Census Tract 101, Pittsylvania County, Virginia	34.99414791	9.232578	0.027 sites/km distance (31%ile)	49%ile
Block Group 1, Census Tract 102, Pittsylvania County, Virginia	36.22391711	9.197267	0.016 sites/km distance (18%ile)	49%ile
Block Group 2, Census Tract 102, Pittsylvania County, Virginia	36.22391711	9.197267	0.021 sites/km distance (24%ile)	60%ile
Block Group 3, Census Tract 102, Pittsylvania County, Virginia	36.22391711	9.197267	0.019 sites/km distance (22%ile)	52%ile
Block Group 1, Census Tract 103, Pittsylvania County, Virginia	33.30561863	9.161558	0.022 sites/km distance (25%ile)	62%ile
Block Group 2, Census Tract 103, Pittsylvania County, Virginia	33.30561863	9.161558	0.023 sites/km distance (27%ile)	47%ile
Block Group 3, Census Tract 103, Pittsylvania County, Virginia	33.30561863	9.161558	0.025 sites/km distance (29%ile)	54%ile
Block Group 4, Census Tract 103, Pittsylvania County, Virginia	33.30561863	9.161558	0.031 sites/km distance (34%ile)	60%ile
Block Group 1, Census Tract 104, Pittsylvania County, Virginia	33.72929008	9.303503	0.028 sites/km distance (32%ile)	46%ile
Block Group 2, Census Tract 104, Pittsylvania County, Virginia	33.72929008	9.303503	0.041 sites/km distance (44%ile)	37%ile
Block Group 3, Census Tract 104, Pittsylvania County, Virginia	33.72929008	9.303503	0.036 sites/km distance (39%ile)	54%ile
Block Group 1, Census Tract 105, Pittsylvania County, Virginia	36.76557222	9.389466	0.044 sites/km distance (46%ile)	35%ile
Block Group 2, Census Tract 105, Pittsylvania County, Virginia	36.76557222	9.389466	0.041 sites/km distance (43%ile)	55%ile
Block Group 3, Census Tract 105, Pittsylvania County, Virginia	36.76557222	9.389466	0.05 sites/km distance (50%ile)	76%ile
Block Group 1, Census Tract 106, Pittsylvania County, Virginia	35.45030889	9.287713	0.029 sites/km distance (33%ile)	68%ile
Block Group 2, Census Tract 106, Pittsylvania County, Virginia	35.45030889	9.287713	0.034 sites/km distance (38%ile)	48%ile
Block Group 1, Census Tract 107, Pittsylvania County, Virginia	36.01970028	9.359805	0.031 sites/km distance (35%ile)	66%ile
Block Group 2, Census Tract 107, Pittsylvania County, Virginia	36.01970028	9.359805	0.048 sites/km distance (49%ile)	67%ile
Block Group 1, Census Tract 108.01, Pittsylvania County, Virginia	38.18338128	9.620939	0.38 sites/km distance (93%ile)	86%ile
Block Group 2, Census Tract 108.01, Pittsylvania County, Virginia	38.18338128	9.620939	0.17 sites/km distance (84%ile)	80%ile
Block Group 1, Census Tract 108.02, Pittsylvania County, Virginia	37.98788753	9.651424	0.11 sites/km distance (74%ile)	33%ile
Block Group 2, Census Tract 108.02, Pittsylvania County, Virginia	37.98788753	9.651424	0.08 sites/km distance (65%ile)	32%ile
Block Group 3, Census Tract 108.02, Pittsylvania County, Virginia	37.98788753	9.651424	0.06 sites/km distance (56%ile)	64%ile
Block Group 4, Census Tract 108.02, Pittsylvania County, Virginia	37.98788753	9.651424	0.11 sites/km distance (73%ile)	55%ile
Block Group 1, Census Tract 109, Pittsylvania County, Virginia	35.92040636	9.534402	0.095 sites/km distance (70%ile)	23%ile
Block Group 2, Census Tract 109, Pittsylvania County, Virginia	35.92040636	9.534402	0.07 sites/km distance (61%ile)	30%ile

Block Group 1, Census Tract 110.01, Pittsylvania County, Virginia	36.39491161	9.586397	0.039 sites/km distance (42%ile)	61%ile
Block Group 2, Census Tract 110.01, Pittsylvania County, Virginia	36.39491161	9.586397	0.045 sites/km distance (47%ile)	37%ile
Block Group 3, Census Tract 110.01, Pittsylvania County, Virginia	36.39491161	9.586397	0.061 sites/km distance (57%ile)	33%ile
Block Group 1, Census Tract 110.02, Pittsylvania County, Virginia	36.9778053	9.582547	0.088 sites/km distance (68%ile)	7%ile
Block Group 2, Census Tract 110.02, Pittsylvania County, Virginia	36.9778053	9.582547	0.047 sites/km distance (48%ile)	38%ile
Block Group 1, Census Tract 111, Pittsylvania County, Virginia	36.34171775	9.702446	0.046 sites/km distance (47%ile)	41%ile
Block Group 2, Census Tract 111, Pittsylvania County, Virginia	36.34171775	9.702446	0.027 sites/km distance (31%ile)	65%ile
Block Group 1, Census Tract 112, Pittsylvania County, Virginia	39.21021882	9.767878	0.089 sites/km distance (68%ile)	48%ile
Block Group 2, Census Tract 112, Pittsylvania County, Virginia	39.21021882	9.767878	0.056 sites/km distance (54%ile)	42%ile
Block Group 3, Census Tract 112, Pittsylvania County, Virginia	39.21021882	9.767878	0.033 sites/km distance (37%ile)	66%ile
Block Group 1, Census Tract 113, Pittsylvania County, Virginia	39.74249916	9.728443	0.14 sites/km distance (80%ile)	6%ile
Block Group 2, Census Tract 113, Pittsylvania County, Virginia	39.74249916	9.728443	0.21 sites/km distance (87%ile)	82%ile
Block Group 3, Census Tract 113, Pittsylvania County, Virginia	39.74249916	9.728443	0.11 sites/km distance (74%ile)	8%ile
Block Group 1, Census Tract 114, Pittsylvania County, Virginia	39.85586318	9.737585	0.37 sites/km distance (93%ile)	33%ile
Block Group 2, Census Tract 114, Pittsylvania County, Virginia	39.85586318	9.737585	0.43 sites/km distance (94%ile)	93%ile
Block Group 3, Census Tract 114, Pittsylvania County, Virginia	39.85586318	9.737585	0.14 sites/km distance (80%ile)	41%ile
Block Group 1, Census Tract 1, Danville city, Virginia	38.56900853	8.837818	0.041 sites/km distance (44%ile)	31%ile
Block Group 2, Census Tract 1, Danville city, Virginia	38.56900853	8.837818	0.031 sites/km distance (35%ile)	21%ile
Block Group 3, Census Tract 1, Danville city, Virginia	38.56900853	8.837818	0.032 sites/km distance (36%ile)	23%ile
Block Group 4, Census Tract 1, Danville city, Virginia	38.56900853	8.837818	0.032 sites/km distance (36%ile)	32%ile
Block Group 1, Census Tract 2, Danville city, Virginia	38.57152316	8.798125	0.021 sites/km distance (25%ile)	26%ile
Block Group 2, Census Tract 2, Danville city, Virginia	38.57152316	8.798125	0.033 sites/km distance (37%ile)	27%ile
Block Group 3, Census Tract 2, Danville city, Virginia	38.57152316	8.798125	0.023 sites/km distance (27%ile)	34%ile
Block Group 1, Census Tract 3, Danville city, Virginia	38.71566893	8.689855	0.032 sites/km distance (36%ile)	33%ile
Block Group 2, Census Tract 3, Danville city, Virginia	38.71566893	8.689855	0.027 sites/km distance (31%ile)	25%ile
Block Group 3, Census Tract 3, Danville city, Virginia	38.71566893	8.689855	0.024 sites/km distance (28%ile)	19%ile
Block Group 1, Census Tract 4, Danville city, Virginia	38.71566893	8.689855	0.029 sites/km distance (33%ile)	29%ile
Block Group 2, Census Tract 4, Danville city, Virginia	38.65558985	8.651643	0.02 sites/km distance (24%ile)	67%ile
Block Group 3, Census Tract 4, Danville city, Virginia	37.28929849	8.595621	0.017 sites/km distance (20%ile)	37%ile
Block Group 4, Census Tract 4, Danville city, Virginia	37.28929849	8.595621	0.022 sites/km distance (26%ile)	23%ile
Block Group 1, Census Tract 5, Danville city, Virginia	37.25058093	8.741415	0.029 sites/km distance (33%ile)	78%ile
Block Group 2, Census Tract 5, Danville city, Virginia	37.25058093	8.741415	0.033 sites/km distance (36%ile)	66%ile
Block Group 3, Census Tract 5, Danville city, Virginia	37.25058093	8.741415	0.028 sites/km distance (32%ile)	72%ile

Block Group 1, Census Tract 6, Danville city, Virginia	40.39200892	8.736144	0.04 sites/km distance (43%ile)	75%ile
Block Group 2, Census Tract 6, Danville city, Virginia	40.39200892	8.736144	0.033 sites/km distance (37%ile)	52%ile
Block Group 3, Census Tract 6, Danville city, Virginia	35.63867705	8.740418	0.043 sites/km distance (45%ile)	63%ile
Block Group 1, Census Tract 7, Danville city, Virginia	35.63867705	8.740418	0.038 sites/km distance (41%ile)	39%ile
Block Group 2, Census Tract 7, Danville city, Virginia	35.63867705	8.740418	0.03 sites/km distance (34%ile)	72%ile
Block Group 3, Census Tract 7, Danville city, Virginia	69.1041532	8.741522	0.038 sites/km distance (41%ile)	73%ile
Block Group 1, Census Tract 8, Danville city, Virginia	35.68820201	8.815863	0.029 sites/km distance (33%ile)	72%ile
Block Group 2, Census Tract 8, Danville city, Virginia	35.68820201	8.815863	0.03 sites/km distance (34%ile)	32%ile
Block Group 3, Census Tract 8, Danville city, Virginia	35.68820201	8.815863	0.019 sites/km distance (22%ile)	53%ile
Block Group 1, Census Tract 9, Danville city, Virginia	35.68820201	8.815863	0.023 sites/km distance (26%ile)	71%ile
Block Group 2, Census Tract 9, Danville city, Virginia	35.68820201	8.815863	0.018 sites/km distance (21%ile)	53%ile
Block Group 3, Census Tract 9, Danville city, Virginia	43.90274617	9.096588	0.052 sites/km distance (51%ile)	34%ile
Block Group 1, Census Tract 10, Danville city, Virginia	43.90274617	9.096588	0.057 sites/km distance (55%ile)	61%ile
Block Group 2, Census Tract 10, Danville city, Virginia	41.39912121	9.054149	0.051 sites/km distance (50%ile)	62%ile
Block Group 1, Census Tract 11, Danville city, Virginia	41.39912121	9.054149	0.037 sites/km distance (40%ile)	55%ile
Block Group 1, Census Tract 12, Danville city, Virginia	41.39912121	9.054149	0.046 sites/km distance (47%ile)	78%ile
Block Group 2, Census Tract 12, Danville city, Virginia	41.39912121	9.054149	0.038 sites/km distance (41%ile)	71%ile
Block Group 1, Census Tract 13.01, Danville city, Virginia	41.57292421	9.02195	0.036 sites/km distance (39%ile)	70%ile
Block Group 1, Census Tract 13.02, Danville city, Virginia	41.57292421	9.02195	0.043 sites/km distance (45%ile)	76%ile
Block Group 1, Census Tract 14, Danville city, Virginia	41.57292421	9.02195	0.045 sites/km distance (47%ile)	72%ile
Block Group 2, Census Tract 14, Danville city, Virginia	40.21418484	8.954093	0.045 sites/km distance (47%ile)	33%ile
Block Group 1, Census Tract 9801, Danville city, Virginia	40.21418484	8.954093	0.041 sites/km distance (43%ile)	29%ile

Data Table 3. Cancer Rates, PM 2.5 Exposure, and Hazardous Waste Facility Proximities

Tract	Total Enrolled in School
Census Tract 101, Pittsylvania County, Virginia	726
Census Tract 102, Pittsylvania County, Virginia	801
Census Tract 103, Pittsylvania County, Virginia	720
Census Tract 104, Pittsylvania County, Virginia	645
Census Tract 105, Pittsylvania County, Virginia	892
Census Tract 106, Pittsylvania County, Virginia	522
Census Tract 107, Pittsylvania County, Virginia	233
Census Tract 108.01, Pittsylvania County, Virginia	599
Census Tract 108.02, Pittsylvania County, Virginia	1479
Census Tract 109, Pittsylvania County, Virginia	512
Census Tract 110.01, Pittsylvania County, Virginia	889
Census Tract 110.02, Pittsylvania County, Virginia	1111
Census Tract 111, Pittsylvania County, Virginia	508
Census Tract 112, Pittsylvania County, Virginia	459
Census Tract 113, Pittsylvania County, Virginia	1589
Census Tract 114, Pittsylvania County, Virginia	861
Census Tract 1, Danville city, Virginia	1256
Census Tract 2, Danville city, Virginia	1047
Census Tract 3, Danville city, Virginia	639
Census Tract 4, Danville city, Virginia	719
Census Tract 5, Danville city, Virginia	270
Census Tract 6, Danville city, Virginia	420
Census Tract 7, Danville city, Virginia	1218
Census Tract 8, Danville city, Virginia	620
Census Tract 9, Danville city, Virginia	701
Census Tract 10, Danville city, Virginia	1256
Census Tract 11, Danville city, Virginia	442
Census Tract 12, Danville city, Virginia	456
Census Tract 13.01, Danville city, Virginia	407
Census Tract 13.02, Danville city, Virginia	170
Census Tract 14, Danville city, Virginia	644
Census Tract 9801, Danville city, Virginia	0

Data Table 4. Total School Enrollments

Tract	Persons in Group Quarters
Census Tract 101, Pittsylvania County, Virginia	5
Census Tract 102, Pittsylvania County, Virginia	0
Census Tract 103, Pittsylvania County, Virginia	0
Census Tract 104, Pittsylvania County, Virginia	5
Census Tract 105, Pittsylvania County, Virginia	916
Census Tract 106, Pittsylvania County, Virginia	90
Census Tract 107, Pittsylvania County, Virginia	28
Census Tract 108.01, Pittsylvania County, Virginia	16
Census Tract 108.02, Pittsylvania County, Virginia	10
Census Tract 109, Pittsylvania County, Virginia	19
Census Tract 110.01, Pittsylvania County, Virginia	0
Census Tract 110.02, Pittsylvania County, Virginia	0
Census Tract 111, Pittsylvania County, Virginia	0
Census Tract 112, Pittsylvania County, Virginia	0
Census Tract 113, Pittsylvania County, Virginia	14
Census Tract 114, Pittsylvania County, Virginia	9
Census Tract 1, Danville city, Virginia	18
Census Tract 2, Danville city, Virginia	294
Census Tract 3, Danville city, Virginia	0
Census Tract 4, Danville city, Virginia	334
Census Tract 5, Danville city, Virginia	319
Census Tract 6, Danville city, Virginia	73
Census Tract 7, Danville city, Virginia	432
Census Tract 8, Danville city, Virginia	6
Census Tract 9, Danville city, Virginia	0
Census Tract 10, Danville city, Virginia	0
Census Tract 11, Danville city, Virginia	0
Census Tract 12, Danville city, Virginia	0
Census Tract 13.01, Danville city, Virginia	0
Census Tract 13.02, Danville city, Virginia	135
Census Tract 14, Danville city, Virginia	0
Census Tract 9801, Danville city, Virginia	0

Data Table 5. Persons in Group Quarters

Name	**Public Housing Residents**
Census Tract 101, Pittsylvania County, Virginia	0
Census Tract 102, Pittsylvania County, Virginia	0
Census Tract 102, Pittsylvania County, Virginia	0
Census Tract 103, Pittsylvania County, Virginia	0
Census Tract 103, Pittsylvania County, Virginia	0
Census Tract 104, Pittsylvania County, Virginia	0
Census Tract 104, Pittsylvania County, Virginia	0
Census Tract 105, Pittsylvania County, Virginia	45
Census Tract 105, Pittsylvania County, Virginia	45
Census Tract 106, Pittsylvania County, Virginia	153
Census Tract 106, Pittsylvania County, Virginia	0
Census Tract 106, Pittsylvania County, Virginia	140
Census Tract 107, Pittsylvania County, Virginia	0
Census Tract 107, Pittsylvania County, Virginia	0
Census Tract 108.01, Pittsylvania County, Virginia	0
Census Tract 108.01, Pittsylvania County, Virginia	0
Census Tract 108.02, Pittsylvania County, Virginia	0
Census Tract 108.02, Pittsylvania County, Virginia	0
Census Tract 109, Pittsylvania County, Virginia	0
Census Tract 109 Pittsylvania County, Virginia	0
Census Tract 110.01, Pittsylvania County, Virginia	0
Census Tract 110.01, Pittsylvania County, Virginia	0
Census Tract 110.02, Pittsylvania County, Virginia	0
Census Tract 111 Pittsylvania County, Virginia	0
Census Tract 111, Pittsylvania County, Virginia	0
Census Tract 112, Pittsylvania County, Virginia	0
Census Tract 112, Pittsylvania County, Virginia	0
Census Tract 113, Pittsylvania County, Virginia	196
Census Tract 113, Pittsylvania County, Virginia	196
Census Tract 114, Pittsylvania County, Virginia	0
Census Tract 114, Pittsylvania County, Virginia	0
Census Tract 1, Danville city, Virginia	100
Census Tract 1 Danville city, Virginia	0
Census Tract 1, Danville city, Virginia	100
Census Tract 1, Danville city, Virginia	100
Census Tract 2, Danville city, Virginia	100

Census Tract 2, Danville city, Virginia	0
Census Tract 2, Danville city, Virginia	100
Census Tract 2, Danville city, Virginia	100
Census Tract 2, Danville city, Virginia	100
Census Tract 2, Danville city, Virginia	100
Census Tract 3, Danville city, Virginia	100
Census Tract 3, Danville city, Virginia	100
Census Tract 4, Danville city, Virginia	100
Census Tract 4, Danville city, Virginia	100
Census Tract 4, Danville city, Virginia	100
Census Tract 5, Danville city, Virginia	100
Census Tract 5, Danville city, Virginia	100
Census Tract 5, Danville city, Virginia	100
Census Tract 6, Danville city, Virginia	100
Census Tract 6, Danville city, Virginia	100
Census Tract 6, Danville city, Virginia	100
Census Tract 7, Danville city, Virginia	100
Census Tract 7, Danville city, Virginia	0
Census Tract 7, Danville city, Virginia	100
Census Tract 8, Danville city, Virginia	100
Census Tract 8, Danville city, Virginia	100
Census Tract 8, Danville city, Virginia	100
Census Tract 9, Danville city, Virginia	100
Census Tract 9, Danville city, Virginia	100
Census Tract 9, Danville city, Virginia	0
Census Tract 10, Danville city, Virginia	100
Census Tract 10, Danville city, Virginia	100
Census Tract 10, Danville city, Virginia	100
Census Tract 10, Danville city, Virginia	100
Census Tract 11, Danville city, Virginia	100
Census Tract 11, Danville city, Virginia	100
Census Tract 11, Danville city, Virginia	100
Census Tract 12, Danville city, Virginia	100
Census Tract 12, Danville city, Virginia	100
Census Tract 12, Danville city, Virginia	100
Census Tract 13.01, Danville city, Virginia	0
Census Tract 13.01, Danville city, Virginia	0

Census Tract 13.02, Danville city, Virginia	0
Census Tract 13.02, Danville city, Virginia	0
Census Tract 14, Danville city, Virginia	100
Census Tract 14, Danville city, Virginia	0
Census Tract 14, Danville city, Virginia	100
Census Tract 98.01, Danville city, Virginia	0

Data Table 6. Persons in Public Housing

TRACT	County_City	LILA ONE MILE	LILA TEN MILE	LILA Vehicle Access Twenty Mile
Census Tract 101, Pittsylvania County, Virginia	Pittsylvania	0	0	1
Census Tract 102, Pittsylvania County, Virginia	Pittsylvania	0	0	0
Census Tract 103, Pittsylvania County, Virginia	Pittsylvania	0	1	1
Census Tract 104, Pittsylvania County, Virginia	Pittsylvania	0	1	1
Census Tract 105, Pittsylvania County, Virginia	Pittsylvania	0	0	1
Census Tract 106, Pittsylvania County, Virginia	Pittsylvania	0	0	1
Census Tract 107, Pittsylvania County, Virginia	Pittsylvania	0	1	0
Census Tract 108.01, Pittsylvania County, Virginia	Pittsylvania	0	0	0
Census Tract 108.02, Pittsylvania County, Virginia	Pittsylvania	0	0	0
Census Tract 109, Pittsylvania County, Virginia	Pittsylvania	0	0	1
Census Tract 110.01, Pittsylvania County, Virginia	Pittsylvania	0	1	0
Census Tract 110.02, Pittsylvania County, Virginia	Pittsylvania	0	0	0
Census Tract 111, Pittsylvania County, Virginia	Pittsylvania	0	0	0
Census Tract 112, Pittsylvania County, Virginia	Pittsylvania	1	0	0
Census Tract 113, Pittsylvania County, Virginia	Pittsylvania	1	0	0
Census Tract 114, Pittsylvania County, Virginia	Pittsylvania	0	0	0
Census Tract 1, Danville city, Virginia	Danville	1	0	0
Census Tract 2, Danville city, Virginia	Danville	0	0	1
Census Tract 3, Danville city, Virginia	Danville	0	0	1
Census Tract 4, Danville city, Virginia	Danville	1	0	1
Census Tract 5, Danville city, Virginia	Danville	0	0	0
Census Tract 6, Danville city, Virginia	Danville	0	0	0
Census Tract 7, Danville city, Virginia	Danville	0	0	0
Census Tract 8, Danville city, Virginia	Danville	0	0	0
Census Tract 9, Danville city, Virginia	Danville	0	0	1
Census Tract 10, Danville city, Virginia	Danville	0	0	1
Census Tract 11, Danville city, Virginia	Danville	0	0	0
Census Tract 12, Danville city, Virginia	Danville	1	0	0
Census Tract 13.01, Danville city, Virginia	Danville	0	0	0
Census Tract 13.02, Danville city, Virginia	Danville	1	0	0
Census Tract 14, Danville city, Virginia	Danville	1	0	0
Census Tract 9801, Danville city, Virginia	Danville	0	0	0

LILA- Low income and low access tract
1-flag for food desert
0-not designated as a food desert

Data Table 7. Food Deserts

TRACT	Limited English Speaking Households
Census Tract 101, Pittsylvania County, Virginia	0
Census Tract 102, Pittsylvania County, Virginia	0
Census Tract 103, Pittsylvania County, Virginia	0
Census Tract 104, Pittsylvania County, Virginia	0
Census Tract 105, Pittsylvania County, Virginia	37
Census Tract 106, Pittsylvania County, Virginia	0
Census Tract 107, Pittsylvania County, Virginia	0
Census Tract 108.01, Pittsylvania County, Virginia	0
Census Tract 108.02, Pittsylvania County, Virginia	0
Census Tract 109, Pittsylvania County, Virginia	12
Census Tract 110.01, Pittsylvania County, Virginia	21
Census Tract 110.02, Pittsylvania County, Virginia	0
Census Tract 111, Pittsylvania County, Virginia	65
Census Tract 112, Pittsylvania County, Virginia	0
Census Tract 113, Pittsylvania County, Virginia	122
Census Tract 114, Pittsylvania County, Virginia	0
Census Tract 1, Danville city, Virginia	0
Census Tract 2, Danville city, Virginia	20
Census Tract 3, Danville city, Virginia	0
Census Tract 4, Danville city, Virginia	0
Census Tract 5, Danville city, Virginia	0
Census Tract 6, Danville city, Virginia	0
Census Tract 7, Danville city, Virginia	0
Census Tract 8, Danville city, Virginia	27
Census Tract 9, Danville city, Virginia	7
Census Tract 10, Danville city, Virginia	0
Census Tract 11, Danville city, Virginia	0
Census Tract 12, Danville city, Virginia	49
Census Tract 13.01, Danville city, Virginia	6
Census Tract 13.02, Danville city, Virginia	0
Census Tract 14, Danville city, Virginia	0
Census Tract 9801, Danville city, Virginia	0

Data Table 8. Linguistically Isolated or English-Limited Households

Attachment B

Informed Consent

INFORMED CONSENT
Lambert Compressor Station Community Impact Assessment

PURPOSE: You are being asked to participate in an interview for a Community Impact Assessment of the Mountain Valley Pipeline's proposed Lambert Compressor Station project. The purpose of this project is to elevate marginalized voices from the frontlines of environmental shifts, and to identify the ways in which energy infrastructure is directly impacting black, indigenous, and POC communities. We especially focused on indigenous communities as these voices are often missing in the energy infrastructure conversation.

MVP is currently planning to submit a request for additional permits to Virginia DEQ, and I intend to submit this report as part of a package describing where they have caused harm or may potentially cause harm, and what they need to do to correct it.

PROCEDURES: If you choose to participate in this interview, Alexa Lawrence will schedule a one-hour interview with you. Interviews may be conducted by phone or by Skype/Google Hangouts/Zoom. In the interview, you will be invited to talk about the ways in which you think about and experience the place where you live, and whether you have any concerns or expectations about ways - positive or negative — in which the MVP might impact yourself or your community. The interview is guided by eight key questions, but you should feel free to share anything you'd like in our conversation. We expect that the interview will take approximately 45-55 minutes to complete.

RISKS: The risks associated with this engagement are minimal and are not greater than risks ordinarily encountered in daily life. Storytelling can be deeply personal and can result in your story being published in the public sphere. For that reason, I will work closely with you to ensure that your words are accurately represented and are not manipulated or used to cause harm to you or any member of your community.

BENEFITS: No economic benefit can be promised to you from your participation in this project; however, your words will be used to shape suggested actions in support of remediation, mitigation, or compensation to communities impacted by the proposed Lambert Compressor Station or the Mountain Valley Pipeline project.

ALTERNATIVES: Participation in this interview is voluntary. You are free to choose not to participate. You may also choose to retract your consent to participate in this interview at any time. Your desire not to participate in this interview or your request to withdraw will have no adverse effects on you or your relationship with Alexa or Land & Heritage. Participants are also free to remove approval of proceeding with the story at any time.

COSTS/COMPENSATION: There are no costs, nor is there any compensation offered for participation in this project.

CONFIDENTIALITY: This interview is confidential, although not anonymous (both the interviewee and the interviewer are aware of each other's identities). However, no information

about you, nor any statement you make, will be made public in any way, or presented in a way that is personally identifiable. Anonymized quotations illustrating broad themes retrieved from interviews may be used in the final report, but you will be contacted for your consent prior to the submission of a final report to VA DEQ.

RECORDING: The interview will only be recorded at the written or verbal request of the interview participant. Audio recordings, if made, would be used for the sole purpose of transcribing interviews for analysis, and would not be published or made public in any way. Interviewees have access to the recording at any point if desired. Any recordings are stored on a password-secured hard-drive, and will be made accessible only to the interviewer/interviewee pair (and a translator, if one was needed).

RIGHT TO WITHDRAW: Your participation is voluntary; you have the right to withdraw or to skip any questions at any time.

OTHER PERTINENT INFORMATION: The interviewer will answer any questions you may have about the project. You may feel free to keep a copy of this consent form. If you have any questions after completing the interview, please contact Alexa Lawrence at alexa@landandheritageconsulting.com.

PARTICIPATION: Please be sure you have read and understood the above information. If you would like to participate in this project, please either state your agreement, or send your signed agreement by email.

[redacted]

[redacted]

Name

Signature

Version: 6/2/2020

Attachment C

Recruitment Email

Hello!

I'm Alexa Lawrence, a Community Relations Advisor at Land & Heritage Consulting, and I'm reaching out to inquire about your perspective and opinion on the planned Lambert Compressor Station, which would be a portion of the Mountain Valley Pipeline's Southgate Extension.

I'm writing with a brief request -- would you be available for a 30-minute Skype or phone interview with me to talk about the proposed Lambert Compressor Station project, which is planned to take place in your area?

As proposed, the Lambert Compressor Station would be part of the MVP Southgate project, a natural gas pipeline system that would span approximately 72 miles from southern Virginia to central North Carolina. The Lambert Compressor Station would be located approximately five to ten miles east of Chatham, in Pittsylvania County, Virginia.

My colleagues and I at Land & Heritage have been asked by EquiTrans Midstream to conduct a Community Impact Assessment. We are not employed by Mountain Valley Pipeline, nor any of its subsidiaries. Our outreach is intended to uncover any potential concerns or risks, or threats to communities located near the proposed project, as well as any potential benefits or opportunities these local communities might anticipate receiving.

As Mountain Valley Pipeline continues to move forward in the planning process for the Lambert Compressor Station, my staff and I are working quickly to complete our assessment of how local communities — including yours — might be impacted by the project.

The information you share with us will be kept confidential and will not be made public although the accumulated findings of our report (with any individual responses made anonymous) will be made public and will be shared with Mountain Valley Pipeline, appropriate regulatory agencies such as the Federal Energy Regulatory Commission and the Virginia Department of Environmental Quality.

In order to better understand the potential impact of this project, we are collecting individual and organizational interviews that ask:

1. How do you think about the landscape in which you currently live? How do you use the places around you, and what meaning does your home place hold for you?
2. Are there any thoughts, questions, or concerns that you (or members of your community) have about energy development, or its associated construction in your area?
3. Are there any thoughts, questions, or concerns that you (or members of your community) have *specifically* about the proposed Lambert Compressor Station? How much do you know about the project?
4. Are there any conflicts or negative impacts you are concerned might impact you or your community as a result of the proposed Lambert Compressor Station or the Mountain Valley Pipeline?
5. Are there any needs in your community that you are hoping that the proposed Lambert Compressor Station, or the parent companies of the Mountain Valley Pipeline could address?

If you are willing to share your thoughts, **we'd like to schedule a 30-minute phone call with you anytime before August 31, 2020.** We'll be conducting phone calls M - F, from 9 am to 6 pm, so if you'd be willing to speak with us, simply reply to this email with a time best suited to your needs. I totally understand if this is a busy time of year for you — please know that we are eager to hear your thoughts, but respectful of your time.

Land & Heritage Consulting is committed to identifying ways in which we can advocate for corporate entities to be better neighbors and to protect local communities, local justice, and the growth of local economies. By agreeing to share your thoughts with us, you'll be helping us to drive creative solutions to the challenges of compressor station construction — and speaking up for the safety and well-being of the people and places that you love.

If you are not able to speak with us, but know someone else in your community who can -- please feel free to forward this email to them; we'd be happy for them to get in touch.

Best,
Alexa

Alexa Lawrence
Community Relations Advisor
Land & Heritage Consulting
alexa@landandheritageconsulting.com
www.landandheritageconsulting.com

Attachment D

Interview Protocol – Lambert Community Members

INFORMED CONSENT

PURPOSE: You are being asked to participate in an interview for a Community Impact Assessment of the proposed Lambert Compressor Station, part of the Mountain Valley Pipeline Southgate Extension project. The purpose of this project is to elevate community voices from the frontlines of environmental shifts, and to identify the ways in which this energy infrastructure project may directly impact local communities.

MVP is currently planning to submit a request for additional permits to Virginia DEQ, and I intend to submit this report as part of a package describing where they have caused harm or may potentially cause harm, and what they need to do to correct it.

PROCEDURES: If you choose to participate in this interview, one of the members of the Land & Heritage team will schedule an interview with you. Interviews may be conducted by phone or by Skype/Google Hangouts/Zoom/Facebook Messenger. In the interview, you will be invited to talk about the ways in which you think about and experience the place where you live, and whether you have any concerns or expectations about ways - positive or negative — in which the MVP might impact yourself or your community.

The interview is guided by three key topics, but you should feel free to share anything you'd like to in our conversation. We expect that the interview will take approximately 30 minutes to complete.

RISKS: The risks associated with this engagement are minimal and are not greater than risks ordinarily encountered in daily life. Storytelling can be deeply personal and can result in your story being published in the public sphere. For that reason, I will work closely with you to ensure that your words are accurately represented and are not manipulated or used to cause harm to you or any member of your community.

BENEFITS: No economic benefit can be promised to you from your participation in this project; however, your words will be used to shape plans for remediation, mitigation, or compensation to indigenous communities from MVP.

ALTERNATIVES: Participation in this interview is voluntary. You are free to choose not to participate. You may also choose to retract your consent to participate in this interview at any time. Your desire not to participate in this interview or your request to withdraw will have no adverse effects on you or your relationship with Land & Heritage, Alexa Sutton Lawrence, or MVP. Participants are also free to remove approval of proceeding with the interview at any time.

COSTS/COMPENSATION: There are no costs, nor is there any compensation offered for participation in this project. Neither Land & Heritage nor MVP will be benefiting monetarily from your interview. This means your story or parts of your story would not be used for the purpose of fundraising, donation seeking, or grant proposals to benefit Land & Heritage or MVP.

CONFIDENTIALITY: This interview is not anonymous, but will be confidential: no identifying information relating to this interview will be published without the prior consent and approval of the participant.

RECORDING: Land & Heritage asks your permission to record the interview for future reference. The interview will only be recorded with the written on verbal consent of the interview participant. Audio recording would be used for the sole purpose of transcribing interview questions and would not be published. You will also have access to the recording at any point if desired.

RIGHT TO WITHDRAW: Your participation is voluntary; you have the right to withdraw or to skip any questions at any time.

OTHER PERTINENT INFORMATION: The interviewer will answer any questions you may have about the project. You may feel free to keep a copy of this consent form. If you have any questions after completing the interview, please contact PERSON WHO HOLDS THE RELATIONSHIP] at [INSERT CONTACT INFO HERE].

PARTICIPATION: Please be sure you have read and understood the above information. If you would like to participate in this project, please either state your agreement, or send your agreement by email to your primary Land & Heritage contacts, [PERSON WHO HOLDS THE RELATIONSHIP].

Version: 6/8/2020

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Self Introduction

- Who you are, what our goal is, etc. (***Same information from the recruitment email***)

Some Facts About MVP

- Venture of Mountain Valley Pipeline, LLC
- Jointly owned by EquiTrans and NextEra Energy
- Trees felled along 303.6 miles (99.9% complete)
- Pipe Strung along 266.7 miles (87.8% complete)
- Maps can be viewed at mountainvalley.info and mvpsouthgate.com

About the Interview Process

Who Is Being Interviewed – In Case Asked

Community members residing (or, for non-profits, working) within 5 to 10 miles of the Lambert Compressor Station.

First Question Set: General – What are your thoughts on energy development projects?

- Relating to Energy Infrastructuring, Overall
- Relating to the Proposed Compressor Station
- General Opinions on the Proposed Project
- Relating to MVP as a company

Second Question Set: Specific – What are the impacts you anticipate on these domains of Indigenous people's lives?

Are there any project-related activities that you believe may result in a markedly disruptive effect on the ability of communities within 5 to 10 miles of the proposed Lambert Compressor Station to continue in the course of ordinary cultural life due to:

1. The loss of primary features of the landscape
2. The loss or destruction of historical artifacts of cultural importance
3. Other losses or disruptions with respect to the following domains:
    - identity: the sense of belonging to a unique collective;
    - sense of place: the experience of attachment to particular places, based on shared sensory experiences, memories and stories;
    - sense of community: social networks, shared values, roles, norms of reciprocity and participation in collective events and activities;
    - spirituality and ceremony: the sense of connection to a wider force which may provide individuals with special powers and responsibilities;
    - governance: the ability to engage in decision-making for collective welfare;
    - stewardship: rules regarding resource management;
    - language: legends, stories, place names and instruction used to encode and transmit culture;
    - traditional knowledge: knowledge about the land and skills passed through generations;
    - livelihood: means of sustenance and economy; and
    - cultural continuity: the ability to engage in the same activities in the same places as ancestors did and to pass those skills and knowledges down to future generations.

Third Question Set: Justice & Fairness/Distributive Expectations

Main Question: What would justice look like for the impacts listed/mentioned above? Given that 85% of the pipeline is already built, what could or should MVP do next to start to make things right with your community?

- Conceptual Beliefs about Justice & Fairness
- Economic Benefit/Loss
- Cultural Benefit/Loss
- Infrastructural Benefit/Loss

- Other Benefit/Loss

Recruitment Messages - Lambert

Hello, [Community Member's Name]!

I'm writing with a brief request -- would you be interested in taking a short survey or conducting a phone interview with me about a proposed energy project in your area?

I'm Alexa Lawrence, a Community Relations Advisor at Land & Heritage Consulting, and I'm reaching out to inquire about your perspective and opinion on the planned Lambert Compressor Station, which would be a portion of the Mountain Valley Pipeline's Southgate Extension.

As proposed, the Lambert Compressor Station would be part of the MVP Southgate project, a natural gas pipeline system that would span approximately 72 miles from southern Virginia to central North Carolina, and would be regulated by the Federal Energy Regulatory Commission (FERC). The Lambert Station would be located approximately five to ten miles east of Chatham, in Pittsylvania County, Virginia.

Land & Heritage has been invited by EquiTrans Midstream to conduct a Community Impact Assessment. However, we are not employed by Mountain Valley Pipeline, nor any of its subsidiaries. Our assessment is intended to uncover any potential concerns or risks to communities located near the proposed project – as well as to identify any potential benefits or opportunities these local communities anticipate or enjoy.

The information you share with us will be kept confidential and will not be individually identifiable, although the accumulated findings of our report (with any individual responses made anonymous) will be made public and will be shared with Mountain Valley Pipeline, appropriate regulatory agencies such as the Federal Energy Regulatory Commission and the Virginia Department of Environmental Quality.

As Mountain Valley Pipeline continues to move forward in the planning process for the Lambert Compressor Station, my staff and I are working quickly to complete our assessment of how local communities – including yours – might be impacted by the project.

If you are willing to share your thoughts, we'd like to schedule a 30-minute phone call with you anytime before September 30, 2020. We'll be conducting phone calls M - F, from 9 am to 6 pm, so if you'd be willing to speak with us, simply reach out by phone or email with a time best suited to your needs. Alternatively, you can share your thoughts by returning the enclosed form. I totally understand if this is a busy time of year for you — please know that we are eager to hear your thoughts, but respectful of your time.

Land & Heritage Consulting is committed to identifying ways in which our clients can work with communities to be better neighbors and stronger advocate for local needs, local justice, and the growth of local economies. By agreeing to share your thoughts with us, you'll be helping us to find creative solutions to the challenges of compressor station construction — and advocating for the safety and well-being of the places that you love.

Best,
Alexa

Contact Us!
Phone: 336-933-1946
Email: alexa@landandheritageconsulting.com

Attachment(s): Lambert Compressor Station Flyer, Single Page Resonse Form

Attachment(s): Lambert Compressor Station Flyer, Single Page Resonse Form

Critical Service Providers

Child Care, Food, Faith, Medical within 10-Mile Radius

Pittsylvania County Community Action	514 Main St, Chatham, VA 24531	Child Care
Community Center at Chatham	36°49'29.2"N 79°23'51.6"W	Child Care
Food Distribution Center – Northern Pittsylvania County Food Center	402 Cheney Ln, Gretna, VA 24557	Food Bank
Food Lion	100 Vaden Dr, Gretna, VA 24557	Grocery
Food Lion	36°40'29.6"N 79°25'00.0"W	Grocery
Chatham Animal Clinic	34 Pruden St, Chatham, VA 24531	Medical
Cherrystone Veterinary Hospital	14390 US-29, Chatham, VA 24531	Medical
Centra Health Medical Center	1220 W Gretna Rd, Gretna, VA 24557	Medical
Southside Large Animal Clinic	617 Andrew Rd, Gretna, VA 24557	Medical
Chatham family Medical Center	19144 US-29, Chatham, VA 24531	Medical
Cornerstone Church of Christ	1186 Fairview North Rd, Chatham, VA 24531	Religious
Cherrystone Baptist Church	11 Lanier Ave, Chatham, VA 24531	Religious
Wilson Memorial Baptist Church	121 Hodnetts Mill Rd, Chatham, VA 24531	Religious
Chalmers James	480 Neighborhood Rd, Chatham, VA 24531	Religious
St. Paul Holiness Church	745 Mill Creek Rd, Chatham, VA 24531	Religious
Oak Grove Christian Church	20581 US-29, Chatham, VA 24531	Religious
Open Bible Baptist Church	20669 US-29, Chatham, VA 24531	Religious
Payneton United Methodist Church	1135 Payneton Rd, Chatham, VA 24531	Religious
Antioch Baptist Church	341 Belair Rd, Gretna, VA 24557	Religious
Springfield Church	708 Main St, Gretna, VA 24557	Religious
Gretna Baptist Church	502 Main St, Gretna, VA 24557	Religious
West End Church of Christ	610 Vaden Dr, Gretna, VA 24557	Religious
Greater Canaan Land Church	309 Cheney Lane, 303 Canaan Land Drive, Gretna, VA 24557	Religious
Elba Baptist Church	131 Northside Dr, Gretna, VA 24557	Religious
Zion Methodist Church	207 Music St, Gretna, VA 24557	Religious
Trinity Episcopal Church	500 Main St, Gretna, VA 24557	Religious
Gretna Christian Church	111 Leftwich St, Gretna, VA 24557	Religious
Kingdom Hall - Jehovah's Witness	296 Farmers Mountain Rd, Gretna, VA 24557	Religious
Beverly Chapel	36°49'15.2"N 79°24'46.6"W	Religious
Watson Memorial United Methodist	36°49'48.0"N 79°23'50.2"W	Religious
Chatham Presbyterian Church	36°49'46.5"N 79°23'50.4"W	Religious
Chatham Christian Church	36°49'26.9"N 79°23'49.6"W	Religious
Corinth Christian Church	36°49'22.3"N 79°23'47.7"W	Religious
New Hope Ame Church	36°49'19.1"N 79°24'04.2"W	Religious
Rehobeth Church	36°50'08.8"N 79°23'31.1"W	Religious
St. Luke's Church	36°50'19.2"N 79°23'36.2"W	Religious
Providence United Methodist Church	36°51'40.4"N 79°12'17.4"W	Religious
Samuel Harris Memorial Baptist Church	36°47'18.9"N 79°23'54.7"W	Religious
Triumph Missionary Baptist Church	36°47'36.5"N 79°23'15.4"W	Religious
Oakland United Methodist Church	36°45'27.3"N 79°23'18.2"W	Religious
White Oak Worship Center	36°43'20.7"N 79°23'10.0"W	Religious
Mt. Pleasant United Methodist	36°43'07.9"N 79°22'48.8"W	Religious
Moser Albert	36°42'52.4"N 79°22'51.0"W	Religious
Womack Chapel Holiness Church	36°49'44.3"N 79°09'33.9"W	Religious
Saint Paul's Church	36°49'19.4"N 79°10'46.9"W	Religious
Elkhorn Baptist Church	36°51'54.8"N 79°06'38.8"W	Religious
Pleasant Grove Baptist Church	37°00'06.0"N 79°13'22.9"W	Religious
Country Line Baptist Church	10151 Chatham Rd, Vernon Hill, VA 24597	Religious
Halifax Baptist Church	36°49'56.4"N 79°04'34.2"W	Religious
Clark Church	36°50'39.1"N 79°23'34.2"W	Religious
First Community Church	36°49'27.9"N 79°23'59.8"W	Religious
Chatham Baptist Church	12 Court Pl, Chatham, VA 24531	Religious
Sheva Church of Christ	36°51'56.3"N 79°20'06.5"W	Religious
Mill Creek Baptist Church	3720 Chalk Level Rd, Chatham, VA 24531	Religious

Greenfield Baptist Church	384 Fairmont Rd, Gretna, VA 24557	Religious
Midway Baptist Church	1949 Midway Rd, Gretna, VA 24557	Religious
The Church of Jesus Christ of Latter-Day Saints	604 Vaden Dr, Gretna, VA 24557	Religious
Harvest Fellowship Church	36°57'14.6"N 79°22'18.6"W	Religious

Schools, Prisons, and Public Housing within 10-Mile Radius

United States Postal Service	3093 Java Rd, Java, VA 24565	Government
Pittsylvania County General District Court	11 Bank St #201, Chatham, VA 24531	Government
Pittsylvania County Social Services	220 H G Mcghee Dr, Chatham, VA 24531	Government
United Postal Service	656 Dry Fork Rd, Dry Fork, VA 24549	Government
Pittsylvania County Jail	1 Bank St, Chatham, VA 24531	Correctional Facility
Green Rock Correctional Center	36°48'06.6"N 79°25'16.4"W	Correctional Facility
Corrections Department	1541 Concord Rd, Chatham, VA 24531	Correctional Facility
My House	36°59'02.9"N 79°21'16.5"W	Public Housing
Gretna Middle School	201 Coffey St, Gretna, VA 24557	School
Gretna High School	100 Gretna Hawks Cir, Gretna, VA 24557	School
Gretna Elementary School	302 Franklin Blvd, Gretna, VA 24557	School
Chatham Hall	800 Chatham Hall Cir, Chatham, VA 24531	School
Chatham High School	36°47'17.9"N 79°24'08.8"W	School
STEM Academy/Regional Alternative School	36°47'25.5"N 79°23'19.5"W	School
Adult Learning Center	36°46'24.5"N 79°23'23.3"W	School
Chatham Middle School	36°45'43.8"N 79°23'15.2"W	School
Pittsylvania Career and Technical Center	36°45'51.9"N 79°23'20.9"W	School
Chatham Elementary School	245 Chatham Elementary Ln, Chatham, VA 24531	School
White Oak School	36°42'30.5"N 79°22'20.4"W	School
Hargrave Military Academy	36°49'55.5"N 79°24'03.7"W	School
Climax Elementary School	36°53'28.1"N 79°29'12.2"W	School
Central Elementary School	36°50'20.1"N 79°23'47.1"W	School
The Bee School	820 Tight Squeeze Industrial Rd, Chatham, VA 24531	School
Pittsylvania County School	1001 Tight Squeeze Rd, Chatham, VA 24531	School
Chatham Health and Rehabilitation Center	100 Rorer St, Chatham, VA 24531	Senior Living

Child Care, Food, Faith, Medical within 10- to 20-Mile Radius

Abundant Life Church Child Care	36°35'44.9"N 79°25'41.8"W	Child Care
Danville Pittsylvania Community Center	36°35'41.8"N 79°23'18.2"W	Child Care
Stonewall Therapeutic Center	36°36'21.9"N 79°22'42.6"W	Child Care
Meadville Center	7007 Chatham Rd, Halifax, VA 24558	Child Care
Walmart Supercenter	36°35'49.0"N 79°25'47.9"W	Grocery
Danville Farmers' Market	36°35'05.6"N 79°23'07.9"W	Grocery
Old Dutch Supermarkets Inc	36°37'08.0"N 79°22'57.1"W	Grocery
Food Lion	4048 Franklin Turnpike, Danville, VA 24540	Grocery
Food Lion	3305 AL-15, Danville, VA 24540	Grocery
Food Lion	540 Westover Dr, Danville, VA 24541	Grocery
Lidl	126 Piedmont Pl, Danville, VA 24541	Grocery
Walmart Neighborhood Market	211 Nor-Dan Dr Unit 1010, Danville, VA 24540	Grocery
Piggly Wiggly	36°34'49.6"N 79°20'37.9"W	Grocery
Food Lion	1461 South Boston Rd, Danville, VA 24540	Grocery
Danville Orthopedic and Athletic Rehab	36°35'42.2"N 79°25'56.8"W	Medical
Providence Family and Sports Med	36°35'40.1"N 79°25'57.8"W	Medical
Sovah ENT and Allergy	36°35'36.1"N 79°25'56.2"W	Medical
Sandy Shores Baptist Church	36°35'23.4"N 79°25'57.6"W	Religious
Dan River Church	36°35'23.1"N 79°24'57.5"W	Religious
Central Boulevard Church of God	36°35'47.6"N 79°24'54.1"W	Religious
Greater Bible Way Apostolic	36°35'47.1"N 79°24'59.2"W	Religious
Mt. Olive Baptist Church	36°36'01.9"N 79°23'26.2"W	Religious
Morton JL	36°35'50.2"N 79°23'18.4"W	Religious
Grace Methodist Church	36°35'54.2"N 79°23'15.1"W	Religious
Greater Deliverance Temple	36°35'57.0"N 79°23'12.0"W	Religious
Holy Church	36°36'04.4"N 79°23'00.4"W	Religious
St. Luke's United Methodist Church	36°36'12.2"N 79°22'54.0"W	Religious
Moffett Memorial Baptist Church	36°35'57.0"N 79°22'51.7"W	Religious
Calvary Church	36°35'52.3"N 79°22'54.1"W	Religious
Thee Apostolic Remnant Church	36°35'48.0"N 79°23'02.1"W	Religious
Three Angels Message Seven Day	36°35'42.9"N 79°23'11.4"W	Religious
Church of Outreach Ministries	36°35'37.2"N 79°23'10.1"W	Religious
Right Touch Christian Church	36°35'35.7"N 79°23'05.0"W	Religious
Cornerstone Church of Jesus	36°35'34.0"N 79°22'58.4"W	Religious
First Pilgrim Church	36°35'44.7"N 79°23'30.3"W	Religious
St. Peter Greek Orthodox Church	36°35'02.3"N 79°23'48.2"W	Religious
First Baptist Church, Danville	36°34'58.2"N 79°23'55.3"W	Religious
First Presbyterian Church	36°34'54.7"N 79°23'57.7"W	Religious
Union Church	36°35'04.8"N 79°23'54.2"W	Religious
Episcopal Church - The Epiphany	36°35'04.0"N 79°23'47.3"W	Religious
The Remnant Church of Power	36°34'51.5"N 79°23'29.5"W	Religious
Kingdom Hall of Jehovah's Witnesses	36°34'49.3"N 79°23'14.1"W	Religious
Malmaison Church	36°41'53.4"N 79°20'20.1"W	Religious
Hillcrest Baptist Church	36°36'16.5"N 79°30'34.8"W	Religious
Longs Church	36°36'12.3"N 79°29'29.2"W	Religious
Longview Evangelical Friends Church	36°36'14.4"N 79°29'29.9"W	Religious
Danville Bible Chapel	36°35'56.7"N 79°29'08.7"W	Religious
Westover Baptist Church	36°35'50.7"N 79°28'57.3"W	Religious
Westover Christian Church	36°36'01.1"N 79°28'06.3"W	Religious
Woodlawn Baptist Church	36°35'55.4"N 79°27'37.6"W	Religious
Bowling United Industries Inc.	36°35'49.8"N 79°27'25.8"W	Religious
Sharon Baptist Church	36°39'26.8"N 79°31'54.8"W	Religious
Whitmill United Methodist Church	36°42'22.5"N 79°31'27.6"W	Religious
Third Avenue Congregational	36°36'37.9"N 79°23'13.4"W	Religious
Total Praise Apostle Church	36°36'36.6"N 79°22'59.3"W	Religious
First Pentecostal Holiness Church	36°36'33.1"N 79°22'49.0"W	Religious
Camp Grove Baptist Church	36°36'22.3"N 79°22'30.4"W	Religious
Vance Street Baptist Church	36°36'19.1"N 79°22'49.6"W	Religious
New Hope Apostolic	36°36'10.3"N 79°22'38.5"W	Religious
Moral Hill Baptist Church	36°40'14.1"N 79°44'04.3"W	Religious
Good Home Primitive Baptist Meeting House	36°40'07.9"N 79°44'10.8"W	Religious
Reach Out Apostolic Tabernacle	36°40'23.5"N 79°44'28.7"W	Religious
Pilgrims Gospel Tabernacle	36°40'13.3"N 79°45'04.1"W	Religious
Schoolfield Primitive Baptist Church	36°47'15.3"N 79°38'22.8"W	Religious
Mount Zion Church	13620 Callands Rd, Callands, VA 24530	Religious
New Life Apostolic Church	9361 Callands Rd, Chatham, VA 24531	Religious
Hollywood Baptist Church	6405 Callands Rd, Chatham, VA 24531	Religious
Greenpond Baptist Church	7120 Anderson Mill Rd, Chatham, VA 24531	Religious

Watson level Baptist Church	2464 Toshes Rd, Chatham, VA 24531	Religious
New Bethel Church of the Brethren	313 Lark Dr, Chatham, VA 24531	Religious
Museville Christian Church Parsonage	112 Victoria Rd, Chatham, VA 24531	Religious
Rising Sun Church	19648 Snow Creek Rd, Penhook, VA 24137	Religious
Rising Sun Missionary Baptist Church	19655 Snow Creek Rd, Penhook, VA 24137	Religious
New Bethel Baptist Church	3580 Wards Rd, Hurt, VA 24563	Religious
Motley United Methodist Church	3341 Grit Rd, Hurt, VA 24563	Religious
New Bethel United Methodist	7061 Dews Rd, Hurt, VA 24563	Religious
St. John Pentecostal Holiness	6658 Dews Rd, Hurt, VA 24563	Religious
Edge Hill Baptist Church	4321 Level Run Rd, Hurt, VA 24563	Religious
Level Run Baptist Church	4925 Level Run Rd, Hurt, VA 24563	Religious
Staunton Baptist Church	6101 Straightstone Rd, Long Island, VA 24569	Religious
First Buffalo Baptist Church	5010 Buffalo Rd, Long Island, VA 24569	Religious
New Second Buffalo Baptist Church	6075 Stage Coach Rd, Nathalie, VA 24577	Religious
Clover Bottom Baptist Church	7042 Stage Coach Rd, Nathalie, VA 24577	Religious
Hickory Grove Baptist Church	2173 Pumping Hill Rd, Nathalie, VA 24577	Religious
Elkhorn Baptist Church	1010 E Elkhorn Rd, Nathalie, VA 24577	Religious
New Zion Baptist Church	7107 Chatham Rd, Nathalie, VA 24577	Religious
First Baptist Church Meadville	3200 Meadville Rd, Halifax, VA 24558	Religious
Banister Hill CME Church	36°50'09.3"N 79°01'51.1"W	Religious
Christ Temple Holiness Church	1197 Blue Rock Rd, Vernon Hill, VA 24597	Religious
Faith Temple Church	1176 Wilson Memorial Trail, Vernon Hill, VA 24597	Religious
New Vernon Baptist Church	2071 Oak Level Rd, Halifax, VA 24558	Religious
Oak Level Presbyterian Church	2140 Oak Level Rd, South Boston, VA 24592	Religious
Ingram Christian Church	1199 Hummingbird Ln, South Boston, VA 24592	Religious
Household Faith Apostolic Church	15124 Mountain Rd, South Boston, VA 24592	Religious
Mountain Grove Missionary Baptist Church	1079 Birch Elmo Rd, South Boston, VA 24592	Religious
Mount Zion Church	1212 Birch Elmo Rd, South Boston, VA 24592	Religious
Sacred Heart Catholic Church	538 Central Blvd, Danville, VA 24541	Religious
St. James Baptist Church	36°35'19.5"N 79°24'20.4"W	Religious
Wesley Chapel AME Zion Church	400 John St, Danville, VA 24541	Religious
Holbrook Street Presbyterian	36°35'12.5"N 79°24'10.2"W	Religious
Loyal Baptist Church	36°35'16.9"N 79°24'08.7"W	Religious
St. Paul AME Chruch	36°35'15.3"N 79°23'58.7"W	Religious
High Street Baptist Church	36°35'18.5"N 79°23'47.7"W	Religious
Sledd Memorial Methodist Church	36°35'27.7"N 79°23'54.2"W	Religious
Union Street Missionary	36°35'31.8"N 79°24'07.6"W	Religious
East New Hope Baptist Church	36°35'00.2"N 79°20'35.6"W	Religious
Morris JB	1762 Halifax Rd, Danville, VA 24540	Religious
Hope Church	1118 Franklin Turnpike, Danville, VA 24540	Religious
Nor-Dan Church of Christ	208 Orchard Dr, Danville, VA 24540	Religious
North Main Baptist Church	2818 N Main St, Danville, VA 24540	Religious
Danville Church of Christ	120 American Legion Blvd, Danville, VA 24540	Religious
Compassion Church	215 3rd Ave, Danville, VA 24540	Religious
Church of God	302 Overby St, Danville, VA 24540	Religious
Abundant Life World Outreach Church	955 Mt Cross Rd, Danville, VA 24540	Religious
Trinity Church	405 Arnett Blvd, Danville, VA 24540	Religious

Schools, Prisons, and Public Housing within 10- to 20-Mile Radius

The Arc of Southside	36°42'29.5"N 79°22'21.4"W	Adult Education Center
Danville Jail	212 Lynn St, Danville, VA 24541	Correctional Facility
Danville Adult Detention Center	1000 South Boston Rd, Danville, VA 24540	Correctional Facility
OT Bonner Middle School	36°35'51.4"N 79°24'38.9"W	School
Westwood Middle School	36°35'51.5"N 79°24'31.6"W	School
Woodrow Wilson Elementary School	36°35'57.1"N 79°22'55.3"W	School
Galileo Magnet High School	36°35'02.8"N 79°23'36.8"W	School
Southside Elementary School	36°41'17.8"N 79°22'24.1"W	School
White Oak School	36°42'30.9"N 79°22'20.4"W	School
Westover Christian Academy	36°35'47.7"N 79°28'58.0"W	School
Tunstall High School	36°40'10.9"N 79°31'28.3"W	School
Tunstall Middle School	36°40'04.1"N 79°31'34.9"W	School
Whitmell Elementary School	36°42'23.0"N 79°31'21.1"W	School
Meadville Elementary School	1011 Meadville School Loop, Nathalie, VA 24577	School
Carlbrook School	3046 Carlbrook Rd, South Boston, VA 24592	School
CIC Head Start	36°35'20.5"N 79°24'10.5"W	School
Langston Focus School	36°35'18.7"N 79°24'25.3"W	School
Sacred Heart Catholic School	540 Central Blvd, Danville, VA 24541	School
George Washington High School	36°35'09.1"N 79°24'44.5"W	School
Medical Solutions Academy	36°35'29.6"N 79°23'57.5"W	School
Forest Hills Elementary School	36°34'40.9"N 79°24'53.6"W	School
Averett University	420 W Main St, Danville, VA 24541	School
Kentuck Elementary School	100 Kentuck Elementary Circle, Ringgold, VA 24586	School
Dan River High School	100 Dan River Wildcat Cir, Ringgold, VA 24586	School
Dan River Middle School	5875 Kentuck Rd, Ringgold, VA 24586	School
Dan River Elementary School	36°39'54.1"N 79°17'57.1"W	School
Union Hall Elementary School	100 Union Hall Elementary Cir, Chatham, VA 24531	School
Dry Fork Christian School	6920 Dry Fork Rd, Dry Fork, VA 24549	School
Alternative Therapy School	2625 Marina Dr, Gretna, VA 24557	School
Mt. Airy Elementary School	100 Mount Airy Elementary Cir, Gretna, VA 24557	School
Twin Springs Elementary School	36°41'16.6"N 79°25'40.5"W	School
Johnson Elementary School	680 Arnett Blvd, Danville, VA 24540	School
Woodberry Hills Elementary School	614 Audubon Dr, Danville, VA 24540	School
Centra Rivermont School Dan River	441 Piney Forest Rd Suite O, Danville, VA 24540	School

Churches, All Food, Medical, and Child Care within 10-Mile Radius

Chatham Animal Clinic	34 Pruden St, Chatham, VA 24531	Medical
Cherrystone Veterinary Hospital	14390 US-29, Chatham, VA 24531	Medical
Food Lion	100 Vaden Dr, Gretna, VA 24557	Grocery
Centra Health Medical Center	1220 W Gretna Rd, Gretna, VA 24557	Medical
Food Distribution Center – Northern Pittsylvania County Food Center	402 Cheney Ln, Gretna, VA 24557	Food Bank
Pittsylvania County Community Action	514 Main St, Chatham, VA 24531	Child Care
Southside Large Animal Clinic	617 Andrew Rd, Gretna, VA 24557	Medical
Cornerstone Church of Christ	1186 Fairview North Rd, Chatham, VA 24531	Religious
Cherrystone Baptist Church	11 Lanier Ave, Chatham, VA 24531	Religious
Wilson Memorial Baptist Church	121 Hodnetts Mill Rd, Chatham, VA 24531	Religious
Chalmers James	480 Neighborhood Rd, Chatham, VA 24531	Religious
Chatham family Medical Center	19144 US-29, Chatham, VA 24531	Medical
St. Paul Holiness Church	745 Mill Creek Rd, Chatham, VA 24531	Religious
Oak Grove Christian Church	20581 US-29, Chatham, VA 24531	Religious
Open Bible Baptist Church	20669 US-29, Chatham, VA 24531	Religious
Payneton United Methodist Church	1135 Payneton Rd, Chatham, VA 24531	Religious
Antioch Baptist Church	341 Belair Rd, Gretna, VA 24557	Religious
Springfield Church	708 Main St, Gretna, VA 24557	Religious
Gretna Baptist Church	502 Main St, Gretna, VA 24557	Religious
West End Church of Christ	610 Vaden Dr, Gretna, VA 24557	Religious
Greater Canaan Land Church	309 Cheney Lane, 303 Canaan Land Drive, Gretna, VA 24557	Religious
Elba Baptist Church	131 Northside Dr, Gretna, VA 24557	Religious
Zion Methodist Church	207 Music St, Gretna, VA 24557	Religious
Trinity Episcopal Church	500 Main St, Gretna, VA 24557	Religious
Gretna Christian Church	111 Leftwich St, Gretna, VA 24557	Religious
Kingdom Hall - Jehovah's Witness	296 Farmers Mountain Rd, Gretna, VA 24557	Religious
Beverly Chapel	36°49'15.2"N 79°24'46.6"W	Religious
Watson Memorial United Methodist	36°49'48.0"N 79°23'50.2"W	Religious
Chatham Presbyterian Church	36°49'46.5"N 79°23'50.4"W	Religious
Community Center at Chatham	36°49'29.2"N 79°23'51.6"W	Child Care
Chatham Christian Church	36°49'26.9"N 79°23'49.6"W	Religious
Corinth Christian Church	36°49'22.3"N 79°23'47.7"W	Religious
New Hope Ame Church	36°49'19.1"N 79°24'04.2"W	Religious
Rehobeth Church	36°50'08.8"N 79°23'31.1"W	Religious
St. Luke's Church	36°50'19.2"N 79°23'36.2"W	Religious
Providence United Methodist Church	36°51'40.4"N 79°12'17.4"W	Religious
Samuel Harris Memorial Baptist Church	36°47'18.9"N 79°23'54.7"W	Religious
Triumph Missionary Baptist Church	36°47'36.5"N 79°23'15.4"W	Religious
Oakland United Methodist Church	36°45'27.3"N 79°23'18.2"W	Religious
La Guadalupana	36°44'38.9"N 79°22'40.0"W	Grocery
White Oak Worship Center	36°43'20.7"N 79°23'10.0"W	Religious
Mt. Pleasant United Methodist	36°43'07.9"N 79°22'48.8"W	Religious
Moser Albert	36°42'52.4"N 79°22'51.0"W	Religious
Womack Chapel Holiness Church	36°49'44.3"N 79°09'33.9"W	Religious
Saint Paul's Church	36°49'19.4"N 79°10'46.9"W	Religious
Elkhorn Baptist Church	36°51'54.8"N 79°06'38.8"W	Religious
Pleasant Grove Baptist Church	37°00'06.0"N 79°13'22.9"W	Religious
Country Line Baptist Church	10151 Chatham Rd, Vernon Hill, VA 24597	Religious
Halifax Baptist Church	36°49'56.4"N 79°04'34.2"W	Religious
Food Lion	36°40'29.6"N 79°25'00.0"W	Grocery
Maynard Amos Store	36°51'08.9"N 79°35'29.4"W	Small Community Food Store

Jed's Grocery	36°55'07.5"N 79°40'28.7"W	Small Community Food Store
Wood's General Merchandise	12660 Franklin Turnpike, Chatham, VA 24531	Small Community Food Store
Custer's Little Grocery	280 Whispering Pines Rd, Axton, VA 24054	Small Community Food Store
Crews Family Orchard and Pumpkin	36°55'48.1"N 79°25'42.6"W	Small Community Food Store
Penhook Minute Market	15550 Old Franklin Turnpike, Penhook, VA 24137	Small Community Food Store
Woody's Country Store	36°58'56.8"N 79°27'59.4"W	Small Community Food Store
Childress Family Store	36°56'25.7"N 79°11'38.4"W	Small Community Food Store
57 Superette	36°49'15.1"N 79°24'23.8"W	Small Community Food Store
Clark Church	36°50'39.1"N 79°23'34.2"W	Religious
First Community Church	36°49'27.9"N 79°23'59.8"W	Religious
Chatham Baptist Church	12 Court Pl, Chatham, VA 24531	Religious
Sheva Church of Christ	36°51'56.3"N 79°20'06.5"W	Religious
Mill Creek Baptist Church	3720 Chalk Level Rd, Chatham, VA 24531	Religious
Greenfield Baptist Church	384 Fairmont Rd, Gretna, VA 24557	Religious
Midway Baptist Church	1949 Midway Rd, Gretna, VA 24557	Religious
The Church of Jesus Christ of Latter-Day Saints	604 Vaden Dr, Gretna, VA 24557	Religious
Harvest Fellowship Church	36°57'14.6"N 79°22'18.6"W	Religious

Schools, Prisons, and Public Housing within 10-Mile Radius

Gretna Middle School	201 Coffey St, Gretna, VA 24557	School
Gretna High School	100 Gretna Hawks Cir, Gretna, VA 24557	School
Gretna Elementary School	302 Franklin Blvd, Gretna, VA 24557	School
My House	36°59'02.9"N 79°21'16.5"W	Public Housing
Pittsylvania County Jail	1 Bank St, Chatham, VA 24531	Jail
United States Postal Service	3093 Java Rd, Java, VA 24565	Government
Pittsylvania County General District Court	11 Bank St #201, Chatham, VA 24531	Government
Pittsylvania County Social Services	220 H G Mcghee Dr, Chatham, VA 24531	Government
United Postal Service	656 Dry Fork Rd, Dry Fork, VA 24549	Government
Chatham Hall	800 Chatham Hall Cir, Chatham, VA 24531	School
Chatham Health and Rehabilitation Center	100 Rorer St, Chatham, VA 24531	Senior Living
Chatham High School	36°47'17.9"N 79°24'08.8"W	School
STEM Academy/Regional Alternative School	36°47'25.5"N 79°23'19.5"W	School
Adult Learning Center	36°46'24.5"N 79°23'23.3"W	School
Chatham Middle School	36°45'43.8"N 79°23'15.2"W	School
Pittsylvania Career and Technical Center	36°45'51.9"N 79°23'20.9"W	School
Chatham Elementary School	245 Chatham Elementary Ln, Chatham, VA 24531	School
White Oak School	36°42'30.5"N 79°22'20.4"W	School
Hargrave Military Academy	36°49'55.5"N 79°24'03.7"W	School
Climax Elementary School	36°53'28.1"N 79°29'12.2"W	School
Central Elementary School	36°50'20.1"N 79°23'47.1"W	School
The Bee School	820 Tight Squeeze Industrial Rd, Chatham, VA 24531	School
Pittsylvania County School	1001 Tight Squeeze Rd, Chatham, VA 24531	School
Green Rock Correctional Center	36°48'06.6"N 79°25'16.4"W	Prison
Corrections Department	1541 Concord Rd, Chatham, VA 24531	Prison

Churches, All Food, Medical, and Child Care within 10- to 20-Mile Radius

Walmart Supercenter	36°35'49.0"N 79°25'47.9"W	Grocery
Abundant Life Church Child Care	36°35'44.9"N 79°25'41.8"W	Child Care
Danville Orthopedic and Athletic Rehab	36°35'42.2"N 79°25'56.8"W	Medical
Providence Family and Sports Med	36°35'40.1"N 79°25'57.8"W	Medical
Sovah ENT and Allergy	36°35'36.1"N 79°25'56.2"W	Medical
Sandy Shores Baptist Church	36°35'23.4"N 79°25'57.6"W	Religious
Dan River Church	36°35'23.1"N 79°24'57.5"W	Religious
Central Boulevard Church of God	36°35'47.6"N 79°24'54.1"W	Religious
Greater Bible Way Apostolic	36°35'47.1"N 79°24'59.2"W	Religious
Mt. Olive Baptist Church	36°36'01.9"N 79°23'26.2"W	Religious
Morton JL	36°35'50.2"N 79°23'18.4"W	Religious
Grace Methodist Church	36°35'54.2"N 79°23'15.1"W	Religious
Greater Deliverance Temple	36°35'57.0"N 79°23'12.0"W	Religious
Holy Church	36°36'04.4"N 79°23'00.4"W	Religious
St. Luke's United Methodist Church	36°36'12.2"N 79°22'54.0"W	Religious
Moffett Memorial Baptist Church	36°35'57.0"N 79°22'51.7"W	Religious
Calvary Church	36°35'52.3"N 79°22'54.1"W	Religious
Thee Apostolic Remnant Church	36°35'48.0"N 79°23'02.1"W	Religious
Three Angels Message Seven Day	36°35'42.9"N 79°23'11.4"W	Religious
Danville Pittsylvania Community Center	36°35'41.8"N 79°23'18.2"W	Child Care
Church of Outreach Ministries	36°35'37.2"N 79°23'10.1"W	Religious
Right Touch Christian Church	36°35'35.7"N 79°23'05.0"W	Religious
Cornerstone Church of Jesus	36°35'34.0"N 79°22'58.4"W	Religious
First Pilgrim Church	36°35'44.7"N 79°23'30.3"W	Religious
Danville Farmers' Market	36°35'05.6"N 79°23'07.9"W	Small Community Food Store
St. Peter Greek Orthodox Church	36°35'02.3"N 79°23'48.2"W	Religious
First Baptist Church, Danville	36°34'58.2"N 79°23'55.3"W	Religious
First Presbyterian Church	36°34'54.7"N 79°23'57.7"W	Religious
Union Church	36°35'04.8"N 79°23'54.2"W	Religious
Episcopal Church - The Epiphany	36°35'04.0"N 79°23'47.3"W	Religious
The Remnant Church of Power	36°34'51.5"N 79°23'29.5"W	Religious
Kingdom Hall of Jehovah's Witnesses	36°34'49.3"N 79°23'14.1"W	Religious
Malmaison Church	36°41'53.4"N 79°20'20.1"W	Religious

Hillcrest Baptist Church	36°36'16.5"N 79°30'34.8"W	Religious
Longs Church	36°36'12.3"N 79°29'29.2"W	Religious
Longview Evangelical Friends Church	36°36'14.4"N 79°29'29.9"W	Religious
Danville Bible Chapel	36°35'56.7"N 79°29'08.7"W	Religious
Westover Baptist Church	36°35'50.7"N 79°28'57.3"W	Religious
Westover Christian Church	36°36'01.1"N 79°28'06.3"W	Religious
Woodlawn Baptist Church	36°35'55.4"N 79°27'37.6"W	Religious
Bowling United Industries Inc.	36°35'49.8"N 79°27'25.8"W	Religious
Sharon Baptist Church	36°39'26.8"N 79°31'54.8"W	Religious
Whitmill United Methodist Church	36°42'22.5"N 79°31'27.6"W	Religious
Old Dutch Supermarkets Inc	36°37'08.0"N 79°22'57.1"W	Grocery
Third Avenue Congregational	36°36'37.9"N 79°23'13.4"W	Religious
Total Praise Apostle Church	36°36'36.6"N 79°22'59.3"W	Religious
First Pentecostal Holiness Church	36°36'33.1"N 79°22'49.0"W	Religious
Camp Grove Baptist Church	36°36'22.3"N 79°22'30.4"W	Religious
Stonewall Therapeutic Center	36°36'21.9"N 79°22'42.6"W	Child Care
Vance Street Baptist Church	36°36'19.1"N 79°22'49.6"W	Religious
New Hope Apostolic	36°36'10.3"N 79°22'38.5"W	Religious
Moral Hill Baptist Church	36°40'14.1"N 79°44'04.3"W	Religious
Good Home Primitive Baptist Meeting House	36°40'07.9"N 79°44'10.8"W	Religious
Taylor's Grocery	36°40'17.7"N 79°44'16.1"W	Small Community Food Store
Reach Out Apostolic Tabernacle	36°40'23.5"N 79°44'28.7"W	Religious
Pilgrims Gospel Tabernacle	36°40'13.3"N 79°45'04.1"W	Religious
Schoolfield Primitive Baptist Church	36°47'15.3"N 79°38'22.8"W	Religious
Mount Zion Church	13620 Callands Rd, Callands, VA 24530	Religious
New Life Apostolic Church	9361 Callands Rd, Chatham, VA 24531	Religious
Hollywood Baptist Church	6405 Callands Rd, Chatham, VA 24531	Religious
Greenpond Baptist Church	7120 Anderson Mill Rd, Chatham, VA 24531	Religious
Watson level Baptist Church	2464 Toshes Rd, Chatham, VA 24531	Religious
New Bethel Church of the Brethren	313 Lark Dr, Chatham, VA 24531	Religious
Museville Christian Church Parsonage	112 Victoria Rd, Chatham, VA 24531	Religious

Rising Sun Church	19648 Snow Creek Rd, Penhook, VA 24137	Religious
Rising Sun Missionary Baptist Church	19655 Snow Creek Rd, Penhook, VA 24137	Religious
New Bethel Baptist Church	3580 Wards Rd, Hurt, VA 24563	Religious
Motley United Methodist Church	3341 Grit Rd, Hurt, VA 24563	Religious
New Bethel United Methodist	7061 Dews Rd, Hurt, VA 24563	Religious
St. John Pentecostal Holiness	6658 Dews Rd, Hurt, VA 24563	Religious
Edge Hill Baptist Church	4321 Level Run Rd, Hurt, VA 24563	Religious
Level Run Baptist Church	4925 Level Run Rd, Hurt, VA 24563	Religious
Staunton Baptist Church	6101 Straightstone Rd, Long Island, VA 24569	Religious
First Buffalo Baptist Church	5010 Buffalo Rd, Long Island, VA 24569	Religious
New Second Buffalo Baptist Church	6075 Stage Coach Rd, Nathalie, VA 24577	Religious
Clover Bottom Baptist Church	7042 Stage Coach Rd, Nathalie, VA 24577	Religious
Hickory Grove Baptist Church	2173 Pumping Hill Rd, Nathalie, VA 24577	Religious
Elkhorn Baptist Church	1010 E Elkhorn Rd, Nathalie, VA 24577	Religious
New Zion Baptist Church	7107 Chatham Rd, Nathalie, VA 24577	Religious
First Baptist Church Meadville	3200 Meadville Rd, Halifax, VA 24558	Religious
Banister Hill CME Church	36°50'09.3"N 79°01'51.1"W	Religious
Meadville Center	7007 Chatham Rd, Halifax, VA 24558	Child Care
Christ Temple Holiness Church	1197 Blue Rock Rd, Vernon Hill, VA 24597	Religious
Faith Temple Church	1176 Wilson Memorial Trail, Vernon Hill, VA 24597	Religious
New Vernon Baptist Church	2071 Oak Level Rd, Halifax, VA 24558	Religious
Oak Level Presbyterian Church	2140 Oak Level Rd, South Boston, VA 24592	Religious
Ingram Christian Church	1199 Hummingbird Ln, South Boston, VA 24592	Religious
Household Faith Apostolic Church	15124 Mountain Rd, South Boston, VA 24592	Religious
Mountain Grove Missionary Baptist Church	1079 Birch Elmo Rd, South Boston, VA 24592	Religious

Mount Zion Church	1212 Birch Elmo Rd, South Boston, VA 24592	Religious
Apple Market	4168 Franklin Turnpike, Danville, VA 24540	Small Community Food Store
Kentuck Grocery	36°39'29.6"N 79°17'54.9"W	Small Community Food Store
Wood's General Merchandise	36°43'58.5"N 79°32'12.9"W	Small Community Food Store
Lynn and Mark Grocery	36°36'18.0"N 79°30'17.9"W	Small Community Food Store
Food Lion	4048 Franklin Turnpike, Danville, VA 24540	Grocery
Food Lion	3305 AL-15, Danville, VA 24540	Grocery
Food Lion	540 Westover Dr, Danville, VA 24541	Grocery
Lidl	126 Piedmont Pl, Danville, VA 24541	Grocery
PAK Supermarket and Grill	3401 Westover Dr, Danville, VA 24541	Small Community Food Store
Midtown Market Inc	36°34'56.2"N 79°24'04.7"W	Small Community Food Store
Sacred Heart Catholic Church	538 Central Blvd, Danville, VA 24541	Religious
St. James Baptist Church	36°35'19.5"N 79°24'20.4"W	Religious
Wesley Chapel AME Zion Church	400 John St, Danville, VA 24541	Religious
Holbrook Street Presbyterian	36°35'12.5"N 79°24'10.2"W	Religious
Loyal Baptist Church	36°35'16.9"N 79°24'08.7"W	Religious
St. Paul AME Chruch	36°35'15.3"N 79°23'58.7"W	Religious
High Street Baptist Church	36°35'18.5"N 79°23'47.7"W	Religious
Sledd Memorial Methodist Church	36°35'27.7"N 79°23'54.2"W	Religious
Union Street Missionary	36°35'31.8"N 79°24'07.6"W	Religious
Walmart Neighborhood Market	211 Nor-Dan Dr Unit 1010, Danville, VA 24540	Grocery
Piggly Wiggly	36°34'49.6"N 79°20'37.9"W	Grocery
Food Lion	1461 South Boston Rd, Danville, VA 24540	Grocery
East New Hope Baptist Church	36°35'00.2"N 79°20'35.6"W	Religious
Morris JB	1762 Halifax Rd, Danville, VA 24540	Religious

Hope Church	1118 Franklin Turnpike, Danville, VA 24540	Religious
Nor-Dan Church of Christ	208 Orchard Dr, Danville, VA 24540	Religious
North Main Baptist Church	2818 N Main St, Danville, VA 24540	Religious
Danville Church of Christ	120 American Legion Blvd, Danville, VA 24540	Religious
Compassion Church	215 3rd Ave, Danville, VA 24540	Religious
Church of God	302 Overby St, Danville, VA 24540	Religious
Abundant Life World Outreach Church	955 Mt Cross Rd, Danville, VA 24540	Religious
Trinity Church	405 Arnett Blvd, Danville, VA 24540	Religious
Tarpley's Chapel Baptist Church	16156 Mt Cross Rd, Dry Fork, VA 24549	Religious
Swansonville Pentecostal Church	16300 Mt Cross Rd, Dry Fork, VA 24549	Religious
Wimbish Wilbur	680 Summerset Rd N, Gretna, VA 24557	Religious
Sumersett Baptist Church	3773 Bibee Rd, Pittsville, VA 24139	Religious
Union Missionary Baptist Church	37°00'29.4"N 79°26'06.4"W	Religious
Wilson Jack	9669 Rockford School Rd, Gretna, VA 24557	Religious
Laurel Grove Baptist Church	901 Laurel Grove Rd, Sutherlin, VA 24594	Religious
Food Distribution Center Northern Pittsylvania County Food Center	1400 Weal Rd, Chatham, VA 24531	Food Bank

Schools, Prisons, and Public Housing within 10- to 20-Mile Radius

OT Bonner Middle School	36°35'51.4"N 79°24'38.9"W	School
Westwood Middle School	36°35'51.5"N 79°24'31.6"W	School
Woodrow Wilson Elementary School	36°35'57.1"N 79°22'55.3"W	School
Galileo Magnet High School	36°35'02.8"N 79°23'36.8"W	School
Southside Elementary School	36°41'17.8"N 79°22'24.1"W	School
White Oak School	36°42'30.9"N 79°22'20.4"W	School
The Arc of Southside	36°42'29.5"N 79°22'21.4"W	Adult Education Center
Westover Christian Academy	36°35'47.7"N 79°28'58.0"W	School
Tunstall High School	36°40'10.9"N 79°31'28.3"W	School
Tunstall Middle School	36°40'04.1"N 79°31'34.9"W	School
Whitmell Elementary School	36°42'23.0"N 79°31'21.1"W	School
Meadville Elementary School	1011 Meadville School Loop, Nathalie, VA 24577	School
Carlbrook School	3046 Carlbrook Rd, South Boston, VA 24592	School
CIC Head Start	36°35'20.5"N 79°24'10.5"W	School
Langston Focus School	36°35'18.7"N 79°24'25.3"W	School
Sacred Heart Catholic School	540 Central Blvd, Danville, VA 24541	School
George Washington High School	36°35'09.1"N 79°24'44.5"W	School
Medical Solutions Academy	36°35'29.6"N 79°23'57.5"W	School
Forest Hills Elementary School	36°34'40.9"N 79°24'53.6"W	School
Averett University	420 W Main St, Danville, VA 24541	School
Danville Jail	212 Lynn St, Danville, VA 24541	Prison

Danville Adult Detention Center	1000 South Boston Rd, Danville, VA 24540	Prison
Kentuck Elementary School	100 Kentuck Elementary Circle, Ringgold, VA 24586	School
Dan River High School	100 Dan River Wildcat Cir, Ringgold, VA 24586	School
Dan River Middle School	5875 Kentuck Rd, Ringgold, VA 24586	School
Dan River Elementary School	36°39'54.1"N 79°17'57.1"W	School
Union Hall Elementary School	100 Union Hall Elementary Cir, Chatham, VA 24531	School
Dry Fork Christian School	6920 Dry Fork Rd, Dry Fork, VA 24549	School
Alternative Therapy School	2625 Marina Dr, Gretna, VA 24557	School
Mt. Airy Elementary School	100 Mount Airy Elementary Cir, Gretna, VA 24557	School
Twin Springs Elementary School	36°41'16.6"N 79°25'40.5"W	School
Johnson Elementary School	680 Arnett Blvd, Danville, VA 24540	School
Woodberry Hills Elementary School	614 Audubon Dr, Danville, VA 24540	School
Centra Rivermont School Dan River	441 Piney Forest Rd Suite O, Danville, VA 24540	School

Appendix B

Virginia Department of Transportation

Environmental Justice Guidelines

ENVIRONMENTAL JUSTICE GUIDELINES

VDOT Virginia Department of Transportation

Civil Rights

TABLE OF CONTENTS

I. INTRODUCTION

President Clinton issued Executive Order 12898 on February 11, 1994, which reinforces the importance of fundamental rights and legal requirements contained in Title VI of the Civil Rights Act of 1964 and the National Environmental Policy Act (NEPA). The Executive Order directs that "each Federal agency and State Highway Administration/Department of Transportation make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations". Other documents which have been issued to further clarify the Executive Order are: the US Department of Transportation's (DOT) Order on Environmental Justice, whose latest order (USDOT Order 5610.2(a) was issued May 2012; the Council on Environmental Quality's (CEQ) "Environmental Justice: Guidance Under the National Environmental Policy Act", dated December 10, 1997; and the Federal Highway Administration's (FHWA) Order on Environmental Justice, whose latest order (FHWA Order 6640.23A) was issued June 2012.

VDOT is committed to the principles of environmental justice (EJ) and is assessing and documenting the impacts of transportation projects on minority and low-income populations as a normal part of our environmental analysis efforts. A key aspect of an EJ analysis is to ensure the involvement of affected communities in the project development process. These guidelines are meant to provide Environmental, Planning, Right of Way, Location and Design, Civil Rights and any other applicable divisions (from this point forward referred to as “the project team”) with a consistent framework for both preparing an EJ analysis and developing an effective public involvement strategy. They contain only principles and general procedures, which means that the specific approach must be tailored to the unique circumstances of each project and those communities affected by it. If the procedures do not seem appropriate for a particular project, then the team should develop a more suitable approach.

The guidelines apply to projects requiring all types of NEPA documentation (Environmental Impact Statements, Environmental Assessments, Categorical Exclusions or environmental reevaluations). The identification of minority or low-income populations actually begins during systems planning by the Metropolitan Planning Organization (MPO) or VDOT's Transportation and Mobility Planning Division but is also carried out by Environmental, Location and Design and Right of Way. This information will be used and supplemented during the environmental inventory and alternatives development phases of the project development process as additional data, analysis and public input are refined. Decision-makers will be better informed about the important issues and concerns of low income and minority populations to be considered along with other factors in determining project location, design and mitigation. The EJ analysis during project development will be conducted concurrently with other technical environmental analyses during the Stage One Reporting stage.

An EJ analysis must be completed for each build alternative. Additionally, the No-Build alternative must be carefully considered as well. For example, it's possible that not building transportation improvements could impact minority or low-income populations (i.e., increased noise or air pollution, limited access to employment, etc.). A clearly written description of all EJ findings must be included in the environmental document.

II. ENVIRONMENTAL JUSTICE AND TITLE VI

The EJ Executive Order supplements the existing requirements of Title VI of the Civil Rights Act. Title VI says that each Federal agency is required to ensure that no person on grounds of race, color, or national origin is excluded from participation in, denied the benefits of, or in any other way subjected to discrimination under any program or activity receiving Federal assistance. Supplemental legislation provides these same protections from discrimination based on sex, age, and disability.

The concept of environmental justice is intended to ensure that procedures are in place to further protect groups which have been traditionally underserved. The fundamental principles of environmental justice are:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The major similarities and differences between the EJ Executive Order and Title VI are described below:

SIMILARITIES	DIFFERENCES
Both address nondiscrimination. Both capture minority populations. Both are rooted in the constitutional guarantee (14th Amendment) that all citizens are created equal and are entitled to equal protection. Both address involvement of impacted citizens in the decision-making process through meaningful involvement and participation.	EJ covers minority and low-income, while Title VI and supplemental legislation cover race, color, national origin, sex, age, disability, limited English proficiency and low income. EJ is an executive order (an order of the President of the United States), while Title VI is a law (an act of Congress). EJ mandates a process, while Title VI prohibits discrimination.

A listing of existing laws and regulations addressing environmental justice and Title VI is included at the end of these guidelines.

III. DEFINITIONS

For your information, the following definitions are provided. They have been taken directly from the US DOT Order on Environmental Justice:

Low-Income
A person whose median household income is at or below the Department of Health and Human Services poverty guidelines.

Minority
A person who is:

- Black (a person having origins in any of the black racial groups of Africa);
- Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
- American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition)

Low-Income-Population
Any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.

Minority-Population
Any readily identifiable groups of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.

Adverse Effects

The totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to:

- Bodily impairment, infirmity, illness or death
- Air, noise, and water pollution and soil contamination
- Destruction or disruption of man-made or natural resources
- Destruction or diminution of aesthetic values
- Destruction or disruption of community cohesion or a community's economic vitality
- Destruction or disruption of the availability of public and private facilities and services
- Vibration
- Adverse employment effects
- Displacement of persons, businesses, farms, or nonprofit organizations

- Increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community
- Denial of, reduction in, or significant delay in the receipt of benefits of DOT programs, policies, or activities

Disproportionately High and Adverse Effects on Minority and Low-Income Populations

An adverse effect:

1. Is predominately borne by a minority population and/or a low-income population, or
2. Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

IV. PUBLIC OUTREACH

Public involvement is the foundation to effectively integrating environmental justice concerns into transportation decision-making. It is not a separate task, but must be fully integrated within the full range of VDOT's processes. Outreach to the public is already a critical component of VDOT's project development process (as outlined in the Public Involvement Guide); environmental justice simply requires us to ensure that minority and low-income populations are included in this public outreach.

The public can provide valuable input and assist in validating information obtained from secondary sources such as census data. They can play an integral role in identifying issues and concerns of their communities, cataloging community resources and past actions affecting their quality of life, suggesting project alternatives, and negotiating avoidance, minimization, mitigation, and enhancements.

A primary goal of environmental justice is to engage those groups traditionally underrepresented in the project development process. For each project, the team should proactively reach out to the minority or low-income communities identified during systems planning and the environmental inventory and alternatives development stages. It doesn't matter whether the study area is predominantly minority or low-income, or if there is only a small EJ community. Outreach is still required to get them involved in the project development process. This outreach effort begins early in the project (i.e., in the same time frame as focus group formation) and continues throughout the process. In order to be effective, your public involvement strategy should be tailored to use adaptive or innovative approaches that overcome linguistic, institutional, cultural, economic, historical, or other potential barriers to effective participation in the decision-making process.

Each project team will need to develop its own outreach strategy thoughtfully, based on the characteristics of the particular study area. There is no 'cookie-cutter' approach, so each project may need to be treated somewhat differently.

Your goal should be to identify minority and low-income populations, bring them into the project development process, and ensure that reasonable efforts are made to address their concerns and provide them meaningful opportunities to influence transportation decisions. It is essential that VDOT visits minority and low income communities prior to the project development stage in order build and establish a relationship so that people in the community will begin to trust VDOT and be willing to share their concerns and their needs. This doesn't mean that your project outreach is directed only toward EJ communities to the exclusion of other communities. The outreach strategies listed below can be applied to all communities, not strictly to EJ communities.

Listed below is a menu of possible tools and strategies which may be useful in identifying, contacting, and engaging the public in the project development process. Remember, you don't have to use all of these strategies; you should use only those which are appropriate for your project and study area:

- For the following agencies, organizations and businesses, consider posting fliers and notices on bulletin boards; including information in church bulletins, homeowner association newsletters, etc.; offering to make project presentations; etc.:
  - Homeowner/community associations
  - Community action agencies
  - Religious organizations (churches, mosques, synagogues, etc.)
  - Civil rights organizations
  - Minority business associations
  - Chambers of Commerce
  - Business and trade organizations (e.g., Washington Board of Trade)
  - Environmental and environmental justice organizations
  - Rural/agricultural organizations
  - Ethnic stores/shops
  - Universities, colleges, vocational and local schools
  - Fraternities/sororities
  - Senior citizen groups (e.g., senior centers, county Office of Aging)
  - Community/recreational centers

- Publish ads and notices in newspapers, radio and other media, particularly media targeted to minority and low-income populations
- In addition to ads and notices, actively pursue having articles about the project published in local newspapers
- Publish ads not just in the legal section of the newspapers, but also in more 'popular' sections
- Include minority or low-income people on project focus groups
- Depending on the make-up of the particular project area, consider translating documents, notices and hearings for limited English-speaking populations
- For public meetings and brochures:
  - Include a slide asking for input from minority and low-income communities
  - Include wording in brochures soliciting input and information

- If at all possible, hold public meetings in locations that are accessible to transit

- Hold meetings at times and locations that are convenient for the attendees
- If appropriate, consider using an independent facilitator at community meetings, task force meetings, etc.
- Consider providing a minute-taker at key community meetings and providing copies of the minutes to attendees and other interested people
- Hold neighborhood open-houses or small informal group meetings
- In any notices for EJ community meetings, ask if there are unique needs/concerns (i.e., interpreter, etc.)
- Consider adding wording in project Initiation Ads and/or project mail-back cards to solicit input on, and active involvement from, minority/low-income/other populations - wording would have to be sensitive to any perception of discrimination
- Use the internet and other electronic media (e.g., VDOT web-site, some colleges and local schools have web-sites with bulletin boards, local governments)
- Place public meeting/workshop brochures, fliers and newsletters in the management offices of apartment buildings occupied by minority or low-income people
- Provide public meeting/workshop brochures, fliers and newsletters at local festivals and fairs
- Post signs in buses
- Distribute public meeting notices at bus/Metro stops
- Post notices in local libraries
- Contact school PTAs - they may be willing to have a presentation at one of their regular meetings
- Conduct in-street interviews to identify local issues/concerns
- Set up informational kiosks in malls, libraries, etc.

Possible innovative/unique ideas for atypical projects:

- Open a project field office in a minority or low-income area
- Hold workshops with affected populations by focusing more on the alternative(s) having the most impact on them.
- Use questionnaires to identify concerns of affected populations (issues, impacts, benefits, etc.) Any questionnaire would have to be developed and distributed early, so that ample time would be available to compile, analyze and use the data.
- Put out fliers and do a "road show" in communities, parks, festivals, malls, etc.
- To keep impacted communities involved and informed during final design and construction, consider having a community representative attend certain team meetings, developing flyers/brochures, etc.

V. IDENTIFICATION OF MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

The identification of minority or low-income populations will begin during systems planning by the Metropolitan Planning Organization (MPO) or Planning District Commissions and VDOT's pre-construction divisions which include the Transportation and Mobility Planning Division, Location and Design, Environmental and Right of Way. This

information developed during planning will be used and supplemented during the project development process as additional data, analysis and public input are refined to be included in the NEPA and other environmental assessment documents. As more information becomes available and the alternatives are developed, the locations of populations will continue to be refined.

You need to be sensitive to the fact that you are identifying both minority and low-income populations, so don't just concentrate on minority communities. Also, remember that there are many wealthy minority communities and many poor non-minority communities.

A. Environmental Inventory

For environmental inventory purposes, the main sources of information regarding locations of minority or low-income populations are census data.

B. Census Data

Because census data is so readily available and easy to use, it is typically the first information gathered when trying to determine if there are minority or low-income populations in the project study area. However, census data is just the starting point used to "flag" census areas that potentially contain minority or low-income populations. You have to keep in mind that even census areas with a small minority or low-income percentage may contain a protected population in your study area - in some cases; a group of a few homes could be considered a population. "Disproportionately high and adverse effects", not size, are the basis for environmental justice. A small minority or low-income population in the project area does not eliminate the possibility of a disproportionately high and adverse effect on that population. That's why it is critical to continue gathering additional information from various sources in order to successfully locate and refine the geographic locations of the populations.

- Determine whether you will use census "tracts" or "blocks". Generally, data based on census tracts should be used for larger project areas. For smaller project areas (like intersection improvements), data based on the smaller census blocks would probably be more appropriate. (* It is the recommendation of FHWA that community profiles be created for each district because it is communities that are being affected.)
- Once the project study area is determined, identify all census tracts/blocks which overlap with it.
- Determine the minority or low-income percentage for each census tract/block.

  1) Minority Percentage

  If there is more than one minority group in your study area, the minority percentage should be based on the aggregate of all minority people. For example, if the percentage of Black persons in the identified census tract/block is 20% and the percentage of Hispanic persons is 20%, then the total of 40% should be used for the minority percentage.

  2) Low-Income Percentage

Census data provides the percentage of people below the poverty level (but does not actually provide the dollar amount of that poverty level). The dollar amount is defined by the Department of Health and Human Services. The data is revised annually and can be accessed at www.aspe.hhs.gov or www.census.gov. In order to be sensitive to low-income communities, do not include the poverty level dollar amount in the environmental document; you should simply keep the information in your project files. Be sure to identify the poverty level associated with the year of the census data being used (e.g., if you are using 1990 census data, use the corresponding 1990 poverty level).

Keep in mind that local jurisdictions may define their own 'poverty level'; however, you are to use the poverty level defined by the Department of Health and Human Services in order to maintain consistency between various jurisdictions.

- Calculate the average minority percentage and average low-income percentage for your entire study area by averaging the individual tract/block percentages.
- Determine which census tracts/blocks should be "flagged" because they could contain minority or low-income populations by comparing the minority or low-income percentage of each individual census tract/block to the average percentage for the study area. If this individual percentage is "meaningfully greater" than the average percentage, then a minority or low-income population is potentially located within that census tract/block.

  On a project-by-project basis, the project team should define "meaningfully greater" and document the rationale. For example, if the minority percentage for a census tract is 10% and the study area average is 5%, this 5% difference could be "meaningfully greater" because it represents a doubling of the average. However, if the minority percentage for a census tract is 75% and the study area average is 70%, this 5% difference is probably not "meaningfully greater" since it represents only a small increase over the average.

- VDOT and Other Agencies

  The project team should use a common sense approach when determining what further level of effort is appropriate for identifying EJ populations. For example, if the census data tells you that your project is in a mostly minority area, you may not need to use the other sources discussed below to identify minority populations - in essence, your entire project area would be a minority population. However, you would still need to go beyond just the census data to identify low-income populations.

  Even if a census tract/block has a small percentage of minority or low-income persons - and is therefore not identified during Step 1 above - it is possible that a population(s) may still be located in that census tract/block. For example, a 5% Asian American population may be entirely located in one particular community, thus qualifying as a minority population. Therefore, you cannot rely on census data alone to identify populations. A site visit is an essential step to identifying populations.

  At a minimum, you should also contact the following sources, via phone conversations, meetings (including project team meetings) or correspondence:

- Local planning and transportation staff, including MPOs
- VDOT Divisions
  1) Environmental
  2) Transportation and Mobility Planning
  3) Right-of-Way and Utilities
  4) Location & Design
  5) Civil Rights

  In any conversations with or letters to the above sources, you must be careful to include the following information so they understand why you are collecting EJ information. Information regarding the locations of EJ communities may raise sensitive issues, so you shouldn't just request locations of EJ communities without explaining why you need the information and what you will be doing with it.

- Provide the purpose/background of environmental justice (reference the Executive Order)
- Emphasize that you are looking for information on both minority and low-income populations - and that they are not the same thing.
- Explain what the four minority groups are and what the poverty level is.
- Request information on the location of minority or low-income populations, based on their knowledge of the project study area.

C. Alternatives Development

After the environmental inventory stage, as preliminary/conceptual alternatives are developed, other sources of information must be used to confirm and further refine the locations of minority and low-income populations. As described earlier, public involvement is a critical component to this effort. The project team will need to determine, based on each particular project, which sources are appropriate to contact.

This contact can be made via formal written correspondence (letters, flyers, etc.), meetings/presentations, phone calls and/or e-mails - the team needs to determine which method is most appropriate for a particular source. Some sources, such as religious groups and schools, in addition to providing race and national origin information about the people attending their services or classes, may also be able to provide information about any low-income communities they may assist. Keep in mind that it's very important to maintain a record of all sources you contact, as well as the input each source provides to you.

Possible additional information sources include, but are not limited to:

- Homeowner/community associations
- Community action agencies
- Religious organizations (churches, etc.)
- Civil rights organizations
- Transportation and Mobility Planning Division (GIS and other data)
- Right of Way and Utilities Division
- Environmental
- State and local tax and financing agencies

- Minority business associations
- Chambers of Commerce
- Business and trade organizations (e.g., Washington Board of Trade)
- Environmental and environmental justice organizations
- Rural/agricultural organizations
- Economic and job development agencies (e.g., Welfare to Work)
- Ethnic stores/shops
- Universities, colleges, vocational and local schools
- Fraternities/sororities
- Senior citizen groups (e.g., senior centers, county Office of Aging)
- Community/recreational centers

NOTE: For purposes of a secondary and cumulative effects analysis (SCEA), census data only will be used to identify minority or low-income populations since this data is existing and readily available. Each census tract which overlaps with the SCEA geographic boundary should be identified. Then the individual minority and low-income percentages for each tract are to be compared to the average study area percentages as determined in FHWA's Environmental Regulations - 23 CFR 771 (you do not need to calculate the average percentages for the entire SCEA boundary). Those individual tracts with percentages meaningfully greater than the study area average percentage will be considered to have minority or low-income populations.

D. Documentation

In the "Affected Environment" section of the environmental document, you will need to carefully discuss your findings regarding minority and low-income populations. While the project files should include all details of your efforts to identify minority or low-income populations in the study area (letters written to agencies/organizations, phone memos, responses or non-responses, etc.), the environmental document should only provide a summary.

- Clearly state whether minority or low-income populations have been identified in the project study area.
- Describe how you concluded whether or not there are minority or low-income populations.
- Describe the results of the census data assessment.
- List all of the agencies, organizations and/or other groups which were contacted and describe how they were contacted (letter, phone call, meeting, etc.).
- Summarize the responses received and/or issues identified.
  The most effective way to display this information is in a matrix format.
- If minority or low-income populations are identified, characterize them by describing their make-up, size, general location, age, etc. It's recommended that study area mapping showing all locations of EJ populations not be included in the environmental document.

VI. ASSESSMENT OF DISPROPORTIONATELY HIGH AND ADVERSE IMPACTS

The definition of adverse effects (see Section II) encompasses a wide variety of potential impacts, including those to human health, the natural and social environment, the economy, community function, etc. It also includes the denial, reduction or delay in receiving benefits, which should be addressed like any other impact. For an EJ analysis, you'll need to consider all of these.

There is no magic formula for determining if a minority or low-income community will experience disproportionately high and adverse impacts due to your project. Since each project - and each minority or low-income community - is different, the team will have to carefully consider many factors in making its determination. You will need to use an approach that combines both qualitative and quantitative information to support your conclusion.

Keep in mind that the EJ analysis must be done for each alternative, including the No-Build. The No-Build alternative is defined as no other improvements being done except maintenance to the existing road. Even under the No-Build, minority or low-income populations may be affected. Impacts such as increased noise, air pollution, congestion, travel times, etc. must be considered and documented appropriately.

One of the most important factors to consider is whether and how the community itself believes it will be impacted. What one community perceives as an impact, another may perceive as a benefit. It is also possible that, within the same community, the same action may be perceived by various segments as both an impact and a benefit. Therefore, it is imperative that you work with the EJ community to see how they feel about the project.

A. Analysis of Disproportionately High and Adverse Effects

Since a one-size-fits-all approach will not work, the Environmental Division and other pre-construction divisions will need to address a variety of questions and considerations in order to conclude if the project will have disproportionately high and adverse impacts (including denial, reduction or delay in receiving benefits) on an EJ population. You will, in essence, be assessing the context and intensity of effects on EJ populations as compared to non-EJ populations.

- You will need to carefully consider all of the items below, since no single item will lead to a supportable conclusion:
- **Is the adverse effect predominantly borne by the EJ population? For example, are more** minority or low-income people impacted than non- minority or non-low-income people? Is the percentage of minority or low-income people impacted greater than the percentage of minority or low-income people in the study area? Be very cautious when using numbers like this, since numbers alone can be misleading (*It is important to actually do a site visit of communities and neighborhoods).

- Will the adverse effect on the EJ population be appreciably more severe or greater in magnitude than the adverse effect on the non-minority or low-income population? In

other words, will the EJ population carry an unfair portion of the impact? For example, if there are ten EJ residences and ten non-EJ residences will each experience noise levels above the federal standard, but noise at the EJ residences will increase by twenty decibels and noise at the non-EJ residences will increase by ten decibels, there may be a disproportionate impact.

- Does the project impact a resource that is especially important to EJ populations? Does it serve an especially important social, religious or cultural function for the EJ community? For example, is a park which is used regularly for cultural festivals being impacted by the project?
- Are there mitigations, enhancement measures or offsetting project benefits (see Section VI) to the affected EJ population? These should be taken into account when assessing if there are disproportionately high and adverse effects.
- Have you assessed the type and severity of adverse effects on non-EJ populations? In order to determine if there are disproportionately high and adverse effects on EJ populations, you will have to take into consideration the comparative impacts in non-EJ areas.

Keep in mind that, while the identification of a disproportionately high and adverse effect on a low-income or minority population does not preclude the project from going forward, it should heighten our attention to alternatives (including alternative sites), mitigation strategies, monitoring needs and preferences expressed by the affected community or population.

Note: In the secondary and cumulative effects analysis (SCEA), you will need to consider the same questions and considerations listed above in order to determine if there are disproportionately high and adverse effects on EJ populations within the SCEA boundary.

B. Documentation

Your conclusions regarding impacts on minority or low-income populations must be thoroughly explained in the "Environmental Consequences" section of the environmental document.

- The final environmental document should clearly conclude whether or not a disproportionately high and adverse impact on any minority or low-income population is likely to result. This conclusion must be reached for each alternative, including the No-Build. Remember to take into account mitigations, enhancement measures or offsetting project benefits (see Section VI) to the affected EJ population.
- Whether or not you choose an alternative in disproportionately high and adverse impacts on minority or low-income populations, you need to supply supporting information to document how you reached that conclusion for each alternative - you have to "make your case".
- Present the analysis you completed and the issues you considered in order to reach your conclusions as concisely as possible. Include a description of impacts (type and severity), any offsetting benefits and mitigations/enhancements, comparison of impacts on EJ and non-EJ populations, etc.

- Document the efforts made to interact with the affected communities, the issues/concerns identified, results of the interaction, etc. Examples of interaction could include meetings to determine whether a community considers a project's effects to be impacts or benefits, correspondence discussing potential mitigation or enhancement measures, etc. A helpful way to present this information would be in a matrix format, which should be included in the appendix of the environmental document. The information in the matrix could include meeting dates, correspondence dates, responses received, issues/concerns identified by the community, etc. You may also want to include copies of important minutes in the appendix.
- When mapping is necessary in order to clearly illustrate the effect of a project on an EJ population, mapping may be included in the environmental document; otherwise, document the impacts textually. Remember to be sensitive to the concerns of the affected communities when determining what type of mapping, if any, will be provided.

VII. AVOIDANCE, MINIMIZATION, MITIGATION AND ENHANCEMENT

If you determine that your project appears to have a disproportionately high and adverse impact on a minority or low-income population, you will then need to consider how the magnitude and severity of the impact can be prevented or reduced. The approach is first to avoid impacts if possible, then minimize impacts, then mitigate unavoidable impacts. Enhancements should also be considered. The definitions of these terms and examples (from the Federal Highway Administration's "Community Impact Assessment" booklet) are provided below:

A. Definitions

- Avoid - to alter a project so an impact does not occur (i.e., shift an alignment to avoid displacements, redesign a road segment as an underpass to avoid cutting off access to a community facility, etc.)
- Minimize - to modify the project to reduce the severity of an impact (i.e., shift an alignment to reduce displacements, alter an alignment to increase the distance between the facility and residences to decrease noise impacts, phase the project to minimize impedance to business access during peak shopping periods, limit interchanges to minimize incompatible land use development, etc.)
- Mitigate - to take an action to alleviate or offset an impact or to replace an appropriated resource (i.e., set aside land for a park or add to public recreation areas to replace lost facilities, erect sound barriers to mitigate noise impacts, provide a bicycle/pedestrian overpass or underpass to provide access to public facilities, etc.)
- Enhance - to add a desirable or attractive feature to the project to make it fit more harmoniously into the community; this will not replace lost resources or alleviate project impacts (i.e., provide signing to recognize specific cultural or historic resources, develop bicycle trails or pathways adjacent to roadways, plant trees and add park benches, add public artwork or a façade to a transportation facility to match the aesthetic design goals of the community, etc.)

B. Considerations in Determining Appropriate Avoidance, Minimization, Mitigation and Enhancement Measures:

- Remember to take mitigation, enhancements and project benefits into account when you are assessing if there will ultimately be a disproportionately high and adverse impact on an EJ population.
- Another important consideration is the fairness in distribution of avoidance, minimization, mitigation and enhancement measures between EJ and non-EJ communities. When considering these measures for an EJ community vs. the entire project area, keep in mind that the measures should be proportional to the level of impact on each.
- A disproportionately high and adverse effect on an EJ population can only be carried out if further avoidance, minimization and mitigation measures are not practicable. In determining whether a measure is 'practicable', the social, economic (including costs) and environmental effects of avoiding, minimizing or mitigating the adverse effects can be taken into account.

You can use experience on other projects to determine what measures may be considered practicable. You should also take into account the nature and severity of the disproportionate impacts when determining what is practicable. For example, it may be appropriate to go beyond 'the norm' depending on how disproportionate the impact is.

Throughout this effort, keep in mind that you may be able to eliminate, reduce or mitigate the initial disproportionate impacts to such a degree that the impacts to the EJ population are now proportional.

C. Coordination with the Impacted EJ Community

The most important consideration in developing avoidance, minimization, mitigation and enhancement measures is how the impacted EJ community feels about them. Throughout the process, you must consult with and elicit the views of the affected populations. Otherwise, you might unknowingly propose a mitigation measure which impacts the community in a different way. Also, if the same community is composed of various minority groups or income levels, each component may have separate (and possibly conflicting) issues or concerns to be considered by the project team.

You should be encouraging the members of the EJ communities that may suffer a disproportionately high and adverse impact to help develop and comment on possible avoidance/minimization alternatives as early as possible in the process.

In addition to community meetings and correspondence, you may want to consider using community questionnaires to solicit input on proposed mitigation and enhancement strategies and to suggest their own strategies, based on the EJ community's perception of impacts. Any questionnaire would have to be developed and distributed early, so that ample time would be available to compile, analyze and use the data.

Once you have worked with the affected EJ communities to determine the appropriate avoidance, minimization, mitigation and enhancement measures, you should continue to keep them informed about the project status and progress throughout the design and construction phases.

Possible Mitigation Strategies (to be coordinated with the affected community):

- Keep the impacted minority or low-income population informed (status, progress, design changes, etc.) during final design and construction of the project; this could be accomplished by posting/mailing notices, meeting with the community, having a community representative serve a liaison role and attend construction partnering meetings, etc.
- Provide noise walls (appropriateness to be discussed with Noise Committee)
- Provide landscaping/visual screening
- Provide lighting
- Provide sidewalk improvements
- Provide multi-modal improvements (i.e., bus shelters, bicycle/pedestrian facilities)
- Build or rehabilitate community parks or recreation centers

- If relocations are required, attempt to relocate to the same area if possible to preserve community cohesiveness
- Documentation - For each alternative, you will need to clearly explain in the "Environmental Consequences" section of the environmental document any avoidance, minimization, mitigation and enhancement measures which have been adopted.
- Document the strategies taken to reduce, avoid or mitigate impacts to EJ communities. The discussion of these strategies should be clearly 'linked' to the associated community impacts. If appropriate, include a discussion of how these strategies helped turn a disproportionate adverse impact into a proportionate adverse impact.
- Include a summary of the public interaction used to develop and/or review the various strategies.
- If necessary in order to clearly illustrate the strategies and results, mapping may be included in the environmental document; otherwise, document the information textually.

Note: Even when VDOT has no responsibility to mitigate impacts not caused by the project, we may encourage other public/private groups to partner together to improve the quality of life in EJ communities.

Once the mitigation commitments have been made in the final environmental document, they are to be recorded in the Environmental Compliance and Considerations Checklists and discussed at the project transition meeting between the planning and design divisions. Planning staff will continue to be involved in the project during final design to ensure that the commitments are incorporated into the construction documents.

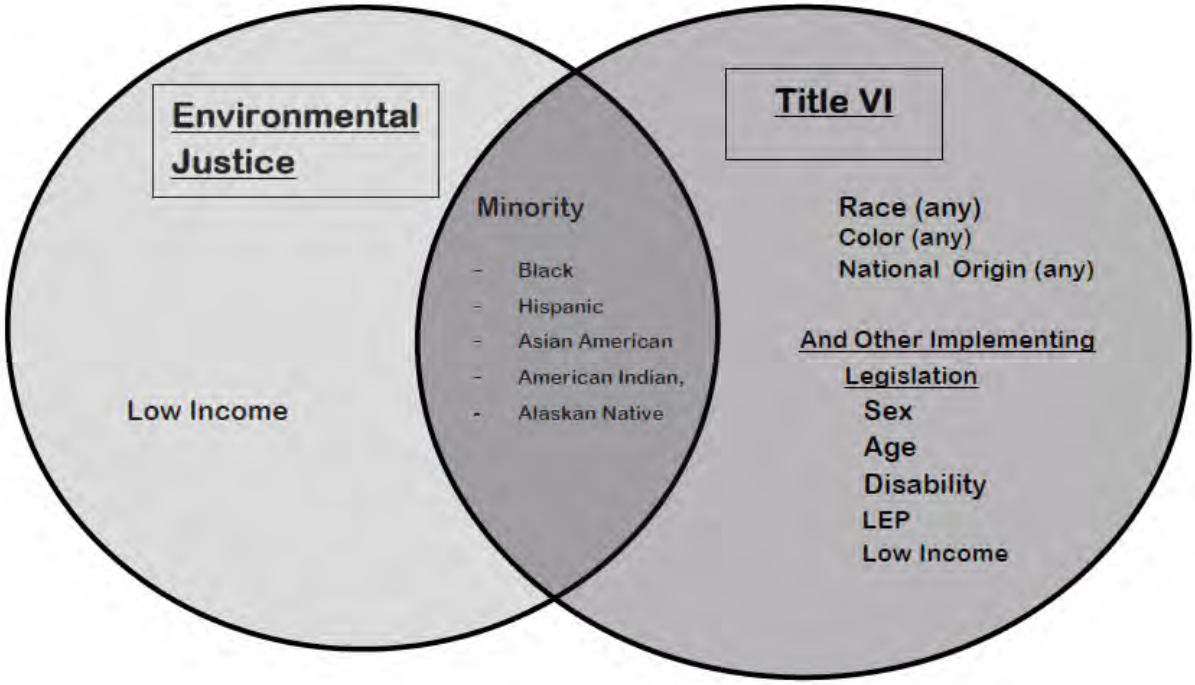
VIII. EXISTING LAWS AND REGULATIONS

- Environmental Justice Executive Order 12898
- US DOT EJ Order, April 1997
- FHWA EJ Order, December 1998
- Title VI Act of 1964
- 23 USC 109(h)
- US DOT Title VI Regulations [49 CFR 21.5 (b)(2)(3)] - addresses contracts and site selections
- Civil Rights Restoration Act of 1987
- National Environmental Policy Act of 1969
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- 23 USC 324 - addresses discrimination on the basis of sex
- Section 504 of the Rehabilitation Act of 1973 (29 USC 790) - addresses discrimination of the basis of disability
- Age Discrimination Act of 1975 (42 USC 6101) - addresses discrimination on the basis of age
- Fair Housing Act of 1988 - addresses discrimination on the basis of religion
- Religious Freedom Restoration Act of 1993 - addresses discrimination on the basis of religion
- 23 CFR 450 - FHWA Planning Regulations
- 23 CFR 771 - FHWA Environmental Regulations

IX. ADDITIONAL SOURCES OF INFORMATION

"Community Impact Assessment: A Quick Reference for Transportation" (FHWA, 9/96)
"Community Impact Mitigation Case Studies" (FHWA, 5/98)
"Transportation & Environmental Justice Case Studies" (FHWA, 12/00)
"Assistance for Reviewing the Application of Title VI and Environmental Justice in the Transportation Planning Process" (FHWA, 2001)
"Environmental Justice Guidance Under the National Environmental Policy Act" (CEQ, 12/97)
"Environmental Policy Statement" (FHWA, 1994)
"EPA Guidance for Consideration of Environmental Justice in Clean Air Act Section 309 Review" (EPA, 4/98)
OMB Bulletin 00-02, "Guidance on Aggregation and Allocation of Data on Race for Use in Civil Rights Monitoring and Enforcement" (OMB, 3/00)
Technical Advisory 6640.8A "Guidance for Preparing and Processing Environmental and 4(f) Documents" (FHWA, 10/87)
FHWA Environmental Justice web site: www.fhwa.dot.gov/environment/ej2.htm

X. INTEGRATION OF ENVIRONMENTAL JUSTICE AND TITLE VI COVERAGE



XI. APPENDIX –A

FEDERAL-AID POLICY GUIDE 23 CFR 771
October 14, 1997

OPI: HEP-31

PART 771 - ENVIRONMENTAL IMPACT AND RELATED PROCEDURES

Sec.

Authority: 42 U.S.C. 4321 et seq.; 23 U.S.C. 109, 110 128, 138 and 315; 49 U.S.C. 303(c), 5301(e), 5323, and 5324; 40 CFR part 1500 et seq.; 49 CFR 1.48(b) and 1.51.

Source: 52 FR 32660, Aug. 28, 1987, unless otherwise noted.

Sec. 771.101 Purpose.

This regulation prescribes the policies and procedures of the Federal Highway Administration (FHWA) and the Urban Mass Transportation Administration (UMTA) for implementing the National Environmental Policy Act of 1969 as amended (NEPA), and the regulation of the Council on Environmental Quality (CEQ), 40 CFR 1500-1508. This regulation sets forth all FHWA, UMTA, and Department of Transportation (DOT) requirements under NEPA for the processing of highway and urban mass transportation projects. This regulation also sets forth procedures to comply with 23 U.S.C. 109(h), 128, 138, and 49 U.S.C. 303, 1602(d), 1604(h), 1604(i), 1607a, 1607a-1 and 1610.

Sec. 771.103 [Reserved]

Sec. 771.105 Policy.

It is the policy of the Administration that:

(a) To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. [] FHWA and UMTA have supplementary guidance on the format and content of NEPA documents for their programs. This includes a list of various environmental laws, regulations, and Executive Orders which may be applicable to projects. The FHWA Technical Advisory T6640.8A, October 30, 1987, and the UMTA supplementary guidance are available from the respective FHWA and UMTA headquarters and field offices as prescribed in 49 CFR Part 7, Appendices D and G.

(b) Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, State, and local environmental protection goals.

(c) Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions.

(d) Measures necessary to mitigate adverse impacts be incorporated into the action. Measures necessary to mitigate adverse impacts are eligible for Federal funding when the Administration determines that:

(1) The impacts for which the mitigation is proposed actually result from the Administration action; and

(2) The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures. In making this determination, the Administration will consider, among other factors, the extent to which the proposed measures would assist in complying with a Federal statute, Executive Order, or Administration regulation or policy.

(e) Costs incurred by the applicant for the preparation of environmental documents requested by the Administration be eligible for Federal assistance.

(f) No person, because of handicap, age, race, color, sex, or national origin, be excluded from participating in, or denied benefits of, or be subject to discrimination under any Administration program or procedural activity required by or developed pursuant to this regulation.

[52 FR 32660, Aug. 28, 1987; 53 FR 11065, Apr. 5, 1988.

Sec. 771.107 Definitions.

The definitions contained in the CEQ regulation and in Titles 23 and 49 of the United States Code are applicable. In addition, the following definitions apply.

(a) Environmental studies--The investigations of potential environmental impacts to determine the environmental process to be followed and to assist in the preparation of the environmental document.

(b) Action--A highway or transit project proposed for FHWA or UMTA funding. It also includes activities such as joint and multiple use permits, changes in access control, etc., which may or may not involve a commitment of Federal funds.

(c) Administration action--The approval by FHWA or UMTA of the applicant's request for Federal funds for construction. It also includes approval of activities such as joint and multiple use permits, changes in access control, etc., which may or may not involve a commitment of Federal funds.

(d) Administration--FHWA or UMTA, whichever is the designated lead agency for the proposed action.

(e) Section 4(f) -- Refers to 49 U.S.C. 303 and 23 U.S.C. 138. [] Section 4(f), which protected certain public lands and all historic sites, technically was repealed in 1983 when it was codified, without substantive change, as 49 U.S.C. 303. This regulation continues to refer to Section 4(f) because it would create needless confusion to do otherwise; the policies Section 4(f) engendered are widely referred to as "Section 4(f)" matters. A provision with the same meaning is found at 23 U.S.C. 138 and applies only to FHWA actions.

Sec. 771.109 Applicability and Responsibilities.

(a) (1) The provisions of this regulation and the CEQ regulation apply to actions where the Administration exercises sufficient control to condition the permit or project approval. Actions taken by the applicant which do not require Federal approvals, such as preparation of a regional transportation plan are not subject to this regulation.

(2) This regulation does not apply to, or alter approvals by the Administration made prior to the effective date of this regulation.

(3) Environmental documents accepted or prepared by the Administration after the effective date of this regulation shall be developed in accordance with this regulation.

(b) It shall be the responsibility of the applicant, in cooperation with the Administration, to implement those mitigation measures stated as commitments in the environmental documents prepared pursuant to this regulation. The FHWA will assure that this is accomplished as a part of its program management responsibilities that include reviews

of designs, plans, specifications, and estimates (PS&E), and construction inspections. The UMTA will assure implementation of committed mitigation measures through incorporation by reference in the grant agreement, followed by reviews of designs and construction inspections.

(c) The Administration, in cooperation with the applicant, has the responsibility to manage the preparation of the appropriate environmental document. The role of the applicant will be determined by the Administration in accordance with the CEQ regulation:

> (1) Statewide agency. If the applicant is a public agency that has statewide jurisdiction (for example, a State highway agency or a State department of transportation) or is a local unit of government acting through a statewide agency, and meets the requirements of section 102(2)(D) of NEPA, the applicant may prepare the environmental impact statement (EIS) and other environmental documents with the Administration furnishing guidance, participating in the preparation, and independently evaluating the document. All FHWA applicants qualify under this paragraph.
>
> (2) Joint lead agency. If the applicant is a public agency and is subject to State or local requirements comparable to NEPA, then the Administration and the applicant may prepare the EIS and other environmental documents as joint lead agencies. The applicant shall initially develop substantive portions of the environmental document, although the Administration will be responsible for its scope and content.
>
> (3) Cooperating Agency. Local public agencies with special expertise in the proposed action may be cooperating agencies in the preparation of an environmental document. An applicant for capital assistance under the Urban Mass Transportation Act of 1964, as amended (UMT Act), is presumed to be a cooperating agency if the conditions in paragraph (c) (1) or (2) of this section do not apply. During the environmental process, the Administration will determine the scope and content of the environmental document and will direct the applicant, acting as a cooperating agency, to develop information and prepare those portions of the document concerning which it has special expertise.
>
> (4) Other. In all other cases, the role of the applicant is limited to providing environmental studies and commenting on environmental documents. All private institutions or firms are limited to this role.

(d) When entering into Federal-aid project agreements pursuant to 23 U.S.C. 110, it shall be the responsibility of the State highway agency to ensure that the project is constructed in accordance with and incorporates all committed environmental impact mitigation measures listed in approved environmental documents unless the State requests and receives written Federal Highway Administration approval to modify or delete such mitigation features.

Sec. 771.111 Early coordination, public involvement, and project development.

(a) Early coordination with appropriate agencies and the public aids in determining the type of environmental document an action requires, the scope of the document, the level of analysis, and related environmental requirements. This involves the exchange of information from the inception of a proposal for action to preparation of the environmental document. Applicants intending to apply for funds should notify the Administration at the time that a project concept is identified. When requested, the Administration will advise the applicant, insofar as possible, of the probable class of action and related environmental laws and requirements and of the need for specific studies and findings which would normally be developed concurrently with the environmental document.

(b) The Administration will identify the probable class of action as soon as sufficient information is available to identify the probable impacts of the action. For UMTA, this is normally no later than the review of the transportation improvement program (TIP) and for FHWA, the approval of the 105 program (23 U.S.C. 105).

(c) When FHWA and UMTA are involved in the development of joint projects, or when FHWA or UMTA acts as a joint lead agency with another Federal agency, a mutually acceptable process will be established on a case-by-case basis.

(d) During the early coordination process, the Administration, in cooperation with the applicant, may request other agencies having special interest or expertise to become cooperating agencies. Agencies with jurisdiction by law must be requested to become cooperating agencies.

(e) Other States, and Federal land management entities, that may be significantly affected by the action or by any of the alternatives shall be notified early and their views solicited by the applicant in cooperation with the Administration. The Administration will prepare a written evaluation of any significant unresolved issues and furnish it to the applicant for incorporation into the environmental assessment (EA) or draft EIS.

(f) In order to ensure meaningful evaluation of alternatives and to avoid commitments to transportation improvements before they are fully evaluated, the action evaluated in each EIS or finding of no significant impact (FONSI) shall:

(1) Connect logical termini and be of sufficient length to address environmental matters on a broad scope;

(2) Have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and

(3) Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

(g) For major transportation actions, the tiering of EISs as discussed in the CEQ regulation (40 CFR 1502.20) may be appropriate. The first tier EIS would focus on broad issues such as general location, mode choice, and area wide air quality and land use implications of the major alternatives. The second tier would address site specific details on project impacts, costs, and mitigation measures.

(h) For the Federal-aid highway program:

(1) Each State must have procedures approved by the FHWA to carry out a public involvement/public hearing program pursuant to 23 U.S.C. 128 and 40 CFR parts 1500 through 1508.

(2) State public involvement/public hearing procedures must provide for:

(i) Coordination of public involvement activities and public hearings with the entire NEPA process.

(ii) Early and continuing opportunities during project development for the public to be involved in the identification of social, economic, and environmental impacts, as well as impacts associated with relocation of individuals, groups, or institutions.

(iii) One or more public hearings or the opportunity for hearing(s) to be held by the State highway agency at a convenient time and place for any Federal-aid project which requires significant amounts of right-of-way, substantially changes the layout or functions of connecting roadways or of the facility being improved, has a substantial adverse impact on abutting property, otherwise has a significant social, economic, environmental or other effect, or for which the FHWA determines that a public hearing is in the public interest.

(iv) Reasonable notice to the public of either a public hearing or the opportunity for a public hearing. Such notice will indicate the availability of explanatory information. The notice shall also provide information required to comply with public involvement requirements of other laws, Executive Orders, and regulations.

(v) Explanation at the public hearing of the following information, as appropriate:

(A) The project's purpose, need, and consistency with the goals and objectives of any local urban planning,

(B) The project's alternatives, and major design features,

(C) The social, economic, environmental, and other impacts of the project,

(D) The relocation assistance program and the right-of-way acquisition process.

(E) The State highway agency's procedures for receiving both oral and written statements from the public.

(vi) Submission to the FHWA of a transcript of each public hearing and a certification that a required hearing or hearing opportunity was offered. The transcript will be accompanied by copies of all written statements from the public, both submitted at the public hearing or during an announced period after the public hearing.

(3) Based on the reevaluation of project environmental documents required by Sec. 771.129, the FHWA and the State highway agency will determine whether changes in the project or new information warrant additional public involvement.

(4) Approvals or acceptances of public involvement/public hearing procedures prior to the publication date of this regulation remain valid.

(i) Applicants for capital assistance in the UMTA program achieve public participation on proposed projects by holding public hearings and seeking input from the public through the scoping process for environmental documents. For projects requiring EISs, a public hearing will be held during the circulation period of the draft EIS. For all other projects, an opportunity for public hearings will be afforded with adequate prior notice pursuant to 49 U.S.C. 1602(d), 1604(i), 1607a(f) and 1607a-1(d), and such hearings will be held when anyone with a significant social, economic, or environmental interest in the matter requests it. Any hearing on the action must be coordinated with the NEPA process to the fullest extent possible.

(j) Information on the UMTA environmental process may be obtained from: Director, Office of Planning Assistance, Urban Mass Transportation Administration, Washington, DC 20590. Information on the FHWA environmental process may be obtained from: Director, Office of Environmental Policy, Federal Highway Administration, Washington, DC 20590.

Sec. 771.113 Timing of Administration activities.

(a) The Administration in cooperation with the applicant will perform the work necessary to complete a FONSI or an EIS and comply with other related environmental laws and regulations to the maximum extent possible during the NEPA process. This work includes environmental studies, related engineering studies, agency coordination and public involvement. However, final design activities, property acquisition (with the exception of hardship and protective buying, as defined in Sec. 771.117(d)), purchase of construction materials or rolling stock, or project construction shall not proceed until the following have been completed:

(1) (i) The action has been classified as a categorical exclusion (CE), or

(ii) A FONSI has been approved, or

(iii) A final EIS has been approved and available for the prescribed period of time and a record of decision has been signed;

(2) For actions proposed for FHWA funding, the FHWA Division Administrator has received and accepted the certifications and any required public hearing transcripts required by 23 U.S.C. 128;

(3) For activities proposed for FHWA funding, the programming requirements of 23 CFR part 450, Subpart B, and 23 CFR part 630, Subpart A, have been met.

(b) For FHWA, the completion of the requirements set forth in paragraphs (a)(1) and (a)(2) of this section is considered acceptance of the general project location and concepts described in the environmental document unless otherwise specified by the approving official. However, such approval does not commit the Administration to approve any future grant request to fund the preferred alternative.

(c) Letters of Intent issued under the authority of Section 3(a)(4) of the UMT Act are used by UMTA to indicate an intention to obligate future funds for multi-year capital transit projects. Letters of Intent will not be issued by UMTA until the NEPA process is completed.

[52 FR 32660, Aug. 28, 1987; 53 FR 11066, Apr. 5, 1988]

Sec. 771.115 Classes of actions.

There are three classes of actions which prescribe the level of documentation required in the NEPA process.

(a) Class I (EISs). Actions that significantly affect the environment require an EIS (40 CFR 1508.27). The following are examples of actions that normally required an EIS:

(1) A new controlled access freeway.

(2) A highway project of four or more lanes on a new location.

(3) New construction or extension of fixed rail transit facilities (e.g., rapid rail, light rail, commuter rail, automated guide-way transit).

(4) New construction or extension of a separate roadway for buses or high occupancy vehicles not located within an existing highway facility.

(b) Class II (CEs). Actions that do not individually or cumulatively have a significant environmental effect are excluded from the requirement to prepare an EA or EIS. A

specific list of CEs normally not requiring NEPA documentation is set forth in Sec. 771.117(c). When appropriately documented, additional projects may also qualify as CEs pursuant to Sec. 771.117(d).

(c) Class III (EAs). Actions in which the significance of the environmental impacts is not clearly established. All actions that are not Class I or II are Class III. All actions in this class require the preparation of an EA to determine the appropriate environmental document required.

Sec. 771.117 Categorical exclusions.

(a) Categorical exclusions (CEs) are actions which meet the definition contained in 40 CFR 1508.4, and, based on past experience with similar actions, do not involve significant environmental impacts. They are actions which: do not induce significant impacts to planned growth or land use for the area, do not require the relocation of significant numbers of people; do not have a significant impact on any natural, cultural, recreational, historic or other resource; do not involve significant air, noise, or water quality impacts; do not have significant impacts on travel patterns; and do not otherwise, either individually or cumulatively, have any significant environmental impacts.

(b) Any action which normally would be classified as a CE but could involve unusual circumstances will require the Administration, in cooperation with the applicant, to conduct appropriate environmental studies to determine if the CE classification is proper. Such unusual circumstances include:

(1) Significant environmental impacts;

(2) Substantial controversy on environmental grounds;

(3) Significant impact on properties protected by Section 4(f) of the DOT Act or section 106 of the National Historic Preservation Act; or

(4) Inconsistencies with any Federal, State, or local law, requirement or administrative determination relating to the environmental aspects of the action.

(c) The following actions meet the criteria for CEs in the CEQ regulation (Section 1508.4) and Sec. 771.117(a) of this regulation and normally do not require any further NEPA approvals by the Administration:

(1) Activities which do not involve or lead directly to construction, such as planning and technical studies; grants for training and research programs; research activities as defined in 23 U.S.C. 307; approval of a unified work program and any findings required in the planning process pursuant to 23 U.S.C. 134; approval of statewide programs under 23 CFR part 630; approval of project concepts under 23 CFR part 476; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed; and Federal-aid system revisions which establish classes of highways on the

Federal-aid highway system.

(2) Approval of utility installations along or across a transportation facility.

(3) Construction of bicycle and pedestrian lanes, paths, and facilities.

(4) Activities included in the State's "highway safety plan" under 23 U.S.C. 402.

(5) Transfer of Federal lands pursuant to 23 U.S.C. 317 when the subsequent action is not an FHWA action.

(6) The installation of noise barriers or alterations to existing publicly owned buildings to provide for noise reduction.

(7) Landscaping.

(8) Installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, and railroad warning devices where no substantial land acquisition or traffic disruption will occur.

(9) Emergency repairs under 23 U.S.C. 125.

(10) Acquisition of scenic easements.

(11) Determination of payback under 23 CFR part 480 for property previously acquired with Federal-aid participation.

(12) Improvements to existing rest areas and truck weigh stations.

(13) Ridesharing activities.

(14) Bus and rail car rehabilitation.

(15) Alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons.

(16) Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increase service to meet routine changes in demand.

(17) The purchase of vehicles by the applicant where the use of these vehicles can be accommodated by existing facilities or by new facilities which themselves are within a CE.

(18) Track and rail bed maintenance and improvements when carried out within the existing right-of-way.

(19) Purchase and installation of operating or maintenance equipment to be located within the transit facility and with no significant impacts off the site.

(20) Promulgation of rules, regulations, and directives.

(d) Additional actions which meet the criteria for a CE in the CEQ regulations (40 CFR 1508.4) and paragraph (a) of this section may be designated as CEs only after Administration approval. The applicant shall submit documentation which demonstrates that the specific conditions or criteria for these CEs are satisfied and that significant environmental effects will not result. Examples of such actions include but are not limited to:

(1) Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (e.g., parking, weaving, turning, climbing).

(2) Highway safety or traffic operations improvement projects including the installation of ramp metering control devices and lighting.

(3) Bridge rehabilitation, reconstruction or replacement or the construction of grade separation to replace existing at-grade railroad crossings.

(4) Transportation corridor fringe parking facilities.

(5) Construction of new truck weigh stations or rest areas.

(6) Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.

(7) Approvals for changes in access control.

(8) Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.

(9) Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.

(10) Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.

(11) Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is

not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.

(12) Acquisition of land for hardship or protective purposes; advance land acquisition loans under section 3(b) of the UMT Act. Hardship acquisition is early acquisition of property by the applicant at the property owner's request to alleviate particular hardship to the owner, in contrast to others, because of an inability to sell his property. This is justified when the property owner can document on the basis of health, safety or financial reasons that remaining in the property poses an undue hardship compared to others. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed.

(e) Where a pattern emerges of granting CE status for a particular type of action, the Administration will initiate rulemaking proposing to add this type of action to the list of categorical exclusions in paragraph (c) or (d) of this section, as appropriate.

[52 FR 32660, Aug. 28, 1987; 53 FR 11066, Apr. 5, 1988]

Sec. 771.119 Environmental assessments.

(a) An EA shall be prepared by the applicant in consultation with the Administration for each action that is not a CE and does not clearly require the preparation of an EIS, or where the Administration believes an EA would assist in determining the need for an EIS.

(b) For actions that require an EA, the applicant, in consultation with the Administration, shall, at the earliest appropriate time, begin consultation with interested agencies and others to advise them of the scope of the project and to achieve the following objectives: determine which aspects of the proposed action have potential for social, economic, or environmental impact; identify alternatives and measures which might mitigate adverse environmental impacts; and identify other environmental review and consultation requirements which should be performed concurrently with the EA. The applicant shall accomplish this through an early coordination process (i.e., procedures under Sec. 771.111) or through a scoping process. Public involvement shall be summarized and the results of agency coordination shall be included in the EA.

(c) The EA is subject to Administration approval before it is made available to the public as an Administration document. The UMTA applicants may circulate the EA prior to Administration approval provided that the document is clearly labeled as the applicant's document.

(d) The EA need not be circulated for comment but the document must be made available for public inspection at the applicant's office and at the appropriate Administration field

offices in accordance with paragraphs (e) and (f) of this section. Notice of availability of the EA, briefly describing the action and its impacts, shall be sent by the applicant to the affected units of Federal, State and local government. Notice shall also be sent to the State intergovernmental review contacts established under Executive Order 12372.

(e) When a public hearing is held as part of the application for Federal funds, the EA shall be available at the public hearing and for a minimum of 15 days in advance of the public hearing. The notice of the public hearing in local newspapers shall announce the availability of the EA and where it may be obtained or reviewed. Comments shall be submitted in writing to the applicant or the Administration within 30 days of the availability of the EA unless the Administration determines, for good cause, that a different period is warranted. Public hearing requirements are as described in Sec. 771.111.

(f) When a public hearing is not held, the applicant shall place a notice in a newspaper(s) similar to a public hearing notice and at a similar stage of development of the action, advising the public of the availability of the EA and where information concerning the action may be obtained. The notice shall invite comments from all interested parties. Comments shall be submitted in writing to the applicant or the Administration within 30 days of the publication of the notice unless the Administration determines, for good cause, that a different period is warranted.

(g) If no significant impacts are identified, the applicant shall furnish the Administration a copy of the revised EA, as appropriate; the public hearing transcript, where applicable; copies of any comments received and responses thereto; and recommend a FONSI. The EA should also document compliance, to the extent possible, with all applicable environmental laws and Executive orders, or provide reasonable assurance that their requirements can be met.

(h) When the Administration expects to issue a FONSI for an action described in Sec. 771.115(a), copies of the EA shall be made available for public review (including the affected units of government) for a minimum of 30 days before the Administration makes its final decision (See 40 CFR 1501.4(e)(2).) This public availability shall be announced by a notice similar to a public hearing notice.

(i) If, at any point in the EA process, the Administration determines that the action is likely to have a significant impact on the environment, the preparation of an EIS will be required.

Sec. 771.121 Findings of no significant impact.

(a) The Administration will review the EA and any public hearing comments and other comments received regarding the EA. If the Administration agrees with the applicant's recommendations pursuant to Sec. 771.119(g), it will make a separate written FONSI incorporating by reference the EA and any other appropriate environmental documents.

(b) After a FONSI has been made by the Administration, a notice of availability of the

FONSI shall be sent by the applicant to the affected units of Federal, State and local government and the document shall be available from the applicant and the Administration upon request by the public. Notice shall also be sent to the State intergovernmental review contacts established under Executive Order 12372.

(c) If another Federal agency has issued a FONSI on an action which includes an element proposed for Administration funding, the Administration will evaluate the other agency's FONSI. If the Administration determines that this element of the project and its environmental impacts have been adequately identified and assessed, and concurs in the decision to issue a FONSI, the Administration will issue its own FONSI incorporating the other agency's FONSI. If environmental issues have not been adequately identified and assessed, the Administration will require appropriate environmental studies.

Sec. 771.123 Draft environmental impact statements.

(a) A draft EIS shall be prepared when the Administration determines that the action is likely to cause significant impacts on the environment. When the decision has been made by the Administration to prepare an EIS, the Administration will issue a Notice of Intent (40 CFR 1508.22) for publication in the Federal Register. Applicants are encouraged to announce the intent to prepare an EIS by appropriate means at the local level.

(b) After publication of the Notice of Intent, the Administration, in cooperation with the applicant, will begin a scoping process. The scoping process will be used to identify the range of alternatives and impacts and the significant issues to be addressed in the EIS and to achieve the other objectives of 40 CFR 1501.7. For FHWA, scoping is normally achieved through public and agency involvement procedures required by Sec. 771.111. For UMTA, scoping is achieved by soliciting agency and public responses to the action by letter or by holding scoping meetings. If a scoping meeting is to be held, it should be announced in the Administration's Notice of Intent and by appropriate means at the local level.

(c) The draft EIS shall be prepared by the Administration in cooperation with the applicant or, where permitted by law, by the applicant with appropriate guidance and participation by the Administration. The draft EIS shall evaluate all reasonable alternatives to the action and discuss the reasons why other alternatives, which may have been considered, were eliminated from detailed study. The draft EIS shall also summarize the studies, reviews, consultations, and coordination required by environmental laws or Executive Orders to the extent appropriate at this stage in the environmental process.

(d) An applicant which is a "statewide agency" may select a consultant to assist in the preparation of an EIS in accordance with applicable contracting procedures. Where the applicant is a "joint lead" or "cooperating" agency, the applicant may select a consultant, after coordination with the Administration to assure compliance with 40 CFR 1506.5(c). The Administration will select any such consultant for "other" applicants. (See Sec. 771.109(c) for definitions of these terms.)

(e) The Administration, when satisfied that the draft EIS complies with NEPA

requirements, will approve the draft EIS for circulation by signing and dating the cover sheet.

(f) A lead, joint lead, or a cooperating agency shall be responsible for printing the EIS. The initial printing of the draft EIS shall be in sufficient quantity to meet requirements for copies which can reasonably be expected from agencies, organizations, and individuals. Normally, copies will be furnished free of charge. However, with Administration concurrence, the party requesting the draft EIS may be charged a fee which is not more than the actual cost of reproducing the copy or may be directed to the nearest location where the statement may be reviewed.

(g) The draft EIS shall be circulated for comment by the applicant on behalf of the Administration. The draft EIS shall be made available to the public and transmitted to agencies for comment no later than the time the document is filed with the Environmental Protection Agency in accordance with 40 CFR 1506.9. The draft EIS shall be transmitted to:

> (1) Public officials, interest groups, and members of the public known to have an interest in the proposed action or the draft EIS;
>
> (2) Federal, State and local government agencies expected to have jurisdiction or responsibility over, or interest or expertise in, the action. Copies shall be provided directly to appropriate State and local agencies, and to the State intergovernmental review contacts established under Executive Order 12372; and
>
> (3) States and Federal land management entities which may be significantly affected by the proposed action or any of the alternatives. These copies shall be accompanied by a request that such State or entity advise the Administration in writing of any disagreement with the evaluation of impacts in the statement. The Administration will furnish the comments received to the applicant along with a written assessment of any disagreements for incorporation into the final EIS.

(h) The UMTA requires a public hearing during the circulation period of all draft EISs. FHWA public hearing requirements are as described in Sec. 771.111(h). Whenever a public hearing is held, the draft EIS shall be available at the public hearing and for a minimum of 15 days in advance of the public hearing. The availability of the draft EIS shall be mentioned, and public comments requested, in any public hearing notice and at any public hearing presentation. If a public hearing on an action proposed for FHWA funding is not held, a notice shall be placed in a newspaper similar to a public hearing notice advising where the draft EIS is available for review, how copies may be obtained, and where the comments should be sent.

(i) The Federal Register public availability notice (40 CFR 1506.10) shall establish a period of not less than 45 days for the return of comments on the draft EIS. The notice and the draft EIS transmittal letter shall identify where comments are to be sent.

(j) For UMTA funded major urban mass transportation investments, the applicant shall

prepare a report identifying a locally preferred alternative at the conclusion of the Draft EIS circulation period. Approval may be given to begin preliminary engineering on the principal alternative(s) under consideration. During the course of such preliminary engineering, the applicant will refine project costs, effectiveness, and impact information with particular attention to alternative designs, operations, detailed location decisions and appropriate mitigation measures.

These studies will be used to prepare the final EIS or, where appropriate, a supplemental draft EIS.

Sec. 771.125 Final environmental impact statements.

(a) (1) After circulation of a draft EIS and consideration of comments received, a final EIS shall be prepared by the Administration in cooperation with the applicant or, where permitted by law, by the applicant with appropriate guidance and participation by the Administration. The final EIS shall identify the preferred alternative and evaluate all reasonable alternatives considered. It shall also discuss substantive comments received on the draft EIS and responses thereto, summarize public involvement, and describe the mitigation measures that are to be incorporated into the proposed action. Mitigation measures presented as commitments in the final EIS will be incorporated into the project as specified in Sec. 771.109(b). The final EIS should also document compliance, to the extent possible, with all applicable environmental laws and Executive Orders, or provide reasonable assurance that their requirements can be met.

(2) Every reasonable effort shall be made to resolve interagency disagreements on actions before processing the final EIS. If significant issues remain unresolved, the final EIS shall identify those issues and the consultations and other efforts made to resolve them.

(b) The final EIS will be reviewed for legal sufficiency prior to Administration approval.

(c) The Administration will indicate approval of the EIS for an action by signing and dating the cover page. Final EISs prepared for actions in the following categories will be submitted to the Administration's Headquarters for prior concurrence:

(1) Any action for which the Administration determines that the final EIS should be reviewed at the Headquarters office. This would typically occur when the Headquarters office determines that (i) additional coordination with other Federal, State or local governmental agencies is needed; (ii) the social, economic, or environmental impacts of the action may need to be more fully explored; (iii) the impacts of the proposed action are unusually great; (iv) major issues remain unresolved; or (v) the action involves national policy issues.

(2) Any action to which a Federal, State or local government agency has indicated opposition on environmental grounds (which has not been resolved to the written satisfaction of the objecting agency).

(3) Major urban mass transportation investments as defined by UMTA's policy on major investments (49 FR 21284; May 18, 1984).

(d) The signature of the UMTA approving official on the cover sheet also indicates compliance with section 14 of the UMT Act and fulfillment of the grant application requirements of Sections 3(d)(1) and (2), 5(h), and 5(i) of the UMT Act.

(e) Approval of the final EIS is not an Administration Action (as defined in Sec. 771.107(c)) and does not commit the Administration to approve any future grant request to fund the preferred alternative.

(f) The initial printing of the final EIS shall be in sufficient quantity to meet the request for copies which can be reasonably expected from agencies, organizations, and individuals. Normally, copies will be furnished free of charge. However, with Administration concurrence, the party requesting the final EIS may be charged a fee which is not more than the actual cost of reproducing the copy or may be directed to the nearest location where the statement may be reviewed.

(g) The final EIS shall be transmitted to any persons, organizations, or agencies that made substantive comments on the draft EIS or requested a copy, no later than the time the document is filed with EPA. In the case of lengthy documents, the agency may provide alternative circulation processes in accordance with 40 CFR 1502.19. The applicant shall also publish a notice of availability in local newspapers and make the final EIS available through the mechanism established pursuant to DOT Order 4600.13 which implements Executive Order 12372. When filed with EPA, the final EIS shall be available for public review at the applicant's offices and at appropriate Administration offices. A copy should also be made available for public review at institutions such as local government offices, libraries, and schools, as appropriate.

Sec. 771.127 Record of decision.

(a) The Administration will complete and sign a record of decision (ROD) no sooner than 30 days after publication of the final EIS notice in the Federal Register or 90 days after publication of a notice for the draft EIS, whichever is later. The ROD will present the basis for the decision as specified in 40 CFR 1505.2, summarize any mitigation measures that will be incorporated in the project and document any required section 4(f) approval in accordance with Sec. 771.135(l). Until any required ROD has been signed, no further approvals may be given except for administrative activities taken to secure further project funding and other activities consistent with 40 CFR 1506.1.

(b) If the Administration subsequently wishes to approve an alternative which was not identified as the preferred alternative but was fully evaluated in the final EIS, or proposes to make substantial changes to the mitigation measures or findings discussed in the ROD, a revised ROD shall be subject to review by those Administration offices which reviewed the final EIS under Sec. 771.125(c). To the extent practicable the approved revised ROD shall be provided to all persons, organizations, and agencies that received a copy of the final EIS pursuant to Sec. 771.125(g).

Sec. 771.129 Re-evaluations.

(a) A written evaluation of the draft EIS shall be prepared by the applicant in cooperation with the Administration if an acceptable final EIS is not submitted to the Administration within 3 years from the date of the draft EIS circulation. The purpose of this evaluation is to determine whether a supplement to the draft EIS or a new draft EIS is needed.

(b) A written evaluation of the final EIS will be required before further approvals may be granted if major steps to advance the action (e.g., authority to undertake final design, authority to acquire a significant portion of the right-of-way, or approval of the plans, specifications and estimates) have not occurred within three years after the approval of the final EIS, final EIS supplement, or the last major Administration approval or grant.

(c) After approval of the EIS, FONSI, or CE designation, the applicant shall consult with the Administration prior to requesting any major approvals or grants to establish whether or not the approved environmental document or CE designation remains valid for the requested Administration action. These consultations will be documented when determined necessary by the Administration.

[52 FR 32660, Aug. 28, 1987; 53 FR 11066, Apr. 5, 1988]

Sec. 771.130 Supplemental environmental impact statements.

(a) A draft EIS, final EIS, or supplemental EIS may be supplemented at any time. An EIS shall be supplemented whenever the Administration determines that:

(1) Changes to the proposed action would result in significant environmental impacts that were not evaluated in the EIS; or

(2) New information or circumstances relevant to environmental concerns and bearing on the proposed action or its impacts would result in significant environmental impacts not evaluated in the EIS.

(b) However, a supplemental EIS will not be necessary where:

(1) The changes to the proposed action, new information, or new circumstances result in a lessening of adverse environmental impacts evaluated in the EIS without causing other environmental impacts that are significant and were not evaluated in the EIS; or

(2) The Administration decides to approve an alternative fully evaluated in an approved final EIS but not identified as the preferred alternative. In such a case, a revised ROD shall be prepared and circulated in accordance with Sec. 771.127(b).

(c) Where the Administration is uncertain of the significance of the new impacts, the applicant will develop appropriate environmental studies or, if the Administration deems appropriate, an EA to assess the impacts of the changes, new information, or new

circumstances. If, based upon the studies, the Administration determines that a supplemental EIS is not necessary, the Administration shall so indicate in the project file.

(d) A supplement is to be developed using the same process and format (i.e., draft EIS, final EIS, and ROD) as an original EIS, except that scoping is not required.

(e) A supplemental draft EIS may be necessary for UMTA major urban mass transportation investments if there is a substantial change in the level of detail on project impacts during project planning and development. The supplement will address site-specific impacts and refined cost estimates that have been developed since the original draft EIS.

(f) In some cases, a supplemental EIS may be required to address issues of limited scope, such as the extent of proposed mitigation or the evaluation of location or design variations for a limited portion of the overall project. Where this is the case, the preparation of a supplemental EIS shall not necessarily:

(i) Prevent the granting of new approvals;

(ii) Require the withdrawal of previous approvals; or

(iii) Require the suspension of project activities; for any activity not directly affected by the supplement. If the changes in question are of such magnitude to require a reassessment of the entire action, or more than a limited portion of the overall action, the Administration shall suspend any activities which would have an adverse environmental impact or limit the choice of reasonable alternatives, until the supplemental EIS is completed.

Sec. 771.131 Emergency action procedures.

Requests for deviations from the procedures in this regulation because of emergency circumstances (40 CFR 1506.11) shall be referred to the Administration's headquarters for evaluation and decision after consultation with CEQ.

Sec. 771.133 Compliance with other requirements.

The final EIS or FONSI should document compliance with requirements of all applicable environmental laws, Executive orders, and other related requirements. If full compliance is not possible by the time the final EIS or FONSI is prepared, the final EIS or FONSI should reflect consultation with the appropriate agencies and provide reasonable assurance that the requirements will be met. Approval of the environmental document constitutes adoption of any Administration findings and determinations that are contained therein. The FHWA approval of the appropriate NEPA document will constitute its finding of compliance with the report requirements of 23 U.S.C. 128.

Sec. 771.135 Section 4(f) (49 U.S.C. 303).

(a) (1) The Administration may not approve the use of land from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

(i) There is no feasible and prudent alternative to the use of land from the property; and

(ii) The action includes all possible planning to minimize harm to the property resulting from such use.

(2) Supporting information must demonstrate that there are unique problems or unusual factors involved in the use of alternatives that avoid these properties or that the cost, social, economic, and environmental impacts, or community disruption resulting from such alternatives reach extraordinary magnitudes.

(b) The Administration will determine the application of section 4(f). Any use of lands from a section 4(f) property shall be evaluated early in the development of the action when alternatives to the proposed action are under study.

(c) Consideration under section 4(f) is not required when the Federal, State, or local officials having jurisdiction over a park, recreation area or refuge determine that the entire site is not significant. In the absence of such a determination, the section 4(f) land will be presumed to be significant. The Administration will review the significance determination to assure its reasonableness.

(d) Where Federal lands or other public land holdings (e.g., State forests) are administered under statutes permitting management for multiple uses, and, in fact, are managed for multiple uses, section 4(f) applies only to those portions of such lands which function for, or are designated in the plans of the administering agency as being for, significant park, recreation, or wildlife and waterfowl purposes. The determination as to which lands so function or are so designated, and the significance of those lands, shall be made by the officials having jurisdiction over the lands. The Administration will review this determination to assure its reasonableness. The determination of significance shall apply to the entire area of such park, recreation, or wildlife and waterfowl refuge sites.

(e) In determining the application of section 4(f) to historic sites, the Administration, in cooperation with the applicant, will consult with the State Historic Preservation Officer (SHPO) and appropriate local officials to identify all properties on or eligible for the National Register of Historic Places (National Register). The section 4(f) requirements apply only to sites on or eligible for the National Register unless the Administration determines that the application of section 4(f) is otherwise appropriate.

(f) The Administration may determine that section 4(f) requirements do not apply to restoration, rehabilitation, or maintenance of transportation facilities that are on or eligible for the National Register when:

(1) Such work will not adversely affect the historic qualities of the facility that

caused it to be on or eligible for the National Register, and

(2) The SHPO and the Advisory Council on Historic Preservation (ACHP) have been consulted and have not objected to the Administration finding in paragraph (f)(1) of this section.

(g) (1) Section 4(f) applies to all archeological sites on or eligible for inclusion on the National Register, including those discovered during construction except as set forth in paragraph (g)(2) of this section. Where section 4(f) applies to archeological sites discovered during construction, the section 4(f) process will be expedited. In such cases, the evaluation of feasible and prudent alternatives will take account of the level of investment already made. The review process, including the consultation with other agencies, will be shortened as appropriate.

(2) Section 4(f) does not apply to archeological sites where the Administration, after consultation with the SHPO and the ACHP, determines that the archeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place. This exception applies both to situations where data recovery is undertaken or where the Administration decides, with agreement of the SHPO and, where applicable, the ACHP not to recover the resource.

(h) Designations of park and recreation lands, wildlife and waterfowl refuges, and historic sites are sometimes made and determinations of significance changed late in the development of a proposed action. With the exception of the treatment of archeological resources in paragraph (g) of this section, the Administration may permit a project to proceed without consideration under section 4(f) if the property interest in the section 4(f) lands was acquired for transportation purposes prior to the designation or change in the determination of significance and if an adequate effort was made to identify properties protected by section 4(f) prior to acquisition.

(i) The evaluations of alternatives to avoid the use of section 4(f) land and of possible measures to minimize harm to such lands shall be developed by the applicant in cooperation with the Administration. This information should be presented in the draft EIS, EA, or, for a project classified as a CE in a separate document. The section 4(f) evaluation shall be provided for coordination and comment to the officials having jurisdiction over the section 4(f) property and to the Department of the Interior, and as appropriate to the Department of Agriculture and the Department of Housing and Urban Development. A minimum of 45 days shall be established by the Administration for receipt of comments. Uses of section 4(f) land covered by a programmatic section 4(f) evaluation shall be documented and coordinated as specified in the programmatic section 4(f) evaluation.

(j) When adequate support exists for a section 4(f) determination, the discussion in the final EIS, FONSI, or separate section 4(f) evaluation shall specifically address:

(1) The reasons why the alternatives to avoid a section 4(f) property are not

feasible and prudent; and

(2) All measures which will be taken to minimize harm to the Section 4(f) property.

(k) The final Section 4(f) evaluation will be reviewed for legal sufficiency.

(l) For actions processed with EISs, the Administration will make the section 4(f) approval either in its approval of the final EIS or in the ROD. Where the section 4(f) approval is documented in the final EIS, the Administration will summarize the basis for its section 4(f) approval in the ROD. Actions requiring the use of section 4(f) property, and proposed to be processed with a FONSI or classified as a CE, shall not proceed until notified by the Administration of section 4(f) approval. For these actions, any required section 4(f) approval will be documented separately.

(m) Circulation of a separate Section 4(f) evaluation will be required when:

(1) A proposed modification of the alignment or design would require the use of section 4(f) property after the CE, FONSI, draft EIS, or final EIS has been processed;

(2) The Administration determines, after processing the CE, FONSI, draft EIS, or final EIS that section 4(f) applies to a property;

(3) A proposed modification of the alignment, design, or measures to minimize harm (after the original section 4(f) approval) would result in a substantial increase in the amount of section 4(f) land used, a substantial increase in the adverse impacts to section 4(f) land, or a substantial reduction in mitigation measures; or

(4) Another agency is the lead agency for the NEPA process, unless another DOT element is preparing the section 4(f) evaluation.

(n) If the Administration determines under Sec. 771.135(m) or otherwise, that section 4(f) is applicable after the CE, FONSI, or final EIS has been processed, the decision to prepare and circulate a section 4(f) evaluation will not necessarily require the preparation of a new or supplemental environmental document. Where a separately circulated section 4(f) evaluation is prepared, such evaluation does not necessarily:

(i) Prevent the granting of new approvals;

(ii) Require the withdrawal of previous approvals; or

(iii) Require the suspension of project activities; for any activity not affected by the section 4(f) evaluation.

(o) An analysis required by section 4(f) may involve different levels of detail where the

section 4(f) involvement is addressed in a tiered EIS.

(1) When the first-tier, broad-scale EIS is prepared, the detailed information necessary to complete the section 4(f) evaluation may not be available at that stage in the development of the action. In such cases, an evaluation should be made on the potential impacts that a proposed action will have on section 4(f) land and whether those impacts could have a bearing on the decision to be made. A preliminary determination may be made at this time as to whether there are feasible and prudent locations or alternatives for the action to avoid the use of section 4(f) land. This preliminary determination shall consider all possible planning to minimize harm to the extent that the level of detail available at the first-tier EIS stage allows. It is recognized that such planning at this stage will normally be limited to ensuring that opportunities to minimize harm at subsequent stages in the development process have not been precluded by decisions made at the first-tier stage. This preliminary determination is then incorporated into the first-tier EIS.

(2) A section 4(f) approval made when additional design details are available will include a determination that:

(i) The preliminary section 4(f) determination made pursuant to paragraph (o)(1) of this section is still valid; and

(ii) The criteria of paragraph (a) of this section have been met.

(p) Use. (1) Except as set forth in paragraphs (f), (g)(2), and (h) of this section, "use" (in paragraph (a)(1) of this section) occurs:

(i) When land is permanently incorporated into a transport-ation facility.

(ii) When there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes as determined by the criteria in paragraph (p)(7) of this section; or

(iii) When there is a constructive use of land.

(2) Constructive use occurs when the transportation project does not incorporate land from a section 4(f) resource, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features or attributes of the resource are substantially diminished.

(3) The Administration is not required to determine that there is no constructive use. However, such a determination could be made at the discretion of the Administration.

(4) The Administration has reviewed the following situations and determined that a constructive use occurs when:

(i) The projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a resource protected by section 4(f), such as hearing the performances at an outdoor amphitheater, sleeping in the sleeping area of a campground, enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance, or enjoyment of an urban park where serenity and quiet are significant attributes;

(ii) The proximity of the proposed project substantially impairs esthetic features or attributes of a resource protected by section 4(f), where such features or attributes are considered important contributing elements to the value of the resource. Examples of substantial impairment to visual or esthetic qualities would be location of a proposed transportation facility in such proximity that it obstructs or eliminates the primary views of an architecturally significant historical building, or substantially detracts from the setting of a park or historic site which derives its value in substantial part due to its setting.

(iii) The project results in a restriction on access which substantially diminishes the utility of a significant publicly owned park, recreation area, or a historic site;

(iv) The vibration impact from operation of the project substantially impairs the use of a section 4(f) resource, such as projected vibration levels from a rail transit project that are great enough to affect the structural integrity of a historic building or substantially diminish the utility of the building; or

(v) The ecological intrusion of the project substantially diminishes the value of wildlife habitat in a wildlife or waterfowl refuge adjacent to the project or substantially interferes with the access to a wildlife or waterfowl refuge, when such access is necessary for established wildlife migration or critical life cycle processes.

(5) The Administration has reviewed the following situations and determined that a constructive use does not occur when:

(i) Compliance with the requirements of section 106 of the National Historic Preservation Act and 36 CFR part 800 for proximity impacts of the proposed action, on a site listed on or eligible for the National Register of Historic Places, results in an agreement of "no effect" or "no adverse effect";

(ii) The projected traffic noise levels of the proposed highway project do not exceed the FHWA noise abatement criteria as contained in Table 1, 23 CFR part 772, or the projected operational noise levels of the proposed transit project do not exceed the noise impact criteria in the UMTA guidelines;

(iii) The projected traffic noise levels exceed the relevant threshold in paragraph (p)(5)(ii) of this section because of high existing noise, but the increase in the projected noise levels if the proposed project is constructed, when compared with the projected noise levels if the project is not built, is barely perceptible (3 dBA or less);

(iv) There are proximity impacts to a section 4(f) resource, but a governmental agency's right-of-way acquisition, an applicant's adoption of project location, or the Administration approval of a final environmental document, established the location for a proposed transportation project before the designation, establishment, or change in the significance of the resource. However, if the age of an historic site is close to, but less than, 50 years at the time of the governmental agency's acquisition, adoption, or approval, and except for its age would be eligible for the National Register, and construction would begin after the site was eligible, then the site is considered a historic site eligible for the National Register;

(v) There are impacts to a proposed public park, recreation area, or wildlife refuge, but the proposed transportation project and the resource are concurrently planned or developed. Examples of such concurrent planning or development include, but are not limited to:

> (A) Designation or donation of property for the specific purpose of such concurrent development by the entity with jurisdiction or ownership of the property for both the potential transportation project and the section 4(f) resource, or
>
> (B) Designation, donation, planning or development of property by two or more governmental agencies, with jurisdiction for the potential transportation project and the section 4(f) resource, in consultation with each other;

(vi) Overall (combined) proximity impacts caused by a proposed project do not substantially impair the activities, features, or attributes that qualify a resource for protection under section 4(f);

(vii) Proximity impacts will be mitigated to a condition equivalent to, or better than that which would occur under a no-build scenario;

(viii) Change in accessibility will not substantially diminish the utilization of the section 4(f) resource; or

(ix) Vibration levels from project construction activities are mitigated, through advance planning and monitoring of the activities, to levels that do not cause a substantial impairment of the section 4(f) resource.

(6) When a constructive use determination is made, it will be based, to the extent it reasonably can, upon the following:

(i) Identification of the current activities, features, or attributes of a resource qualified for protection under section 4(f) and which may be sensitive to proximity impacts;

(ii) An analysis of the proximity impacts of the proposed project on the section 4(f) resource. If any of the proximity impacts will be mitigated, only the net impact need be considered in this analysis. The analysis should also describe and consider the impacts which could reasonably be expected if the proposed project were not implemented, since such impacts should not be attributed to the proposed project;

(iii) Consultation, on the above identification and analysis, with the federal, State, or local officials having jurisdiction over the park, recreation area, refuge, or historic site.

(7) A temporary occupancy of land is so minimal that it does not constitute a use within the meaning of section 4(f) when the following conditions are satisfied:

(i) Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

(ii) Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the section 4(f) resource are minimal;

(iii) There are no anticipated permanent adverse physical impacts, nor will there be interference with the activities or purpose of the resource, on either a temporary or permanent basis;

(iv) The land being used must be fully restored, i.e., the resource must be returned to a condition which is at least as good as that which exited prior to the project; and

(v) There must be documented agreement of the appropriate Federal, State, or local officials having jurisdiction over the resource regarding the above conditions.

[52 FR 32660, Aug. 28, 1987; 53 FR 11066, Apr. 5, 1988, as amended at 56 FR 13279, Apr. 1, 1991]

Sec. 771.137 International-actions.

(a) The requirements of this part apply to:

(1) Administration actions significantly affecting the environment of a foreign nation not participating in the action or not otherwise involved in the action.

(2) Administration actions outside the U.S., its territories, and possessions which significantly affect natural resources of global importance designated for protection by the President or by international agreement.

(b) If communication with a foreign government concerning environmental studies or documentation is anticipated, the Administration shall coordinate such communication with the Department of State through the Office of the Secretary of Transportation.

APPENDIX XII. TECHNICAL ASSISTANCE TOOLS

VDOT EJ TECHNICAL ASSISTANCE TOOL
SOCIAL ELEMENTS

Project Name: _____Project Code:_____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

SAT=Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)

Answers are required for questions that have no N/A box.

The following checklist is guidance. Discipline report writers should adjust contents according to complexity and type of project. Reviewers should use the checklist adjusting its use where appropriate. However, all users should be aware of requirements that are driven by regulations and address those areas accordingly.

I. Studies and Coordination

(Applicable laws: 42 USC 2000d-d4. Title VI of the Civil Rights Act of 1964.40CFR. 1500-1508 (CEQ), 23 CFR 771 (FHWA)

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Describe studies performed and coordination with local agencies. Identify agencies and programs administered.

II. Public Involvement/Interaction

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Description of public involvement/interaction plan. 1. Include any tribal contact and determine if government-to-government consultation is needed. 2. Include any targeted outreach to minority, disable. 3. Include any specific efforts to address limited English proficiency, if applicable.

III. Affected Environment

Report should include a description of each Section 4 (f) resource:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Community Cohesion. Describe neighborhood population characteristics (e.g., minority, elderly, disabled, transit-dependent, larger family, income, Level, owner/tenant status). Access and linkages With community facilities/services (churches, schools, community centers, gathering places etc.). (If a low-income and/or minority population is Identified, see Environmental Justice.)
☐	☐	☐	☐	B.	Recreation. Describe and show maps of the type and location of parks, recreation areas, recreation areas, recreation trails, and natural landmarks. Include information on:
☐	☐	☐	☐		1. Available activities and facilities.
☐	☐	☐	☐		2. Use and number of users per activity.
☐	☐	☐	☐		3. Unique qualities.
☐	☐	☐	☐		4. Statement of national, state, or local significance as determined by official with jurisdiction.
☐	☐	☐	☐		5. Access.
☐	☐	☐	☐		6. Ownership.
☐	☐	☐	☐		7. Section 4(f) and/or 6(f) applicability.
				C.	Regional and Community Growth. Consider:
☐	☐	☐	☐		1. Local and regional population-breakdown by towns and communities.
☐	☐	☐			2. Population projected changes
☐	☐	☐			a. Ethnic/racial composition.
☐	☐	☐			b. Age/family composition.
☐	☐	☐			c. Income levels/major employment.
☐	☐	☐			d. Limited English composition.
☐	☐	☐			e. Disabled composition.
☐	☐	☐			f. Status of community, if in transition.
				D.	Services. Discuss:
☐	☐	☐			1. Educational facilities and attendance boundaries.
☐	☐	☐	☐		2. Religious institutions.
☐	☐	☐	☐		3. Social institutions (community centers, fraternal organizations, children's homes, etc.).
☐	☐	☐	☐		4. Medical services (hospitals, nursing homes, medical and dental clinics, etc.)
☐	☐	☐			5. Fire and police protection.
☐	☐	☐			6. Public services and utilities (energy, telephone, cable, water, sewer, solid waste, storm water, and other appropriate).

SAT	INC	MIS	N/A		
☐	☐	☐	☐		7. cemeteries.

☐	☐	☐	☐	8.	Government institutions and national defense installations.
☐	☐	☐	☐	9.	Other governmental services. Particularly social service/aid programs and locations as relates to proposed action.
				E.	Pedestrian, Bicyclist, and Transit Facilities.
☐	☐	☐	☐	1.	Describe location and type of existing facilities, including discussion of local plan.
☐	☐	☐	☐	2.	State whether local and land use/recreation plans include bike/pedestrian/transit facilities. Include paratransit where appropriate.
☐	☐	☐	☐	3.	Consider travel times (if available), capacity, circulation, and congestion on other facilities in the region.
☐	☐	☐	☐	4.	Discuss whether new facilities are proposed, include sufficient information to explain the basis for providing them (e.g., proposed bicycle facility is a link in the local plan, a new bus stop is needed, or sidewalks will reduce project access impact).
☐	☐	☐	☐	5.	Discuss safety issues as they relate to pedestrians and bicyclists.
☐	☐	☐	☐	6.	Discuss whether the project has potential to connect existing bike/pedestrian/transit facilities.
				F.	Environmental Justice.
☐	☐	☐	☐	1.	Document the presence of low-income or minority communities.

IV. Impacts

SAT	INC	MIS	N/A		
				A.	Community Cohesion. Consider project effects on the community such as:
☐	☐	☐		1.	Impacts on community life.
☐	☐	☐		2.	Effects on persons and groups.
☐	☐	☐		3.	Changes in social relationships/patterns.
☐	☐	☐	☐	4.	Isolation-community divided or set apart by project.
☐	☐	☐		5.	Redistribution, influx or loss of population.
SAT	**INC**	**MIS**	**N/A**		
☐	☐	☐	☐	6.	Cutting off streets.
☐	☐	☐	☐	7.	Separating residences from community facilities.
☐	☐	☐	☐	8.	Separating adjoining residential areas.
☐	☐	☐	☐	9.	Isolating areas.

10. Increasing automobile dependency.
11. Impact to and availability of affordable and accessible housing supply within the study area.

B. Recreation. Consider direct and indirect (growth induced, etc.) impacts on:
1. Facilities/capacity.
2. Access.
3. Aesthetics.
4. Air quality.
5. Noise.
6. Water.
7. Land use in the vicinity.

C. Cultural Resources
1. Describe any impacts to tribal areas i.e.: Usual and customary

D. Recreational and Community Growth. Consider:
1. Population changes caused by the proposed project. Include estimates on the effects such changes will have on the resource base in his study area. (Where a project induces significant growth, discuss the impacts of such growth under the appropriate headings in this outline. See also E.)
2. Effect on characteristics of population in the study area.
   a. Ethnic/racial composition.
   b. Age/family composition.
   c. Income levels/major employment.
3. Effect on population growth patterns.

E. Services. Consider the following impacts on each of the services listed in II.D., above.
1. Changes in service travel times.
2. Circuitry of access.
3. Changes in services area.
4. Potential new or additional public facilities And services needed.

F. Pedestrian, Transit and Bicyclist Facilities. Consider:

SAT	INC	MIS	N/A	
☐	☐	☐	☐	1. Use projects/capacity – design year data.
☐	☐	☐	☐	2. Safety/travel time.
☐	☐	☐	☐	3. Circulation changes.
☐	☐	☐	☐	4. How changes in accessibility will affect facility users.
				5. Describe provisions included in the project for a reasonable alternative route, or

Demonstrate that such a route exists.

☐ ☐ ☐ ☐
☐ ☐ ☐ ☐
☐ ☐ ☐ ☐

V. Mitigation

Consider:

SAT	INC	MIS	N/A		
				A.	Community Cohesion. Describe:
☐	☐	☐	☐	1.	Mitigation measurers and commitments.
				2.	Mitigation measures considered or available but not included, with reasons why.
				B.	Recreation. Describe:
☐	☐	☐	☐	1.	Mitigation measures and commitments.
☐	☐	☐	☐	2.	Mitigation measures considered or available but not included, with reasons why.
☐	☐	☐	☐	C.	Regional and Community Growth. Mitigation is normally not applicable.
				D.	Services. Describe:
☐	☐	☐	☐	1.	Mitigation measures and commitments.
☐	☐	☐	☐	2.	Mitigation measures considered or available but not included, with reasons why.
☐	☐	☐	☐	E.	Pedestrian, Transit and Bicyclist Facilities. Discuss any proposed measure to avoid or reduce adverse impacts on the facility and its users.
☐	☐	☐	☐	F.	Describe efforts to mitigate impacts on any potentially impacted low-income and/or minority communities in the environmental process. (This can be done in separate EJ report)

VI. Summary

Summarize the analysis done and conclusions reached. The summary should include enough detail so that it can be included in the environmental document with only minor modification. This summary should include:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	The objectives of the project.
				B.	Current land use patterns.
☐	☐	☐		C.	Impacts of all alternatives including the no-build alternative.
☐	☐	☐		D.	Recommended mitigation.

☐ ☐ ☐ E. Comparison of alternatives based on impacts and cost effectiveness of mitigation.

☐ ☐ ☐ F. Describe public involvement/interaction plan, types of public involvement, timing.

General Comments:-

_____
_____
_____
_____
_____
_____
_____

VDOT EJ TECHNICAL ASSISTANCE TOOL
ECONOMIC ELEMENTS

Project Name: _____ Project Code: _____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

SAT=Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)
Answers are required for questions that have no N/A box.

The following checklist is guidance. Discipline report writers should adjust contents according to complexity and type of project. Reviewers should use the checklist adjusting its use where appropriate. However, all users should be aware of requirements that are driven by regulations and address those areas accordingly.

I. Studies and Coordination

(Refer to National Cooperative Highway Research Report-I22, Summary and Evaluation of Economic Consequences of Highway Improvements.)

SAT	INC	MIS	N/A		
				A.	Field interviews with employers in impacted area. Include small, large, minority owned and any unique businesses.
☐	☐	☐	☐	1.	Discuss what kind of adverse impact any relocations could have on employees as Well as local economy; i.e.; where do employees live? How do they get to work?
☐	☐	☐	☐	B.	Residents.
☐	☐	☐	☐	C.	County and city government officials.
☐	☐	☐	☐	D.	Local business and economic leaders.
☐	☐	☐	☐	E.	Studies of existing conditions.
☐	☐	☐	☐	F.	New industrial and commercial development in various planning or construction phases.
☐	☐	☐	☐	G.	Market feasibility studies.
☐	☐	☐	☐	H.	Real estate transactions.
☐	☐	☐	☐	I.	Property assessment valuations.
☐	☐	☐	☐	J.	County tax rolls.

II. Affected Environment

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Describe general economic climate of the area.
☐	☐	☐	☐	B.	Include established business districts and Transportation facility related business.

III. Impacts

SAT	INC	MIS	N/A		
				A.	Describe effects on overall business activity of:
☐	☐	☐	☐	1.	Loss of productive business or farm property through induced development.
☐	☐	☐		2.	Increases or decreases in travel time for shipment of goods.
☐	☐	☐	☐	3.	Changes in business and shopping patterns as a result of changes in accessibility; e.,g., effects on highway related businesses.
☐	☐	☐	☐	4.	Loss of business due to construction of alternative on new alignment including any businesses important to low-income and/or minority populations.
				B.	Describe increase, decrease, or change in location In permanent jobs after completion, due to:
☐	☐	☐	☐	1.	Basic industry or commercial location and relocation.
☐	☐	☐	☐	2.	Bypass diversions.
☐	☐	☐	☐	3.	Barrier effects.
☐	☐	☐	☐	4.	Induced growth or development.
☐	☐	☐	☐	5.	Facility relocation.
				C.	Describe effects on property value trends and the Local economy of:
☐	☐	☐	☐	1.	Traffic volumes.
☐	☐	☐	☐	2.	Competing enterprises and centers.
☐	☐	☐	☐	3.	Visibility.
☐	☐	☐	☐	4.	Physical access to facility or property.
☐	☐	☐	☐	5.	Altered commercial sales potential.
☐	☐	☐	☐	6.	Reduced revenue from loss of taxable property to highway right of way.
☐	☐	☐	☐	7.	Changed revenue from in-migration or out-migration of high tax-producing land users.
				D.	Describe these effects on the region:
☐	☐	☐	☐	1.	Effects on bypassed communities and/or businesses.

SAT	INC	MIS	N/A		
☐	☐	☐	☐	2.	Effects on areas in proximity to the facility.
☐	☐	☐	☐	3.	Effects on areas near interchanges or transit stops.

IV. Mitigation

SAT	INC	MIS	N/A		
☐	☐	☐	☐	A.	Mitigation measurers and commitments e.,g., control, commitments to minority/low-income affected community.
☐	☐	☐	☐	B.	Mitigation measurers considered or available but not included, with reasons why.

V. Construction Activity Impacts

(All impacts associated with construction of the project are to be addressed in a "Construction Activity Impacts: section of the environmental document. Provide the following information, as appropriate, for inclusion in that section.)

SAT	INC	MIS	N/A		
				A.	Under **Impacts,** consider temporary construction effects, such as:
☐	☐	☐	☐	1.	Construction expenditures.
☐	☐	☐	☐	2.	Temporary construction revisions to business or farm access.
☐	☐	☐	☐	3.	Temporary jobs created during construction.
☐	☐	☐	☐	4.	Impact of construction expenditures on sales tax revenues (consider multiplier effect).
☐	☐	☐	☐	B.	Under **Mitigation:**
☐	☐	☐	☐	1.	Mitigation measures and commitments; e.g. access provisions, public information program from construction activities.
☐	☐	☐	☐	2.	Mitigation measures considered or available but not included, with reasons why.

VI. Summary

Summarize the analysis done and conclusions reached. The summary should include enough detail so that it can be included in the environmental document with only minor modifications.

SAT	INC	MIS	N/A		
☐	☐	☐		A.	The objectives of the project.
☐	☐	☐		1.	Current economic activity and patterns.

SAT	INC	MIS	N/A		
☐	☐	☐			2. Impacts of all alternative including the no build.
☐	☐	☐			3. Recommended mitigation.
☐	☐	☐		B.	Alignment with any local comprehensive and/or neighborhood plans.
☐	☐	☐		C.	Comparison of alternatives based on impacts and cost effectiveness of mitigation.

General Comments:_____

VDOT EJ TECHNICAL ASSISTANCE TOOL
RELOCATION

Project Name: _____ Project Code: _____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

SAT=Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)
Answers are required for questions that have no N/A box.

Use this form if project displaces homes and/or businesses.

The following checklist is guidance. Discipline report writers should adjust contents according to complexity and type of project. Reviewers should use the checklist adjusting its use where appropriate. However, all users should be aware of requirements that are driven by regulations and address those areas accordingly.

I. Studies and Coordination

(Refer to Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 as amended in 1987.)
Consider:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Census data.
☐	☐	☐	☐	B.	Social/economic reports.
☐	☐	☐	☐	C.	Contact with community leaders and local officials
☐	☐	☐		D.	Field Surveys.

II. Affected Environment

Discuss (if necessary)

SAT	INC	MIS	N/A		
☐	☐	☐	☐	A.	Characteristics of the affected area, such as minority and ethnic, disabled, elderly, family size, income level, owner/tenant status, and long-term stability of the area (e.g., is the area in transition?)
☐	☐	☐	☐	B.	Numbers, descriptions, types of occupancy, and sizes (number of employees) of business and farms within the area. Describe business or farm products or services, particular requirements, specific availability of replacement sites/buildings.

III. Impacts

SAT	INC	MIS	N/A		
☐	☐	☐	☐	A.	Residential impacts. Include an estimate of the number of households to be displaced and any anticipated relocation problems to the extent such information is available.
					Describe:
☐	☐	☐	☐	1.	Dwelling types(s) i.e., single-family, multi-family, Section 8 or other subsidized housing, etc.
☐	☐	☐	☐	2.	Occupancy type (owner/tenant).
☐	☐	☐	☐	3.	Resident characteristics.
☐	☐	☐	☐		a. Elderly.
☐	☐	☐	☐		b. Disabled.
☐	☐	☐	☐		c. Minorities (racial, ethnics, or religious groups).
☐	☐	☐	☐		d. Income level (low, middle, high).
☐	☐	☐	☐		e. Large or small families.
☐	☐	☐	☐		f. Length of occupancy.
☐	☐	☐	☐		g. Transit dependency.
☐	☐	☐	☐		h. Limited English speaking.
☐	☐	☐	☐	B.	Summarize how many minority and/or low-income Households are impacted.
☐	☐	☐	☐	C.	Business, farm, and nonprofit organization impacts.
☐	☐	☐	☐	1.	Estimate of the number, types, and sizes of business, farms, and nonprofit organizations to be displaced. How many of these are minority owned or operated?
☐	☐	☐	☐	2.	The approximate number of employees for each business, farm, and nonprofit organization.

IV. Mitigation

Discuss relocation assistance. (Preparers should consult regional Real Estate Services personnel as early as possible for assistance in preparing relocation information.)

SAT	INC	MIS	N/A		
				A.	Residential.
☐	☐	☐	☐	1.	Describe available housing in the area and the ability to provide suitable relocation housing for residents being displaced, including moving existing structures to a

						new location.
☐	☐	☐	☐		2.	Describe any special advisory or other services that will be necessary for special relocation problems.
☐	☐	☐	☐		3.	Include a statement of commitment to last resort housing when sufficient comparable replacement housing may not be available.
				B.		Business, farm, and nonprofit organizations.
☐	☐	☐	☐		1.	Discuss probable availability of replacement facilities for business and nonprofit organizations, including moving existing structures to a new location.
☐	☐	☐	☐		2.	Discuss potential relocation of farm operations.
☐	☐	☐	☐	C.		Include a statement that the acquisition and relocation program will be conducted in accordance with the Uniform Relocation assistance and Real Property Acquisition Policies Act of 1970, as amended, and that resources are available to all residential and business relocates without discrimination.
☐	☐	☐	☐	D.		Describe specific measures or coordination discuss With local governments, organizations, etc., to Reduce general or specific impacts. Special Financial and incentive programs or opportunities (beyond those provided by the Uniform Relocation Assistance Act) available throughout other agencies or organizations for residential and Business relocates may be unidentified.
☐	☐	☐	☐	E.		Describe any additional mitigation measures and commitments.

V. Construction Activity Impacts

All impacts associated with construction of the project are to be addressed in a "Construction Activity Impacts" section of the environmental document. Provide the following information, as appropriate, for inclusion in that section.

SAT	INC	MIS	N/A			
☐	☐	☐	☐	A.	**Impacts**	Normally not applicable.
☐	☐	☐	☐	B.	**Mitigation**	Normally not applicable.

VI. SUMMARY

Summarize the analysis done and conclusions reached. The summary should include enough

detail so that it can be included in the environmental document with only minor modification. The summary should include.

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Objectives of the project.
☐	☐	☐		B.	Current housing availability and vacancy rates.
☐	☐	☐		C.	Impacts of all alternatives including the no-build.
☐	☐	☐		D.	Recommend mitigation and reference to the Uniform Relocation Act.
☐	☐	☐		E.	Comparison of alternatives based on impacts and cost effectiveness of mitigation. Total relocations/ displacements including number or percentage of minority/low-income households/business impacted. Separate into households impacted and business impacted.

General Comments:_____

_____

_____

_____

_____

_____

_____

VDOT EJ TECHNICAL ASSISTANCE TOOL
ENVIRONMENTAL JUSTICE

Project Name: _____ Project Code: _____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

SAT=Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)
Answers are required for questions that have no N/A box. The following checklist is guidance. Discipline report writers should adjust contents according to complexity and type of project. Reviewers should use the checklist adjusting its use where appropriate. However, all users should be aware of requirements that are driven by regulations and address those areas accordingly.

I. Studies and Coordination

Refer to Social and Economic Technical Assistance Tools and the EJ Guidelines. Also refer to 42 USC 2000d-d4, 23 CFR Part 771, Title VI of the Civil Rights Act of 1964, and Presidential Executive Orders 12898 and 13166.

There are three (3) types of environmental documents that require FHWA concurrence and adoption. However, CEs for activities specified under 23 CFR 771.117 (c), normally DO NOT require formal FHWA approval.

Class I: Environmental Impact Statement (EIS)
An EIS is prepared when it is determined through environmental studies, public involvement, and coordination with other Federal, State and local agencies that the project will have a significant impact on the environment. The EIS process requires the preparation of a Notice of Intent (NOI), a Draft Environmental Impact Statement (DEIS), a Final Environmental Impact Statement (FEIS), and a Record of Decision (ROD).

Class II: Categorical Exclusion (CE)
The CE is the most commonly used environmental processing option. The CE is not an environmental document, but a determination that a project will have no significant individual or cumulative SEE impacts. In other words, the project would not have significant impacts on planned growth or land use for the area; does not require the relocation of significant numbers of people; does not have a significant impact on any natural, cultural recreational, historic or other resource; do not involve significant air, noise, or water quality impacts; do not have significant environmental impacts.

Class III: Environmental Assessment (EA)
The EA is prepared for projects when the significance for the impacts is not known or clearly established. Projects that are not categorical exclusions and do not obviously require an EIS will require the preparation of an EA to determine the significance of the impacts and whether an EIS should be prepared. The amount of information and degree of analysis that should be performed

and included in an EA will depend on the size, type, location, number o reasonable alternatives, potential for significant impacts and other factors of the project.

II. Introduction

To be completed as a sub-set of the Socio-Economic Analysis if demographic analysis has identified low-income and/or minority residents in the project area. These are specific to an EJ analysis, but are to be used in conjunction with the overall Social-Economic-Relocation analysis. It is helpful to include maps highlighting the location of alternatives overlaid with any minority and/or low-income populations residing within the primary study area.

SAT	INC	MIS	N/A		
☐	☐	☐		A.	A definition of populations, which are the subject of EJ analysis; Percentage of low-income and minority populations present within impacted census blocks, block groups, or tracts.
☐	☐	☐		B.	Statement of two-pronged approach; enhanced public involvement (describing outreach to EJ populations), and analysis of impact/avoidance of disproportionate impact.

III. Affected Populations

SAT	INC	MIS	N/A	Definition of area of potential impact	
☐	☐	☐		A.	Documentation of data sources and methods for determination. Census data alone is generally not adequate. Data from public involvement, local comprehensive plans and "windshield surveys" are some examples of where supplemental data can be obtained.
☐	☐	☐		B.	Document the presence of low-income or minority populations. (Identification, description, and location of EJ population.)

IV. Enhanced Public Involvement

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Describe special efforts to address literacy, language, transportation, schedule, childcare, other barriers to involvement.
SAT	**INC**	**MIS**	**N/A**		
☐	☐	☐		B.	Description of target outreach efforts to involve low income/minority population. Describe methods Used to overcome potential barriers.
				C.	Documentation of strategy and results (attendance, responses, etc.).

V. Assessment of Impacts

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Definitions of adverse and disproportionate impacts (as per USDOT order.).
☐	☐	☐		B.	Analysis of impacts of each alternative, including No-Build, on EJ population. (Types of impacts as listed in Social-Economic-Relocation checklists)
☐	☐	☐		C.	Documentation of community perception of impacts, positive and negative and severity.
☐	☐	☐		D.	Description of any disproportionately high and adverse impacts on low-income or minority population.
☐	☐	☐		E.	Description of any offsetting benefits should be described.
☐	☐	☐		F.	Conclusion of impacts on EJ population. Are adverse impacts appreciably more severe or greater in magnitude that the adverse impacts that will be suffered by the non-minority/low-income population?

VI. Avoidance, Minimization, Mitigation and Enhancement

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Discussion of any alternatives that avoid such impacts as they pertain to the EJ population. Include discussion of practicability.
☐	☐	☐		B.	Description of efforts to avoid, minimize, mitigate, enhance, or offset project as they pertain to the EJ population.
☐	☐	☐		C.	Description of social, economic, and environmental effects of mitigation measurers as they pertain to the EJ population
☐	☐	☐		D.	Mitigation commitments.
☐	☐	☐		E.	Documentation of community perception of suitability of mitigation proposed.

VII. Summary

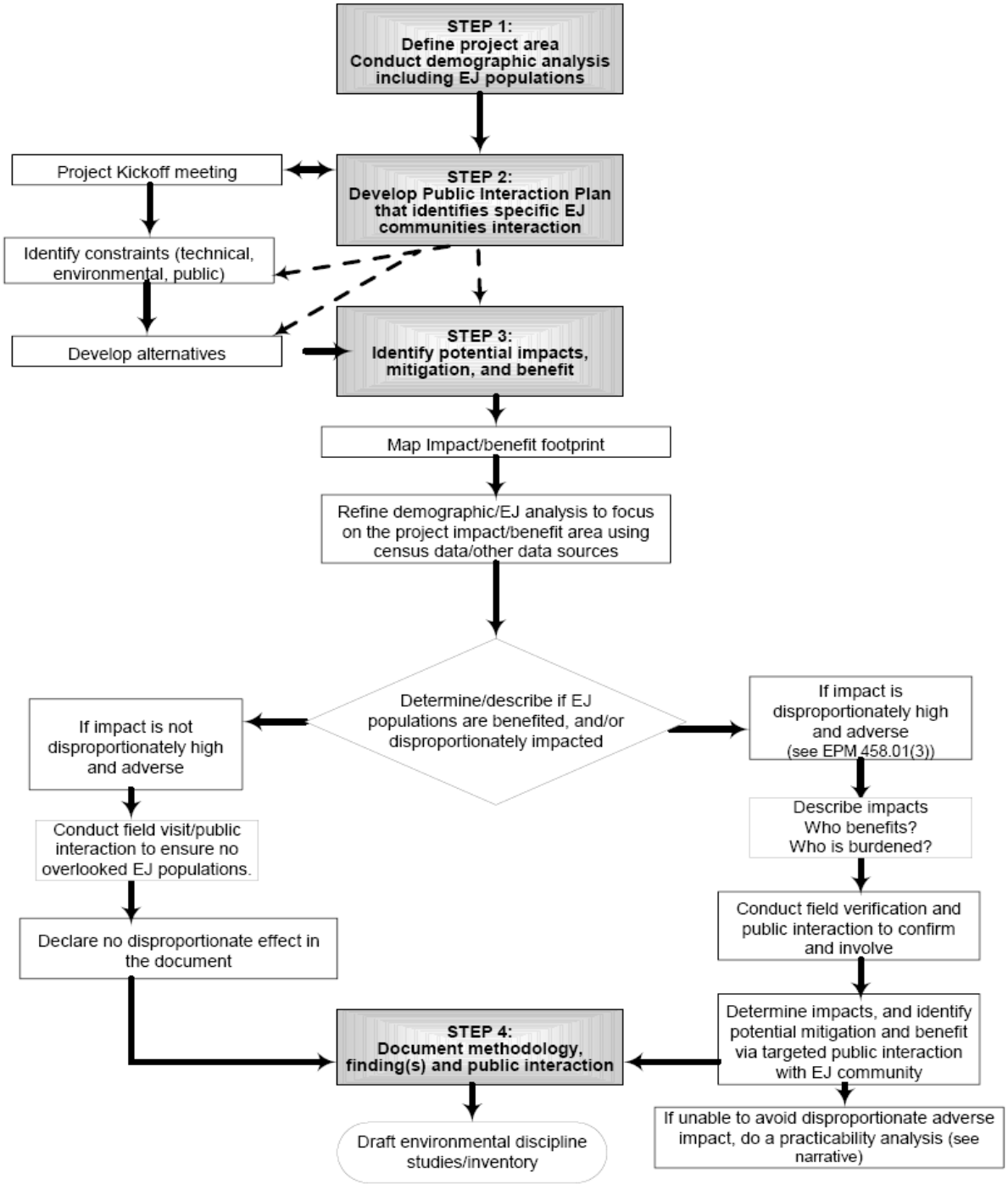
Summarize the analysis done and conclusions reached. The summary should include enough detail so that it can be included in the final environmental document with only minor

modification.

The summary should include:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	The objectives of the project.
☐	☐	☐		B.	Environmental Justice populations and issues involved.
☐	☐	☐		C.	Impacts of all alternative including the no-build alternative.
☐	☐	☐		D.	Recommended mitigation.
☐	☐	☐		E.	Comparison of alternatives based on impacts and reasonableness of mitigation.
☐	☐	☐		F.	Summarize practicability determination if disproportionately high and adverse effects on minority populations or low-income populations cannot be avoided, minimized or mitigated.

Environmental Justice Analysis – Step-by-Step Flowchart



APPENDIX XIII. CONDUCTING AN ENVIRONMENTAL JUSTICE ANALYSIS STEP-BY-STEP OVERVIEW

Purpose and Requirements

This step-by-step overview provides directions on how to analyze transportation planning and project development effects on minority and low income communities. This condensed guide was developed in accordance with Title VI of the Civil Rights Act of 1964, National Environmental Policy Act (NEPA), Intermodal Surface Transportation Efficiency Act (ISTEA), and the Presidential Executive Order 12898 of 1994 as applicable throughout all stages of project development and construction. This guide acts a general framework for any environmental justice analysis.

VDOT intends this guidance to:

- Provide a consistent approach to conducting an environmental justice analysis.
- Ensure transportation planning and project development are done in a manner that does not have the effect of excluding persons from participation in or receiving program benefits.
- Promote the exchange of lessons learned.
- The step-by-step is a general process to refine an environmental justice (EJ) analysis throughout project development through the planning, environmental, project development, construction, and maintenance process.

Environmental Justice Analysis Overview

The EJ analysis process is composed of four basic steps:

1. Conduct a demographic analysis of the Study Area.
2. Develop a Public Interaction/Involvement Plan (PIP).
3. Determine impact(s), appropriate mitigation, and benefits(s) with regard to EJ populations via public interaction with the potentially affected communities.
4. Document the EJ analysis process.

Step 1 - Demographics

Prior to the project kick off meeting, but after the project is defined, conduct a demographic analysis of the project area, map the results, and develop a PIP based on this analysis. The analysis must identify any environmental justice (EJ) populations, and should include other data elements relevant to the PIP – e.g., age, disability, limited English proficiency, income level.

An EJ community includes individuals and minority populations, i.e., Asians, Blacks, Hispanics, Native Americans, and Pacific Islanders, as well as, low-income populations as defined by Presidential Executive Order 12898.

Step 2 – PIP Development

The PIP will be developed and modified to meet specific public and project needs as the project proceeds through the planning, environmental, project development, construction, and maintenance process.

The project team, assisted by this step-by-step overview, needs to decide how and where public interaction will occur in addition to circulating the usual reports for review and comment – as required or appropriate for project scoping; constraint identification; alternative development; and impact, mitigation, and benefit identification.

The PIP should:

1. Set public interaction goals and objectives.
2. Identify people and organizations to be reached based on demographics and relevant information.
3. Develop a strategy based on the goals/objectives and characteristics of the target audiences.
4. Incorporate strategies and techniques to aid decision-making.
5. Be evaluated and modified as more information is obtained from the impacted community.
6. Document the public interaction process and its results.

Step 3 - Impact/Mitigation/Benefits

When alternatives are developed, potential impacts, mitigation, and benefits should be identified and mapped prior to producing a draft document. Map the affected geographic areas, and refine the demographic analysis to determine if EJ communities are affected. A disproportionately high and adverse effect on minority and low-income populations means an adverse effect that:

1. Is predominately borne by a minority population and/or a low-income population; or
2. Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non low-income population.

Disproportionately high and adverse effects on minority populations or low-income populations will only be carried out if further mitigation measures of alternatives that would avoid or reduce the disproportionately high and adverse effects are not "practicable." To determine the practicability of a mitigation measurer or an alternative, take into account the social, economic (including costs) and environmental effects of avoiding or mitigating the adverse effects. This process should be documented.

The analysis also needs to ensure that any potential for disproportionately high and adverse effects on populations protected by Title VI and EJ ("protected populations") will only be carried out if:

1. A substantial need for the program, policy or activity exists, based on the overall public interest; and
2. Alternatives that would have less adverse effects on protected populations have either:
    a) Adverse social, economic, environmental, or human health impacts that are more severe; or
    b) Would involve increased costs of an extraordinary magnitude.

A PIP is implemented within these affect EJ communities to obtain feedback on the alternatives, impacts, mitigation and benefits. A correlation should be made between the results of the public interaction, particularly with an adversely impacted EJ community, and the proposed mitigation and benefits.

Step 4 - Document the Process

The EJ analysis process is documented as follows:

- Summarize related laws, regulations and guidance,
- Define "adverse" and "disproportionate" impacts (per USDOT order.)
- Document data sources and methods for determination.
- Describe the study area and its demographics using narrative and maps,
- Summarize public interaction strategy,
- Describe and map impacts, mitigation and benefits and those populations affected,
- Describe specific interactions with the affected communities and results,
- Make an EJ determination(s),
- If the determination result is high and disproportionately adverse, another determination should be made taking into consideration the effect that mitigation and benefits will have.
- If disproportionately high and adverse effects on minority populations or low-income populations cannot be avoided, minimized or mitigated, a practicability determination should be made.

Draft the environmental discipline studies/inventories, and produce a draft environmental/planning document. The EJ determination is done concurrently with preparation of other environmental documents to allow for the inclusion of any related impacts such as noise, air, etc.

APPENDIX L
Data Collection Guidelines

The diversity of Virginia's population reflects the diversity of the population of the entire nation. It is critically important that VDOT and its sub-recipients be innovative in engaging historically under represented populations and businesses in the planning, project development and maintenance processes. According to the census bureau 2010 data, Virginia's total population estimate for 2013 was 8,260,405; females made up 50.1% of the population; people 65 years and older made up 13.4% of the population; Whites (not Hispanic or Latino) made up 63.6% of the population; Blacks or African Americans made up 19.7% of the population; Asians made up 6.1% of the population; Hispanic or Latinos made up 8.6% of the population, Native Hawaiian and Other Pacific Islanders made up 0.1 % of the population and American Indians and Alaska Native made up 0.5% of the population.

Purpose of Collecting Data:

23 U.S.C, 200.9(b)(4) requires the state "develop procedures for the collection of statistical data of participants in and beneficiaries of State highway programs, i.e., relocatees, impacted citizens (race, color, disability, sex, age and national origin) and affected communities." In addition, data collection provides measurable evidence of the Department's performance as it relates to Title VI for annual reports to the FHWA and the Department's efforts to ensure compliance with Title VI.

Objective data is necessary to identify:

1. Transportation needs of all persons within boundaries and plans or projects.
2. Impacts and persons impacted.
3. Persons to include in the decision making process.
4. "Champion(s) for various modes and transportation options.
5. Strategies to address impacts.
6. Alternatives to modes and locations and types of facilities (transit, light rail, van and carpooling, HOV lanes, etc.).
7. Priorities for investments.
8. Sources for financing investments.
9. Strategies to disseminate information.

Based on Title VI implementing regulations, each division/district is required to:

1. Provide for the collection of data and information to permit effective enforcement of Title VI.
2. Collect data about beneficiaries.
3. Analyze the data and information collected.
4. Eliminate discrimination when it is found.
5. Take affirmative measures to ensure nondiscrimination.

Types of data and analysis:

Each division develops a process to collect data with regard to race, color, national origin, sex, disability and age. Data that will be helpful in determining compliance with Title VI:

DATA	ANALYSIS
Population	District and statewide population and growth rates
	District and statewide ethnic composition
	Sex and age distribution
	Number of households by income group
	Median household by income
	Percent of persons below poverty level
	Percent of persons with mobility limitations
	Percent of mobility limitations
	Percent of elderly persons
	Language(s) spoken
	Percent of disabled by types of disability
Mode Choice	Number of trips per capita
	Percent of households with no automobiles
	Percent of households by income groups using various modes of transportation (e.g., bus, carpool, commuter rail, automobile)
	Percent of persons by ethnic, gender and disability group using various modes of transportation (e.g., bus, carpool, commuter rail, automobile)
Transportation System	Transportation system congested
	Delay as a percentage of travel time
	Travel time
	Exposure to transportation hazards (environmental, safety, crime)
	Access to jobs, churches, synagogues, mosques, medical care, schools, emergency services, grocery stores, family
Employment	Present and future location of jobs
	Present and future location of housing
	Present and future location of low-income communities
Other	Public investment per capita (Federal, State and Local)
These are recommendations; data should not be limited to these categories.	

Types of analysis to address compliance with Title VI:

1. Percent of benefits allocated to persons below poverty line vs. persons above poverty line.
2. Distribution of benefits (dollars, facilities, systems, projects) by groups and communities.
3. Impact of investments on income, race, gender, disability and age groups.
4. Allocation of funds by mode (highway, bus, commuter rail, etc.)
5. Projected population increases versus planned facilities and types of facilities.
6. Language needs assessment.

Types of performance indicators:

1. Mobility – ease of movement of people and goods.
2. Accessibility – access to opportunities (jobs, medical care, emergency services, family, shopping, entertainment).
3. Environment – sustainable development and preservation of the existing system and the environment.
4. Cost-effectiveness – maximized return on investment, direct as well as indirect costs associated with air pollution, congestion delay for individuals/businesses.
5. Reliability – system reliability (probability of arriving at destination or even making the trip).
6. Safety – physical design and operation of system (measured in accidents per person a mile) also includes security related to criminal activities on highways as well as on transit systems.
7. Equity – transportation investments and benefits are invested in a manner that meets the needs of all persons.
8. Customer Satisfaction – increased ability to make trips, improved travel time, safety and security, improved access to system.
9. Livable Communities – enhancement of living conditions for communities through transportation policies that provide multi-modal options including non-motorized modes.

Resources for collecting data:

1. Census Data
2. School Districts
3. Transit Ridership Surveys
4. Management Systems (Pavement and Congestion)
5. Land Use Plans
6. Geographic Information Systems
7. Transportation Models
8. Metropolitan Planning Organization Committees (e.g., Citizen Advisory Committees)

How to collect data:

Each division develops a process to collect data for the following basis:

Race	White/Caucasian
	Black/African American
	American Indian/Alaskan Native
	Asian
	Hawaiian/Pacific Islander
	Hispanic/Latino
National Origin	Born in United States, Puerto Rico, Guan, The U.S. Virgin Islands, Northern Marianas or
	Born Abroad of American parent(s)
	Born outside U.S., Puerto Rico, Guam, the U.S. Virgin Islands or Northern Marianas
Does the Person Speak a Language other than English at home?	If yes, what is the language? _____
	No
Sex	Male
	Female
Disability	Yes
	No
Age	_____

How to present/allocate multiple race responses is addressed in Office Management and Budget Bulletin No. 00-02. 1

All of the data collection considerations above apply directly to VDOT programs and when administering new or renewal contracts or applications for grants, permits or loans, an oversight perspective of your sub-recipients must be recognized and applied.

In addition, the U.S. Department of Justice regulations offer the examples below for determining compliance with Title VI:

1. The manner in which services are or will be provided and the related data necessary for determining whether any persons are or will be denied such services on the basis of prohibited discrimination.
2. The population eligible to be served by race, color, national origin, sex, disability

1 Office of Management and Budget Bulletin No. 00-02 establishes multiple race response is acceptable.

and age.

3. Data regarding, covered employment, including use of planned use of bilingual public contact employees servicing beneficiaries of the program where necessary to permit effective participation by beneficiaries unable to speak or understand English.
4. The location of existing or proposed facilities connected with the program and related information adequate for determining whether the location has or will have the effect of unnecessarily denying access to any persons on the basis of prohibited discrimination.
5. The present or proposed membership, by race, color, national origin, sex, disability and age, in any planning or advisory body which is an integral part of the program.
6. Where location is involved, the requirements and steps used or proposed to guard against unnecessary impact on persons on the basis of race, color, national origin, sex, disability or age.

Additional data, such as demographic maps, the racial composition of affected neighborhoods or census data, may be necessary or appropriate for understanding information requirements listed above. This type of data is required to the extent that the data is available.

The Title VI Specialist or the Division Administrator of Civil Rights must be promptly notified of any complaint filed against any program and its sub-recipients alleging discrimination on the basis of race, color, national origin, sex, disability or age.

Appendix C

MVP Southgate Project

Resource Report 5 – Socioeconomics

(November 2018)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 5 – Socioeconomics

November 2018

MVP Southgate Project
Resource Report 5 – Socioeconomics

Resource Report 5 – Filing Requirements	
Information	**Location in Resource Report**
Minimum Filing Requirements	
1. Describe socioeconomic conditions within the Project area. (§ 380.12(g)(1))	Section 5.3
2. Evaluate impact of any substantial immigration of people on governmental facilities and services and describe plans to reduce the impact on the local infrastructure. (§ 380.12(g)(2))	Section 5.4
3. Describe on-site manpower requirements and payroll during construction and operation including number of construction personnel who currently reside within the impact area, would commute daily to the site from outside the impact area, or would relocate temporarily within the impact area. (§ 380.12(g)(3))	Section 5.4.1, 5.4.2, 5.4.5
4. Determine whether existing housing within the impact area is sufficient to meet the needs of the additional population. (§ 380.12(g)(4))	Section 5.4.3
5. Describe number and types of residences and businesses that would be displaced by the Project, procedures to be used to acquire these properties, and types and amounts of relocation assistance payments. (§ 380.12(g)(5))	Section 5.4.3
6. Conduct a fiscal impact analysis evaluating incremental local government expenditures in relation to incremental local government revenues that would result from construction of the Project. Incremental expenditures include, but are not limited to, school operating costs, road maintenance and repair, public safety, and public utility costs. (§ 380.12(g)(6))	Section 5.4.2 Appendix 5-A
Additional Information Often Missing and Resulting in Data Requests	
7. Estimate total worker payroll and material purchases during construction and operation.	Section 5.4.2 Table 5.4-1 Appendix 5-A
8. Estimate project-related ad valorem and local tax revenues.	Section 5.4.2 Table 5.4-2 Appendix 5-A
9. Describe impacts on local traffic due to construction- and operation-related traffic and worker commuting. Address impacts on marine traffic where applicable (e.g., LNG import/export facilities).	Section 5.4.5
10. Evaluate the effects of the project on minority and low income populations in consideration of Executive Order 12898. (59 Fed. Reg. 7629 (Feb. 16, 1994)).	Section 5.3.8, 5.4.8

RESOURCE REPORT 5
SOCIOECONOMICS
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RESOURCE REPORT 5
SOCIOECONOMICS

LIST OF ACRONYMS AND ABBREVIATIONS

ACEJ	Advisory Council on Environmental Justice
CFR	Code of Federal Regulations
CSA	combined statistical area
EJ	Environmental Justice
EJ Act	Environmental Justice Act
EJ Board	Secretary's Environmental Justice and Equity Advisory Board
EJSCREEN	EPA's Environmental Justice Screening and Mapping Tool
EPA	U.S. Environmental Protection Agency
FERC or Commission	Federal Energy Regulatory Commission
FTI	FTI Consulting Inc.
I-40	Interstate 40
INGAA	Interstate Natural Gas Association of America
HDD	horizontal directional drill
I-40/85	I-40 and I-85
I-85	Interstate 85
Mountain Valley	Mountain Valley Pipeline, LLC
MP	milepost
MSA	metropolitan statistical areas
MVP	Mountain Valley Pipeline, LLC
NCDEQ	North Carolina's Department of Environmental Quality
Project or Southgate Project	MVP Southgate Project
RV	recreational vehicle
SR 87	State Route 87
U.S.	United States

RESOURCE REPORT 5
SOCIOECONOMICS

5.1 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Southgate Project" or "Project"). The Southgate Project facilities will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina. See Resource Report 1 (General Project Description) for additional Project information.

5.1.1 Environmental Resource Report Organization

Resource Report 5 is prepared and organized according to the FERC *Guidance Manual for Environmental Report Preparation* (February 2017). Section 5.2 describes the analysis area for the socioeconomic assessment. Section 5.3 describes existing socioeconomic conditions, including population, economic conditions, housing, community services, transportation, tax revenues, and environmental justice. Section 5.4 describes how the existing socioeconomic conditions could be affected during construction and operation of the Project. References used in the development of Resource Report 5 are listed in Section 5.5.

5.2 ANALYSIS AREA

The socioeconomic analysis area (Project area) for the Southgate Project focuses on the counties where the Project facilities will be constructed and operated. The Project is in Pittsylvania County, Virginia, and Rockingham and Alamance counties, North Carolina. Approximately two-thirds of the pipeline (47 miles) will be located in North Carolina (Table 5.2-1). Aboveground facilities include the construction of one new compressor station, four new meter (interconnect) stations, pig launchers and receivers, and mainline valves that will be installed at various locations along the pipeline route.

The Project counties are located in urbanized areas that are defined by the U.S. Census Bureau as areas of 50,000 or more people (U.S. Census Bureau, 2010a). The Project counties include one combined statistical area ("CSA[1]"), two metropolitan statistical areas ("MSA[2]"), and one micropolitan statistical area[3] that provide large labor pools consisting of highly skilled and well-educated workers, access to a wide range of equipment, materials, services, and sufficient temporary housing to accommodate the Project workforce. These populated areas are within the direct impact areas, and therefore, construction and operation impacts from the Project to surrounding communities and municipalities are not anticipated.

[1] CSAs consist of two or more adjacent metropolitan and micropolitan statistical areas that have substantial employment interchange. The MSA that combine to create a CSA retain separate identities within the larger CSA (U.S. Census Glossary, 2018).

[2] MSAs are Core Based Statistical Areas ("CBSAs") associated with at least one urbanized area that has a population of at least 50,000. The MSA comprises the central county or counties or equivalent entities containing the core, plus adjacent outlying counties having a high degree of social and economic integration with the central county or counties as measured through commuting (U.S. Census Glossary, 2018).

[3] Micropolitan statistical areas are CBSAs associated with at least one urban cluster that has a population of at least 10,000 but less than 50,000. The micropolitan statistical area comprises the central county or counties or equivalent entities containing the core, plus adjacent outlying counties having a high degree of social and economic integration with the central county or counties as measured through commuting (U.S. Census Glossary, 2018).

Table 5.2-1 Construction Schedule for the MVP Southgate Project				
Facility	**County/State**	**Milepost**		**Miles**
		From	**To**	
H-605 Pipeline				
Spread 1	Pittsylvania, Virginia	0.0	0.4	0.4
H-650 Pipeline				
Spread 1	Pittsylvania, Virginia	0.0	26.1	26.1
	Rockingham, North Carolina	26.1	30.4	4.3
Spread 2	Rockingham, North Carolina	30.4	52.6	22.2
	Alamance, North Carolina	52.6	73.1	20.5
			Total	**73.1**
Facility				
Lambert Compressor Station /Lambert Interconnect Delivery / MLV 1	Pittsylvania, Virginia	0.0	NA	NA
LN 3600 Interconnect Delivery	Rockingham, North Carolina	28.2	NA	NA
T-15 Dan River Interconnect Delivery / MLV 4	Rockingham, North Carolina	30.4	NA	NA
T-21 Haw River Interconnect Delivery / MLV 8	Alamance, North Carolina	73.1	NA	NA
N/A = Not Applicable				

Pittsylvania County, Virginia

Approximately 26 miles of the pipeline, one compressor station and one interconnect will be in Pittsylvania County. Total land area in Pittsylvania County is 978.18 square miles and includes 9.23 square miles of water (U.S. Census, 2010b). The county is home to three towns and several other unincorporated communities with several major highways that cross through it (Pittsylvania County, 2018). Pittsylvania County is also included in the Danville micropolitan statistical area. For the purposes of this analysis, the City of Danville is not included as part of Pittsylvania County because it is an independent city bounded by Pittsylvania County and the North Carolina border and is located approximately 2.5 miles at its closest point to the Southgate Project. With respect to Environmental Justice ("EJ") areas, Pittsylvania County contains 16 census tracts, 9 of which are crossed by the Project and of that amount one census tract is a potential EJ communities (less than 1 percent). See Section 5.3.8 for more details on EJ.

Rockingham County, North Carolina

Approximately 26 miles of the pipeline and two interconnects will be in Rockingham County. Total land area in Rockingham County is 572.71 square miles and includes 7.15 square miles of water (U.S. Census, 2010b). There is one public-use airport and several major highways that cross through the county. Rockingham County is included in the Greensboro-High Point MSA which is part of the Greensboro-Winston-Salem-High Point CSA. The county is home to two cities, four towns, and 10 townships (Rockingham County, 2018). With respect to EJ communities, Rockingham County contains 21 census

tracts, 10 of which are crossed by the Project and of that amount four census tracts are potential EJ communities (less than 1 percent). See Section 5.3.8 for more details on EJ.

Alamance County, North Carolina

Approximately 21.1 miles of the pipeline and one interconnect will be in Alamance County. Total land area in Alamance County is 434.74 square miles and includes 10.79 square miles of water (U.S. Census, 2010b). Alamance County is centrally located in North Carolina, linking the Research Triangle and the Piedmont Triad metropolitan regions. The county is home to three cities, six towns, and many other smaller unincorporated communities and villages (Alamance County, 2018). Alamance County is included in the Burlington MSA which is part of the Greensboro-Winston-Salem-High Point CSA. With respect to EJ communities, Alamance County contains 36 census tracts, nine of which are crossed by the Project and of that amount two census tracts are potential EJ communities (less than 1 percent). See Section 5.3.8 for more details on EJ.

5.3 EXISTING SOCIOECONOMIC CONDITIONS

The socioeconomic data used in this evaluation were obtained from the most recent U.S. Department of Commerce, Bureau of the Census, and Bureau of Labor Statistics online databases. Additional information on community public services and available housing, hotel lodging, and rental units was obtained from publicly available online sources.

5.3.1 Population

Population data and trends including population density for the Project area are provided in Table 5.3-1. The three counties in the Project area had a total combined population of 314,598 in 2017, with 80 percent of this total located in the North Carolina counties. Population by county ranged from 162,391 in Alamance County to 61,258 in Pittsylvania County.

Population densities by county in 2017 ranged from 63.21 persons per square mile (persons/square mile) in Pittsylvania County to 383.00 persons/square mile in Alamance County. The corresponding statewide densities were approximately the same averaging around 212 persons/square mile.

Table 5.3-1
Population by State and County for the MVP Southgate Project

State/County	2017 Population	2017 Population Density (persons/square mile)	Population Change (Percent)	
			2000 to 2010	2010 to 2017
Virginia	**8,470,020**	**214.5**	**13.0**	**5.9**
Pittsylvania	61,258	63.21	2.9	-3.5
North Carolina	**10,273,419**	**211.31**	**18.5**	**7.7**
Rockingham	90,949	160.68	1.9	-2.9
Alamance	162,391	383.00	15.5	7.5

Source: U.S. Census Bureau, 2000, 2010, 2017 Census.

Population increased in all three counties in the Project area between 2000 and 2010. Alamance County experienced the greatest population increase, 15.5 percent. Pittsylvania and Rockingham counties had population increases of 2.9 and 1.9 percent, respectively. Alamance County continued to experience a

population growth of 7.5 percent between 2010 and 2017 while Pittsylvania and Rockingham counties experienced declines.

5.3.2 Employment and the Economy

Table 5.3-2 provides information on the economy and employment in the Project area. Per capita annual income was approximately equivalent among the Project counties with only an approximate $1,300 difference between the highest and lowest. The unemployment rates for the Pittsylvania and Rockingham counties were slightly above their respective state rates while Alamance County was equal at 4.3 percent. The civilian workforce estimates for 2017 for the Project counties include: 29,542 workers in Pittsylvania County; 41,106 workers in Rockingham County; and 79,767 workers in Alamance County. The total civilian workforce for all of the Project counties is 150,415 workers. Within the Project area, the major occupations are in the fields of educational, health and social services", "manufacturing", and "retail trade" (U.S. Census, 2016). Other top industries in the Project area include professional, scientific, and technical services, arts and entertainment, and construction.

Table 5.3-2
Existing Socioeconomic Conditions in the MVP Southgate Project Area

State/County	Per Capita Income (U.S. Dollars) a/	Civilian Labor Force (persons) b/, c/	Unemployment Rate b/, c/	Top Five Major Industries a/
Virginia	**$34,967**	**4,338,619**	**3.2**	**A, E, P, Pu, R**
Pittsylvania County	$22,650	29,542	4.5	C, E, M, P, R
North Carolina	**$26,779**	**4,987,865**	**4.3**	**A, E, M, P, R**
Rockingham County	$21,298	41,106	5.2	A, E, M, P, R
Alamance County	$23,989	79,767	4.3	C, E, M, P, R

Sources:
a/ U.S. Census Bureau, American Fact Finder, Selected Economic Characteristics 2012-2016 American Community Survey 5 – year estimates.
b/ Bureau of Labor Statistics, Table 1. Civilian Labor Force (May 2018 preliminary) for states.
c/ Bureau of Labor Statistics, Labor Force Data by County, 2017 Annual Averages for counties (number of unemployed people as a percentage of the labor force).

Industries:
A = Arts, entertainment, and recreation, and accommodation and food services.
Ag = Agriculture, forestry, fishing and hunting, and mining.
C = Construction.
E = Educational, health and social services.
F = Finance and insurance, and real estate and rental and leasing.
M = Manufacturing.
O = Other services, except public administration.
P = Professional, scientific, management, administrative and waste management services.
Pu = Public administration.
R = Retail trade.
T = Transportation and warehousing, and utilities.

5.3.3 Housing

Table 5.3-3 provides select housing data from the Project counties. Data on housing units are estimates for 2016 prepared by the U.S. Census Bureau, 2012-2016 American Community Survey 5 – year estimates (U.S. Census Bureau, 2012-2016). The number of total housing units varies across the impact area, largely based on the county population and the presence of the MSA, CSA, or micropolitan statistical area. In 2016, Pittsylvania County (with the lowest population) had the fewest housing units (31,334 units) while Alamance County, with the highest population, had the most housing units (68,211 units). Rockingham County possessed the highest rental vacancy rate of 8.9 percent while Pittsylvania County possessed the lowest rate of 3.6 percent. Each of the three counties had over 5,000 vacant housing units available (17,253 total). Based on available online resources, there are approximately 44 hotels and motels within the Project counties, as well as 12 campgrounds and recreational vehicle ("RV") parks providing hundreds of rental units.

Table 5.3-3
Housing by State and County for the MVP Southgate Project

State/County	Housing Units 2016 a/			Hotels and Motels b/	Campgrounds & RV Parks c/
	Total	Vacant Housing Units	Rental Vacancy Rate (%)	# of Facilities/ Rooms	# of Facilities/ sites
Virginia	**3,445,357**	**355,179**	**10.3**	**NA**	**NA**
Pittsylvania	31,334	5,007	3.6	3/160	5/172
North Carolina	**4,453,767**	**638,375**	**7.2**	**NA**	**NA**
Rockingham	43,591	6,088	8.9	15/603	4/147
Alamance	68,211	6,158	7.5	26/1,355	3/88

Sources:
a/ U.S. Census Bureau, 2012-2016. Selected Economic Characteristics 2012-2016 American Community Survey 5 – year estimates
b/ HotelMotels.info. 2018; Bing Maps, 2018; Experience Danville Pittsylvania County, 2018; Visit Rockingham County, 2018; Visit Alamance County, 2018.
c/ Go Camping America, 2018; RV Clubs, 2018; Experience Danville Pittsylvania County, 2018; Visit Rockingham County, 2018; Visit Alamance County, 2018.
N/A = Not Applicable

5.3.3.1 Existing RV and Campground Facilities

Table 5.3-4 lists existing RV and campground facilities that would be located within commuting distance of the Southgate Project.

Table 5.3-4
Existing RV and Campground Facilities in the MVP Southgate Project Counties

Existing RV And Campground Facilities	Description / Amenities
Virginia	
Pittsylvania County	
Elkhorn Lake Campground and ATV Trails 2500 Elkhorn Road, Java	• 560+ acre recreation area with private 110-acre lake and family campground • Opened year round, gated • 60 RV sites onsite • Full hookups for electric service • 8.7 miles away from closest point of pipeline centerline at MP 0.5 • Rustic cabins, picnic pavilions, fishing and boat ramp, swimming pool and water slide • Band events and entertainment • 31 miles of ATV trails and motorcycle Enduro track
Leesville Lake Campground 3129 Gallows Road, Gretna	• 40-acre campground site • Opened year round, pet friendly • 9.0 miles away from closest point of pipeline centerline at MP 0.0 • 12 spacious full hookup campsites • Swimming pool • Large wooded areas • Old road-bed trails • Access to a 17-mile long lake providing fishing, boating, kayaking, canoeing, and other water sports and activities • Access to boat ramps, floating docks, and paved parking areas with boat trailer spaces
Paradise Lake and Campground 593 Keeling Drive, Keeling	• Opened year round, pet friendly • 17 large and 40 small RV sites with full hookups • 7 miles away from closest point of pipeline centerline at MP 11.0 • Rustic cabins and tent sites • Bath and laundry facilities • Swimming pool • Snack bar • Outdoor activities • Access to Paradise Lake providing fishing, paddle and jon boating
Smith Mountain Campground 155 Liberty Road, Penhook	• Opened year round, pet friendly • Located adjacent to pond and 4 miles from Smith Mountain Lake with public boat landing • 20 large wooded and level RV sites with four pull through sites; all with electric service • 17 miles away from closest point of pipeline centerline at MP 0.0 • 10 tent sites available • Bath house and pavilion • Walking trails, outdoor activities
Running Cedar RV Resort 3129 Gallows Road Post Office Box 556, Gretna	• Located steps from the 17-mile long Leesville Lake • 23 large wooded and level campsites with water and electric service • 18 miles away from closest point of pipeline centerline at MP 0.0 • Access to public lake front picnic area with public boat ramp, fishing • Clubhouse with lounge area and game room, private outdoor pool, walking trails

Table 5.3-4 Existing RV and Campground Facilities in the MVP Southgate Project Counties	
Existing RV And Campground Facilities	**Description / Amenities**
North Carolina	
Rockingham County	
Lake Reidsville 630 Water Works Road, Reidsville	• Multipurpose recreation facility with a campground located on a 750-acre lake and park providing outdoor activities • Opened year round, every day • 46 wooded sites with water and electricity with 28 having full hookups • 5 miles away from closest point of pipeline centerline at MP 46.5 • Swimming is not allowed since Lake Reidsville is a municipal water source
Dan River Campground 724 Webster Road, Stoneville	• Small family owned and operated tent and RV campground site • Located on the Dan River about 20 miles from the Martinsville Speedway • Opened April 1 through October 31, pet friendly • 53 RV sites (20 that have water, electric and sewer hookup; 13 that have water and electric hookup that are available for RV camping) • 4 tent sites have electric and water and 5 sites are tent only with no hookups • 12.4 miles away from closest point of pipeline centerline at MP 36.0 • River activities include more than 30 canoes and kayaks and over 100 float tubes available
	• Swimming, outdoor activities, walking trails
Humphrey's Ridge Marine and Campground, Belews Lake 548 Shelton Road, Stokesdale	• Located on Belews Lake which is a 3,864 acre lake with an 88-mile shoreline • Opened early April through early September • 36 RV sites • 22 miles away from closest point of pipeline centerline at MP 41.0
Lisa's RV Landing 3440 US 311, Madison	• Opened year round • 12 RV sites • 22 miles away from closest point of pipeline centerline at MP 40.0 • Can accommodate all types of campers from the smallest tent to the biggest 5th wheel and motorhomes with slide-outs • Electric hook ups
Alamance County	
Jones Station RV Park 2710 Jones Drive, Mebane	• 25-acre privately owned RV park and campground park • 56 deluxe camp sites • Opened year round • Full hookups on all sites as well as RV Storage • Bathhouse and several other modern day amenities • Park can accommodate large pull-throughs • 4.4 miles away from closest point of pipeline centerline at MP 73.11
Hidden Lake Park 4460 South NC Highway 54, Hidden Lake Road, Graham	• Opened year-round for camping (RV hookups and tent) • 12 RV sites • Swimming and water slide • Concessions with picnic area • Two bath houses • 5.0 miles away from closest point of pipeline centerline at MP 73.11

Table 5.3-4 Existing RV and Campground Facilities in the MVP Southgate Project Counties	
Existing RV And Campground Facilities	**Description / Amenities**
Crane Creek Campground & RV Park 1256 Longest Acre Road, Snow Camp	• 80 wooded acres sitting on the Cane Creek mountain range • Opened year round • 20 hookups (water and electric) and additional sites with no hookups • Can accommodate all types of campers from the smallest tent to the biggest 5th wheel and motorhomes with slide-outs • 22 miles away from closest point of pipeline centerline at MP 40.0
Sources: Experience Danville Pittsylvania County, 2018; Visit Rockingham County, 2018; Visit Alamance County, 2018.	

5.3.4 Travel and Tourism

Table 5.3-5 provides domestic travel-related economic impacts for the Project area in 2016. The Southgate Project counties each account for less than 1 percent in travel-related expenditures compared to their state totals (VATC, 2016; VisitNC, 2016). However, preliminary data for year 2017 for both states indicate increases in all areas of domestic travel-related economics ranging from a low of 1.1 percent to a high of 7.1 percent (U.S. Travel Association, 2018).

Virginia

The Southgate Project area is located in the southern region of Virginia known for its six speedways, history and heritage, rolling countryside, and outdoor activities (Virginia, 2018). Domestic and international travelers to Virginia spent nearly $25 billion in 2016 that supported 234,670 jobs and provided $3.4 billion in state and local taxes and the travel industry was the fourth largest private employer in the state (U.S. Travel Association, 2016).

Among the 95 counties in Virginia, Pittsylvania County ranked 55th with respect to economic impacts resulting from domestic travel in 2016 (VATC, 2016). Domestic travelers spent approximately $73 million in Pittsylvania County in 2016, which represents less than 1 percent of the states total. The travel and tourism industry generated $14 million in payroll in Pittsylvania County and resulted in approximately $4 million in state tax revenue and $2 million in local tax revenue in 2016 (Table 5.3-5).

North Carolina

The Southgate Project area is located in the Greensboro and Winston-Salem region known for having the nation's largest natural-habitat zoo, being the furniture capital of the world, and the nation's largest pottery community (VisitNC, 2018). Domestic and international travelers to North Carolina spent nearly $24 billion in 2016 that supported 229,530 jobs and provided $3.7 billion in state and local taxes and the travel industry was the sixth largest private employer in the state (U.S. Travel Association, 2016).

In 2016, domestic traveler expenditures in Rockingham County were approximately $71 million, representing less than 1 percent of the state total (VisitNC, 2016). The travel and tourism industry generated $12 million in payroll in Rockingham County and resulted in approximately $3.8 million in state tax revenue and $1.7 million in local tax revenue in 2016 (Table 5.3-5).

Domestic traveler expenditures in Alamance County were more than double that of Rockingham County at $180 million, but still only representing less than 1 percent of the state total (VisitNC, 2016). The travel

and tourism industry generated $29 million in payroll in Alamance County and resulted in approximately $11 million in state tax revenue and $3 million in local tax revenue in 2016 (Table 5.3-5).

Table 5.3-5
Domestic Travel-Related Economic Impacts in the MVP Southgate Project Counties, 2016

State/County	Travel-Related Expenditures $(millions)	Travel-Related Payroll $(millions)	Travel-Related Employment (thousands)	Travel-Related State Tax Receipts $(millions)	Travel-Related Local Tax Receipts $(millions)
Virginia	**$23,699.81**	**$5,624.41**	**229.26**	**$1,014.41**	**$663.39**
Pittsylvania	$73.27	$14.04	0.66	$3.98	$2.14
North Carolina	**$23,021.47**	**$5,558.72**	**219.70**	**$1,187.24**	**$699.49**
Rockingham	$70.91	$12.01	0.57	$3.79	$1.71
Alamance	$179.95	$29.58	1.40	$10.66	$3.13

Source:

2016 Impact of Travel on Virginia (VATC, 2016).
2016 Impact of Travel on North Carolina (VisitNC, 2016).

5.3.5 Public Services

Public services and facilities are available in the Southgate Project area, including full-service law enforcement, hospitals, career and volunteer fire departments, and public schools. Select public service information is provided in Table 5.3-6.

5.3.5.1 Education

The total number of public schools are summarized by county in Table 5.3-6. There are 80 public schools in the Project counties consisting of elementary, middle, and high schools. The parking lot of one public school will be crossed by the Southgate Project pipeline at approximately milepost ("MP") 71.3. Refer to Resource Report 8 for further details.

5.3.5.2 Police and Fire Services

Summary data for law enforcement and fire departments are presented by county in Table 5.3-6. These data provide a general overview of resources available in each county. In general, the number of police and fire departments is directly related to the overall size and population of the county, as well as the number of communities. Multiple law enforcement agencies and providers exist in the potentially affected counties of the Project, including state patrol, county sheriffs, and local police departments. In many cases, mutual aid agreements allow agencies to support one another in emergency situations.

The Southgate Project counties have full service law enforcement agencies that are each staffed by one sheriff's office that employs, on average, 140 full and part-time deputies and officers who provide services in the areas of corrections, operations, investigations, and administration (Table 5.3-6). In addition, there are hundreds of state troopers in the corresponding states (approximately 675 in Virginia and over 1,600 in North Carolina) that provide similar services as the counties (VSP, 2015; NCDPS, 2015).

Multiple fire departments provide fire protection, rescue, and suppression services in the Southgate Project counties. Many of these fire departments are at least staffed with a few full-time paid fire-fighter and several part-time volunteers. Several of the fire stations in the Southgate Project counties also provide

combined medical services. For instance, Pittsylvania County has 21 fire stations, four of which have combined emergency medical services (Pittsylvania County, 2018).

5.3.5.3 Medical Facilities

Medical facility summaries are presented by county in Table 5.3-6. There are only four hospitals in the Southgate Project counties with over 600 beds; however, the area has numerous outpatient clinics providing emergency services, general care, eye and dental, onsite pharmaceuticals, and other specialty services (Open Door Clinic, 2018; Piedmont Health, 2018). Pittsylvania County also has approximately 12 emergency transport agencies that provide emergency ambulance services to surrounding communities (Pittsylvania County, 2018).

Table 5.3-6
Public Services in the MVP Southgate Project Area

County/State	Number of Public Schools a/	Number of Police Departments b/	Number of Fire and Rescue Departments c/	Number of Hospitals d/	Number of Hospital Beds d/
Pittsylvania, Virginia	19	3	21	1	50
Rockingham, North Carolina	25	6	16	2	339
Alamance, North Carolina	36	6	8	1	238
TOTAL	**80**	**15**	**45**	**4**	**627**

Sources:
a/ Pittsylvania County Schools, 2018; Rockingham County Schools, 2018; Alamance County Schools, 2018.
b/ Pittsylvania County Sheriff, 2018; Rockingham County Sheriff, 2018; Alamance County Sheriff, 2018.
c/ USA Fire & Rescue. 2018; Carolinas Fire Page, 2018; Pittsylvania County GIS, 2018; Pittsylvania County, 2018.
d/ AHD (American Hospital Director), 2018.

5.3.6 Transportation

The Southgate Project area will mainly be accessed by use of existing highways. Major routes crossed by the pipeline alignment in Pittsylvania County, Virginia include U.S. Route 29 and U.S. Route 58. U.S. Route 29 extends north/south for approximately 1,036 miles from Pensacola, Florida to the western suburbs of Baltimore, Maryland. It will be crossed twice by the pipeline, near MP 4.5 in Pittsylvania County, Virginia and again near MP 41.7 in Rockingham County, North Carolina. U.S. Route 29 bisects Virginia, entering the state at Danville and passing through several towns before leaving the state in Arlington County and entering the District of Columbia (AARoads, 2018). U.S. Route 58 is an east/west highway that extends for approximately 508 miles from just northwest of Harrogate, Tennessee to U.S. Route 60 in Virginia Beach, Virginia and will be crossed by the Southgate Project pipeline near MP 20.0. Major routes and that will be crossed by the Project are identified in Table 5.3-7.

Other major routes that will be crossed by the pipeline alignment include State Route 87 ("SR 87"), Interstate 40 ("I-40"), Interstate 85 ("I-85"), and U.S. 70. SR 87 is a primary state highway in Virginia that extends approximately 4 miles from the North Carolina state line north to U.S. Route 220 in Henry County, Virginia. It parallels the majority of the pipeline route through Alamance and Rockingham counties in North Carolina and will also cross the pipeline near MPs 49.2 and 55.8 in Alamance County. I-40 and I-85 ("I-40/85") are major east-west interstate highways traversing through the southcentral/southeastern portions of the U.S. I-40 travels through North Carolina for approximately 421 miles and intersects (shares)

with I-85 east of downtown Greensboro. In Alamance County, the pipeline will cross the shared I-40/85 near MP 70.9. U.S. 70 (Haw River Bypass) is a primary corridor that extends east/west through North Carolina connecting Raleigh, Smithfield, Goldsboro, Kinston, Havelock and the Port of Morehead City that is a major hurricane evacuation route. The pipeline alignment will cross U.S. 70 at MP 68.5.

Table 5.3-7
Major Interstates and Highways Crossed by the MVP Southgate Project

Approximate Milepost	Highway	County	State
4.5	U.S. Route 29	Pittsylvania	Virginia
20.0	U.S. Route 58 (Martinsville Highway)	Pittsylvania	Virginia
41.7	U.S. Route 29	Rockingham	North Carolina
42.2	U.S. 158 West	Rockingham	North Carolina
49.2	SR 87	Alamance	North Carolina
55.8	SR 87	Alamance	North Carolina
68.5	Highway 70 (Haw River Bypass)	Alamance	North Carolina
70.9	Interstate 40/85	Alamance	North Carolina

Optional transportation available in the region include train and airline resources. North Carolina has more than 3,200 miles of railroad track serving 22 states in the eastern half of the country. North Carolina also has four international airports, 11 regional airports and two major deep-water seaports (EDPNC, 2018). The Amtrak National provides daily round-trip service throughout the majority of the Project area (Amtrak, 2018). The Burlington-Alamance and Danville Regional Airports provide regional air service to many major cities, internal and external to Virginia and North Carolina. The Piedmont Triad International Airport in Greensboro, North Carolina is approximately 25 miles away from the closest point of the pipeline at MP 54 (WPPDC, 2018).

5.3.7 Tax Revenues

5.3.7.1 Sales and Use Taxes

The general sales and use tax rate for Virginia is 5.3 percent (4.3 percent state tax and 1 percent local tax), Table 5.3-8. Additional state tax is imposed in the Northern Virginia and Hampton Roads regions, neither of which is crossed by the Project (Virginia State Tax Division, 2017).

The general sales and use tax rate for North Carolina is 6.75 or 7.00 percent (4.75 percent state tax plus applicable local rates at 2.00 or 2.25 percent tax), (North Carolina Department of Revenue, 2017)).

Table 5.3-8
Sales and Use Tax Rates by Location

State/County	County Tax Rate (%)	State Tax Rate (%)	Total Tax Rate (%)
Virginia			
Pittsylvania	1.00	4.3	5.3
North Carolina			
Rockingham	2.00	4.75	6.75
Alamance	2.00	4.75	6.75

5.3.8 Environmental Justice

Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994) was issued to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities. The order requires each federal agency to identify and address as appropriate the disproportionately high and adverse effects of its programs, policies and activities on minority populations and low-income populations. It also provides minority and low-income communities access to public information and public participation.

5.3.8.1 Federal Environmental Screening

To determine potential impacts on minority and low-income populations, the Southgate Project used the Environmental Protection Agency's ("EPA") Environmental Justice Screening and Mapping Tool ("EJSCREEN") demographic index (EPA, 2017a), in accordance with FERC *Guidance Manual for Environmental Report Preparation*. EJSCREEN's demographic index is a block group which exceeds 50 percent minority population and/or exceeds 50 percent population whose household income is below twice the federally defined poverty threshold (EPA, 2017b). Block groups and census tracts of potential EJ communities where the Project facilities cross or are in are included in Tables 5.3-9 and 5.3.10 and displayed on Figure 5.3-1. Data in Table 5.3-9 was taken from the U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates which is what the EJSCREEN uses. Discussions on the results are provided in the following sections.

EPA's Environmental Justice Showcase Communities

The Southgate Project also conducted a review of EPA's Environmental Justice Showcase Communities for Regions 3 and 4 and determined that none of the Project facilities are located in these communities (EPA, 2017c).

Tribal Consultation

On July 24, 2014, the EPA issued its Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples. The Policy focuses on EPA's work with federally recognized tribes, state recognized tribes, tribal members, indigenous community-based/grassroots organizations, Native Hawaiians, individual Native Americans, and others living in Indian country. The Policy also discusses EPA's work with other federal agencies, state agencies, and other interested groups (EPA, 2014).

The Southgate Project is actively coordinating with federal tribes that are cooperating agencies in the FERC process (see Resource Report 4 for more details). In addition, the Project has conducted outreach with state tribes and has been actively coordinating with interested tribal representatives.

In addition to federal guidance, the Southgate Project also assessed state level EJ policies, as applicable, which are further discussed in the following sections (see Section 5.3.8.2 below).

Table 5.3-9
EJ Block Group and Census Tracts for Counties Crossed by the MVP Southgate Project

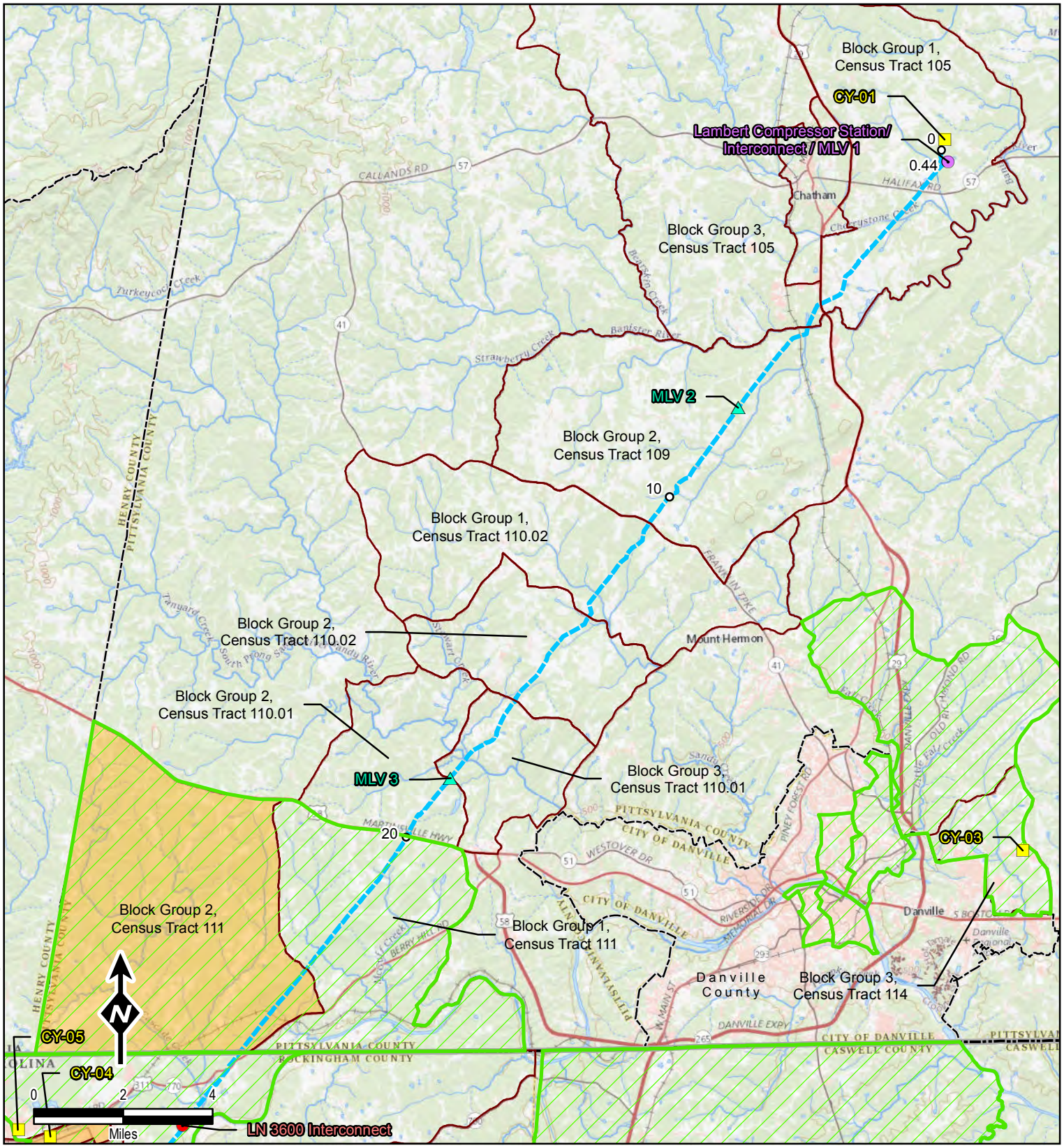
State/County Block Group/Census Tract	Total Population	Median Household Income (U.S. Dollars)	Percent												
			White	African American	Native American & Alaskan Native	Asian	Native Hawaiian & Pacific Islander	Other Race	Hispanic or Latino Origin	Children (5 and under)	Elderly (over 65)	Non- English at Home a/	Less Than High School Education	Minority Population b/	Households Below Poverty b/
Virginia	**8,310,301**	**$66,149**	**68.7**	**19.2**	**0.3**	**6.1**	**0.1**	**2.3**	**8.7**	**6.1**	**13.8**	**15.5**	NA	NA	NA
Pittsylvania County	***62,392***	***$43,087***	***74.9***	***21.2***	***0.1***	***0.4***	***0.0***	***1.7***	***2.4***	***4.5***	***19.8***	***3.7***	NA	NA	NA
Block Group 1, Census Tract 105	1,423	NA	79.4	18.1	0.0	0.0	0.0	.5	2.5	5	19	5	2	20.6	29.2
Block Group 3, Census Tract 105	2,011	NA	52.5	44.3	0.0	1.0	0.0	1.0	1.0	2	13	5	4	47.5	48.5
Block Group 2, Census Tract 109	1,450	NA	82.7	11.7	0.0	0.0	0.0	3.5	2.9	3	20	3	5	17.3	35.3
Block Group 1, Census Tract 110.02	3,513	NA	87.3	12.3	0.2	0.0	0.0	0.0	0.0	4	17	4	4	12.7	25.2
Block Group 2, Census Tract 110.02	1,325	NA	86.8	12.4	0.0	0.0	0.8	0.0	0.0	6	16	4	7	13.2	41.1
Block Group 3, Census Tract 110.01	1,122	NA	91.4	8.6	0.0	0.0	0.0	0.0	0.0	6	17	2	2	8.6	40.6
Block Group 2, Census Tract 110.01	746	NA	91.8	6.7	0.0	0.0	0.0	0.0	0.0	1	24	2	8	8.2	29.4
Block Group 1, Census Tract 111	1,366	NA	84.8	15.2	0.0	0.0	0.0	0.0	3.0	2	20	6	3	18.2	39.5
Block Group 2, Census Tract 111	1,575	NA	48.9	38.3	0.0	0.0	0.0	12.3	12.8	7	13	6	6	**51.1**	32.6
North Carolina	**9,940,828**	**$48,256**	**69.2**	**21.5**	**1.2**	**2.6**	**0.1**	**3.0**	**8.9**	**6.1**	**14.7**	**11.3**	NA	NA	NA
Rockingham County	***93,643***	***$40,003***	***75.7***	***18.9***	***0.4***	***0.5***	***0.1***	***2.8***	***5.5***	***5.2***	***18.3***	***5.6***	NA	NA	NA
Block Group 1, Census Tract 402	1,000	NA	92.7	6.3	0.0	1	0.0	0.0	1.1	2	23	16	7	8.4	45.5
Block Group 1, Census Tract 401.01	756	NA	90.3	9.7	0.0	0.0	0.0	0.4	0.0	0	15	5	5	10.1	42.1
Block Group 1, Census Tract 411	681	NA	78.6	21.4	0.0	0.0	0.0	0.0	0.0	0	21	1	2	21.4	**57.9**
Block Group 3, Census Tract 401.01	1,295	NA	71.1	15.8	0.0	0.0	0.0	14.1	13.2	9	22	9	7	31.0	38.8
Block Group 2, Census Tract 401.01	1,875	NA	75.9	20.1	1.7	0.0	0.0	1.0	1	2	20	4	6	24.1	45.8
Block Group 2, Census Tract 401.02	1,130	NA	51.2	48.8	0.0	0.0	0.0	2.8	3	13	10	2	2	**51.7**	**67.3**
Block Group 3, Census Tract 401.02	846	NA	73.0	13.7	0.0	0.0	0.0	0.0	0.0	6	22	0	4	27.0	**45.7**
Block Group 1, Census Tract 413	1,977	NA	80.9	14.7	0.0	0.7	0.0	0.9	1	7	18	2	10	19.1	**54.3**
Block Group 4, Census Tract 413	1,033	NA	61.0	34.1	0.0	0.0	0.0	0.7	11.9	7	21	17	4	**50.2**	45.4
Block Group 2, Census Tract 413	1,214	NA	72.0	25.3	2.7	0.0	0.0	0.0	0.0	1	25	0	3	28.0	35.1
Alamance County	***156,372***	***$43,209***	***70.7***	***18.6***	***0.4***	***1.5***	***0.1***	***6.0***	***12.1***	***5.9***	***16.0***	***12.6***	NA	NA	NA
Block Group 2, Census Tract 215	1,366	NA	82.4	10.8	0.0	0.0	0.0	6.2	6.2	6	13	6	3	17.6	21.7
Block Group 1, Census Tract 215	1,313	NA	83.5	10.3	0.0	0.0	0.0	6.2	6.2	9	17	8	2	16.5	29.6
Block Group 4, Census Tract 215	1,362	NA	89.0	6.5	0.0	0.0	0.0	4.0	4.0	5	18	2	0	11.0	35.2
Block Group 3, Census Tract 215	729	NA	95.5	1.6	0.0	0.0	0.0	2.9	4.5	10	12	2	3	6.2	25.1
Block Group 1, Census Tract 214	1,703	NA	94.5	1.1	0.0	0.4	0.0	0.0	3.9	5	22	5	3	9.5	35.4
Block Group 5, Census Tract 213	891	NA	58.2	34.8	0.2	0.0	0.0	3.9	6.1	5	22	5	6	42.4	47.7
Block Group 2, Census Tract 212.01	1,783	NA	68.3	20.0	0.0	0.0	0.0	8.1	13.6	6	14	10	10	36.2	**54**
Block Group 3, Census Tract 212.01	1,151	NA	84.4	8.5	0.0	0.0	0.0	7.0	7.0	1	10	9	7	15.6	**57**
Block Group 1, Census Tract 220.01	1,404	NA	82.1	14.9	0.0	2	0.0	0.0	5	5.0	19	5	6	22.6	17.8

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
a/ Percent is only for non-English population age 5 years and over. **b/** Data fields are shaded for those census block groups with more than 50 percent of minority population and/or households below the poverty level.
N/A = Not applicable.

Table 5.3-10
EJ Block Group and Census Tracts for Counties Crossed by the MVP Southgate Project by Milepost

State/*County* Block Group/Census Tract	Milepost Enter	Milepost Exit	Total Distance (Miles) b/	Collocation Distance (Miles)
Virginia/*Pittsylvania County*				
Block Group 1, Census Tract 105 a/	0.00	0.44	0.44	0.44
Block Group 1, Census Tract 105	0.00	4.33	4.33	3.29
Block Group 3, Census Tract 105	4.33	4.94	0.62	.054
Block Group 2, Census Tract 109	4.94	10.74	5.80	4.99
Block Group 1, Census Tract 110.02	10.74	13.38	2.63	1.67
Block Group 2, Census Tract 110.02	13.38	15.93	2.55	0.90
Block Group 3, Census Tract 110.01	15.93	18.26	2.33	1.31
Block Group 2, Census Tract 110.01	18.26	19.96	1.71	1.71
Block Group 1, Census Tract 111	19.96	23.70	3.73	3.73
Block Group 2, Census Tract 111	23.70	26.09	2.39*	2.39*
North Carolina/*Rockingham County*				
Block Group 1, Census Tract 402	26.09	30.08	3.99	3.31
Block Group 1, Census Tract 401.01	30.08	30.48	0.40	0.40
Block Group 1, Census Tract 411	30.48	36.28	5.80*	3.35*
Block Group 3, Census Tract 401.01	36.28	38.82	2.54	0.25
Block Group 2, Census Tract 401.01	38.82	39.68	0.86	.017
Block Group 2, Census Tract 401.02	39.68	40.34	0.66*	0.00*
Block Group 3, Census Tract 401.02	40.34	42.19	1.84	1.00
Block Group 1, Census Tract 413	42.19	43.16	0.97	0.40
Block Group 4, Census Tract 413	43.16	44.90	1.74*	0.70*
Block Group 1, Census Tract 413	44.90	48.41	3.51	0.19
Block Group 2, Census Tract 413	48.41	52.63	4.22	3.24
North Carolina/*Alamance County*				
Block Group 2, Census Tract 215	52.63	55.07	2.43	1.92
Block Group 1, Census Tract 215	55.07	57.86	2.79	1.89
Block Group 4, Census Tract 215	57.86	60.26	2.40	0.73
Block Group 3, Census Tract 215	60.26	61.37	1.11	0.00
Block Group 1, Census Tract 214	61.37	66.08	4.71	0.00
Block Group 5, Census Tract 213	66.08	66.39	0.30	0.00
Block Group 2, Census Tract 212.01	66.39	69.65	3.26*	0.00*
Block Group 3, Census Tract 212.01	69.65	72.92	3.27*	0.00*
Block Group 1, Census Tract 220.01	72.92	73.11	0.19	0.00

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
a/ Southgate Lateral (H605 Pipeline).
b/ Totals may be off slightly due to rounding of numbers.
* Potential EJ Community.



Legend

- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Mileposts
- Proposed Pipeline Route
- Not a Potential Environmental Justice Area
- Potential Environmental Justice Area
- Opportunity Zones
- State Boundary
- County Boundary

Note: A Potential Environmental Justice Area is a block group which exceeds 50% minority population and/or exceeds 50% population whose household income is below twice the federally-defined poverty threshold.

Percentage of Route Within Potential Environmental Justice Area: 29%

Percentage of Route Not Within Potential Environmental Justice Area: 71%

Data Sources: ESRI, USGS, TRC, EQT, Census Bureau ACS 2012-2016

1 inch = 3 miles
When Printed 8.5x11

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Figure 5.3-1
Page 1 of 2

Environmental Justice Areas Map
Virginia

TRC
Results you can rely on

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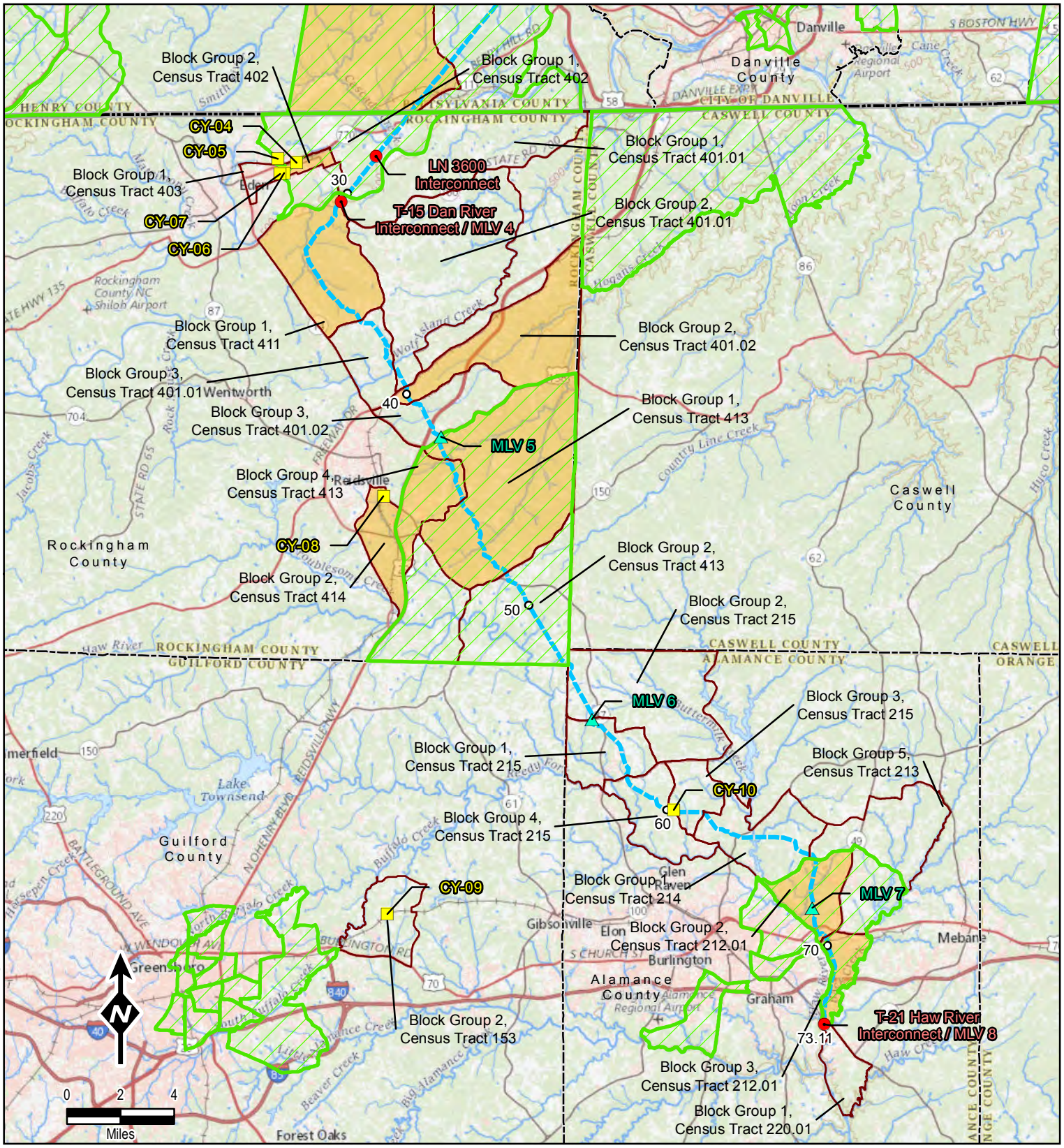

Legend

- Contractor Yard
- Meter Station
- Valve Site
- Mileposts
- Proposed Pipeline Route
- Not a Potential Environmental Justice Area
- Potential Environmental Justice Area
- Opportunity Zones
- State Boundary
- County Boundary

Note: A Potential Environmental Justice Area is a block group which exceeds 50% minority population and/or exceeds 50% population whose household income is below twice the federally-defined poverty threshold.

Percentage of Route Within Potential Environmental Justice Area: 29%

Percentage of Route Not Within Potential Environmental Justice Area: 71%

Data Sources: ESRI, USGS, TRC, EQT, Census Bureau ACS 2012-2016

1 inch = 5 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 5.3-1
Page 2 of 2

Environmental Justice Areas Map
North Carolina

TRC
Results you can rely on

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Opportunity Zones

Opportunity Zones[1] are a new community development program established by Congress in the Tax Cuts and Jobs Act of 2017 to encourage long-term investments in low-income urban and rural communities nationwide. The Opportunity Zones program provides a tax incentive for investors to re-invest their unrealized capital gains into Opportunity Funds that are dedicated to investing into Opportunity Zones designated by the chief executives of every U.S. state and territory (EIG, 2018).

North Carolina Opportunity Zones will offer qualified investors certain tax benefits when they invest unrealized capital gains into these areas. Investments made by qualified entities known as Opportunity Funds into certified Opportunity Zones will receive three key federal tax incentives to encourage investment in low-income communities.

The federal law allows each state to designate up to 25 percent of its total low-income census tracts as Opportunity Zones candidates. North Carolina has just over 1,000 of these tracts, so only 252 census tracts could be selected as Opportunity Zones (NC Commerce, 2018). Opportunity Zones for the Project counties are displayed on Figure 5.3-1. Many of these zones correspond to the block groups and census tracks of potential EJ communities where the Project facilities are located or cross.

Minority and Low-Income

A total of seven block groups out of 28 crossed by the Southgate Project exceeded the national averages of minority populations and/or low income populations where the Project facilities cross or are in (Table 5.3-9 and Figure 5.3-1). These seven block groups of potential EJ communities represent approximately 17.12 miles of the total Project route (23 percent), (Table 5.3-10 and Figure 5.3-1). While the Southgate Project pipeline route crosses EJ communities, it is collocated with existing infrastructure for approximately 34 percent (6.44 miles) of the alignment within the EJ census tracts. These existing facilities have been in operation for decades within these communities. With respect to demographic indexes, one block group in Pittsylvania County exceeded the 50 percent threshold of the minority population of the national average by approximately 1 percent and one block group in Rockingham County exceeded the threshold by approximately 2 percent and one block group was equal to the threshold. Low income populations for five block groups (three in Rockingham County and two in Alamance) were reported to be above the national averages by approximately 4 and 5 percent, and one at 17 percent. One block group in Rockingham County exceeded the 50 percent threshold of both demographic indexes.

Racial/Ethnic Composition

Table 5.3-9 provides the percentages of the general racial/ethnic compositions for the Project counties and block groups crossed by the Project. Racial/ethnic compositions for the Southgate Project area is predominantly white with six block groups over 90 percent, 10 block groups at or over 80 percent, two counties and six block groups over 70 percent, once county and five block groups approximately 51 to 70 percent and one block group at 49 percent followed by the African American racial/ethnic composition with two block groups averaging approximately 46 percent, two block groups approximately 30 to 40 percent,

[1] An Opportunity Zone is an economically-distressed community where new investments, under certain conditions, may be eligible for preferential tax treatment. Localities qualify as Opportunity Zones if they have been nominated for that designation by the state and that nomination has been certified by the Secretary of the U.S. Treasury via his delegation authority to the Internal Revenue Service (IRS, 2018).

14 block groups between 10 and 25 percent and the remaining block groups under 10 percent while the Project counties averaged approximately 20 percent.

Non-English Speaking Groups

Data was taken from the U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates for language spoken at home (S1601), (U.S. Census Bureau, 2012-2016). According to the Census, language spoken at home is defined as the language currently used by respondents at home that is either "English only" or a non-English language used in addition to English or in place of English.

Alamance County was approximately 1.3 percent higher than North Carolina's estimate for percentages of non-English speaking populations age 5 and over in the Project area, while Pittsylvania and Rockingham counties each were less than their respective state estimates by 12 and 6 percent (Table 5.3-9). Of the seven block groups of potential EJ communities, only two had percentages of non-English speaking populations age 5 and over that averaged 3 percent.

Children and Elderly

According to the U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, two of the Project counties have less people age 5 and under living in the Project area compared to their respective state estimates by more than 1 percent (and one was equal), and average 5.2 percent of the state population. However, for the elderly living in the Project area, each of the Project counties exceed their respective state estimates by more than 3 percent, and average approximately 18 percent of the state population (Table 5.3-9). With respect to the block groups, the highest and lowest percent of people age 5 and under and people age 65 and over living in the Project area are located in Rockingham County. Section 5.4.8 provides a discussion on human health and protective standards including children and the elderly.

Public Outreach

To facilitate public involvement and outreach, the Southgate Project has developed a Public, Stakeholder, and Agency Participation Plan (see Resource Report 1, Appendix 1-L). This plan outlines a commitment to engage actively with stakeholders throughout the life cycle of the Project and provides the steps the Southgate Project has identified to ensure successful ongoing communication with stakeholders, including establishing a Project website (www.mvpsouthgate.com), a toll-free phone line (833-MV-SOUTH), and e-mail mail@mvpsouthgate.com. The Southgate Project will continue to meet with stakeholders to discuss the ongoing efforts associated with the Project.

5.3.8.2 State Environmental Screening

The states of Virginia and North Carolina have recently established EJ councils and / or policies that appear to be under development, as described further below; however, neither state currently has data or policies available for the counties in the Southgate Project area.

Virginia

Virginia's Executive Order 73 (effective October 31, 2017) established the Advisory Council on Environmental Justice ("ACEJ"). The ACEJ provides independent advice and recommendations to the Executive Branch on integrating environmental justice considerations throughout Virginia's programs, regulations, policies, and procedures, among other goals. The ACEJ focuses on strategic, scientific, technological, regulatory, community engagement, and economic issues related to environmental justice

throughout Virginia and interacts with several groups (Virginia Natural Resources, 2018). The Southgate Project will continue to coordinate with the ACEJ as it develops state polices and guidelines to address EJ.

North Carolina

North Carolina's Department of Environmental Quality ("NCDEQ") recently formed the Secretary's Environmental Justice and Equity Advisory Board ("EJ Board"). The scope of the EJ Board is to assist the NCDEQ in achieving and maintaining the fair and equal treatment and meaningful involvement of North Carolinians regardless of where they live, their race, religion or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Board members will work directly with NCDEQ staff to help elevate the voices of the underserved and underrepresented as the NCDEQ work to protect the public's health and natural resources (NCDEQ, 2018).

The NCDEQ also committed to new policies to ensure compliance with federal civil rights laws, including a language access program and the development of an EJ tool to examine demographic, health, and environmental characteristics of communities impacted by NCDEQ policies (NCEJN, 2018). The Southgate Project will continue to coordinate with the NCDEQ as it develops state polices and guidelines to address EJ.

5.4 ECONOMIC EFFECTS AND MITIGATION

Construction impacts from the Project will be short-term and localized, due primarily to the short construction period and small composition of the labor force. Potential effects associated with construction of the Project could result in minor temporary increases in the local population, demand for temporary housing, and use of temporary public services such as police, fire, and medical services. However, sufficient public services exist within the Project area to support the needs of the construction crew and personnel associated with construction of the Project. In addition, construction activities will be in large CSA/MSA areas that have sufficient capability and capacity to manage the temporary influx of personnel without affecting the level of service provided to the current population. Revenues from construction employment, local expenditures by the construction companies for construction materials, and non-local construction workers for temporary housing, food, and entertainment will temporarily benefit the local economy.

5.4.1 Population and Employment

Overall construction of the pipeline and associated facilities of the Project is expected to take 10-12 months, with a proposed construction start date in the first quarter of 2020. Based on current discussions with qualified construction contractors, the Southgate Project estimates that local workers will account for approximately 55 percent of construction jobs for each spread for the duration of the Project. The remaining 45 percent of the construction workforce will consist of non-local workers. Local workers are defined here as those who normally reside within daily commuting distance of the work sites.

Non-local workers will temporarily relocate to the Project vicinity for the duration of their employment; some workers will possibly commute home on weekends, depending on the location of their primary residence. Individual non-local workers may also relocate along the length of the Southgate Project and between segments depending on their assignment. Very few of the non-local workers employed during the construction phase of each spread are expected to be accompanied by family members or permanently relocate to the affected areas. If a larger than anticipated percentage of non-local construction personnel is

required to meet peak workforce requirements, sufficient workers should be available in the labor pool in the surrounding areas since the Project is located within large CSA/MSA areas.

Table 1.4-1 compares the projected average and peak numbers of non-local workers with existing population by construction spread. These estimates illustrate the numbers of non-local workers expected to be present during construction. Non-local workers seeking temporary accommodation would reside in daily commuting distance of their work sites. Some non-local workers would likely reside in the counties within which they are working; others may locate in larger communities in adjacent or nearby communities. This is discussed further in Section 5.4.3.

The Southgate Project expects approximately four new jobs will also be required for operations and maintenance of the Project facilities.

Impacts to the local population in the Southgate Project area from non-local construction activities would be temporary and minimal. Non-local construction personnel will typically disperse following completion of specialized construction activities. Therefore, no long-term population impacts will result from construction of the Project.

5.4.2 Economy and Tax Revenue

5.4.2.1 Construction-Related Tax Revenues

The Southgate Project has conducted an economic analysis of the Project and is evaluating the results. A report and summary of the conclusions for Project construction and operation in Virginia and North Carolina will be provided upon completion.

The Southgate Project estimates that it will spend approximately $464 million on labor, equipment, materials, acquisition, and other services to develop and construct the project facilities, of which $68 million is expected to be spent directly in Virginia and $113 million is expected to be spent directly in North Carolina. These expenditures will generate economic activity and support employment and income elsewhere in the economy through the multiplier effect, as initial changes in demand "ripple" through the local economy and support indirect and induced impacts. During peak construction in 2020, the Southgate Project estimates that the Project would generate and support an estimated 570 total (direct, indirect, and induced) jobs in Virginia during Project construction, and an estimated 1,130 total jobs in North Carolina. A detailed economic report for the Project is included in Appendix 5-A. *[Note: Appendix 5-A to be provided in a supplemental filing expected to be filed in early 2019.]*

Table 5.4-1 below shows the tax revenue that the Southgate Project will generate over the pre-construction and construction periods from 2018 to 2020. The Southgate Project estimates that it will generate $4.1 million and $6.3 million in tax revenue in Virginia and North Carolina, respectively, with the largest impact from property taxes. The property tax value is conservative in that it excludes estimated property taxes for materials that are on-site but not yet installed.

Table 5.4-1
Estimated State and Local Tax Revenues Generated During Construction for the MVP Southgate Project

Type of Tax	Virginia ($ million) a/, b/	North Carolina ($ million) a/, b/
Sales and Use Tax	$1.2	$2.3
Income Tax	$0.9	$1.5
Property Tax c/	$1.5	$1.6
Other Personal	$0.1	$0.4
Other Business	$0.4	$0.5
Total	**$4.1**	**$6.3**

a/ Estimated tax revenues are presented in millions of dollars.
b/ These estimates are aggregate totals for the entire construction period.
c/ Taxes generated by induced economic activity during construction; numbers conservatively do not include property taxes paid directly by the Southgate Project during construction.

Sources: FTI Consulting 2018.

5.4.2.2 Ad Valorem Tax Revenues

Estimated ad valorem taxes that will be paid once the pipeline is in service are presented by county and state in Table 5.4-2 (FTI Consulting 2018). Estimated ad valorem tax revenues as a share of general fund total revenues in the Project counties will range from 0.4 percent (Alamance County) to 1.8 percent (Pittsylvania County).

The Project will also generate an additional $1.7 million for municipalities in North Carolina. Table 5.4-2 below does not include this figure, however, as neither Rockingham nor Alamance counties receive these funds.

Table 5.4-2
Estimated Annual Ad Valorem Tax Revenues During Operation by County for the MVP Southgate Project

County/State	General Fund Total Revenues (dollars) a/	Annual Ad Valorem Taxes (dollars) a/	Percent of General Fund Total Revenues
Pittsylvania	$67,227,000	$1,212,000	1.8%
Virginia Subtotal	**$67,227,000**	**$1,212,000**	1.8%
Rockingham	$90,031,000	$1,038,000	1.2%
Alamance	$152,280,000	$681,000	0.4%
North Carolina Subtotal	$242,311,000	**$1,719,000**	0.7%
Total	**$309,538,000**	**$2,931,000**	

a/ Numbers are presented in 1,000s.
Sources: FTI Consulting 2018.

5.4.3 Housing

During construction of the Project, the presence of construction workers immigrating to the Southgate Project area will increase the demand for temporary short-term housing. The majority of construction workers will likely temporarily relocate to the vicinity of the Project area for the duration of their employment, possibly commuting home on weekends, depending on the location of their primary residence.

Non-local construction workers are most likely to use available temporary housing such as area campgrounds/RV parks and hotel/motels in the Southgate Project area and possibly adjacent towns or counties that are within a reasonable daily commuting distance of the Project. Non-local construction workers are also most likely to provide their own housing units (e.g. travel trailers or RV campers). The Southgate Project estimates approximately 45 percent of the construction workers would be non-local and of that amount approximately 25 percent would bring their own travel trailers or RV campers. At peak construction, approximately 290 non-local workers that would utilize existing RV camping facilities for temporary housing. As listed in Section 5.3.3.1, there are 12 RV and campground facilities located in the Project counties providing over 400 individual RV sites; the majority of which are open year round.

Given the large number of available vacant housing units (over 5,000 in each Project county, totaling 17,253), the number of potential hotel rooms available in each Project county (totaling over 2,000, Table 5.3-3), plus the 400 individual RV sites, the Southgate Project does not expect a conflict with hotels, RV parks, or other temporary housing in the Project counties during the tourism season. The anticipated migration of non-local construction workers to the Project area represents less than 1 percent of the total temporary housing (rental housing, hotel and motel rooms, and RV hookups) and therefore, the temporary demand for these facilities is unlikely to displace permanent residents or adversely affect housing prices or cause any conflicts with tourism.

5.4.3.1 Travel and Tourism

The Southgate Project counties provide mainly outdoor recreation tourist attractions, but also provide arts, music, historical structures and districts, dining, museums, sporting events, and shopping opportunities. The high tourist season in the Project area typically peaks during summer vacation season between May and October and in October for viewing fall foliage. Travel-related expenditures for the Project counties each accounted for less than 1 percent in 2016 compared to their state totals (VATC, 2016) and are only expected to increase by small percentages annually; therefore, construction of the Project is not anticipated to adversely impact the tourist season in the region. However, short-term impacts, including temporary increases in dust, noise, and traffic from construction is expected but are not anticipated to adversely impact tourism in the region. If any potential conflicts are identified with tourism, mitigation measures will be evaluated, which may include timing of construction to avoid peak use periods, maintaining access to businesses at all times, and expediting construction through the areas frequented by tourists. The Project will coordinate directly with affected stakeholders on an individual basis to further reduce potential adverse effects. Potential impacts to recreational resources, and visual impacts on recreation and other sensitive resources are addressed in Resource Report 8.

5.4.3.2 Displacement of Residences and Businesses

The Southgate Project has no plans to displace or relocate any businesses as a result of construction or operation of the Project.

5.4.4 Property Values

Several studies have examined the effects of gas pipelines on sales and property values. A study on "The Effect of Natural Gas Pipeline on Residential Value" performed by Diskin et al. (2011) could "not identify a systematic relationship between proximity to [a] pipeline and sale price or value." A study conducted by Integra Realty Resources for the Interstate Natural Gas Association of America ("INGAA") Foundation in 2016 found that "There is no measurable impact on the sales price of properties located along or in

proximity to a natural gas pipeline versus properties which are not located along or in proximity to the same pipeline." (INGAA, 2016)

The 2016 INGAA Foundation study reviewed underground FERC-regulated natural gas transmission pipelines in residential areas in the Midwest, Northeast, Mid-Atlantic and Southeast. In addition, a study by Gnarus Advisors LLC (2012) examined whether proximity to pipelines, with a focus on natural gas pipelines, has an effect on residential property values. The study contains a literature review specific to pipelines and property values, with a focus on actual sales data. The authors conclude that there is "no credible evidence based on actual sales data that proximity to pipelines reduces property values." Further, they found that "hypothetical surveys of actual or potential market participants should not be used as a substitute for the systematic analysis of market data, as they may overstate the effects, if any, of proximity to disamenities, including pipelines, on property values."

In addition, FERC, the lead federal agency on the construction of pipelines, researched pipelines' effect on property values and reported the results in an Environmental Impact Statement and Environmental Assessments issued 2018, 2012 and 2013. The Environmental Impact Statement and Environmental Assessments found that there was no pipeline-related impact on property value. Further, with respect to compressor stations, the Commission Staff has found that various nuisance effects are prominent, such as noise, aesthetics or air emissions could potentially affect property values in the same way as homes near major roads might be devalued. However, when noise and visual impacts are sufficiently mitigated, a compressor station will not significantly impact property values.[2]

Additionally, the compressor station will meet emission standards (see Resource Report 9 for more details). Therefore, it is unlikely that the compressor station will significantly reduce property values or resale values.

5.4.5 Community Infrastructure

The Southgate Project counties have numerous medical facilities and emergency response services to temporarily accommodate the construction workforce (Table 5.3-6). The temporary immigration of construction workers to local communities will be short term and is not expected to affect the levels of service provided by existing law and fire protection personnel or burden medical facilities. Local police assistance will likely be required to facilitate traffic flows during construction at some road crossings and permits will be required for vehicle load and width limits for some of the vehicles delivering Project materials and supplies. The Project will work directly with local law enforcement, fire departments, and emergency medical services to coordinate for effective emergency response. Furthermore, in accordance with 49 Code of Federal Regulations ("CFR") 192.615, The Project is currently preparing an Emergency Response Plan for construction and operation of the pipeline and associated facilities (see Resource Report 11).

[2] Environmental Impacts Statement for Midship Pipeline Company, LLC, Midcontinent Supply Header Interstate Pipeline Project at pp. 4-118 & 4-119, Docket No. CP17-458-000 (June 2018). Environmental Assessment for Millennium Pipeline Co, LLC's Hancock Compressor Project at pp. 42-43, Docket No. CP13-14-000 (Feb. 28, 2013). Environmental Assessment for Millennium Pipeline Co, LLC's Minisink Compressor Project at pp. 22-23, Docket No. CP11-515-000 (Feb. 29, 2012).

Very few, if any, of the non-local workers employed during the construction phase of each spread are expected to be accompanied by family members. As a result, the number of school age of children expected to relocate is very limited and unlikely to noticeably affect school enrollment in the Project area.

5.4.6 Transportation and Traffic

Resource Report 8 (Table 8.2-4) provides a complete list of public road crossings for the Southgate Project. Major state and federal transportation routes and highways that will be crossed by the pipeline are also identified in Table 5.3-7. To the extent feasible, existing public and private roads in the Project area will be used to access the Project facilities.

Construction of the Southgate Project will result in minor, short-term effects on the transportation system in the Project area. Construction will be scheduled for work within roadways and specific crossings so as to avoid commuter traffic and schedules for school buses and local city transit buses to the greatest extent practical.

The Southgate Project will incorporate measures to maintain safety, minimize traffic disruption, and ensure that construction activities will not prevent the passage of emergency vehicles. Measures may include the creation of temporary travel lanes during construction or the placement of steel plate bridges to allow continued traffic flow during open trenching. Traffic lanes and residential access will be maintained, except for the temporary periods essential for pipeline installation. Provisions will be made to allow passage of emergency vehicles at all times. In areas where traffic volumes are high or other circumstances (e.g., congested areas) exist, the Project will employ a police detail to ensure traffic flow and the safety of pedestrians and vehicles. All necessary permits for public road crossings or work within public road rights-of-way, including from the Virginia Department of Transportation and the North Carolina Department of Transportation will be obtained. The Project will also require its construction contractors to ensure enforcement of local vehicle weight restrictions and limitations by its vehicles and to remove any soil that is left on the road surface by the crossing of construction equipment. When necessary for equipment to cross roads, mats or other appropriate measures, such as sweeping, will be used to reduce deposition of mud. In the event that construction traffic causes damage to any roads, the Project will immediately repair the road in accordance with the requirements set forth by the landowner or agency having jurisdiction over the road.

In addition to the traffic impacts caused by road crossings, the temporary movement of construction equipment and materials and the daily commuting of employees to and from the construction work areas will add to existing traffic volumes on local roads. Construction activities will be spaced over two construction spreads, with each spread responsible for all construction activities within a specific milepost range along the pipeline (Table 5.2-1). These activities will include grading, trenching, pipe stringing, welding, lowering-in, backfilling, regrading, and restoration described more fully in Resource Report 1. Construction activities at each spread will proceed in sequence in an assembly-line fashion along the right-of-way, with one crew following the next from clearing until final clean-up. As a result, construction workers and equipment will not only be divided between two spreads, but will also be distributed at different locations within each spread.

Equipment and materials will be transported from various laydown areas and storage yards within the vicinity of the pipeline. Most construction equipment will remain on site during construction. Several construction-related trips will be made each day (to and from the job site) on each of the construction

spreads. This level of traffic will remain consistent throughout the construction period and will typically occur during the early morning hours (from 5:00 to 6:00 a.m.) and evening hours (after 6:00 p.m.). Typically, the pipeline construction work week is 6 days, sometimes extending to 7 days as required by the workload and construction schedule. However, some work, such as stream crossings may be conducted on a 24-hour basis until that particular task is complete.

Construction crews would commute to the Southgate Project work areas in their personal or company vehicles. Workers will be deployed in various locations along each spread, thereby reducing the potential for congestion in any one area. Pipeline construction work is typically scheduled to take advantage of daylight hours and involves long work days (at least 10 hours). With typical start and finish times of 7:00 a.m. and 7:00 p.m., most workers will commute to and from the construction right-of-way during off-peak hours. Some discrete activities (e.g. hydrostatic testing, HDD, tie-ins, stream crossings, purge and packing the pipeline facilities) may occur beyond these timeframes. Because construction is expected to move sequentially along the pipeline route, traffic flow impacts that do arise will be temporary on any given section of roadway. Refer to Appendix 5-B – MVP Southgate Project Traffic Management Plan for more details.

Construction vehicles can pose concern when school buses are traveling their established routes. Communities expect for their children to have safe and timely travel to and from school. The Southgate Project will work with the governing School Districts or the School Transportation Departments in the Project area to identify school bus routes and times. The Project will avoid school bus routes to the extent practicable.

The Southgate Project does not anticipate substantive impacts on transportation infrastructure and traffic patterns along the pipeline route during construction or operation of the Project facilities.

5.4.7 Agriculture

In Virginia, agriculture is the largest private industry, contributing $70 billion annually and providing more than 334,000 jobs in Virginia (VDACS, 2017a). According to a 2017 economic impact study, production agriculture employs nearly 54,000 farmers and workers in Virginia and generates approximately $3.8 billion in total output (VDACS, 2017b). Land in farms accounted for 30.3 percent of the total land area in Virginia in 2012 (Table 5.4-3). However, the number of farms in Pittsylvania County accounted for approximately 2.9 percent (1,354 farms) of the total number of farms in Virginia, which is 46,030 farms.

In North Carolina, agriculture is expected to see modest declines between 2014 and 2024 and agricultural employment is likely to follow the national projected trend and drop 5.3 percent during the same period. This decrease will most likely be driven by employment declines in crop production and animal production (LEAD, 2016). Land in farms accounted for 26 percent of the total land area in North Carolina in 2012. The Project counties in North Carolina accounted for an average of 3.2 percent (1,634 farms) of the total farms in North Carolina (50,218) and represented approximately 0.1 percent of agricultural market value compared to that of the state (Table 5.4-3).

Table 5.4-3
Summary of Agriculture by County and State, 2012 for the MVP Southgate Project

County/State	Number of Farms	Land in Farms (acres)	% of Total Land Area	Average Farm Size (acres)	Market Value of Agriculture Products Sold	Total Market Value of Agriculture Products Sold	
						Crops (%)	Livestock, Poultry, and Products (%)
Virginia	**46,030**	**8,302,444**	**30.3**	**180**	**$3,753,287,000**	**36**	**64**
Pittsylvania	1,354	287,262	46.3	212	$86,942,000	42	58
North Carolina	**50,218**	**8,414,756**	**26.0**	**168**	**$12,588,142,000**	**34**	**66**
Rockingham	902	112,166	30.9	124	$32,804,000	74	26
Alamance	732	83,551	30.7	114	$32,930,000	47	53

Source: USDA, 2012.

Agricultural land accounted for approximately 14 percent of total land area where the Southgate Project facilities will be located. Of that amount, 266.3 acres will be impacted during construction and operation of the Project (200 temporary, 66.2 permanent). Therefore, the Project is unlikely to noticeably affect overall agricultural production and employment in any of the Project counties. Refer to Resource Report 8 for further discussions.

5.4.8 Environmental Justice

5.4.8.1 Disproportionate High and Adverse Effects on Minority or Low Income Populations

As discussed in Section 5.3.8, assessing the potential for disproportionately high and adverse impacts on minority and/or low income populations typically involves two steps: first, identifying whether minority and/or low-income communities are present, and, then, if these types of communities are present, evaluating whether high and adverse human health or environmental effects will disproportionately affect the identified community or communities. As indicated in the above discussion, review of census data suggests the presence of low income, and, to a much lesser extent, minority communities. As indicated in Table 5.3-9, the six block groups total population is 7,297 (2.3 percent) of the total population in EJ compared to that of the Southgate Project counties total population of 308,280. However, construction of the Southgate Project is not expected to result in adverse and disproportionate human health or environmental effects to these communities, as discussed below.

The Southgate Project facilities will be designed in compliance with the national ambient air quality standards, which are protective of human health, including children, the elderly, and sensitive populations. Construction of the Project is not expected to have high and adverse human health or environmental effects on any nearby communities. Adverse construction-related impacts will likely include increases in local traffic and noise, as well as fugitive dust, and could result in temporary delays at some highway crossings. These impacts will be temporary, localized, and are not expected to be significant. The Project will implement a variety of measures that will minimize potential impacts on nearby communities, including environmental justice communities. For instance, the Project will employ proven construction-related practices to control fugitive dust, such as application of water or other commercially approved dust control

applications on unpaved areas subject to frequent vehicle traffic. Similarly, noise control measures will be implemented during project construction. See Resource Report 9 for more detail and discussions on noise and air quality impacts.

The presence of existing infrastructure must be considered when evaluating relevant Project impacts, including environmental justice and opportunity zones. When collocated with existing infrastructure or utility corridors, the incremental impacts of an additional pipeline are significantly less compared to routing through a greenfield area. Collocation minimizes potential impacts on the general population and environmental justice communities alike. Mountain Valley developed the Southgate Project pipeline route to collocate to the maximum extent practicable and avoid unnecessary greenfield impacts. Within environment justice communities, the Project pipeline route is collocated for 7.4 miles, resulting in 7.4 fewer miles of greenfield impacts, including greenfield impacts on environmental justice communities. Many of these environmental justice communities are also located within opportunity zones along the route (See Figure 5.3-1).

Construction could also increase demand for health care and municipal services, as well as potentially increase demand for police and fire protection services. However, these impacts are expected to be temporary and are not expected to measurably affect the quality of services currently received by local communities and residents.

The Southgate Project facilities will also be designed, constructed, operated, and maintained in accordance with or to exceed the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration minimum federal safety standards in 49 CFR 192 (see Resource Report 11 for more details). These regulations, which are intended to protect the public and to prevent natural gas facility accidents and failures, apply to all areas along the pipeline routes regardless of the presence or absence of minority or low income populations.

The Southgate Project will continue to update its stand alone, interactive Project web site to provide the public with the most recent information, including a Project overview, map of the facilities, list of frequently asked questions, list of the Project contacts and announcements of public meetings on the Project. The Project intends to continue its efforts to keep landowners, public officials, and the relevant permitting agencies fully informed of developments on the Project.

Revenues from construction employment, local expenditures by the construction companies for construction materials, and non-local construction workers for temporary housing, food, and entertainment will temporarily benefit the local economy. The increased property tax base during Project operation will be beneficial in the long-term. Local communities will benefit from ad valorem taxes paid annually by the Southgate Project over the life of the Project. Refer to Resource Reports 1.1.2 and 10 for further discussions on the "Purpose and Need" of the Project and additional benefits the Project is expected to provide.

In conclusion, the construction and operation of the Southgate Project would not cause a disproportionate share of adverse environmental or socioeconomic impacts on any racial, ethnic, or socioeconomic group, or on block groups that meet the environmental justice criteria.

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MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 5

Appendix 5-A

Economic Benefits of the MVP Southgate Project in Virginia and North Carolina

[To be provided in a supplemental filing expected to be filed in early 2019.]

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 5

Appendix 5-B

MVP Southgate Project
Traffic Management Plan

MVP Southgate Project

Traffic and Transportation Management Plan

November 2018

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1.0 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") has developed this Traffic and Transportation Management Plan to describe the measures the MVP Southgate Project ("Project" or "Southgate Project") and their Contractors will take to minimize potential impacts on state and local roadways during the construction of the Project. This plan outlines traffic impact minimization measures, noxious weed control measures, and dust control methods that will be used on the Project to reduce impacts during construction.

Operations and maintenance activities will be conducted with light vehicles at very few occasions that should have no impact to roadways and traffic once the project is in-service.

1.1 Traffic Impacts

Prior to construction, the Southgate Project will obtain applicable Federal, State/Commonwealth, and local road use and crossing permits, as required. The Project personnel will comply with all permit requirements and conditions to provide for public safety and minimize impacts on public roads. Copies of this *Traffic and Transportation Management Plan* and applicable road use and crossing permits will be provided to the appropriate personnel and maintained at each Contractors' field office.

The Southgate Project's Traffic Coordinator will consult with State and local agencies regarding detour routes, speed/load limits, and other use limitations, conditions, or restrictions on the roads that will be utilized during construction. Before the start of construction, the Project will work with these agencies to obtain the most up-to-date traffic information for the roadways in the Project area as well as ongoing road reconstruction or improvement projects in the vicinity of the pipeline route and facilities area. Where local, private roadways will be affected, the Project will coordinate with landowners and lessees of properties to mitigate potential impacts on those roads. Similarly, where roads on public lands will be affected, the Project will coordinate with the appropriate managing agency to mitigate potential impacts on roads or implement required traffic and transportation procedures. As discussed further in the following sections, the Project will place and maintain traffic control measures, such as flag persons, warning signs, lights, and/or barriers, as appropriate, to ensure the safety of construction workers and the public and to minimize traffic congestion. The Project will maintain traffic flow and emergency vehicle access on roadways with traffic control personnel or detour signs, where necessary. The Project's Traffic Coordinator will work with local law enforcement, fire departments, and emergency medical services to coordinate access for effective emergency response during construction. Contractors will be directed to comply with local weight limitations and restrictions on area roadways.

The Southgate Project strives to mitigate the increase in construction-related truck traffic on local roads shared with community and school buses in suburban and more densely populated rural areas. Key components to a successful community partnership include:

- Central point of command for construction traffic route plan. The Project will have a Traffic Coordinator reporting to the Safety Program Manager or Construction Manager responsible for maintaining traffic related plans, procedures, records, and documents.
- School bus curfews. Often times construction vehicles can pose concern when school buses are traveling their established routes. The community expects for their children to have safe and timely travel to and from school. The Project will work with the governing School Districts or the School Transportation Department in the project area to identify the bus routes and times. To the extent practicable, construction traffic will be limited or refrained during the bus route times with a published school bus route curfew time period.
- Speed enforcement. In more rural areas, law enforcement is often not staffed to handle a sudden increase in traffic. Establishing a third-party contractor to assist in monitoring the speed of the route not only keeps contractor and the public safe but lends accountability to the Project. Inevitably, contractors will end up off of bonded routes. The Traffic Coordinator will be able to actively monitor these issues and reduce unbonded travel that can become costly if damage occurs. The Coordinator can also be useful in diffusing potential hostile situations with neighbors and landowners.

All impacts shall be within the guidelines of all applicable agencies, as well as approval from landowners. A list of state and county contacts is provided in the table below. Once construction is complete, the Project will restore all roads back to their original level of service or better, unless the Project is directed otherwise in writing by the landowner or regulatory agency. Pre-construction video will be used to document the roadway condition prior to Project usage.

Virginia County, State Requirements			
	Phone	**Website**	**Contact Name/Position**
State Agency			
Virginia Department of Transportation (VDOT)	(540) 381-7194	http://www.virginiadot.org/	Paul Brown, Area Land Use Engineer
Virginia County			
Pittsylvania	(434) 432-7974	http://pittsylvaniacountyva.gov/	Greg Sides, Assistant County Administrator

North Carolina County, State Requirements			
	Phone	**Website**	**Contact Name/Position**
State Agency			
North Carolina Department of Transportation (NCDOT)	(919) 707-2500 (336) 487-0000	https://www.ncdot.gov/Pages/default.aspx	Chief Engineer, Tim M. Little, PE. Mike Mills, PE, Division 7 Engineer
North Carolina County			
Rockingham	(336) 342-8101	https://www.co.rockingham.nc.us/	Lance L. Metzler, County Manager
Alamance	(336) 228-1312	https://www.alamance-nc.com/	Bryan Hagood, County Manager

2.0 PIPELINE ROAD CROSSINGS

The Southgate Project will construct road and highway crossings in accordance with the permit requirements and the construction drawings for the crossing. No work on any such crossing shall be started before obtaining all applicable permits from the regulatory agencies. At a minimum, the Project will maintain single lane traffic on all roads and shall provide flagmen, road signs and all other signaling required by the governing authority to supervise the flow of traffic. The Project will provide barricades, warning signs, flares, lanterns, flagmen and such other protective measures required to maintain traffic and to safeguard the public at all times.

Any damage to paved or blacktop roads shall be repaired per specifications provided by the regulatory agencies. Road surfaces other than hard surface roads (e.g., paved, blacktop, or concrete) shall be backfilled in well-tamped 6-inch layers and shall be finished with a well-tamped surface matching the existing road. If flowable fill is used, it will be in accordance with the appropriate mix per agency specifications. For all types of crossings, additional or other limitations may be provided by the governing municipality and must prevail.

At the end of each workday, the Southgate Project will make passable any open-cut driveways for ingress and egress. This may be accomplished by using steel plates. Any and all steel plates used for such purposes shall be properly pinned (i.e., secured in place) and ramped on each end to allow traffic flow. The backfilling road crossings shall be performed immediately after the pipe is installed and in accordance with requirements established by the applicable permit.

3.0 CONSTRUCTION TRAFFIC

An increase in traffic to local and state roads will be expected throughout the day between the hours of 6:00 a.m. and 7:00 p.m. or sunset, whichever is later. Emergencies or other designated construction activities may necessitate nighttime work. The temporary traffic will include transportation for construction workers in light and heavy duty trucks, as well as tractor trailers hauling machinery and materials. Impacts are expected to be minor and short term because construction spreads and personnel will be geographically dispersed and personnel will commute to and from work areas in early morning and late evening during nonpeak traffic hours. Traffic will be entering and leaving off-site locations such as laydown yards, right-of-way and additional temporary workspace for the purpose of pipeline construction, hauling material and roadway maintenance. Once the material and heavy equipment are placed on the right-of-way, construction equipment will move in a linear manner along the right-of-way as work progresses, minimizing traffic on local roads. The amount of equipment moved by hauling from site to site will be reduced due to the accessibility created by the construction right-of-way.

The Southgate Project may make road improvements at areas that are not conducive to heavy hauling and large traffic volume, in addition to maintaining all bonded roads during construction, and finally returning the roads back to their original or better level of service, meaning their original width and length, unless the Project is directed otherwise in writing by the landowner or state agency.

4.0 NOXIOUS WEEDS

To prevent noxious weeds from transporting along roadways, the Southgate Project developed the following measures:

- The prompt seeding and revegetation of areas of disturbed soils with certified weed-free seed.
- Encourage the cleaning of equipment and vehicles prior to entering or leaving each management area. (Pressure wash in a designated area only.)
- Minimize soil disturbance, where possible.
- Use certified weed-free mulch/straw for erosion control.

5.0 FUGITIVE DUST CONTROL

Dirt and gravel during construction periods in dry weather can create an inhospitable environment for neighbors and workers. The Southgate Project developed the following fugitive dust control measures to address this issue.

Implementation of construction and restoration best management practices and operational controls will be used to mitigate fugitive dust emissions. The project earth disturbance permit will outline specific practices that control fugitive dust, including a construction sequence; use of rock construction entrances; and temporary soil stabilization methods. Operational controls are also implemented, including the use of a reduced speed limit on unpaved access roads as well as sweeping/vacuuming paved roadways when Project-related soils are tracked out onto paved surfaces.

Wet suppression, using water, is the predominate method of suppressing fugitive dust on unpaved roads and gravel pads as it causes finer materials to adhere into larger particles. Increasing the moisture content of the finer materials may be accomplished either naturally or mechanically. Moisture content of unpaved road surfaces can be naturally increased through rainfall. Moisture content can also be increased mechanically through the application of water. The amount of water required to sufficiently control fugitive dust emissions is dependent on the characteristics of materials (e.g., surface moisture content), ambient conditions (e.g., rainfall, humidity, temperature), activities occurring in the area (e.g., vehicle traffic, vehicle weight, speeds).

The following measures will be taken to reduce fugitive dust from operations:

- Fugitive dust emissions from vegetation removal, clearing and grading, cutting and filling, topsoil removal, trenching, backfilling and stockpile storage will be controlled to a great extent by following the construction sequencing and disturbing limited areas at a time;

- Fugitive dust emissions generated by motorized equipment and miscellaneous vehicle traffic will be controlled by wet suppression as necessary;
- Fugitive dust emissions from paved roads will be controlled with a combination of water trucks, power washers, sweeping and/or vacuuming. If necessary, additional potential sources of water for dust control may include other municipal systems, groundwater supply wells, and/or approved surface waters;
- Track out of loose materials will be controlled using rock construction entrances on access roads that begin at a junction with paved roads; and
- When environmental conditions are dry, inspection of dust control measures will be conducted daily.

6.0 INSPECTION, MONITORING, AND RECORD KEEPING

The construction contractor will implement the dust control measures specified in this plan. All construction personnel will be informed of the measures in this plan. Environmental inspectors will have primary responsibility for monitoring and enforcing the implementation of dust control measures by the construction contractor. The inspectors will also be responsible for ensuring that these measures are effective and proper documentation is maintained. When environmental conditions are dry, inspection of dust control measures will be conducted daily, and the environmental inspectors will be responsible for recording the following information on a daily basis:

- weather conditions, including temperature, wind speed and wind direction;
- number of water trucks in use;
- incidents where dust concentration is such that special abatement measures must be implemented;
- condition of soils (e.g., damp, crusted, unstable) on the right-of-way and other construction sites;
- condition of soils (e.g., damp, crusted, unstable) on access roads;
- condition of track-out pads;
- overall status of dust control compliance.

This information will be incorporated into the environmental inspector's daily report, and significant instances of non-compliance with the plan will be reported to the Construction Manager as soon as they are discovered.

Appendix D

Federal Energy Regulatory Commission

Final Environmental Impact Statement

(February 14, 2020)

Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, NE, Washington, DC 20426

FERC/EIS-0297F **February 2020**

Southgate Project

Final Environmental Impact Statement

Mountain Valley Pipeline, LLC
FERC Docket No.: CP19-14-000

Cooperating Agencies:

U.S. Army Corps of Engineers

U.S. Fish & Wildlife Service

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 3
Mountain Valley Pipeline, LLC.
Southgate Project
Docket No. CP19-14-000

TO THE INTERESTED PARTIES:

The staff of the Federal Energy Regulatory Commission (FERC or Commission), with the participation of the cooperating agencies listed below, has prepared a final environmental impact statement (EIS) for the Southgate Project (Project) proposed by Mountain Valley Pipeline, LLC (Mountain Valley). Mountain Valley requests authorization to construct and operate about 75.1 miles of natural gas transmission pipeline, one new compressor station, and accompanying facilities that would provide 375 million cubic feet of gas per day of available capacity for transport from the City of Chatham, in Pittsylvania County, Virginia to a delivery point with Dominion Energy North Carolina (DENC), formerly PSNC[1], near the City of Graham in Alamance County, North Carolina.

The final EIS assesses the potential environmental effects of the construction and operation of the Project in accordance with the requirements of the National Environmental Policy Act (NEPA). As described in the final EIS, the FERC staff concludes that approval of the Project would result in some adverse environmental impacts; however, these impacts would be reduced to less-than-significant levels because of the impact avoidance, minimization, and mitigation measures proposed by Mountain Valley and those recommended by staff in the EIS.

The United States Army Corps of Engineers (COE) and the U.S. Department of the Interior Fish and Wildlife Service (FWS) participated as cooperating agencies in preparation of this EIS. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis. The cooperating agencies provided input into the analyses, conclusions, and recommendations presented in the EIS. Following issuance of the final EIS, the cooperating agencies will issue subsequent decisions, determinations, permits, or authorizations for the Project in accordance with each individual agency's regulatory requirements. The COE would use this EIS in their regulatory process, and to satisfy

[1] Following a January 2, 2019 merger, Dominion Energy, Inc. acquired PSNC and changed the company name to Dominion Energy North Carolina.

compliance with NEPA and other related federal environmental laws (e.g., the National Historic Preservation Act).

The EIS addresses the potential environmental effects of the construction and operation of the following Project facilities:

- about 75.1 miles of new 24-inch and 16-inch diameter natural gas pipeline located in Pittsylvania County, Virginia, and Rockingham and Alamance Counties, North Carolina;
- one new 28,915 horsepower compressor station (Lambert Compressor Station) in Pittsylvania County, Virginia;
- four interconnects or tie-ins with facilities operated by Mountain Valley, East Tennessee Gas, and DENC; and
- ancillary facilities including pig launchers and receivers, mainline block valves (MLV), and cathodic protection beds.

The Commission mailed a copy of the *Notice of Availability* of the final EIS to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Indian Tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the area of the Project. The final EIS is available in hard copy at libraries in the area of the Project and in electronic format. It may be viewed and downloaded from the FERC's website (www.ferc.gov), on the Environmental Documents page (https://www.ferc.gov/industries/gas/enviro/eis.asp). In addition, the final EIS may be accessed by using the eLibrary link on the FERC's website. Click on the eLibrary link (https://www.ferc.gov/docs-filing/elibrary.asp), click on General Search, and enter the docket number in the "Docket Number" field, excluding the last three digits (i.e., CP19-14). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659.

Questions?

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website (www.ferc.gov) using the eLibrary link. The eLibrary link also provides access to the texts of all formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription that allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to www.ferc.gov/docs-filing/esubscription.asp.

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TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
°F	degrees Fahrenheit
µg/l	micrograms per liter
µg/m	micrometers
µg/m^3	micrograms per cubic meter
ACHP	Advisory Council on Historic Preservation
ACP	Atlantic Coast Pipeline
AERMOD	atmospheric dispersion modeling system
AOI	area of interest
APE	area of ppotential effect
AQCR	Air Quality Control Region
ARM2	Ambient Ration Method
ASCE	American Society of Civil Engineers
ATV	all-terrain vehicles
ATWS	additional temporary workspaces
AVERT	EPA's Avoided Emmissions and Generation Tool
BA	biological assessment
BACT	Best Available Control Technology
BCC	Birds of Conservation Concern
bcf/d	billion cubic feet per day
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLS	Bureau of Labor Statistics
BMP	best management practice
CA	Critical Area
CAA	Clean Air Act
CadnaA	computer aided noise abatement
Cardinal Pipeline	Cardinal Pipeline Company, LLC
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CH_4	Methane

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
CI	Chief Inspector
CLG	Certified Local Governments
cm	centimeters
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalents
COE	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CS	compressor station
CWA	Clean Water Act
CY	contractor yard
dB	unweighted decibel
dBA	decibels on the A weighted decibel scale
DENC	Dominion Energy North Carolina
DOI	Department of the Interior
DOT	U.S. Department of Transportation
Dth/d	dekatherms per day
E&SC Plan	Erosion and Sediment Control Plan
East Tennessee	East Tennessee Natural Gas, LLC
ECD	Erosion control device
eGRID	EPA's Emissions & Generation Resource Integrated Database
EI	Environmental Inspector
EIR	Environmental Information Request
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
ESA	Endangered Species Act
ESC	erosion and sediment controls
ESD	emergency shutdown
FAE	Force Assisted Excavation
FEMA	Federal Emergency Management Agency
FERC Plan	*Upland Erosion Control, Revegetation and Maintenance Plan*

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
FERC Procedures	*Wetland and Waterbody Construction and Mitigation Procedures*
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FR	Federal Register
FWS	U.S. Fish and Wildlife
GCCC	Governor's Commission on Climate Change
GHG	greenhouse gas
GIS	Geographic Information System
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutant
HCA	High Consequence Area
HDD	horizontal directional drill
hp	Horsepower
HPSA	Health Professional Shortage Areas
HQW	High Quality Waters
HUC	Hydrologic Unit Code
Hz	Hertz
IBA	Important Bird Area
IBC	International Building Code
IMP	Integrity Management Plan
IPaC	Information for Planning and Conservation
IR	Inadvertent Return
IRR	Integra Reality Resources
ISO	International Organization for Standardization
JLRB	Jordan Lake Riparian Buffer
km	kilometer
L_d	Daytime equivalent sould level
L_{dn}	day-night sound level
L_{eq}	10-minute average noise level
$L_{eq(24)}$	24-hour equivalent sound level
LiDAR	Light Imaging Detection and Ranging
L_{max}	maximum noise level

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
L_n	Nightitme equivalent noise level
LNG	liquefied natural gas
M&R	Meter and Regulator
MACT	Maximum Achievable Control Technology
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
MCA	moderate consequences area
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
MLV	mainline block valve
MMBtu/hr	million British thermal units per hour
MMcf/d	million cubic feet per day
MMI	Modified Mercalli Intensity
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
Mountain Valley	Mountain Valley Pipeline, LLC
MP	milepost
MUA/P	Medically Underserved Areas/Populations
MVP	Mountain Valley Pipeline Project
MW	megawatt
N_2O	Nitrious oxide
NAAQS	National Ambient Air Quality Standards
NABCI	North American Bird Conservation Initiative
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDEQ	North Carolina Department of Environmental Quality
NCDNCR	North Carolina Department of Natural and Cultural Resources
NCDOT	North Carolina Department of Transportation
NCDWR	North Carolina Division of Water Resources
NCEI	National Center for Environmental Information
NCFA	North Carolina Forestry Association
NCFS	North Carolina Forest Service
NCGS	North Carolina Geological Survey

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
NCNHP	North Carolina Natural Heritage Program
NCOSA	North Carolina Office of State Archaeology
NCWAP	North Carolina Wildlife Action Plan
NCWRC	North Carolina Wildlife Resources Commission
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants for Source Categories
NGA	Natural Gas Act
NGO	Non-governmental organizations
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
No2x	nitrogen dioxides
NOA	Notice of Application
NOI	*Notice of Intent to Prepare and Environmental Impact Statement for the Planned MVP Southgate Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings*
NO_x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NSA	noise sensitive area
NSF/ANSI	National Sanitation Foundation/American National Standards Institute
NSPS	New Source Performance Standards
NSR	New Source Review
NSW	Nutrient Sensitive Waters
NURE	National Uranium Resource Evaluation
NW	northwest

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
NWI	National Wetlands Inventory
NWS	National Weather Service
O_3	Ozone
OEP	Office of Energy Projects
OGI	optical gas imaging
ORV	off-road vehicle
PA	Programmatic Agreement
Pb	Lead
PCB	polychlorinated biphenyl
PEM	palustrine emergent
PERT	Program Evaluation Review Technique
PF	Pre-filing
PFO	palustrine forested
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIR	potential impact radius
PM	Particulate matter
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppb	parts per billion
ppm	parts per million
Project	Southgate Project
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PSS	palustrine scrub-shrub
PTE	potential-to-emit
RCNM	Roadway Construction Noise Model
RHA	River and Harbors Act of 1899
RMP	risk management plan
RR	Resource Report
RRBA	Roanoke River Basin Association
RV	Recreational vehicle
SAAC	Significant Ambient Air Concentration

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System
Secretary	Secretary of the Commission
SFHA	Special Flood Hazard Areas
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMPE	South Mist Pipeline Extension
SO_2	sulfur dioxide
SPCC Plan	Spill, Prevention, Control, and Countermeasures
SPL	Sound Pressure Level
SWAP	Source Water Assessment Program
THPO	Tribal Historic Preservation Officer
TMDL	total maximum daily loads
tpy	tons per year
Transco	Transcontinental Gas Pipe Line Company LLC
TRC	TRC Solutions, Inc.
TSS	total suspended solids
U.S.	United States
U.S.C.	United States Code
UDP	Unanticipated Discovery Plans
USDA	U.S. Department of Agriculture
USDHHS	U.S. Department of Health and Human Services
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VAC	Virginia Administrative Code
VADCR	Virginia Department of Conservation and Recreation
VADCR-DNH	Virginia Department of Conservation and Recreation, Division of Natural Heritage
VADEQ	Virginia Department of Environmental Quality
VADGIF	Virginia Department of Game and Inland Fisheries
VADGMR	Virginia Division of Geology and Mineral Resources
VADH	Virginia Department of Health
VADH-ODW	Virginia Department of Health Office of Drinking Water
VADHR	Virginia Department of Historic Resources

TECHNICAL ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
VADMME	Virginia Department of Mines, Minerals, and Energy
VADOF	Virginia Department of Forestry
VADOT	Virginia Department of Transportation
VAFWIS	Virginia Fish and Wildlife Information Service
VaNLA	Virginia Natural Landscape Assessment
VdB	vibration decibel
VMRC	Virginia's Marine Resources Commission
VOC	volatile organic compounds
VSAT	very small aperture terminal
WEAP	Worker Environmental Awareness Program
WEG	Wind erodibility groups
WNS	White-nose syndrome
WQC	Water Quality Certification
WS	Water Supply
Yards	contractor and storage yards
ZCC	Zones of Critical Concern
ZPC	Zones of Peripheral Concern

EXECUTIVE SUMMARY

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this final Environmental Impact Statement (EIS) to fulfill the requirements of the National Environmental Policy Act (NEPA), under Title 40 Code of Federal Regulations (CFR) Parts 1500-1508, and the Commission's regulations at 18 CFR Part 380. On November 6, 2018, Mountain Valley Pipeline, LLC (Mountain Valley[1]), filed an application with the FERC, under Section 7(c) of the Natural Gas Act (NGA) and Part 157 of the Commission's regulations, requesting authorization to construct and operate certain interstate natural gas facilities in Virginia and North Carolina.

The FERC is the federal agency responsible for authorizing interstate natural gas transmission facilities under the NGA, and is the lead federal agency for preparation of this EIS in compliance with the requirements of NEPA.[2] The United States (U.S.) Army Corps of Engineers (COE) Norfolk and Wilmington Districts, and the U.S. Department of the Interior Fish and Wildlife Service (FWS) Virginia and North Carolina Field Offices participated as cooperating agencies in preparation of the EIS. A cooperating agency has jurisdiction by law or has special expertise with respect to environmental resource issues associated with a project.[3]

PROPOSED ACTION

The Southgate Project (Southgate Project or Project) would involve the construction and operation of 75.1 miles of underground natural gas transmission pipeline system in Virginia and North Carolina. Mountain Valley also proposes to construct and operate a new compressor station (Lambert Compressor Station) in Virginia; four new meter stations (referred to as interconnects); four pig launchers and receivers at three locations; eight main line valves; and four cathodic protection beds. Associated with construction of the proposed facilities would be contractor yards, staging areas, temporary extra workspaces, and access roads.

In general, as described by Mountain Valley, the purpose and need for the Southgate Project is to meet the specific requests for natural gas transportation service of its anchor shipper, Dominion Energy North Carolina (DENC), formerly PSNC[4], a local natural gas distribution company. Mountain Valley states that the Project will provide additional firm natural gas transportation services for DENC to meet its growing supply needs via interconnections with the under construction Mountain Valley Pipeline Project in southern Virginia and the interstate pipeline of East Tennessee Natural Gas Transmission, LLC (East Tennessee) in North Carolina to two new delivery points on the DENC distribution system in Rockingham and Alamance Counties,

1 Mountain Valley is a joint venture among affiliates of EQM Midstream Partners, LP; NextEra Energy Inc; AltaGas Ltd. and RGC Resources, Inc. MVP Southgate Project facilities would be operated by an affiliate of EQM Midstream Partners, LP.

2 40 CFR Part 1501.5.

3 40 CFR Part 1501.6.

4 Following a January 2, 2019 merger, Dominion Energy, Inc. acquired PSNC and changed the company name to Dominion Energy North Carolina.

North Carolina. The Project would have the capacity to transport 375 million cubic feet of gas per day.

PUBLIC INVOLVEMENT

On May 3, 2018, Mountain Valley filed a request with the FERC to initiate the Commission's pre-filing environmental review process for the Project. On May 15, 2018, the FERC staff granted Mountain Valley's request and established a pre-filing docket number, PF18-4-000, to place information related to the Project into the public record. The intent of our[5] pre-filing process is to encourage the early involvement of interested stakeholders, facilitate interagency cooperation, and identify and resolve issues before an application is filed.

During pre-filing, Mountain Valley sponsored three open house meetings held at various locations throughout the Project areas to explain their Project to the public. Representatives of the FERC staff also attended those open house meetings to answer questions from the public about our environmental review process. A total of about 300 people attended the open houses.

On August 9, 2018, the Commission issued a Notice of Intent (NOI) to *Prepare an Environmental Impact Statement for the Planned Southgate Project, and Request for Comments on Environmental Issues, and Notice of Public Scoping Sessions*. The NOI was published in the *Federal Register* on August 15, 2018, and mailed to more than 1,100 interested parties on our environmental mailing list for the Project. The NOI briefly described the Project, summarized the FERC's environmental review process, provided a preliminary list of issues identified by us, invited comments on the environmental issues that should be addressed in the EIS, listed the dates, times, and locations of three public scoping sessions, and established a closing date for receipt of comments of September 10, 2018.

The scoping sessions were held in Reidsville and Haw River, North Carolina and Chatham, Virginia between August 20 and 23, 2018. About 100 people in total attended the sessions, with 68 people providing oral comments. During the scoping period, we received a total of 137 comments on the Project; all comments are in the Commission's public record. Transcripts of the scoping sessions were placed into the public record for this proceeding.[6]

The most common comments we received were on project need. The Commission's role in reviewing the details of any project is to make a determination of whether a proposed project is in the public convenience and necessity. The Commission bases its decisions on financing, rates, market demand, gas supply, environmental impact, and other issues concerning a proposed project. The forthcoming Commission order for the Project will address the need for the Southgate Project when it makes a determination of whether the Project is in the public convenience and necessity. We also received numerous comments regarding impacts on water quality, socioeconomics, and health and safety. These resources are addressed in the EIS.

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5 "We," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects.

6 See FERC eLibrary Accession Numbers 20180921-4000, 20181004-4006, and 20181004-4007. These comments can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the numbers above in the "Numbers: Accession Number" field.

During the pre-filing period, Mountain Valley assessed numerous route alternatives. Mountain Valley adopted 101 route alternative segments and/or minor route variations into its proposed Project design for various reasons, including landowner requests, avoidance of sensitive environmental resources (such as archaeological sites or wetlands), avoidance of areas of steep terrain or side slopes, and engineering considerations.

We issued a *Notice of Availability of the Draft Environmental Impact Statement for the Proposed Southgate Project* on July 26, 2019. A formal notice was also published by the Environmental Protection Agency in the Federal Register on August 2, 2019, indicating that the draft EIS was available. The draft EIS was mailed to four local libraries. The notice of availability established a 45-day comment period on the draft EIS that ended on September 16, 2019 and announced the time, date, and location of public comment sessions to take comments on the draft EIS. We held three public comment sessions in Virginia and North Carolina between August 19 - 22, 2019.

At our comment sessions, a total of 65 people provided oral and written comments. Transcripts of the sessions were placed in the public record for this proceeding.[7] In response to our notice, 77 stakeholders submitted a total of 92 letters including letters from landowners, public officials, non-government organizations, and government agencies regarding the draft EIS. Multiple form letters and petitions were also submitted in response to the draft EIS. The most commonly received comments on the draft EIS related to need for the Project, impacts on water quality, issues associated with the mainline Mountain Valley Pipeline Project, and general comments regarding the content of the draft EIS. Our responses to relevant comments are provided in appendix I of this final EIS. A subject index is provided in appendix J showing the location of relevant terms in the EIS.

PROJECT IMPACTS AND MITIGATION

Construction and operation of the Project could result in impacts on environmental resources, including geology, soils, groundwater, surface water, wetlands, vegetation, wildlife, fisheries, special-status species, land use, visual resources, socioeconomics, cultural resources, air quality, noise, and safety. In section 3 of this final EIS, we include an evaluation of alternatives to the Project, including the No-Action Alternative, system alternatives, and route alternatives. In section 4.13, we assess the cumulative impacts of the Project added to other known actions within the same geographic area and in the same timeframe.

We evaluate the impacts of the Project, taking into consideration Mountain Valley's proposed avoidance, minimization, and mitigation measures. Our analysis of impacts on environmental resources is summarized below and is discussed in detail in section 4 of this final EIS. Where necessary, we recommend additional mitigation measures to reduce impacts on specific resources. Section 5.2 of this final EIS contains a compilation of our recommended mitigation measures.

[7] See FERC eLibrary Accession Numbers 20190923-4000, 20190923-4001, and 20190923-4002. These comments can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the numbers above in the "Numbers: Accession Number" field.

Geology and Soils

The overall effects of Project construction and operation on topography and existing geologic conditions would be minor. Primary impacts would be limited to construction activities and would include temporary disturbance resulting from grading and trenching operations. After completion of construction activities, topography and associated drainages in areas of temporary disturbance would be returned to pre-construction contours and elevations to the extent practicable.

The Project pipeline permanent easement would be within 28.5 feet of parcels owned by the East Alamance Quarry, a crushed stone aggregates operation, near milepost (MP) 66.8. Mountain Valley has adjusted the pipeline route at this location to reduce impacts on planned or future mining activities. The Project does not cross land owned by the East Alamance Quarry. Therefore, we conclude that the Project would not significantly impact or be impacted by the East Alamance Quarry.

We received comments regarding the presence of uranium deposits in the Project vicinity in Pittsylvania County. The nearest commercially viable uranium deposit is 3.5 miles north of the Lambert Compressor Station, and concentrations of uranium in sediment, soils, shallow bedrock, and groundwater near the Project workspace are comparable to concentrations in the conterminous U.S. Additional uranium deposits do occur in the vicinity of the Coles Hills deposit; however, those deposits are not economically viable due to the size and grade of the deposits present. Further, uranium is generally not highly mobile in the environment, and Mountain Valley would implement its *Erosion and Sediment Control Plan* (E&SC Plan) to address fugitive dust mitigation, stormwater control, and erosion and sediment control measures.

With the implementation of Mountain Valley's best management practices (BMPs), we conclude that impacts on geological resources would be adequately minimized.

During and following construction, the potential for soil erosion would be minimized through the use of erosion controls and revegetation measures as described in FERC's *Upland Erosion Control, Revegetation and Maintenance Plan* as modified by Mountain Valley (referred to as Mountain Valley's Plan). To further minimize soil erosion, the Project would follow BMPs included in Mountain Valley's E&SC Plan and *Winter Construction Plan*. To address inadvertent spills of hazardous materials or petroleum products during construction, or in the event of an unanticipated discovery of existing contaminated media, Mountain Valley would implement its *Spill, Prevention, Control, and Countermeasures Plan* and *Unanticipated Discovery of Contamination Plan.* We find that these plans would minimize potential impacts on soils.

Groundwater, Surface Waterbody Crossings, and Wetlands

The Project would not cross any sole source aquifers or principal source aquifer areas. No wellhead protection areas were identified within the Project area. Prior to construction, Mountain Valley would identify any private wells and springs near construction workspaces that are used for potable water on affected properties. As described in the Project's *Water Resources Identification and Testing Plan*, Mountain Valley would offer to conduct pre-construction and post-construction water quality testing for all water supply wells located within 150 feet of Project workspaces; with post-construction testing being conducted if a pre-construction water quality test was performed. We are recommending that prior to construction Mountain Valley provide additional information

on private water wells or springs, including the well's or springs' status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts on the private water wells or springs.

In general, the watersheds crossed by the Project contain development consistent with a rural environment. The water quality and biota within Project area streams are largely reflective of the degree of upstream development. The Project would require 223 crossings of waterbodies, 4 of which are major waterbodies. The Project crossings would follow the FERC *Wetland and Waterbody Construction and Mitigation Procedures* as modified by Mountain Valley (referred to as Mountain Valley's Procedures) and the E&SC Plan. Mountain Valley would use Horizontal Direction Drill (HDD) crossings at the Dan River and the Stony Creek Reservoir. Mountain Valley's *HDD Contingency Plan* would ensure that drill operations are monitored and adjusted to avoid potential inadvertent returns of drilling fluid to the ground surface, and if one should occur, that the release would be contained to the extent practicable and remediated. Conventional bore crossings are proposed at Cascade Creek/Dry Creek, Wolf Island Creek, and Deep Creek due to the potential presence of federal or state listed aquatic species in these systems. All other crossing would be completed using dry-ditch methods (dam-and-pump or flume method) to minimize in-stream construction and surface water impacts.

The Project crosses the Dan River which is listed on the Nationwide Rivers Inventory by the National Park Service; the Banister River which is a potential Blueway river (a state-designated recreational water trail); and the Sandy River which is a potential Virginia Scenic River. The Dan River would be crossed by the HDD method to avoid impacts on the river. The Sandy River and Banister River would be crossed using a dry-ditch crossing method (e.g. dam-and-pump or flume) and would experience minor short-term impacts during construction. Mountain Valley would implement its Procedures to minimize impacts and work with state agencies regarding effects to recreational boaters.

Mountain Valley has indicated that water required for construction and hydrostatic testing would be obtained primarily from the Dan River, if approved by the FWS, at milepost 30.1. Municipal water sources would be used as a secondary source, if necessary. The hydrostatic test water would be discharged through sediment filters in vegetated uplands away from waterbodies and wetlands.

The Project is not expected to permanently affect surface or ground water resources. Though temporary impacts would result from the Project, with implementation of BMPs and mitigation proposed by Mountain Valley, as well as our recommendations, we conclude the Project would not significantly affect water resources.

Mountain Valley made numerous modifications to its proposed route to avoid and reduce wetland crossings and impacts; however, construction of the Project would impact 25.7 acres of wetlands. Most of these impacts would be temporary and short-term. The Project's operational right-of-way would affect 5.6 acres of wetlands, including the conversion of 0.2 acre of palustrine scrub-shrub (PSS) wetland to palustrine emergent (PEM) wetland, and 4.2 acres of palustrine forested (PFO) wetlands to PSS and PEM wetlands. While adverse and long-term impacts on wetlands would occur, the Project would not result in any loss of wetlands. With adherence to Mountain Valley's Procedures and the implementation of BMPs and mitigation proposed by Mountain Valley, we conclude the Project would not significantly affect wetlands. In addition,

the COE could require Mountain Valley to offset unavoidable impacts on wetlands through the creation, restoration, enhancement, or preservation of at least an equal amount of wetlands through implementation of an agency-approved *Compensatory Mitigation Plan*.

Vegetation, Wildlife, Fisheries, and Federally Listed Species

The Project is located wholly within the Piedmont Region and areas that have been heavily used as cropland; however, many of these areas have regrown into successional forests. Managed or developed land classes include agricultural land, commercial, industrial, and residential areas. These land classes represent about 21 percent of the proposed land that would be required for the Project. About 94 percent of the land within the Project footprint is vegetated, including agricultural land, upland forest, upland herbaceous/shrub-scrub, and wetlands. Of these vegetated areas, the majority (about 44 percent) consists of forested upland, followed by herbaceous/scrub-shrub upland (about 39 percent); less than 2 percent of the pipeline Project area is within wetland vegetation communities.

The primary effect of pipeline facility construction would be cutting, clearing, and/or removal of existing vegetation. The majority of vegetation affected by construction of the Project would be upland forested land, which would result in long-term impacts. To minimize forest fragmentation and edge effects, Mountain Valley has collocated about 49 percent (36.8 miles) of the pipeline route with existing linear corridors. Following construction, Mountain Valley would seed the construction workspace and allow natural succession to revegetate temporary workspaces disturbed by construction in accordance with Mountain Valley's Plan and Procedures. To control the spread of noxious weed species within the Project area, Mountain Valley developed an *Exotic and Invasive Plant Species Control Plan* in coordination with state agencies. Given the high level of collocation with existing, maintained rights-of-way through the majority of large forested areas crossed by the proposed pipeline route, and Mountain Valley's commitment to restore disturbed areas, we conclude that impacts on vegetation, including the spread of invasive species, would be adequately minimized.

The temporary and permanent loss and/or conversion of habitat and the general disturbance created by the use of construction equipment would impact wildlife. This impact would vary depending on the type and quantity of habitat affected and the ability of species to leave Project work areas and successfully utilize adjacent habitats. Constructing the Project may result in limited mortality of less mobile animals, such as small rodents, reptiles, amphibians, and invertebrates, which may not be able to relocate from the immediate construction area.

The Project would cross 21 perennial waterbodies containing fisheries of special concern. Constructing and operating the Project could temporarily impact fisheries and aquatic resources. Mountain Valley would adhere to all federal and state permit conditions, including those regarding the minimization of impacts on fisheries of special concern (adhering to recommended work windows for in-water construction). Based on our review of the potential impacts and mitigation measures, including our recommendations, we conclude that constructing and operating the Project would not significantly impact wildlife, terrestrial habitats, migratory birds, or fisheries and aquatic resources.

Federal agencies are required by the Endangered Species Act (ESA) Section 7(a)(2) to ensure that any action authorized, funded, or carried out by the agency would not jeopardize the

continued existence of a federally listed threatened or endangered species or species proposed for listing, or result in the destruction or adverse modification of designated critical habitat. There are five federally listed threatened or endangered species, two species of concern, and one species that is proposed as threatened that could potentially be affected by the Project. We have determined that the Project would not likely adversely affect these species. We are submitting this final EIS as our final Biological Assessment (BA) and requesting concurrence from the FWS for our determinations of effect for federally listed species potentially affected by the Project in accordance with Section 7 of the ESA. We have included a recommendation that restricts construction until our ESA consultation with the FWS is completed.

Land Use

The primary land uses affected by construction would be forested/woodland and open land. In addition, agricultural, silviculture, industrial/commercial, and residential land types would be affected during construction. As currently designed, 19.2 acres of residential land would be affected by construction of the pipeline and use of access roads. Mountain Valley prepared and would adhere to site-specific *Residential Construction Plans* for 24 residential structures currently identified as within 25 feet of construction work areas or where a plan was requested by a landowner or agency. No occupied residences would be removed to construct the pipeline.

The Project would cross the Mountains-to-Sea Trail, a North Carolina state trail, at MP 69.8. The trail/road would be crossed by conventional bore resulting in no direct impacts on the trail or its use. In general, recreation areas and special use areas crossed by the Project are expected to experience some temporary impacts during construction, such as clearing of trees, noise, dust, and limited access which may prevent or curtail recreational activities within construction areas.

Socioeconomics and Transportation

The Project may affect the socioeconomic character of communities near the proposed facilities. These potential impacts include temporary population increases, new employment opportunities, increased demand for housing and public services, impacts on tourism and local businesses, transportation impacts, impacts on environmental justice communities, and increased revenues associated with sales and payroll taxes. Mountain Valley would coordinate with local fire departments, police departments, and emergency first responders to address any Project needs, including traffic assistance and emergency response preparedness. The communities in the Project area have adequate public service infrastructure to meet the potential needs of non-local workers who relocate temporarily. Therefore, we conclude that the Project would not significantly impact public services.

Our review of available studies indicates that the Project is not likely to have a significant adverse impact on property values. There may be a potential benefit to the state and local economies by creating a short-term stimulus to the affected areas through payroll expenditures, local purchases of consumables Project-specific materials, room rentals, and sales tax. However, these benefits would generally be temporary and minor. Although low income and minority populations exist within the Project area, the Project would not have a disproportionately high and adverse environmental or human health impact on minority or low income populations.

Cultural Resources

As of the end of October 2019, Mountain Valley ~~had~~ conducted cultural resources inventories of a total of about 70.5 miles of pipeline route (94 percent); 30.3 acres at aboveground facilities (100 percent); 119.2 acres at yards (68 percent); 1.1 acres at cathodic protection beds (66 percent); and 29.9 miles of access roads (93 percent). During those inventories, Mountain Valley recorded 81 archaeological sites and 241 historic architectural sites in the direct area of potential effect (APE).

FERC staff consulted with the State Historic Preservation Offices (SHPO) of Virginia and North Carolina, and interested Indian tribes and other consulting parties, prior to making determinations of National Register of Historic Places (NRHP) eligibility and project effects. Of the archaeological sites, 55 were evaluated as not eligible for the NRHP, 23 were assessed as potentially eligible or unevaluated, and 3 were determined eligible. Of the historic architectural sites, 201 were evaluated as not eligible, 34 are potentially eligible or unevaluated, 2 should be treated as eligible, 1 is eligible, and 3 are listed in the NRHP. No further work was recommended for the sites not eligible for the NRHP.

We have not yet completed the process of complying with the National Historic Preservation Act (NHPA). Additional investigations and/or plans remain outstanding. About 5 miles of proposed pipeline route, and about 2.5 miles of access roads have still not yet been surveyed. Also, about 0.6 acres at cathodic protection beds, and 55.6 acres at proposed yards remain to be inventoried.

We recommend that prior to allowing construction to proceed, Mountain Valley must complete surveys, and file with the Commission evaluation reports, avoidance plans, or treatment plans for NRHP listed or eligible sites, as necessary, and file comments of the SHPOs, interested Indian tribes, and other consulting parties on those reports and plans. Commission staff has developed an agreement document that outlines the process that would be used to resolve adverse effects on historic properties.

Air Quality and Noise

Air quality impacts associated with construction of the Project would include emissions from construction equipment, fugitive dust, and open burning. Such air quality impacts would generally be temporary and localized, and are not expected to cause or contribute to a violation of applicable air quality standards. Operational emissions would be generated by the Lambert Compressor Station, as well as minimal emissions from maintenance blowdowns and incidental leaks from the pipeline and four interconnects. Mountain Valley would comply with all applicable federal requirements and associated air permits to minimize effects on air quality in the area. As a result, we conclude that the Project would not result in a significant impact on local or regional air quality.

Noise sensitive areas (NSA) near the construction areas may experience an increase in perceptible noise, but the effect would be temporary and localized. Operational noise impacts would be limited to areas near the aboveground facilities, primarily the Lambert Compressor Station. Noise impacts on NSAs due to operation of the pipeline, meter stations, and compressor station would be negligible to barely perceptible. However, we have included a recommendation

for Mountain Valley to verify the actual noise levels from operation of the compressor station at full load.

For construction of the Project's proposed aboveground facilities, nighttime work may be necessary for specific situations related to safety, permit compliance, or other non-typical circumstances. Noise levels due to 24-hour construction of the Lambert Compressor Station would be below the FERC criterion of 55 decibels on the A-weighted scale day-night noise level (dBA L_{dn}) at the nearest NSAs. However, noise levels due to 24-hour construction of three of the four interconnects would all be above the FERC criterion of 55 dBA L_{dn} at the nearest NSAs. Mountain Valley would develop a *Nighttime Construction Noise Management Plan,* which would include specific noise mitigation, such as noise barriers, quieter equipment, or partial equipment enclosures. To ensure that residents and sensitive receptors near the aboveground facilities would not be significantly affected by the noise levels from nighttime construction, we have included a recommendation that Mountain Valley file its *Nighttime Construction Noise Management Plan* prior to construction. This plan would include site-specific mitigation measures and demonstrate that noise levels would be reduced below 48.6 dBA at night and 55 dBA L_{dn} overall at the nearest NSA, or would not exceed 10 dBA over the ambient at the nearest NSA where ambient noise levels are already above 55 dBA L_{dn}.

Based on our analyses, mitigation measures proposed, and our recommendation, we conclude that construction and operation of the Project would not result in significant noise impacts on residents and the surrounding communities.

Reliability and Safety

The Project would be designed, constructed, operated, and maintained to meet the U.S. Department of Transportation's (DOT) *Minimum Federal Safety Standards* in 49 CFR 192 and other applicable federal regulations. These regulations include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. Mountain Valley would also design, construct, operate, and maintain the Lambert Compressor Station in accordance with modern engineering practices that meet or exceed the DOT safety standards.

Mountain Valley would follow federal safety standards for pipeline class locations based on population density. The DOT regulations are designed to ensure adequate safety measures are implemented to protect all populations. We conclude that Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety.

Cumulative Impacts

We analyzed cumulative impacts of the Project, in addition to other projects that may occur within the same area of geographic scope and timeframe. The other projects we examined include FERC-jurisdictional natural gas transportation projects; non-jurisdictional project-related facilities; other energy projects; mining operations; transportation or road projects; and commercial/residential/industrial and other development projects.

Most of the impacts resulting from construction and operation of the Project would be temporary and localized, contained within the right-of-way and extra workspaces, and when added to the impacts of other projects are not expected to result in significant cumulative impacts. However, some long-term cumulative impacts would occur in forested wetlands and forested uplands regarding vegetative communities and associated wildlife habitats. Given the Project BMPs, design features, and mitigation measures that would be implemented; and the federal and state laws and regulations protecting resources, and permitting requirements, we conclude that when added to other past, present, and reasonably foreseeable future actions, cumulative impacts on environmental resources within the geographic scopes affected by the Project would not be significant.

Alternatives Considered

As required by NEPA and Commission policy, we identified and evaluated reasonable alternatives to the Project to determine whether the implementation of an alternative would be environmentally preferable to the proposed action. An alternative would be environmentally preferable if it offers a significant environmental advantage over the proposed action. We evaluated the No Action Alternative, system alternatives, three major and six minor route alternatives, and various minor route variations. Based on our findings that no other alternative would meet the purpose of the Project, be technically and economically feasible, and provide a significant environmental advantage, we conclude that the proposed Project is the preferred alternative than can meet the Project purpose.

MAJOR CONCLUSIONS

For most resources, the construction and operation of the Project would result in limited adverse environmental impacts. Most adverse environmental impacts would be temporary or short-term during construction, but some long-term and permanent environmental impacts would occur on forest and wetlands. This determination is based on our review of the information provided by Mountain Valley and further developed from environmental information requests; field reconnaissance; scoping; literature research; alternatives analyses; and contacts with federal, state, and local agencies, and other stakeholders. We conclude that approval of the Project would result in some adverse environmental impacts, but these impacts would be reduced to less-than-significant levels through implementation of our recommendations and Mountain Valley's proposed avoidance, minimization, and mitigation measures. The following factors were also considered in our conclusions:

- about 36.8 miles, or about 49 percent, of the 75.1-mile pipeline route would be constructed adjacent to existing rights-of-way;
- Mountain Valley would minimize impacts on natural and cultural resources during construction and operation of the Project by implementing Mountain Valley's Plan and Procedures, its E&SC Plan, and other Project-specific plans (e.g., *Unanticipated Discovery of Historic Properties and Human Remains Plan*, *HDD Contingency Plan, Spill Prevention Control and Countermeasures Plan*, *Exotic and Invasive Species Control Plan*, *Traffic Management Plan*, and *Landslide Mitigation Plan*);
- the FERC staff would complete the process of complying with section 7 of the ESA prior to construction;

- the FERC staff would complete the NHPA compliance process prior to construction;
- Mountain Valley would comply with all applicable federal requirements and associated air and noise regulatory requirements during construction and operation of the Project; and
- an environmental inspection program and a third-party monitoring oversight program would be implemented to ensure compliance with the mitigation measures that become conditions of the FERC authorization.

In addition, we recommend that should the Project be approved by the Commission, the Project-specific impact avoidance, minimization, and mitigation measures that we have developed (included in this EIS as recommendations) be attached as conditions to any Certificate of Public Convenience and Necessity issued by the Commission. These recommended mitigation measures are presented in section 5.2 of the EIS.

1.0 INTRODUCTION

In accordance with the Natural Gas Act (NGA, Title 15 United States Code [U.S.C.] § 717), the Federal Energy Regulatory Commission (FERC or Commission) is responsible for deciding whether to authorize the construction and operation of interstate natural gas transmission facilities. The National Environmental Policy Act (NEPA, 42 U.S.C. § 4321 et seq.) requires that the Commission consider the environmental impacts of a proposed project prior to making a decision. The Commission's natural gas program's environmental staff[1] has prepared this final Environmental Impact Statement (EIS) so that the FERC can comply with NEPA, and to assess the potential environmental impacts that could result from the construction and operation of the Southgate Project (Project), as proposed by Mountain Valley Pipeline, LLC (Mountain Valley)[2] in Docket No. CP19-14-000.

The vertical line in the margin identifies text that is new or modified in this final EIS and differs materially from the corresponding text in the draft EIS. Changes were made to address comments from cooperating agencies and other stakeholders on the draft EIS; incorporate modifications to the Project after publication of the draft EIS; update information included in the draft EIS; and incorporate supplemental information filed by Mountain Valley in response to recommendations in the draft EIS, and in response to our post-draft EIS environmental information requests.

On November 6, 2018, Mountain Valley filed an application with the FERC pursuant to Section 7(c) of the NGA, as amended. Mountain Valley is seeking a Certificate of Public Convenience and Necessity (Certificate) to construct, install, own, operate, and maintain a new interstate natural gas pipeline and ancillary facilities in Virginia and North Carolina. Mountain Valley's application was assigned Docket No. CP19-14-000.[3] The Commission issued a Notice of Application (NOA) for the Project on November 19, 2018, and the notice appeared in the *Federal Register* (FR) on November 26, 2018.

Mountain Valley's Southgate Project would involve the construction and operation in Virginia and North Carolina of the following:

- about 75.1 miles of new 24-inch and 16-inch-diameter natural gas pipeline in Pittsylvania County, Virginia, and Rockingham and Alamance Counties, North Carolina;

[1] Commission staff was assisted in the preparation of this EIS by a third-party environmental contractor, Cardno, Inc.

[2] MVP Southgate is a joint venture among affiliates of EQM Midstream Partners, LP; NextEra Energy Inc; AltaGas Ltd. and RGC Resources, Inc. MVP Southgate Project facilities would be operated by an affiliate of EQM Midstream Partners, LP.

[3] Previous to the filing of Mountain Valley's application, the Southgate Project was under pre-filing environmental review by the FERC staff in Docket No. PF18-4-000.

- one new compressor station (Lambert Compressor Station) totaling about 28,915 International Organization for Standardization (ISO) horsepower (hp) in Pittsylvania County, Virginia;
- four interconnects/meter stations or tie-ins with facilities operated by Mountain Valley, East Tennessee Natural Gas, LLC (East Tennessee), and Dominion Energy North Carolina (DENC), formerly PSNC[4]; and
- ancillary facilities including pig[5] launchers and receivers, mainline block valves (MLV), and cathodic protection beds.

The Project would be designed to transport 375 million cubic feet per day [MMcf/d]) of natural gas. The Project is described in more detail in section 2.0.

1.1 PURPOSE AND NEED

The Council on Environmental Quality's (CEQ) regulations for implementing NEPA at 40 CFR 1502.13 recommends that an EIS should briefly address the underlying purpose and need for a project. In general, as described by Mountain Valley, the purpose and need for the Southgate Project is to meet the specific requests for natural gas transportation service of its anchor shipper, DENC, a local natural gas distribution company. Mountain Valley states that the Project will provide additional firm natural gas transportation services for DENC to meet its growing supply needs via interconnections with the under construction Mountain Valley Pipeline project in southern Virginia and the interstate pipeline of East Tennessee in North Carolina to two new delivery points on the DENC distribution system in Rockingham and Alamance Counties, North Carolina.

The Commission's role in reviewing the details of any project is to make a determination of public convenience and necessity. The Commission bases its decisions on financing, rates, market demand, gas supply, environmental impact, and other issues concerning a proposed project. The Commission has developed a "Certificate Policy Statement"[6] that established criteria for determining whether there is a need for a proposed project and whether the proposed project would serve the public interest. The Commission decision, in its Order, would review the need for the Project.

During the scoping comment period, the Commission received comments regarding the potential for Mountain Valley to further expand the Project and eventually export natural gas. We[7] do not have any information in the record to support this contention. Mountain Valley states in its application that it did not design its facilities to transport natural gas to a liquefied natural gas (LNG) export terminal. The nearest LNG export terminal to the terminus of the Project would be the existing Cove Point LNG terminal on the Chesapeake Bay in Calvert County, Maryland, about 190 miles away. There is no direct connection from the Project terminus in Alamance County,

4 Following a January 2, 2019 merger, Dominion Energy, Inc. acquired PSNC and changed the company name to Dominion Energy North Carolina.

5 A "pig" is a device used to clean or inspect the interior of a pipeline.

6 See *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227 (1999), clarified in 90 FERC ¶ 61,128, and further clarified in 92 ¶ 61,094 (2000).

7 "We," "us," or "our" refers to the environmental staff in FERC's Office of Energy Projects.

North Carolina to the Cove Point terminal. Mountain Valley stated that it does not intend to seek permission to export natural gas overseas as LNG from the U.S. Department of Energy.

1.2 PURPOSE AND SCOPE OF THIS EIS

Our principal purposes in preparing this EIS are to:

- identify and assess the potential direct, indirect, and cumulative impacts on the natural and human environment that would result from the construction and operation of the proposed Project;
- describe and evaluate reasonable alternatives to the proposed Project that would avoid or minimize adverse impacts on environmental resources;
- recommend mitigation measures, as necessary, that could be implemented by Mountain Valley to reduce impacts on specific environmental resources; and
- encourage and facilitate involvement by the public and interested agencies in the environmental review process.

This EIS addresses topics including Project alternatives; geology; soils; water resources; wetlands; vegetation; wildlife and aquatic resources; special status species; land use, recreation, special interest areas, and visual resources; socioeconomics; cultural resources; air quality and noise; reliability and safety; and cumulative impacts. This EIS describes the affected environment as it currently exists and analyzes the environmental consequences of the proposed Project. This EIS also presents our conclusions and recommended mitigation measures.

Our description of the affected environment is based on a combination of data sources, including desktop resources such as scientific literature and regulatory agency reports, information from resource and permitting agencies, scoping comments, field data collected by Mountain Valley and its consultants, and our own site visits. Our resource specialists independently fact-checked data submitted by the applicant. As of October 2019, Mountain Valley has field surveyed about 96 percent of all the proposed Project facility locations.

On October 26, 2018, we sent letters to various federal and state resource agencies that might have an interest in cooperating in the production of the EIS for the Project, as defined in 40 CFR 1501.6.[8] The U.S. Army Corps of Engineers (COE), Norfolk and Wilmington Districts, and the U.S. Fish and Wildlife Service (FWS) agreed to be cooperating agencies. See section 1.2.2 and 1.2.3 below for details on cooperating agency roles and responsibilities. A cooperating agency has jurisdiction by law over part of a project and/or has special expertise with respect to environmental issues. Cooperating agencies play a role in the environmental analyses of this project and assist in developing mitigation plans or other measures. They participate in the NEPA

[8] The FERC sent letters to the U.S. Army Corps of Engineers District Officers in Norfolk, Virginia and Wilmington, North Carolina; Region 4 of the U.S. Environmental Protection Agency in Atlanta, Georgia; the Virginia and North Carolina Field Offices of the U.S. Fish and Wildlife Service; the Virginia Department of Mines, Minerals, and Energy; the Virginia Department of Conservation and Recreation; the Virginia Department of Game and Inland Fisheries; the Virginia Department of Environmental Quality, the Virginia Marine Resources Commission; the North Carolina Wildlife Resources Commission; and the North Carolina Department of Environmental Quality; requesting their participation as cooperating agencies.

process by reviewing the application and related materials, and by reviewing administrative drafts of the overall EIS or the specific portions related to agency permitting or special expertise. The roles and the scope of the actions of FERC and the cooperating agencies in the Project review processes are described in the sections below.

1.2.1 Federal Energy Regulatory Commission

Originally known as the Federal Power Commission when first created by Congress in 1920, the agency was reorganized and renamed the FERC under the administration of President Jimmy Carter. The FERC is an independent federal regulatory agency[9] that regulates the interstate transportation of natural gas, among other industries, in accordance with the NGA of 1938 as amended.

Pursuant to the Energy Policy Act of 2005 (EPAct) Section 313(b)(1), the FERC is the lead federal agency for the coordination of all applicable federal authorizations. Thus, the FERC is the lead federal agency for preparation of this EIS to comply with NEPA, as described in the CEQ's regulations at 40 CFR 1501.5 and in keeping with the May 2002 Interagency Agreement with other federal agencies.[10]

As the lead federal agency, we prepared this EIS to assess the environmental impacts that could result from constructing and operating the Project. This document was prepared in compliance with the requirements of the CEQ's regulations at 40 CFR 1500-1508, and the FERC's regulations for implementing NEPA at 18 CFR 380. As applicable, this EIS is also intended to fulfill the cooperating federal agencies obligations under NEPA and to support subsequent conclusions and decisions made by the Commission and the cooperating agencies.

The Commission will consider the findings contained herein, as well as non-environmental issues, in its review of Mountain Valley's application. The identification of environmental impacts related to the construction and operation of the Project, and the mitigation of those impacts, as disclosed in this EIS, would be components of the Commission's decision-making process. The Commission would issue its decision in an Order. If the Project is approved, the Commission would issue a Certificate to Mountain Valley. The Commission may accept the application in whole or in part, and can attach conditions to the Order that would be enforceable actions to assure that the proper mitigation measures are implemented prior to a project going into service.

1.2.2 U.S. Army Corps of Engineers

Under Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (later incorporated into the Clean Water Act [CWA] 33 U.S.C. § 1344) the COE was given authority

[9] The decision makers at the agency are five Commissioners (at full contingent) appointed by the President and confirmed by the Senate. The decisions of the Commission cannot be challenged by the President or Congress, but may be reviewed in federal court.

[10] May 2002 Interagency Agreement on Early Coordination of Required Environmental and Historic Preservation Reviews Conducted in Conjunction With the Issuance of Authorizations to Construct and Operate Interstate Natural Gas Pipelines Certificated by the Federal Energy Regulatory Commission, signed by the FERC, Advisory Council on Historic Preservation, CEQ, USDA, U.S. Department of the Army, U.S. Department of Commerce, U.S. Department of Energy, EPA, U.S. Department of Interior, and Department of Transportation.

over the discharge of dredged or fill materials into the Waters of the United States. The Project would cross two COE Districts, including the Norfolk District and Wilmington District.

The COE's regulations for permits under Section 10 of the Rivers and Harbors Act (RHA, 33 U.S.C. § 403) can be found at 33 CFR 322, while regulations for permits under Section 404 of the CWA are at 33 CFR 323, and processing of permits is at 33 CFR 325. The Norfolk and Wilmington Districts agreed to be a cooperating agencies in the production of this EIS. As a cooperating agency, the COE may adopt this EIS for the purposes of exercising its regulatory authorities. Mountain Valley filed its permit applications with the Norfolk and Wilmington Districts of the COE on November 30, 2018.

The District Engineer cannot make a decision on a permit application until the requirements of NEPA are fulfilled. After the publication of an EIS, the COE authorization can be issued under the Nationwide Permit Program. In communications with FERC staff, representatives of the COE indicated that individual COE Districts would not finalize their permit processes for the Project until after the FERC has documented completion of the National Historic Preservation Act (NHPA) Section 106 and Endangered Species Act (ESA) Section 7 consultations. We expect that the Project would be considered by the COE under its Nationwide Permit Program. However, if it is determined that an Individual Permit with the COE is required, and once the COE determines a permit application to be complete, it would issue a public notice. In accordance with EPAct Section 313(d), the COE would submit or summarize relevant information used in its permit decision, potentially including comments received on its notice, and file this information with the FERC, as the Commission is the keeper of the consolidated record for the proceedings. If an individual permit is required, as an element of its review, the COE must consider whether the proposed Project represent the least environmentally damaging practicable alternative pursuant to the CWA Section 404(b)(1) guidelines. The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall purpose of the Project.

1.2.3 U.S. Fish and Wildlife Service

The mission of the FWS is to conserve, protect, and enhance, fish, wildlife, and plants and their habitats. Towards that goal, the FWS works to enforce federal wildlife laws, protect endangered species, manage migratory birds, conserve habitats including wetlands, and restore fisheries. The FWS cares for about 150 million acres in more than 500 National Wildlife Refuges.

The FERC, as the lead federal agency for the Project, is required to consult with the FWS to determine whether any federally listed or proposed endangered or threatened species or their designated critical habitats would be affected by the Project. If it is determined that the Project is likely to adversely affect federally listed species or their critical habitats, the FERC staff must prepare a biological assessment (BA) to identify the nature and extent of adverse impacts, and to recommend measures that would avoid, reduce, or mitigate impacts on habitats and/or species. At this time, we have not determined that the Project would adversely affect a listed species. Upon issuance of the draft EIS, we requested to initiate informal consultation under Section 7 of the ESA. In a letter dated August 16, 2019, we informed the FWS that our draft EIS serves as the BA for the Project; however, due to incomplete surveys for listed species at the time of the draft EIS, our final BA and request for concurrence would be provided with the final EIS. Therefore, with

this final EIS, we are requesting concurrence from the FWS on our determinations of effect for listed species potentially affected by the Project. The consultation process under Section 7 of the ESA is outlined in regulations at 50 CFR 402. The ESA is further discussed in sections 1.4.4 and 4.7 of this EIS.

In addition, the FWS has statutory authority and responsibilities for enforcing the Migratory Bird Treaty Act (MBTA), the Fish and Wildlife Improvement Act, and the Fish and Wildlife Act. The FWS may issue permits under the MBTA in accordance with 50 CFR 21. On March 30, 2011, the FERC and the FWS entered into a Memorandum of Understanding (MOU) regarding compliance with the MBTA. On December 22, 2017, the Department of the Interior (DOI) issued a memorandum (M-37050) analyzing whether the MBTA prohibits the accidental or incidental take of migratory birds. In M-37050, the DOI clarified their position stating that the MBTA does not prohibit incidental take. The MBTA is further discussed in sections 1.4.5 and 4.6 of this EIS. The FWS also has the authority to issue permits under the Bald and Golden Eagle Protection Act (BGEPA), in accordance with regulations at 50 CFR 22. The BGEPA is further discussed in sections 1.4.1 and 4.6 of this EIS.

1.3 PUBLIC REVIEW

On May 3, 2018, Mountain Valley filed a request to enter into the Commission's pre-filing (PF) environmental review process for the Project. The FERC granted Mountain Valley's request on May 15, 2018, and established pre-filing Docket No. PF18-4-000. Prior to and during the pre-filing process, Mountain Valley contacted federal, state, and local governmental agencies to inform them about the Project and discuss Project-specific issues. Mountain Valley also contacted affected landowners to inform them about the Project, and to obtain permission to perform environmental surveys. Mountain Valley developed a public participation plan (Public, Stakeholder, and Agency Participation Plan[11]) to facilitate stakeholder communications and make information available to the public and regulatory agencies.[12] This public participation plan established a single point of contact within Mountain Valley for the public or agencies to call or e-mail with questions or concerns; a publicly accessible website (http://www.mvpsouthgate.com/) with information about the Project (including maps) and Project status; and regular newsletter mailings for affected landowners and other interested parties.

Between June 25 and 28, 2018, after entering into PF, Mountain Valley hosted three informal open house meetings along the planned Southgate route. The purpose of the open houses was to provide affected landowners, elected and agency officials, and the general public with information about the Project and to give them an opportunity to ask questions and express their concerns. A total of about 300 people attended the open house meetings. We participated in the open houses to provide information regarding the Commission's environmental review process to interested stakeholders and to listen to stakeholder concerns.

[11] Mountain Valley's Public, Stakeholder, and Agency Participation Plan was included as appendix 1-L to Resource Report 1 in its November 06, 2018, application. The Public, Stakeholder, and Agency Participation Plan can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.

[12] Mountain Valley's public participation plan was filed with its May 3, 2018, request to the FERC to initiate the pre-filing review process.

On August 9, 2018, the FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned MVP Southgate Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Sessions* (NOI). The NOI was published in the FR on August 15, 2018 (83 FR 40509) and sent to over 1100 parties on our environmental mailing list, which included federal and state resource agencies; elected officials; environmental groups; non-governmental organizations (NGO); Native Americans and Indian tribes; potentially affected landowners; local libraries and newspapers; and other stakeholders who had indicated an interest in the Project. The NOI also announced the date, time, and location of public scoping sessions sponsored by the FERC in the Project area. Issuance of the NOI opened a 30-day formal scoping period that ended September 10, 2018.

The FERC sponsored three public scoping sessions in the Project area during the formal scoping period to provide the public with the opportunity to comment verbally on the Project. The scoping sessions were held in Reidsville, North Carolina on August 20, 2018; Chatham, Virginia on August 21, 2018; and Haw River, North Carolina on August 23, 2018. A total of 68 attendees provided oral comments at the sessions. Transcripts of each scoping session were placed into the FERC's public record for the Project and are available for viewing electronically through the Internet.[13]

The issuance of our NOI for the Project on August 9, 2018, marked the start of the official scoping period. During the official scoping period, from August 9, 2018 to September 10, 2018, we received 137 comments. This includes: 4 letters from Indian tribes; 5 letters from state agencies; 1 letter from county governments; 14 letters from NGOs; 9 letters from affected landowners; 36 letters from the general public; and 68 oral comments transcribed at the public scoping meetings. We also received 65 form letters.

During the PF period, the FERC staff visited the Project area and inspected portions of the pipeline route. In addition, the FERC staff attended meetings with representatives of Mountain Valley, the North Carolina Wildlife Resources Commission (NCWRC) on June 25, 2018; the COE Wilmington District, FWS Raleigh Field Office, and North Carolina Department of Environmental Quality (NCDEQ) in separate meetings on June 27, 2018; a conference call with the Virginia State Historic Preservation Officers (SHPO) on August 7, 2018; a meeting with COE Norfolk District on August 8, 2018; and a meeting with Virginia Department of Environmental Quality (VADEQ), Virginia Marine Resources Commission, Virginia Department of Conservation and Recreation (VADCR), Virginia Department of Game and Inland Fisheries (VADGIF) on August 8, 2018. Notes summarizing these meetings were placed into the FERC's public record for the proceeding.[14]

During the PF period, FERC staff participated in conference calls on an approximately bi-weekly basis with representatives from Mountain Valley and federal and state governmental

[13] To access the public record for this proceeding, go to the FERC's Internet website (http://www.ferc.gov), click on "Documents & Filings" and select the "eLibrary" feature. Click on "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the field (i.e., PF18-4, or CP19-14). Select an appropriate data range.

[14] The notes for these meetings can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the following numbers in the "Numbers: Accession Number" field – 20180712-3035, 20180830-3014, 20180830-3052

agencies to discuss the progress of the Project and issues. Summaries of the telephone calls were placed in the FERC's public record.

Mountain Valley filed its formal application for the Project on November 6, 2018. On November 19, 2018, the FERC issued a NOA. Our notice stated there are two ways to become involved in the Commission's review of the Project. One way is to become an intervenor, or party to the proceeding. This is a legal position that carries certain rights and responsibilities, and gives parties legal standing to request a rehearing and challenge a Commission decision in court. The second way to participate is to file comments with the Secretary of the Commission (Secretary). The comment period to respond to the NOA closed on December 10, 2018. Between the filing of Mountain Valley's application, and December 31, 2018, 42 parties filed for intervenor status. However, five additional entities filed late motions to become intervenors after the comment period closed, including the Monacan Indian Nation and Sappony Tribe. The Commission has granted these requests for late intervention.

From the time we accepted Mountain Valley's request to start the PF process on May 3, 2018 up to the filing of the application on November 6, 2018, we received 181 comment letters on the record about the Project. Table 1.3-1 lists the environmental topics raised in comments received on the Project during the scoping period. The most common comments were on Project need, water quality, socioeconomics, and health and safety topics. Table 1.3-1 also includes comments received after the formal scoping period ended on September 10, 2018, including relevant environmental comments raised by individuals requesting to be intervenors in the Commission's Southgate proceeding.

TABLE 1.3-1

Issues Identified During the Scoping Process for the Southgate Project

Issues	Percentage of all Comments Received a/	EIS Section Addressing Issue
General	**62**	
Project purpose and need	40	1.1
Coordination of NEPA reviews by cooperating agencies		1.2
Pre-filing process		1.3
Compliance with environmental permits		1.4
Right-of-way width		2.3.1
Depth of cover		2.4.1.3
Non-jurisdictional facilities		2.2
Timeframes and project schedules		2.5
Future project expansion		2.8
Mitigation measures		4.0
Exportation of natural gas		1.1
Alternatives	**25**	**3.0**

TABLE 1.3-1

Issues Identified During the Scoping Process for the Southgate Project

Issues	Percentage of all Comments Received a/	EIS Section Addressing Issue
No Action Alternative		3.2
Energy conservation		3.1.1
Consideration of renewable energy alternatives		3.1.1
Use of other natural gas systems		3.3
Consideration of alternative routes to avoid populated areas and sensitive resources		3.4
Geology	**24**	**4.1**
Potential for seismic activity (earthquakes)		4.1.4.1, 4.1.4.2
Uranium deposits		4.1.4.8
Impacts from landslides		4.1.4.4, 4.1.4.5
Impacts from blasting		4.1.4.6,
Impacts due to construction in karst terrain		4.1.4.5
Soils	**(included in Geology)**	**4.2**
Erosion and sediment control		4.2.2
Contaminated soils		4.2.7
Water Quality and Aquatic Resources	**51**	**4.3, 4.6**
Impacts on groundwater and drinking water supplies		4.3.1.
Impacts on septic systems		4.8.3.1
Dewatering methods		2.4.1.5, 4.3.2.7.
Waterbody crossings		2.4.2.1, 4.3.2
Impacts of horizontal directional drill crossings		2.4.2.1, 4.3.2
Impacts on the pipeline from a flood event		4.1.4.7
Hydrostatic Testing		2.4.1.6, 4.3.2.6
Impacts on fishery resources		4.6.5
Wetlands	**(included in Water and Aquatic resources)**	**4.4**
Impacts on wetlands		4.4.2
Vegetation	**20**	**4.5**
Impacts on interior forest		4.5.4.3
Revegetation of areas cleared during construction		4.5.4
Plans for invasive species control		4.5.3, 4.5.4.1
Wildlife	**20**	**4.6**
Compliance with the Migratory Bird Treaty Act		4.6.3
Impacts on wildlife from habitat removal and project construction		4.6.1.1,
Impacts on wildlife from forest fragmentation/forest edge effect		4.6.1.1

TABLE 1.3-1

Issues Identified During the Scoping Process for the Southgate Project

Issues	Percentage of all Comments Received a/	EIS Section Addressing Issue
Impacts on wildlife from water contamination		4.6.5
Special Status Species	**6**	**4.6, 4.7**
Agency coordination and requirements		4.6.3, 4.7
Evaluation of potential impacts on threatened or endangered species and their habitat		4.7.1
Land Use	**31**	**4.8**
Impacts on future development plans		2.8, 4.8.3.2
Impacts on crop yields and loss of agricultural land		4.8.1.1
Eminent domain and compensation process		4.8.2
Impacts on existing residences and structures during construction and operation		4.8.3
Impacts on recreational and special interest areas		4.8.4
Impacts on landowners from removal of lands from conservation programs with potential tax implications		4.8.4.1
Hazardous waste sites		4.8.5
Visual impacts of cleared rights-of-way & aboveground facilities		4.8.6
Socioeconomics	**44**	**4.9**
Employment opportunities for local contractors and laborers and increased tax revenues		4.9.1, 4.9.7
Impacts on community public safety resources		4.9.3
Impacts on environmental justice communities		4.9.8, 4.13
Impacts on homes, businesses, and land values		4.9.5
Impacts on ability to obtain and afford homeowner's insurance		4.9.5
Impacts on tourism		4.9.6
Impacts on transportation infrastructure (roads, highways, railroads) and traffic		4.9.4
Cultural Resources	**22**	**4.10**
Tribal consultations		4.10.1.2
Impacts on culturally and historically significant properties		4.10.2
Cultural Attachment		4.10.1.3
Air Quality	**20**	**4.11.1**
Consistency with the emissions limits and standards		4.11.1.2
Impacts on air quality		4.11.1.7
Climate Change and Greenhouse gas emissions		4.11.1

TABLE 1.3-1

Issues Identified During the Scoping Process for the Southgate Project

Issues	Percentage of all Comments Received a/	EIS Section Addressing Issue
Noise	**(included in Air Quality)**	**4.11.2**
Potential noise impacts on residences, schools and wildlife		4.11.2
Reliability and Safety	**40**	**4.12**
Emergency response		4.12.1
Remote detection of pipeline leaks		4.12.1
Safety and reliability of constructing and maintaining the pipeline		4.12.1
Pipeline damage from blasting		4.12.1, 4.1.4.6
Pipeline damage from accidental third-party or terrorist actions		4.12.4
Pipeline Safety Standards in rural areas		4.12.1
Cumulative Impacts	**5**	**4.13**
Analysis of cumulative impacts		4.13

a/ Percentages will not sum to 100 percent because most letters include more than one category

During the public scoping period, we received comments regarding if there is a need for the additional natural gas supplies in North Carolina. Others questioned the need for the Project on the grounds that it would not directly benefit the citizens of Virginia. Some stated that construction and operation of the Project would be a burden on affected landowners. In this EIS, we address these comments in either the Alternatives section (see section 3) or in the Socioeconomics section (see section 4.9).

The Commission issued a *Notice of Availability of the Draft Environmental Impact Statement for the Proposed Southgate Project* on July 26, 2019. A formal notice was also published by the Environmental Protection Agency (EPA) in the FR on August 2, 2019, indicating that the draft EIS was available. The draft EIS was mailed to four local libraries. The distribution list was included as appendix A of the draft EIS. The Notice of Availability established a 45-day comment period on the draft EIS that ended on September 16, 2019 and announced the time, date, and location of public comment sessions to take comments on the draft EIS. The notice described procedures for filing comments on the draft EIS and how information about the Project could be found on the FERC's website.

We held three public comment sessions during the draft EIS comment period. The comment sessions were held between August 19 - 22, 2019 in Wentworth and Haw River, North Carolina and Chatham, Virginia. The comment sessions provided interested parties with an opportunity to provide oral or written comments on our analysis of the environmental impacts of the Project as described in the draft EIS. A total of 65 individuals provided either written or oral comments at the sessions. A transcript of each comment session and copies of each written comment are part of the FERC's public record for the Project. In addition, 77 parties submitted a

total of 92 letters in response to the draft EIS. Multiple form letters and petitions were also submitted in response to the draft EIS. The most commonly received comments on the draft EIS related to need for the Project, impacts on water quality, issues associated with the mainline Mountain Valley Pipeline Project (MVP Project), and general comments regarding the content of the draft EIS. All substantive environmental comments on the draft EIS that were received through January 15, 2020 have been addressed in this final EIS. Our responses to relevant comments on the draft EIS are provided in appendix I of this EIS. A subject index is provided in appendix J showing the location of relevant terms in the EIS.

We received numerous comments regarding the MVP Project's failures in erosion and sediment control and concerns about how past performance should be considered in our environmental analysis of the Southgate Project. For the MVP Project in Virginia, Mountain Valley specified and designed its erosion control measures in accordance with the Virginia Erosion and Sediment Control Handbook. Measures employed included the use of clean water diversion berms, conveyance pipes and plunge pools for maintaining upland runoff from entering the right-of-way, use of water bars with sump filters in combination with perimeter erosion and sediment controls (ESC) (i.e., compost filter sock, silt fence, super silt fence, etc.) within the right-of-way to manage stormwater and sediment during construction. The approved ESC and stormwater management plans utilized rainfall data obtained for each county in Virginia in which Project earth-disturbing activities were undertaken. This information was used during the design to account for geographic variation in storm intensity. In West Virginia, erosion control measures were designed and deployed consistent with the West Virginia Erosion and Sediment Control Best Management Practice Manual. The Commission's third-party environmental compliance monitors conducted daily environmental inspections of the project right-of-way throughout construction and restoration phases of the project to document compliance with Mountain Valley's proposed mitigation and the conditions of the Commission's October 13, 2017 Order Issuing Certificates regarding the MVP Project.

Throughout the construction and restoration phases of the MVP Project, Mountain Valley has continually upgraded or revised ESC implementation to meet changing weather conditions and to address controls during severe storm events. Still, 2018 broke annual precipitation records. For Roanoke County, Virginia, 2018 was the wettest year on record, with data compiled since 1895. Rainfall during the year totaled about 63 inches, which represents a 51 percent increase over the annual median for the 124-year period. The year included intense rainfall events over short periods, such as those in September and October from Hurricanes Florence and Michael, and Subtropical Storm Alberto. All of this precipitation generated stormwater and flooding within each of the watersheds affected by the MVP Project.

Because 2018 was an unusual year yielding record breaking precipitation amounts and given the flatter terrain where the Southgate Project would be constructed, we do not anticipate the Southgate Project would experience the same issues with erosion and sediment control. For the Southgate Project, Mountain Valley proposes to use Virginia and North Carolina standards for erosion and sediment control, which mandate that control measures be designed to handle storm events that are reasonably expected to occur during the period of construction. Mountain Valley has also agreed to implement supplemental control measures, which exceed the minimum standards required by these states. As discussed in section 4.3, Mountain Valley would monitor weather conditions during construction and appropriately adjust erosion control measures as necessary to minimize the impacts from heavy precipitation events. To document the effectiveness

of erosion control devices and verify that they are properly maintained, FERC representatives would be on-site during construction to monitor compliance. Weekly reports would document Mountain Valley's compliance with erosion control requirements.

The Commission's *Notice of Availability* for this final EIS is being mailed to the agencies, tribes, individuals, and organizations on the distribution list provided in appendix A. The *Notice of Availability* includes information on how this final EIS may be viewed and downloaded from the FERC website. This final EIS was filed with the EPA for issuance of a formal public *Notice of Availability* in the FR. In accordance with CEQ's regulations implementing NEPA, no agency decision on a proposed action may be made until 30 days after the EPA publishes a *Notice of Availability* for this EIS. However, the CEQ regulations provide an exception to this rule when an agency decision is subject to a formal internal process. In such cases, the agency decision may be made at the same time the notice of the EIS is published, allowing both periods to run concurrently. Should the Commission issue an Order authorizing the Project, it would be subject to a 30-day rehearing period. Therefore, the Commission could issue its decision concurrently with the EPA's notice.

1.4 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS

The FERC and the other federal agencies that must make a decision on the Project are required to comply with numerous federal statutes in addition to NEPA, including the BGEPA, Clean Air Act (CAA), CWA, ESA, MBTA, NHPA, and RHA. Each of these statutes has been taken into account in the preparation of this final EIS, as discussed below.

Table 1.4-1 lists the major federal, state, and local permits, approvals, and consultations for construction and operation of the Project. The table also provides the dates, or anticipated dates, when Mountain Valley commenced, or anticipates commencing, formal permit and consultation procedures.

TABLE 1.4-1

Major Environmental Permits, Licenses, Approvals, and Consultations Applicable to the Southgate Project

Agency	Permit/ Consultation/ Regulations	Submittal Date	Receipt Date
Federal			
FERC	Certificate under Section 7 of the Natural Gas Act, 18 CFR 380	November 6, 2018 application filed with the FERC	Pending
Advisory Council on Historic Preservation (ACHP)	Comment on undertakings under Section 106 of the NHPA; 36 CFR 800	November 14, 2019, FERC staff letter to ACHP with finding of adverse effects and invitation to participate in resolution	December 10, 2019 letter from ACHP to FERC declining to participate

TABLE 1.4-1

Major Environmental Permits, Licenses, Approvals, and Consultations Applicable to the Southgate Project

Agency	Permit/ Consultation/ Regulations	Submittal Date	Receipt Date
COE - Norfolk District, Wilmington District	33 CFR 320 & 322; and Section 404 of CWA, 33 CFR 323 and Joint Permit Application under Section 401 of CWA	Application submitted November 30, 2018, Additional information submitted January 17, February 8, and October 2019	Pending
FWS – Virginia and North Carolina Field Offices	Consultations under Section 7 of ESA, 50 CFR 402; BGEPA, 50 CFR 22; and MBTA, 50 CFR 21	Informal communications initiated by Applicant May 2018; Notice of FERC filing sent November 6, 2018; Reports submitted February 20, 25, 2019. Virginia freshwater mussel survey report provided May 16, 2019. November 12, 2019 - North Carolina aquatic survey report.	Pending
State of Virginia			
VADEQ – Water Division	Section 401 CWA – Water Quality Certificate and Water Protection Permit for impacts on non-404 regulated wetlands or waters	November 30, 2018	Pending
	Section 402 CWA National Pollutant Discharge Elimination System (NPDES) Permit – Construction Stormwater Permit	March 2019	Pending
VADEQ – Air Division	Article 6 Minor New Source Air Quality Permit	November 8, 2018	Pending
Virginia Department of Conservation and Recreation	State listed species consultation	May 2018; Notice of FERC filing sent November 6, 2018; Additional information sent February 20, 21, 25, 2019	Pending

TABLE 1.4-1

Major Environmental Permits, Licenses, Approvals, and Consultations Applicable to the Southgate Project

Agency	Permit/ Consultation/ Regulations	Submittal Date	Receipt Date
	Floodplain Management Program – local determination of Special Flood Hazard Area	Mountain Valley continues to coordinate with local floodplain administration. Anticipated submittal February 2020.	Pending
Virginia Department of Historic Resources	Section 106 NHPA Consultations	Reports submitted November 6, 2018; February 22, 2019; March 25, 2019	February 13, 2019 comments on first draft survey reports. May 10, 2019 comments on first testing report May 16, 2019 comments on second testing report
Virginia Department of Transportation	Road bonds and crossing permits under Code of Virginia 33.1-12	August 2019	Pending
Virginia Marine Resources Commission	Permit for encroachment on state-owned submerged lands	November 30, 2018	Pending
Virginia Department of Game and Inland Fisheries	State listed species consultation	May 2018 Freshwater mussel survey report provided May 16, 2019	Pending
State of North Carolina			
NCDEQ - Division of Water Resources	Joint Permit Application under Section 401 of CWA; Isolated/non-404 wetlands and water permit	Application submitted November 30, 2018; Additional information submitted January 17, February 8, 2019	Denial on June 3, 2019 [a/]. Resubmittal August, 2019
	Jordan Lake Watershed Major Variance	February 8, 2019	Denial on June 3, 2019. Resubmittal August 2019
	Floodplain Permit	Mountain Valley continues to coordinate with local floodplain administration. Anticipated submittal February 2020.	Pending
NCDEQ – Division of Energy, Mineral and Land Resources	General Permit NCG010000 to discharge stormwater under the NPDES for Construction Activities	April 2019	Pending

TABLE 1.4-1

Major Environmental Permits, Licenses, Approvals, and Consultations Applicable to the Southgate Project

Agency	Permit/ Consultation/ Regulations	Submittal Date	Receipt Date
NCDEQ – Natural Heritage Program	State listed species consultation	May 2018; February 20, 25, 2019	Pending
North Carolina Wildlife Resources Program	Listed Species Consultations, Fish and Wildlife Coordination Act, North Carolina Environmental Policy Act	May, August 10, 20 & 31, September 20, 2018; November 12, 2019 – NC Aquatic Survey Report	Pending
North Carolina Department of Natural and Cultural Resources	Section 106 NHPA Consultations	Reports submitted November 6, 2018; March 13, 2019; March 28, 2019	December 20, 2018 comments on first draft survey reports April 15, 2019 comments on first testing report May 7, 2019 comments on Addendum 1 survey report
North Carolina Department of Transportation	Road bonds and crossing permits	June 2019	Pending

a/ Mountain Valley's application was denied on procedural grounds until a preferred route was identified by the FERC, at which time Mountain Valley was instructed it could reapply for the Joint Permit Application under Section 401 of the CWA; Isolated/non-404 wetland and water permit.

1.4.1 Bald and Golden Eagle Protection Act

The BGEPA (16 U.S.C. § 668) was originally passed by Congress in 1940, and amended in 1962 to also protect golden eagles. The 1972 amendment increased penalties for violation of the Act. The 1978 amendment allowed taking of golden eagle nests that interfere with resource development, with permission from the Secretary of the Interior. The BGEPA prohibits taking without a permit, or taking with wanton disregard for the consequences of an activity, any bald or golden eagle or their body parts, nests, chicks, or eggs, which includes collection, molestation, disturbance, or killing. The BGEPA protections include provisions not included in the MBTA, such as the protection of unoccupied nests and a prohibition on disturbing eagles. The BGEPA includes limited exceptions to its prohibitions through a permitting process. This EIS discusses compliance with the BGEPA in section 4.5.

1.4.2 Clean Air Act

Congress originally passed the CAA (42 U.S.C. § 85) in 1963, and made major revisions to it in 1970, 1977, and 1990. The primary objective of the CAA, as amended, is to establish federal standards for various pollutants from both stationary and mobile sources, and to provide for the regulation of polluting emissions via state implementation plans. In addition, the CAA was established to prevent significant deterioration in certain areas where air pollutants exceed national

standards and to provide for improved air quality in areas that do not meet federal standards (nonattainment areas).

The EPA has regulatory authority under the CAA. Section 309 of the CAA directs the EPA to review and comment in writing on environmental impacts associated with all major federal actions. Section 4.11.1 of this EIS has a detailed discussion of air quality issues.

1.4.3 Clean Water Act

The CWA got its legislative start as the Federal Water Pollution Control Act of 1948, but the Act was amended and renamed in 1972. The CWA (33 U.S.C. § 1251 et seq.) establishes the basic structure for regulating discharges of pollutants into the Waters of the United States and regulating quality standards for surface waters. Section 404 of the CWA outlines procedures by which the COE can issue permits for the discharge of dredged or fill material into Waters of the United States, including wetlands. The EPA also independently reviews Section 404 CWA applications and has veto power for permits issued by the COE.

Mountain Valley submitted its original Section 404 CWA permit applications to the Norfolk and Wilmington Districts of the COE on November 30, 2018.

The EPA has also delegated Water Quality Certification (WQC) under CWA Section 401 and National Pollutant Discharge Elimination System (NPDES) permitting under CWA Section 402 to state agencies (i.e., the VADEQ and the NCDEQ) in states crossed by the Project. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. The NPDES permit program controls stormwater discharges.

Mountain Valley submitted its Section 401 applications to the VADEQ and the NCDEQ in November 30, 2018. On June 3, 2019, NCDEQ issued a letter of denial of the Section 401 Water Quality Certification for the Project based on procedural grounds. Mountain Valley re-filed its application with NCDEQ in August 2019. Section 4.3 of this EIS discusses impacts on water resources that may be applicable to compliance with the CWA.

1.4.4 Endangered Species Act

The Endangered Species Preservation Act of 1966 was amended in 1969, and evolved into the ESA (16 U.S.C. § 1531-1544) in 1973. Section 7 of the ESA states that any project authorized, funded, or conducted by any federal agency (in this case, the FERC) should not "…jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined…to be critical…." As previously stated, the FERC, as the lead federal agency for the Project, is required to consult with the FWS to determine whether any federally listed or proposed endangered or threatened species or their designated critical habitats would be affected by the Project. Additional information regarding compliance with the ESA can be found in section 4.7.

1.4.5 Migratory Bird Treaty Act

The MBTA (16 U.S.C. § 703-712) dates back to 1918, but has been amended many times. The MBTA implements various treaties and conventions between the United States (U.S.),

Mexico, Canada, Japan, and Russia for the protection of migratory birds. Birds protected under the MBTA include all common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, native doves and pigeons, swifts, martins, swallows, and others, including their body parts (feathers, plumes, etc.), nests, and eggs. The MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. This EIS discusses compliance with the MBTA in section 4.6.

1.4.6 National Historic Preservation Act

Congress passed the NHPA in 1966 (54 U.S.C. § 3001 et seq.), which has been amended multiple times, most recently in 2014. The NHPA created the National Register of Historic Places (NRHP), established the Advisory Council on Historic Preservation (ACHP), and directed states to appoint SHPOs.

Section 101(d)(6) of the NHPA states that properties of religious and cultural importance to an Indian tribe may be determined to be eligible for the NRHP. In meeting our responsibilities under the NHPA, and our tribal trust obligations, the FERC consulted on a government-to-government basis with Indian tribes that may have an interest in the Project and its potential effects on traditional cultural properties. The current status of government-to-government consultations regarding the identification of historic properties in the area of potential effect (APE) that may have religious or cultural significance to Indian tribes is further discussed in section 4.10.

Section 106 of the NHPA requires the FERC to take into account the effects of its undertakings on historic properties, and afford the ACHP an opportunity to comment. Historic properties include prehistoric or historic sites, districts, buildings, structures, objects, or properties of traditional religious or cultural importance that are listed or eligible for listing on the NRHP. In accordance with the regulations for implementing Section 106 at 36 CFR 800, the FERC, as the lead agency, is required to consult with the appropriate SHPOs, interested Indian tribes, and other consulting parties; identify historic properties in the APE; assess project effects on historic properties; and resolve adverse effects. Mountain Valley, as a non-federal party, is assisting the FERC in meeting its obligations under Section 106 by preparing the necessary information and analyses as allowed under Part 800.2(a)(3). However, the FERC remains responsible for all final determinations. The status of our compliance with the NHPA is summarized in section 4.10 of this EIS.

1.4.7 Federal, State, and Local Permits, Licenses, Approvals, and Consultations

In some cases, Mountain Valley would obtain applicable state and local permits or authorizations, as required under specific state and county laws and regulations in order to allow the Project to move forward. The FERC encourages cooperation between applicants and state and local authorities; however, state and local agencies, through the application of state and local laws, may not prohibit or unreasonably delay the construction or operation of facilities approved by the

FERC. Any state or local permits issued with respect to jurisdictional facilities must be consistent with the conditions of any authorization issued by the FERC.[15]

A list of major federal and state environmental permits, approvals, and consultations for the Project is provided in table 1.4-1. Mountain Valley would be responsible for obtaining all permits and approvals required to construct and operate the Project, regardless of whether or not they appear in this table.

[15] *See* 15 U.S.C. § 717r(d) (2019) (state or federal agency's failure to act on a permit considered to be inconsistent with Federal law); *see also, Schneidewind v. ANR Pipeline Co.,* 485 U.S. 293, 310 (1988) (state regulation that interferes with FERC's regulatory authority over the transportation of natural gas is preempted) and *Dominion Transmission, Inc. v. Summers,* 723 F.3d 238, 243 (D.C. Cir. 2013) (noting that state and local regulation is preempted by the NGA to the extent it conflicts with federal regulation, or would delay the construction and operation of facilities approved by the Commission).

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 PROPOSED FACILITIES

The Project would involve the construction and operation of a welded-steel underground natural gas transmission pipeline and associated aboveground facilities in Virginia and North Carolina. Figure 2.1-1 provides an overview map of the Project. Detailed maps showing the proposed pipeline and facility locations are provided in appendix B.1. The Project facilities would be installed using the methods described in section 2.4.

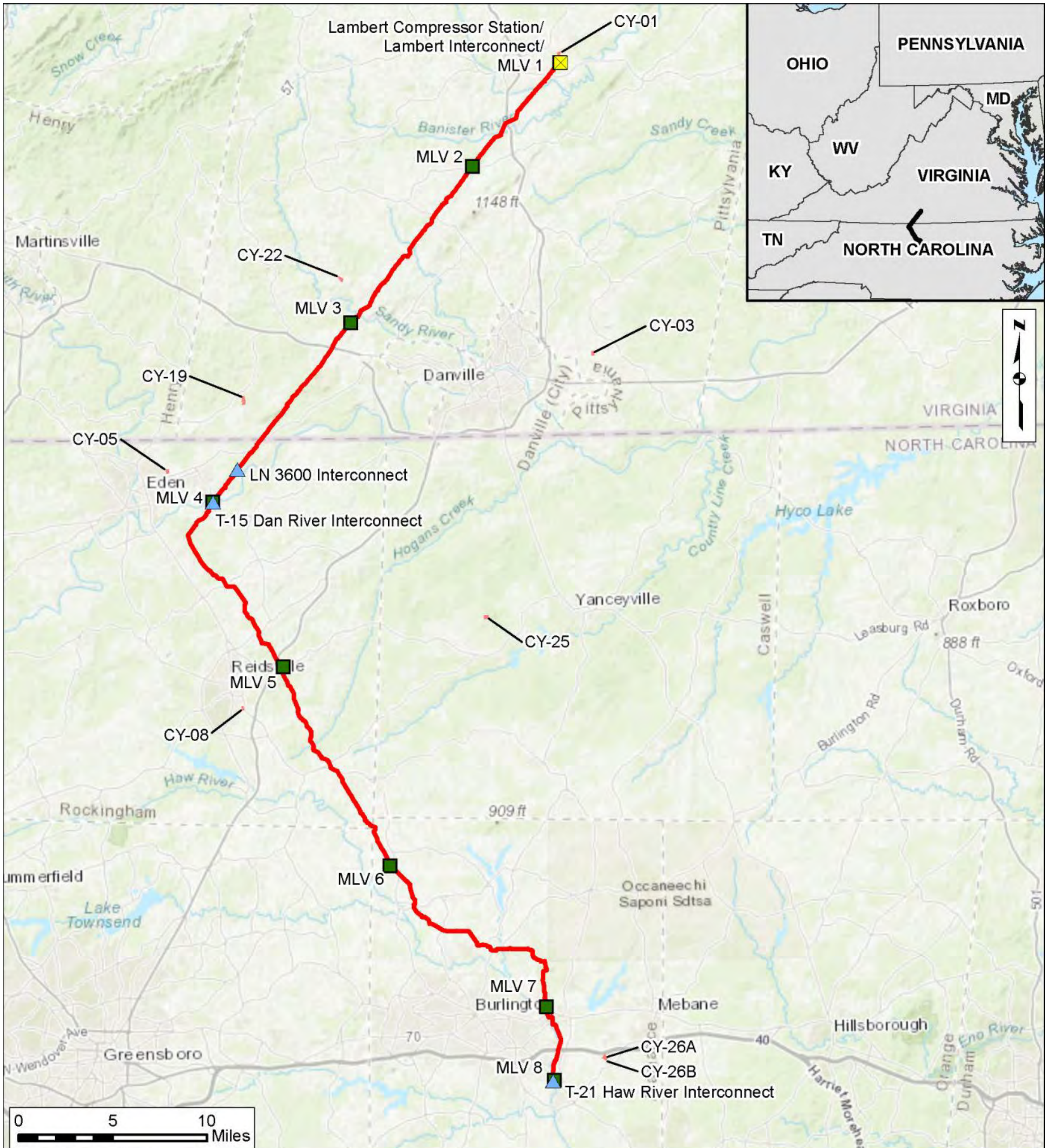
The Project would consist of 75.1 miles of 16-inch and 24-inch-diameter natural gas transmission pipeline. Aboveground facilities would consist of a new compressor station (Lambert Compressor Station) in Virginia; four new interconnects/meter stations; four pig launchers and receivers at three locations; eight MLVs; and four cathodic protection beds.

The pipeline would be constructed of steel and installed underground for the entire length using the methods described in sections 2.4.2 and 2.4.3. The basic functions of the various aboveground facilities are summarized in the following bullets, and additional details are provided below in sections 2.1.1 and 2.1.2.

2.1.1 Pipeline Facilities

The proposed Project includes 75.1 miles of new natural gas pipeline in Virginia and North Carolina. Locations of the pipeline facilities are described in table 2.1-1. Pipeline facilities include the following:

- installation of 0.5 mile of 24-inch-diameter natural gas transmission pipeline (H-605) located in Pittsylvania County, Virginia;
- installation of 30.7 miles of 24-inch-diameter natural gas transmission pipeline (H-650) located in Pittsylvania County, Virginia, and Rockingham County, North Carolina; and
- installation of 43.9 miles of 16-inch-diameter natural gas transmission pipeline (H-650) located in Rockingham and Alamance County, North Carolina.



Proposed Pipeline Route
Meter Station/Interconnect
Compressor Station
Mainline Valve
Yard

Figure 2.1-1

Southgate Project

Southgate Overview Map

TABLE 2.1-1

Southgate Project Pipeline Facilities

Milepost a/	Pipeline / Diameter	County, State	Approximate Length (miles) b/
0.0 – 0.5	H-605 Pipeline / 24-inch	Pittsylvania, VA	0.5
0.0RR – 26.1	H-650 Pipeline / 24-inch	Pittsylvania, VA	26.4
26.1 – 30.4	H-650 Pipeline / 24-inch	Rockingham, NC	4.3
30.4 – 52.6	H-650 Pipeline / 16-inch	Rockingham, NC	22.4
52.6 – 73.2RR	H-650 Pipeline / 16-inch	Alamance, NC	21.5
	Total (H-605 and H-650 pipelines)		**75.1**

a/ Mileposts with an "RR" indicate locations where a re-route was incorporated into the pipeline alignment.
b/ The milepost numbering does not directly correspond to actual pipeline length due to the incorporation of reroutes.

The pipeline route begins with a new 0.5-mile pipeline (H-605) that would interconnect the Mountain Valley Pipeline Project to the Lambert Compression Station. From the Lambert Compressor Station, the proposed Southgate pipeline (H-650) would proceed 74.6 miles through Pittsylvania County, Virginia, and Rockingham and Alamance Counties, North Carolina. The pipeline has been designed to transport 375 MMcf/d of natural gas. The maximum allowable operating pressure (MAOP) for the H-605 pipeline would be 1,480 pounds per square inch gauge (psig) and H-650 pipeline would be 1,440 psig. For 36.8 miles (49 percent) of the route, the Project would be collocated with existing utility corridors and rights-of-way (see table 2.1-2). The proposed route is considered collocated with an existing corridor if the new permanent right-of-way is located immediately adjacent to or overlaps the existing utility right-of-way.

TABLE 2.1-2

Summary of Pipeline Collocated with Existing Rights-of-Way for the Southgate Project

Collocation Type	Virginia (miles)	North Carolina (miles)	Total (miles)	Percent of Total Project Length
Overhead Power Lines/Electric Transmission Line Rights-of-Way	0	11.9	11.9	15.8
Pipeline Rights-of-Way	19.1	5.8	24.9	33.2
Total	**19.1**	**17.7**	**36.8**	**49.0**

2.1.2 Aboveground Facilities

Mountain Valley proposes to construct a new compressor station (Lambert Compressor Station) in Pittsylvania County, Virginia; four new meter stations; four interconnects; four pig launchers and receivers at three locations; and eight MLVs. The basic functions of the aboveground facilities are summarized below, and additional details regarding each facility is provided below in table 2.1-3.

- Compressor stations use engines to maintain pressure within the pipeline in order to deliver the contracted volumes of natural gas to specific points at specific pressures. Compressors are housed in buildings that are designed to attenuate noise and allow for operation and maintenance activities. Compressor stations also typically include administrative, maintenance, storage, and communications buildings, and can include metering and pig launcher/receiver facilities discussed below. Most stations consist of a developed, fenced area within a larger parcel of land that remains undeveloped. The location of the compressor station and amount of compression needed are determined primarily by hydraulic modeling.
- Interconnects (meter stations) measure the volume of gas removed from or added to a pipeline system. Most meter stations consist of above and below ground piping within a small graveled area with small building(s) that enclose the measurement equipment. Mountain Valley would construct and operate interconnects within the Lambert Compressor Station, at customer delivery points, and at interconnections with other interstate transmission systems.
- MLVs consist of a small system of aboveground and underground piping and valves that control the flow of gas within the pipeline and can also be used to vacate, or blow off, the gas within a pipeline segment, if necessary. Five of the MLVs would be installed within the operational rights-of-way of the pipeline right-of-way. Three of the MLVs would be installed within the limits of associated facilities.
- Launchers and receivers are facilities where internal pipeline cleaning and inspection tools, referred to as "pigs," can inserted or retrieved from the pipeline. Pig launchers/receivers consist of an aboveground group of piping within the pipeline right-of-way or other aboveground facility boundaries.
- Cathodic protection systems help prevent corrosion of underground facilities. These systems typically include a small, aboveground transformer-rectifier unit and an associated anode groundbed located on the surface or underground. Mountain Valley identified locations where groundbeds would extend off of the pipeline right-of-way for a short distance.

TABLE 2.1-3

Aboveground Facilities for the Southgate Project

Facility	County, State	MP	Description
Lambert Compressor Station (with Lambert Interconnect, MLV 1 and pig launcher)	Pittsylvania, VA	0.0RR	A proposed new 28,915-hp compressor station consisting of two natural gas turbine-driven compressors housed in one compressor building that would take natural gas from the proposed H-605 pipeline at the Lambert Interconnect and discharge into the H-650 pipeline. This location would include the Lambert Interconnect, MLV 1 and a 24-inch pig launcher.
Lambert Interconnect (within Lambert Compressor Station, with pig launcher)	Pittsylvania, VA	0.0RR	New interconnecting meter station at the Lambert Compressor Station to receive gas from the Mountain Valley Pipeline system via the H-605 pipeline and discharge into the Lambert Compressor Station.
LN 3600 Interconnect	Rockingham, NC	28.2	New interconnecting meter station to take gas from the existing East Tennessee LN 3600 and discharge into the Southgate pipeline.
T-15 Dan River Interconnect (with MLV 4 and pig launcher and receiver)	Rockingham, NC	30.4	New interconnecting meter station to take gas from the Southgate pipeline and discharge into the existing DENC T-15 Dan River facility. This location would include MLV 4 and a 16-inch pig launcher and 24-inch receiver
T-21 Haw River Interconnect (with MLV 8 and pig receiver)	Alamance, NC	73.2RR	New interconnecting meter station to take gas from the Southgate pipeline and discharge into the existing DENC T-21 Haw River facility. This location would include MLV 8 and a 16-inch pig receiver.
MLV 1 (within Lambert Compressor Station at Lambert Interconnect)	Pittsylvania, VA	0.0RR	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping at the Lambert Compressor Station connection to H-650 pipeline.
MLV 2	Pittsylvania, VA	7.4	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping within the permanent easement north of Dry Fork Road.
MLV 3	Pittsylvania, VA	18.3	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping within the permanent easement south of Pine Lake Road.
MLV 4 (within T-15 Dan River Interconnect)	Rockingham, NC	30.4	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping at the T-15 Dan River Interconnect.
MLV 5	Rockingham, NC	42.2	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping within the permanent easement south of Hwy 158.

TABLE 2.1-3

Aboveground Facilities for the Southgate Project

Facility	County, State	MP	Description
MLV 6	Alamance, NC	55.1	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping within the permanent easement south of Gilliam Church Road.
MLV 7	Alamance, NC	68.7	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping within the permanent easement south of Haw River Hopedale Road.
MLV 8 (within T-21 Haw River Interconnect)	Alamance, NC	73.2RR	Mainline valve with aboveground valve operators, risers, blowdown valves, and crossover piping at the T-21 Haw River Interconnect.

The local service provider would provide primary telecommunication services to aboveground facilities. Mountain Valley would install very small aperture terminal (VSAT) equipment at the Lambert Compressor Station, meter stations, and MLV sites for backup telecommunications service. Mountain Valley proposes to install an 80-foot communication tower at the Lambert Compressor Station.

Electrical services from the local distribution company would be installed at meter stations, MLVs, and cathodic protection locations. The primary power source at the Lambert Compressor Station would be natural gas generators; however, backup electrical service would be provided by the local distribution company.

2.1.3 Cathodic Protection

Cathodic protection units would include both aboveground and underground components. These units are installed to decrease or prevent corrosion of the pipe, by running a low electric current. Cathodic protection equipment could consist of underground negative connection cables, linear anode cable systems, aboveground junction boxes, and rectifiers. Mountain Valley is still evaluating locations to install cathodic protection at four locations along the Project; however, the preferred locations are provided in table 2.1-4.

TABLE 2.1-4

Cathodic Protection Units for the Southgate Project

MP	County, State	Cathodic Protection Type
9.4	Pittsylvania, VA	Conventional
20.0	Pittsylvania, VA	Conventional
44.9	Rockingham, NC	Conventional
60.2	Alamance, NC	Conventional

According to Mountain Valley, the permanent footprint of conventional anode and cable type cathodic surface groundbeds would require additional right-of-way with dimensions of about 50 feet wide and 500 feet long to be located perpendicular to the pipeline right-of-way. Surface groundbeds would not require a temporary workspace adjacent to the permanent footprint.

2.2 NON-JURISDICTIONAL FACILITIES

Under Section 7 of the NGA, the FERC is required to consider, as part of its decision to authorize interstate natural gas facilities, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. As such, FERC has no authority or jurisdiction over the siting, permitting, licensing, construction, or operation of these facilities. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities (e.g., a power plant at the end of a FERC-jurisdictional pipeline) or they may be merely associated as minor, non-integral components of the jurisdictional facilities that would be constructed and operated as a result of the Certification of the proposed. These facilities are addressed below.

The non-jurisdictional facilities associated with the Project would include installation of aboveground and underground powerlines and telecommunications from existing nearby power poles to the meter stations, Lambert Compressor Station, MLVs, and cathodic protection groundbeds. These extensions would range from 50 feet to 1,684 feet in length. Telecommunications would be radio and/or cellular provided by the local telecommunications provider with VSAT service as a backup. Dominion Energy would make minor improvements to its Dan River and Haw River delivery points in conjunction with the Project. Impacts associated with these non-jurisdictional facilities are addressed in section 4.13.

2.3 LAND REQUIREMENTS

Construction of the Project would disturb 1,465.9 acres of land. This includes the pipeline construction right-of-way, permanent right-of-way, additional temporary workspaces (ATWS), aboveground facilities, contractor and storage yards (yards), cathodic protection areas, and new and improved access roads (see table 2.3-1). Operation of the Project would use about 450 acres, which includes the permanent pipeline easements, aboveground facilities, and permanent access roads.

TABLE 2.3-1

Land Requirements for the Southgate Project

Project Component/State	Land Affected During Construction (acres)	Land Affected During Operation (acres)
PIPELINE FACILITIES		
Virginia		
H-605 Pipeline Right-of-Way	7.8	2.6
H-650 Pipeline Right-of-Way	399.6	150.3
North Carolina		
H-650 Pipeline Right-of-Way	752.1	278.7
Pipeline Total	***1,159.5***	***431.6***
ABOVEGROUND FACILITIES		
Virginia		
Lambert Compressor Station/Interconnect/MLV 1	19.1	8.6
MLV 2 and 3	<0.1	<0.1
North Carolina		
LN3600 Interconnect	4.6	0.9
T-15 Dan River Interconnect/MLV 4	5.2	0.8
MLV 5, 6, and 7	<0.1	<0.1
T-12 Haw River Interconnect/MLV 8	1.3	0.6
Aboveground Facilities Total	**30.4**	**11.1**
CONTRACTOR YARDS		
Virginia	98.1	0.0
North Carolina	76.8	0.0
Contractor Yards Total	**174.9**	**0.0**
ACCESS ROADS (acres for improvement of existing roads and new road construction)		
Virginia	37.7	2.3
North Carolina	61.8	3.4
Access Roads Total	**99.5**	**5.7**
CATHODIC PROTECTION BEDS		
Virginia	1.1	1.1
North Carolina	0.7	0.7
Cathodic Protection Groundbeds Total	**1.8**	**1.8**
Virginia Totals	**563.5**	**165.0**
North Carolina Totals	**902.6**	**285.2**
Project Totals	**1,465.9**	**450.0**

Note: Pig launchers and receivers will be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect), therefore, acreage calculations for the pig launchers and receivers are included with those facilities. MLVs 1, 4, and 8 will be located within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect), therefore, acreage calculations for MLVs 1, 4, and 8 are included with those facilities.

2.3.1 Pipelines

Mountain Valley would generally use a 100-foot-wide construction right-of-way to install the pipeline in uplands and a 75-foot-wide construction right-of-way through wetlands. Right-of-way configurations proposed by Mountain Valley for its pipeline are included in appendix B.2. Construction of the pipelines would affect a total of 1,159.5 acres, including ATWS, but excluding staging areas, yards, access roads, and cathodic protection beds. Pipeline construction would affect 407.4 acres of land in Virginia and 752.1 acres in North Carolina. The temporary work areas used during construction of the pipelines would be restored to their pre-construction condition and use after the facilities are built.

Following construction, Mountain Valley would retain a 50-foot-wide permanent right-of-way to operate the pipeline. The operational permanent easement for the pipelines would require about 431.6 acres. Operation of the pipelines would affect 152.9 acres in Virginia and 278.7 acres in North Carolina.

2.3.2 Aboveground Facilities

A total of 30.4 acres would be affected by construction of aboveground facilities. Operation of aboveground facilities would affect a total of 11.1 acres. The temporary work areas used during construction of the aboveground facilities would be restored to their pre-construction condition and use after the facilities are built.

Construction of the new Lambert Compressor Station, Lambert Interconnect, and MLV 1 would be within the same facility on land owned by Mountain Valley and would affect about 19 acres all in Pittsylvania County, Virginia. Operation of these facilities would require 8.6 acres in total.

Construction of the remaining interconnects and MLVs would affect a total of 11.1 acres. Construction and operation in Virginia would require about 0.04 acre for MLV 2 and MLV 3. In North Carolina, construction of these facilities would require about 11 acres, and operation would use a total of 2.3 acres.

2.3.3 Additional Temporary Workspaces

During construction of the pipeline facilities, Mountain Valley would require ATWS in areas such as the following:

- adjacent to crossings of railroads, waterbodies, wetlands, other utilities, and at some roadways;
- construction constraints that require special construction techniques, such as horizontal directional drill (HDD) entry and exit locations;
- HDD pullbacks;
- conventional bores;
- areas requiring extra trench depth;

- timber storage areas;
- installation of erosion and sediment controls, and stormwater management to meet state regulations;
- areas with steep side slopes and difficult terrain;
- pipeline interconnects;
- areas for extra spoil storage;
- areas for temporary storage of segregated topsoil;
- locations with soil stability concerns;
- truck turnarounds;
- equipment passing lanes; and
- staging and fabrication areas.

As proposed by Mountain Valley, the Project would require 94.8 acres of ATWS in Virginia and 198.1 acres in North Carolina, affecting a total of 292.9 acres combined. ATWS would be used only during construction of the Project. After pipeline installations, all of the ATWS would be restored to their pre-construction condition and use, to the extent possible. Appendix B.3 identifies where Mountain Valley has proposed ATWS within 50 feet of a wetland or waterbody.

2.3.4 Contractor Yards

Mountain Valley would need temporary yards during construction to store pipe, materials, and equipment; set up offices; and mobilize workers. Land requirements for contractor yards proposed for temporary use during construction of the Project are provided in table 2.3-1. Depending upon the conditions at each site, Mountain Valley would clear trees, grade, modify drainage, import gravel or crushed rock, install buildings (usually pre-fabricated mobile offices), and construct internal roadways as needed. After pipeline installation, Mountain Valley would allow yards to return to pre-construction use, unless the landowner requests otherwise.

During pipeline construction, Mountain Valley would use four yards in Virginia and five yards in North Carolina (see table 2.3-2). The yards would temporarily occupy about 175 acres. These yards are depicted on the maps in appendix B.1.

TABLE 2.3-2

Contractor Yards for the Southgate Project

Name	Approx. MP	County	State	Municipality	Parcel	Land Use a/	Acres
CY-01	0.0 (on H-605)	Pittsylvania	VA	Chatham	VA-PI-001.000	OL	22.2
CY-22	16.1 (1.9 miles northwest)	Pittsylvania	VA	--	VA-PI-218.CY	FW, OL	23.1 (forest to be cleared 2.9)
CY-03	20.5 (13 miles east)	Pittsylvania	VA	Danville	VA-PI-142.200.CY	FW, OL, CI	16.8 (forest to be cleared 0.1)
CY-19	24.7 (1.9 miles northwest)	Pittsylvania	VA	Cascade	VA-PI-207	OL	36.2
CY-05	28.3 (3.6 miles west)	Rockingham	NC	Eden	NC-RO-001.200.CY NC-RO-001.300.CY NC-RO-001.400.CY	CI, OL	18.3
CY-25	38.9 (12.3 miles east)	Caswell	NC	Yanceyville	NC-CA-001.000.CY	FW, OL	24.9 (forest to be cleared 0.1)
CY-08	44.6 (2.9 miles west)	Rockingham	NC	Reidsville	NC-RO-136.100.CY NC-RO-136.300.CY	OL, CI	11.5
CY-26A	71.7 (2.4 miles east)	Alamance	NC	Swepsonville	NC-AL-226.CY NC-AL-227.CY	OL	11.8
CY-26B	71.7 (2.4 miles east)	Alamance	NC	Swepsonville	NC-AL-226.CY NC-AL-227.CY	FW, OL	10.3 (forest to be cleared 0.2)
						Total	**174.9**

a/ CI = Commercial / Industrial; FW = Upland Forest / Woodland; OL = Upland Open Land

2.3.5 Access Roads

Mountain Valley would mostly use existing public and private roads to gain access to its respective rights-of-way. However, many existing roads are not suitable for construction traffic.

In addition to the use of public roads, Mountain Valley would use 119 (totaling 30.5 miles) existing access roads and construct 41 new roads (totaling 1.8 miles). Use of these 160 access roads would affect about 99.5 acres. Almost all of the existing access roads (113) would require improvements for pipeline construction traffic. Mountain Valley would use 17 of the access roads for permanent access to the right-of-way and aboveground facilities, including 7 existing roads and 10 new roads. Permanent use of access roads would affect 5.7 acres. Appendix B.4 identifies

each road improvement proposed for the Project. Additional information regarding access roads can be found in appendix B.4 and section 4.8.1.

2.3.6 Cathodic Protection

After installation of the pipeline, Mountain Valley would install cathodic protection rectifiers and groundbeds at four sites. These facilities would affect about 1.8 acres for construction and operation.

2.4 CONSTRUCTION PROCEDURES

Mountain Valley would design, construct, operate, and maintain its respective pipelines and facilities in accordance with U.S. Department of Transportation (DOT) regulations under 49 CFR 192 (Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards) and other applicable federal and state regulations. DOT regulations specify pipeline material selection; minimum design requirements; protection from internal, external, and atmospheric corrosion; and qualification procedures for welders and operations personnel, in addition to other design standards. Mountain Valley would also comply with the siting and maintenance requirements under 18 CFR 380.15 and other applicable federal and state regulations, including the requirements of the U.S. Department of Labor, Occupational Safety and Health Administration. These safety regulations are intended to ensure adequate protection of the public, pipeline workers, contractors, and employees, and to prevent natural gas pipeline accidents and failures. Pipeline safety is discussed further in section 4.12 of this EIS.

Mountain Valley agreed to adopt the FERC's general construction, restoration, and operational mitigation measures outlined in our *Upland Erosion Control, Revegetation and Maintenance Plan* (FERC Plan) with modifications, herein referred to as Mountain Valley's Plan[1]. Mountain Valley also agreed to adopt our *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures)[2] with modifications; herein referred to as Mountain Valley's Procedures[3]. Mountain Valley requested modifications to certain requirements of the FERC Plan and Procedures and provided site-specific justifications which are further described below and in sections 4.3 and 4.4.

The requirements of the FERC Procedures that Mountain Valley requested modifications of are:

- unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, instream work, except that required to install or

[1] Mountain Valley's Plan was included in its October 23, 2019 application supplement. Mountain Valley's Plan can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191023-5022 in the "Numbers: Accession Number" field.

[2] FERC Plan and Procedures are available on the FERC Internet website at: http://www.ferc.gov/industries/gas/enviro/guidelines.asp.

[3] Mountain Valley's Procedures were included in its October 23, 2019 application supplement. Mountain Valley's Procedures can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191023-5022 in the "Numbers: Accession Number" field.

remove equipment bridges, must occur during the following time windows: b. coolwater and warmwater fisheries– June 1 through November 30 (Section V.B.1.b.);

- that prior to construction, site-specific justifications must be filed with the Secretary, for review and written approval, for extra work areas that would be closer than 50 feet from a waterbody or wetland (V.B.2.a and VI.B.1.a);
- where pipelines parallel a waterbody, at least 15 feet of undisturbed vegetation must be maintained between the construction right-of-way and the waterbody (and any adjacent wetland), except where maintaining this offset would result in greater environmental impact (Section V.B.3.c); and
- the width of the construction right-of-way should be limited to 75 feet or less in wetlands.

Mountain Valley has requested to locate extra work areas closer than 50 feet from a waterbody or waterbody in certain locations, and has requested modifications to the 15-foot buffer described above. Mountain Valley also requested a greater than 75-foot-wide construction corridor at four wetland locations due to utility lines, road crossing, and extensive HDD operations. The locations where these modifications would be located for the Project are identified in appendix B.3 and B.8. In addition, based on coordination with state agencies, Mountain Valley is requesting modified waterbody crossing windows. We have reviewed the requested modifications and have found them acceptable.

Mountain Valley is also requesting modification to the FERC Plan in order to provide enhanced inspection frequency per state requirements in watersheds with established total maximum daily loads (TMDL); and enhanced spacing of temporary slope breakers. In addition, Mountain Valley is requesting an adjustment to the mowing timing restrictions to protect migratory birds per agency consultation. We have reviewed the requested modifications and have found them acceptable

To further reduce construction impacts, Mountain Valley has indicated that it would implement a Project-specific *Erosion and Sediment Control Plan* (E&SC Plan)[4] that outlines best management practices (BMPs) and the placement of erosion control devices (ECDs) within Project work areas in accordance with Virginia and North Carolina regulations. The E&SC Plan has been submitted to the states for review and approval. The E&SC Plan would contain measures that are consistent with and/or would provide greater protection than those required in Mountain Valley's Plan and Procedures.

Mountain Valley has also agreed to implement supplemental control measures, which exceed the minimum standards required by these states. As discussed in section 4.3, Mountain Valley would monitor weather conditions during construction and appropriately adjust erosion

[4] Mountain Valley's Virginia and North Carolina draft narrative *Erosion and Sediment Control Plan* (E&SC Plan) was filed on June 21, 2019. The E&SC Plan can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190621-5150 in the "Numbers: Accession Number" field.

control measures as necessary to minimize the impacts from heavy precipitation events. In addition, Mountain Valley has developed a Project-specific *Spill, Prevention, Control, and Countermeasures Plan* (SPCC Plan)[5] and an *Unanticipated Discovery of Contamination Plan*[6] in order to contain hazardous materials stored or discovered during construction of the Project.

2.4.1 General Pipeline Construction Procedures

Constructing the Project would generally be completed using typical upland overland sequential pipeline construction techniques, which include survey and staking; clearing and grading; trenching; pipe stringing, bending, and welding; lowering-in and backfilling; hydrostatic testing; commissioning; and cleanup and restoration (see figure 2.4-1). These construction techniques would generally proceed in an assembly line fashion with construction crews moving down the construction right-of-way as work progresses. Mountain Valley would have two construction spreads that would each be simultaneously conducting construction activities at different locations along the route. Construction and restoration at any particular point along the pipeline route would take about 3 weeks to complete; although progress could be delayed by topography, weather, or other factors. Specialized construction methods such as side-slope construction, HDD, conventional bore, and special procedures for crossing waterbodies and wetlands would be used as needed and are described below. Construction at the Lambert Compressor Station would involve standard industrial site construction activities.

In response to a comment on the draft EIS by the VADEQ, Mountain Valley would implement measures to reuse and recycle Project materials, and prevent pollution, where appropriate, to minimize impacts on the environment. Reuse and recycling of Project waste streams would include, where feasible: mulching or reuse of brush following clearing to the extent practicable in accordance with landowner conditions/agreements; and reuse of hydrostatic test water from one test segment to the next test segment. Mountain Valley would also require all contractor employees, subcontractors, and agency representatives to attend the Project-specific Worker Environmental Awareness Program (WEAP) training prior to conducting any activities on the Project, which emphasizes the importance that Mountain Valley places on environmental compliance, identifies permit conditions and restrictions applicable to the Project, and identifies spill reporting procedures and emergency notification requirements. Mountain Valley would develop seed mixes in coordination with FWS, VADEQ, NCDEQ, and Mountain Valley's threatened and endangered species consultant to provide habitat for threatened and endangered species as well as to stabilize and revegetate the Project limits with pollinator-friendly species. Mountain Valley would encourage supply-chain partners to implement pollution prevention and would coordinate with VADEQ regarding additional guidance on pollution prevention techniques.

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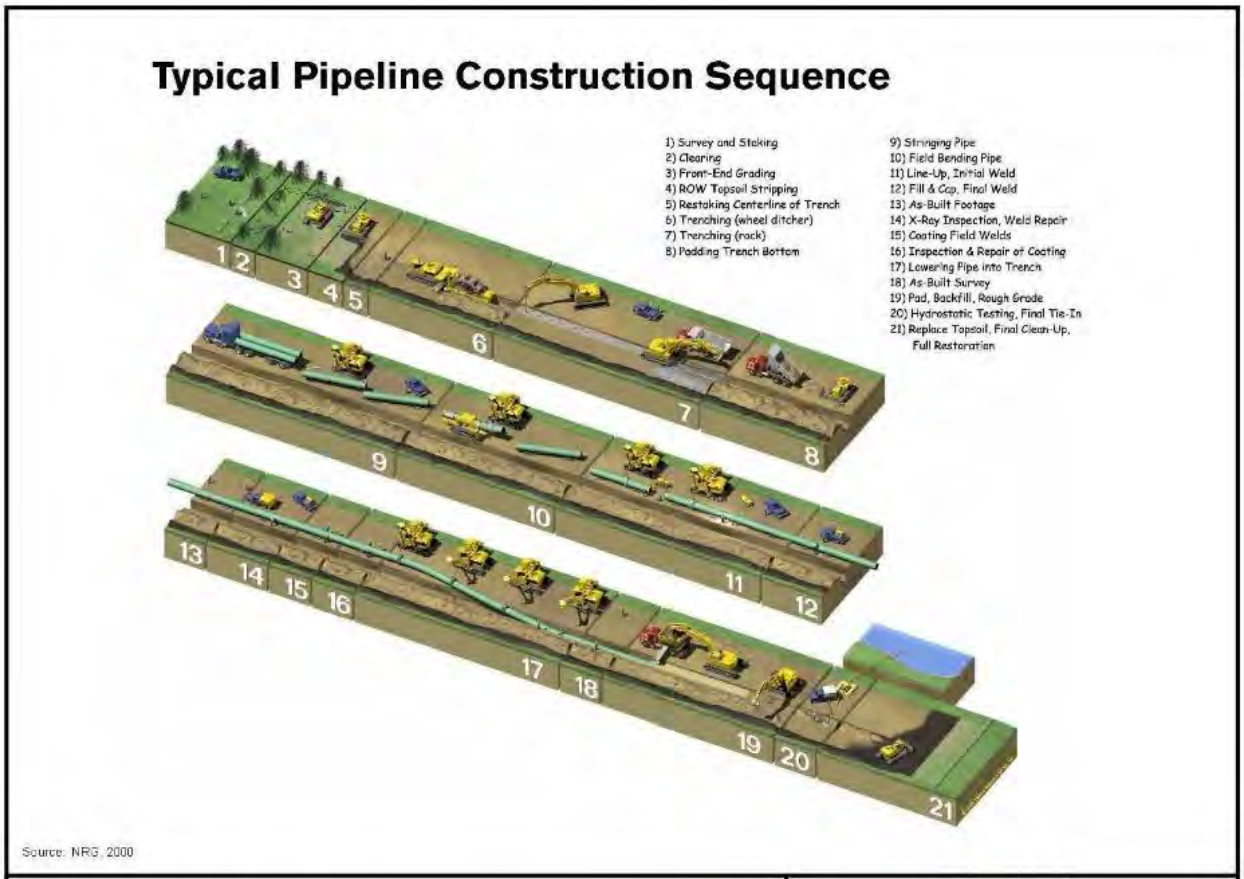
[5] Mountain Valley's SPCC Plan was included as appendix 1-G to Resource Report 1 in its November 06, 2018, application. The SPCC Plan can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.

[6] Mountain Valley's *Unanticipated Discovery of Contamination Plan* was included as appendix 6-H to Resource Report 6 in its November 06, 2018, application. The *Unanticipated Discovery of Contamination Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.



Typical Pipeline Construction Sequence	**Figure 2.4-1** **Southgate Project**

2.4.1.1 Survey and Staking

The first step of construction involves engineering and land survey crews staking the limits of the construction right-of-way, the centerline of the proposed trench, ATWS, and other approved work areas. Mountain Valley would mark approved access roads using temporary signs or flagging, and the limits of approved disturbance on any access roads requiring widening. Mountain Valley would fence off environmentally sensitive areas (e.g., waterbodies and wetlands, special status species habitat, and historic properties) where the construction right-of-way may be constricted. Property markers and old survey monuments would be referenced and marked, and replaced during restoration. Mountain Valley would contact the One-Call system for each state and county to locate, identify, and flag existing underground utilities to prevent accidental damage during pipeline construction. Typically, land surveying is done using all-terrain vehicles (ATV) and pick-up trucks.

2.4.1.2 Clearing and Grading

Clearing and grading would remove trees, shrubs, brush, roots, and large rocks from the construction work area and would level the right-of-way surface to allow operation of construction

equipment. The specified construction right-of-way widths would be cleared, including ATWS. Existing fences may not be removed, but new gates may be cut, and fences reinforced.

Vegetation would generally be cut or scraped flush with the surface of the ground, leaving rootstock in place where possible. In the draft EIS, Mountain Valley proposed the following timber and brush disposal methods: 1) If requested by the landowner, merchantable timber would be cut to useable lengths and stacked on the edge of the right-of-way to a maximum height of 4 feet with openings every 200 feet to allow the safe passage of wildlife; 2) cut timber would be disposed in accordance with landowner wishes; unless Mountain Valley purchases the timber as part of its compensation agreements; and 3) brush cleared from the construction corridor would be open burned, windrowed, chipped/mulched and blown off of the right-of-way, or hauled off for disposal at an approved location. According to Mountain Valley, chipped brush would be blown off of the right-of-way with landowner approval. Chips would not be blown into environmentally sensitive areas (i.e., waterbodies, wetlands, and habitat for special status species).

Any open burning would be conducted on a site-specific basis, in accordance with applicable state and local regulations and Mountain Valley's *Fire Prevention and Suppression Plan*.[7] Burning of cleared slash would only take place in upland areas, away from residences, waterbodies, and wetlands. Impacts on air quality during burning are discussed in section 4.11.1. In response to landowner comments received on the draft EIS regarding the burning of brush, Mountain Valley clarified that no burning would occur where landowners have objected to the activity. Landowner preferences or requests would be the primary consideration when determining the appropriate disposal method.

In the draft EIS, we determined that Mountain Valley's proposed timber and brush disposal methods, specifically windrowing timber along on the right-of-way without being hauled off and used for beneficial reuse by the landowner as well as blowing chips off of the right-of-way, do not comply with the FERC Plan, section III.E. Therefore, we included a recommendation in section 4.5 requiring Mountain Valley to file revised disposal plans in accordance with the FERC Plan.

In response to our recommendation in the draft EIS, Mountain Valley provided the additional details on their brush and timber removal methods. Mountain Valley confirmed that they would blow chipped brush on the right-of-way only. Regarding the stacking of timber, at locations where the landowner requests to keep the timber and not have it removed from the right-of-way, Mountain Valley proposes to stack the timber in appropriate locations in order to allow construction to proceed. The duration of time the stacks of timber would remain on the right-of-way would be a landowner preference. If the landowner does not want to keep the timber, Mountain Valley would utilize disposal methods including removal from the Project to an approved disposal location, or chipping or burning on the right-of-way in a timely manner.

However, we do not accept this modification to the FERC Plan and in section 4.5 we have included a recommendation that requires Mountain Valley to conduct regular collection of timber

[7] Mountain Valley's *Fire Prevention and Suppression Plan* was included as appendix 1-H to Resource Report 1 in its November 06, 2018, application. The *Fire Prevention and Suppression Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.

on the right-of-way, for either relocation to an alternate location on the landowners property or disposal, in accordance with the FERC Plan.

Grading would be conducted where necessary to provide a reasonably level work surface. More extensive grading, referred to as two-tone construction, would be required in uneven terrain and where the right-of-way traverses side slopes. Equipment used for clearing and grading activities could include grinding machines, motor-graders, bulldozers, track-hoes, and dump trucks.

Mountain Valley has indicated that it would separate topsoil from subsoil in residential, agricultural areas, and unsaturated wetlands. Mountain Valley would segregate at least the top 12 inches of topsoil where 12 or more inches of topsoil is present. In soils with less than 12 inches of topsoil, the entire topsoil layer would be segregated. See section 4.2 for additional information regarding topsoil segregation.

Temporary erosion controls would be installed along the construction right-of-way immediately after initial disturbance of the soil and would be maintained throughout construction. Temporary erosion control measures would remain in place until permanent erosion controls are installed or restoration is completed. Mountain Valley has committed to employing Environmental Inspectors (EIs) during construction to help determine the need for erosion controls and ensure that they are properly installed and maintained. Additional discussion of EI responsibilities is provided in section 2.4.4.

2.4.1.3 Trenching

Soil and bedrock would be removed to create a trench into which the pipeline would be placed. A track-mounted excavator/backhoe or similar equipment would be used to dig the pipeline trench. When rock is encountered, tractor-mounted mechanical rippers or rock trenchers would be used to fracture the rock prior to excavation. Blasting may be used in specific areas where hard bedrock is close to the surface. Blasting is more fully discussed in section 4.1 of this EIS.

Excavated soils would be stockpiled along the right-of-way on the side of the trench away from the construction traffic ("spoil side"). Subsoil would not be allowed to mix with the previously stockpiled topsoil. In response to comments from NCDEQ, Mountain Valley stated rock that is excavated from the right-of-way during construction activities would be utilized as backfill or would be removed from the site and taken to an approved disposal location. If necessary, rock would be appropriately sized via mechanical means to ensure it can be incorporated into the backfill. Rock would be incorporated in the backfill to a depth of 4 inches or more in locations where rock was present pre-construction such that it would not inhibit herbaceous growth. In section 4.1.4.6, we have recommended that Mountain Valley confirm it will not bury excess rock fragments generated during trenching or blasting in any location other than where the rock originated and all excess rock fragments not suitable for reburial at the point of origin would be considered construction debris and should be disposed of consistent with the FERC Plan. Specific locations for temporarily storing/staging excess rock are unknown as such locations where there may be excess rock would be identified during construction by the pipeline contractor and inspection staff. Rock would be stored/staged on the right-of-way as needed and

incorporated into the backfill as outlined above. If rock is encountered during construction in steep topographic areas, the rock would be relocated via truck to a stable area with more favorable slope conditions.

The trench would be dug at least 12 inches wider than the diameter of the pipeline and excavated to a depth of 5.5 feet to 9 feet in order to provide sufficient cover over the pipeline in accordance with DOT standards in 49 CFR 192.327 (see table 2.4-1). The depths provided in table 2.4-1 may deviate based on topography, soil composition, and pipe diameter; however, there would generally be 36 inches of cover over the top of the pipeline in deep soils and 18 inches of cover in areas of consolidated rock. At waterbody crossings, the pipe would be more deeply buried; with a minimum of 4 feet of cover at navigable waterways and a minimum of 2 feet of cover at waterbodies with consolidated rock. As discussed in section 4.3, the pipeline would be buried deeper than the DOT standards for several waterbodies in order to prevent exposure of the pipeline due to scour. Mountain Valley would install its uncased pipeline with a minimum of 10 feet of cover under railroads; and a minimum of 5.5 feet of cover for cased pipe under a railroad.

TABLE 2.4-1

Minimum DOT Specifications for Depth of Cover over Natural Gas Pipelines

Location a/	Normal Soil (cover depth in inches)	Consolidated Rock (cover depth in inches)
DOT PHMSA Class 1	36	18
DOT PHMSA Class 2, 3, and 4	36	24
Actively cultivated agriculture	48	24
Drainage ditches of public roads	36	24
Navigable river, stream, or harbor	48	24
Minor stream crossings	36	24

DOT PHMSA – U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration

a/ As defined in 49 CFR 192.5.

Class 1: offshore areas and areas within 220 yards of a pipeline with ≤10 buildings intended for human occupancy.

Class 2: areas within 220 yards of a pipeline with >10 but <46 buildings intended for human occupancy.

Class 3: areas within 220 yards of a pipeline with >46 buildings intended for human occupancy and areas within 100 yards of either a building or a small, well defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period.

Class 4: areas within 220 yards of a pipeline where buildings with four or more stories are prevalent.

2.4.1.4 Pipe Stringing, Bending, Welding, and Coating

After trenching, sections of pipe typically between 40 and 60 feet long (also referred to as "joints") would be transported to the right-of-way by truck, off-loaded by track-hoes or side-boom tractors, and strung beside the trench in a continuous line. The pipe would be delivered to the job site with a protective coating of fusion-bonded epoxy or other approved coating that would inhibit corrosion by preventing moisture from coming into direct contact with the steel.

Individual sections of pipe would be bent using a track-mounted, hydraulic pipe-bending machine to conform to the contours of the ground after the joints of pipe sections are strung alongside the trench. Where multiple or complex bends are required, bending may be conducted at the pipe fabrication factory, and the pipe would be shipped to areas pre-bent.

After the pipe joints are bent, they would be aligned, welded together into a long segment, and placed on temporary supports at the edge of the trench. Mountain Valley would use welders who are qualified according to applicable standards in 49 CFR 192 Subpart E, American Petroleum Standard 1104, and other requirements. Automated welding may be used by Mountain Valley in areas of flat terrain.

Every completed weld would be examined by a welding inspector to determine its quality using radiographic or other approved methods as outlined in 49 CFR 192. Radiographic examination is a non-destructive method of inspecting the inner structure of welds and determining the presence of defects. Welds that do not meet the regulatory standards would be repaired or removed.

After a weld is approved, a coating crew would coat the area around the weld before the pipeline is lowered into the trench. Prior to application, the coating crew would thoroughly clean the bare pipe with a power wire brush or sandblast machine to remove dirt, mill scale, and debris. The crew would then apply the coating and allow the coating to dry. The pipeline would be inspected electronically (also referred to as "jeeped" because of the sound of the alarm on the testing equipment) for faults or voids in the coating and would be visually inspected for scratches, and other defects. Mountain Valley would repair damage to the coating before the pipeline is lowered into the trench. The welded pipe would be placed on wooden skids next to the trench.

2.4.1.5 Lowering-in and Backfilling

The trench would be inspected to be sure it is free of rocks and other debris that could damage the pipe or protective coating before the pipe is lowered into the trench. Trench dewatering may be necessary to inspect the bottom of the trench in areas where water has accumulated. Trench water would be discharged through sediment removal devices in well-vegetated upland areas away from waterbodies and wetlands. The pipeline would then be lowered into the trench by side-boom tractors. Trench breakers (such as sand bags or foam) would then be installed in the trench on slopes at specified intervals to prevent subsurface water movement along the pipeline.

Sandbags may be placed on top of the pipe after it is in place at the bottom of the trench to protect it from rocks. The first 12 inches at the bottom of the trench above the pipe would be clean fill, absent of rocks. Limestone dust may be brought in and used as padding material only when other local suitable fill is unavailable. The trench would then be backfilled using the excavated material; first with subsoil, then with topsoil. If needed, certified clean fill material would be brought in that is free of contamination with oil, petroleum, hazardous material, or coal combustion residuals. Backfilling could be done by track-hoes, bulldozers, graders, or backfilling machines. A crown of soil may extend above the trench in agricultural, grasslands-rangelands, and open lands, to account for settling. Any excess soils would be spread evenly over the right-of-way.

2.4.1.6 Hydrostatic Testing

Mountain Valley would hydrostatically test the pipeline after backfilling to ensure the system is capable of withstanding the operating pressure for which it was designed. Hydrostatic testing involves filling the pipeline with water to a designated test pressure and maintaining that pressure for about 8 hours. Actual test pressures and durations would be consistent with the requirements of 49 CFR 192. Any leaks would be repaired and the section of pipe retested until the required specifications were met.

Mountain Valley has indicated that water for hydrostatic testing would be obtained primarily from the Dan River at milepost 30.1 and from municipal water sources if necessary. If chlorinated water is used, a dechlorination agent may be required prior to discharge, depending on the discharge location. No chemicals would be added to test water unless approved by FERC and applicable federal and state regulatory agencies. The test water would contact only new pipe. No desiccant or chemical additives would be used to dry the pipe after testing.

The pipeline would be tested in segments, and the water may be moved through each sequential segment along the route, or the water would be discharged. The hydrostatic test water would be discharged through sediment filters in vegetated uplands away from waterbodies and wetlands. Section 4.3.2 provides more information on hydrostatic testing.

2.4.1.7 Commissioning

Test manifolds would be removed and final pipeline tie-ins would be completed after hydrostatic testing. The pipeline then would be cleaned and dried using mechanical tools (pigs) that are moved through the pipeline with pressurized dry air. Pigs also would be used to internally inspect the pipeline to detect whether any abnormalities or damage exists. Any problems or concerns would be addressed as appropriate.

Pipeline commissioning would then commence. Commissioning involves verifying that equipment has been properly installed and is working, verifying that controls and communications systems are functioning, and confirming that the pipeline is ready for service. In the final step, the pipeline would be prepared for service by purging the pipeline of air and loading it with natural gas. Mountain Valley would not be authorized to place the pipeline facilities into service until after it has documented to the FERC that restoration activities are proceeding in a satisfactory manner, and the companies have received written permission from the Director of the Office of Energy Projects (OEP).

2.4.1.8 Cleanup and Restoration

Within 20 days of backfilling the trench (10 days in residential areas), all work areas would be graded and restored. If seasonal or other weather conditions prevent compliance with these timeframes, temporary erosion controls would be maintained until conditions allow completion of final cleanup. Surplus construction material and debris would be removed from the right-of-way unless that landowner or land-managing agency approves otherwise and it is used for beneficial reuse. As previously stated, rock excavated from the right-of-way during construction activities

may be utilized as backfill or would be removed from the Project site for disposal at an approved landfill.

After backfilling the trench, the topographic contours would be restored to their original pre-construction condition as close as possible, using graders and bulldozers; except where drainage patterns may cause erosion. Permanent erosion control features, such as slope breakers (water bars), would be installed on steep terrain. Fences and gates would be repaired. In addition, driveways and access roads would be restored to pre-construction conditions. Markers showing the location of the pipeline would be installed at fence and road crossings in order to identify the owner of the pipeline and convey emergency information in accordance with applicable governmental regulations, including DOT safety requirements. Mountain Valley would conduct restoration activities in accordance with landowner agreements, permit requirements, and recommended seeding mixes, rates, and dates in accordance with the Project's E&SC Plan.

The right-of-way would be seeded within 6 working days following final grading, weather and soil conditions permitting, although seeding would not be required in actively cultivated croplands unless requested by the landowner. Alternative seed mixes specifically requested by the landowner or required by agencies may be used. Any soil disturbance that takes place outside the permanent seeding season or any bare soil left unstabilized by vegetation would be mulched in accordance with the FERC Plan (see section 4.4).

2.4.2 Special Pipeline Construction Procedures

Special construction techniques are required when a pipeline is installed across waterbodies, wetlands, roads and railroads, foreign utilities, steep slopes, residences, agricultural lands, and other sensitive environmental resources. These procedures are further discussed as they apply to specific resources in section 4.0.

2.4.2.1 Waterbody Crossings

Waterbody crossings would be completed in accordance with Mountain Valley's Procedures and measures required in other federal or state issued permits. A total of 277 waterbodies would be either crossed by the pipeline or would be present within construction workspace. The pipeline would cross 223 waterbodies, 4 of which are major waterbodies. The waterbodies that would be crossed and the proposed crossing methods for each are listed in appendix B.5. Waterbody crossings are discussed in more detail in section 4.3.2.2 of this EIS.

ATWS necessary for waterbody crossings would be placed a minimum of 50 feet from the waterbody edge. The 50-foot setback would be maintained unless site-specific approval for a reduced setback is granted by the FERC and other jurisdictional agencies (see appendix B.3 and section 4.3.2).

To prevent sedimentation caused by equipment traffic crossing through waterbodies, temporary equipment bridges would be installed across waterbodies. Bridges may include clean rock fill over culverts, equipment pads, wooden mats, free-spanning bridges, and other types of spans. Equipment bridges would be maintained throughout construction. Each bridge would be designed to accommodate normal to high streamflow (storm events) and would be maintained to

prevent soil from entering the waterbody and to prevent restriction of flow during the period of time the bridge is in use.

Sediment barriers, such as silt fence and straw bales, would be installed immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers would be properly maintained throughout construction, until replaced by permanent erosion controls or restoration of adjacent upland areas is complete and revegetation has stabilized the disturbed areas. Trench plugs, consisting of compacted earth of similar low permeability material would be installed at the entry and exit points of wetlands and waterbodies to prevent water from the stream or wetland from moving along the trench. After backfilling, streambanks would be re-established to approximate pre-construction contours and stabilized.

The pipelines would be installed below scour depth (see section 4.3.2) for each waterbody crossed. In most cases, at least 4 feet of cover over the pipeline at waterbody crossings would be maintained; except in consolidated rock, where there would be a minimum of 2 feet of cover. Trench spoil would be placed on the banks above the high-water mark for use during backfilling. In some cases, the pipeline would be coated with concrete for negative buoyancy. Concrete would not be poured or cured along the right-of-way. Any staging areas used to cast concrete would be located away from any waterbodies and enclosed with perimeter erosion and sediment controls to ensure that materials are unable to enter a waterbody. Additionally, should concrete need to be mixed within the staging area, a wash-out pit would be implemented and materials disposed of properly.

The majority of waterbody crossings for the Project would be dry-ditch crossings (flume, dam-and-pump, or cofferdam). The Dan River and Stony Creek Reservoir are proposed to be crossed via an HDD; and three locations are proposed to be crossed via conventional bore including Cascade Creek/Dry Creek, Wolf Island Creek, and Deep Creek. These crossing methods are briefly described below.

Flume Construction Method

The flume method is a type of dry-ditch crossing that involves diverting the flow of water across the construction work area through one or more flume pipes placed in the waterbody. The first step in the flume crossing method involves placing a sufficient number of adequately sized flume pipes in the waterbody to accommodate the highest anticipated flow during construction. After placing the pipe in the waterbody, sand bags or equivalent dam diversion structures are placed in the waterbody upstream and downstream of the trench area. These devices serve to dam the stream and divert the water flow through the flume pipes, thereby isolating the water flow from the construction area between the dams. Flume pipes are typically left in place during pipeline installation until trenching under the flumes, pipe installation, and final cleanup of the streambed is complete. Once the pipeline is installed, and the streambed and banks restored, the flume pipes are removed, allowing water flow to return to pre-construction conditions.

Dam-and-Pump Construction Method

The dam-and-pump method is similar to the flume crossing method except that pumps and hoses are used instead of flumes to move water across the construction work area. Temporary

dams are installed across the waterbody on both the upstream and downstream sides of the construction right-of-way, usually using sandbags or plastic sheeting. Pumps are then set up at the upstream dam with the discharge line (or hoses) routed through the construction area to discharge water immediately downstream of the downstream dam. An energy dissipation device is typically used to prevent scouring of the streambed at the discharge location. The pipeline is then installed and the trench backfilled, allowing water flow to be re-established to pre-construction conditions. After backfilling, the dams are removed and the banks restored and stabilized.

HDD Construction Method

An HDD involves drilling a hole under the waterbody (or other sensitive feature) and installing a pre-fabricated pipe segment through the hole. Mountain Valley is proposing to use the HDD method to cross the Dan River and Stony Creek Reservoir.

The first step in an HDD is to drill a small-diameter pilot hole from one side of the crossing to the other using a drill rig. As the pilot hole progresses, segments of drill pipe are inserted into the hole to extend the length of the drill. The drill bit is steered and monitored throughout the process until the desired pilot hole has been completed. The pilot hole is then enlarged using several passes of successively larger reaming tools. Once reamed to a sufficient size, a pre-fabricated segment of pipe is attached to the drill string on the exit side of the hole and pulled back through the drill hole towards the drill rig. Depending on the substrate and length, drilling and pullback can last anywhere from a few days to a few weeks. Additional information regarding the HDD method is presented in section 4.3.

Conventional Bore Method

Conventional boring consists of creating a tunnel-like shaft for a pipeline below roads, waterbodies, wetlands, or other sensitive resources without affecting the surface of the resource bore pits are excavated on both sides of the resource to the depth of the adjacent trench and graded to match the proposed slope of the pipeline. A boring machine is then used within the bore pit to tunnel under the resource by using a cutting head mounted on an auger. The auger rotates and advances forward as the hole is bored. Once the hole is bored, a pre-fabricated section of pipe is pushed through the borehole. At particularly long crossings, pipe sections may be welded onto the pipe string just before being pushed through. Due to the depth of the bore pit and proximity to water resources, this method may require use of sheet pile to maintain the integrity of the bore pits and use of well point dewatering systems to avoid flooding of the pits. Borings are usually conducted 24 hours per day and typically require between 2 and 10 days to complete from start to finish. Mountain Valley is proposing to use the conventional bore method at three locations to cross Cascade Creek/Dry Creek, Wolf Island Creek, and Deep Creek.

2.4.2.2 Wetland Crossings

Wetland crossings would be completed in accordance with Mountain Valley's Procedures, and other federal and state permits. A total of 89 wetlands (144 individual crossings) would be crossed by the pipeline. An additional 80 wetlands (117 individual locations) would be within temporary workspaces associated with pipeline construction. A total of 10 wetlands would be temporarily affected within workspaces for access roads and the T-15 Dan River Interconnect.

This is an increase from what was reported in the draft EIS due to Project route changes and surveys on previously unavailable properties. The wetlands that would be crossed are listed in appendix B.6 and are discussed further in section 4.3.3.

Mountain Valley would use a 75-foot-wide construction right-of-way through wetlands unless site-specific approval for an increased right-of-way width is granted by the FERC and other jurisdictional agencies (see section 4.3.3). ATWS may be required on both sides of wetlands to stage construction equipment, fabricate the pipeline, and store materials. ATWS for wetland crossings would be located in upland areas a minimum of 50 feet from the wetland edge unless site-specific approval for a reduced setback is granted by the FERC and other jurisdictional agencies (see section 4.3). Mountain Valley proposes to use extra workspace within 50 feet of waterbodies and wetlands at specific locations as listed in appendix B.3.

Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. Stump removal, topsoil segregation, and excavation would be limited to the area immediately over the trenchline. A limited amount of stump removal and grading may be conducted in other areas to ensure a safe working environment. During clearing, sediment barriers, such as silt fence and staked straw bales, would be installed and maintained adjacent to wetlands and within temporary extra workspaces as necessary to minimize sediment runoff.

Construction equipment working in wetlands would be limited to that essential for right-of-way clearing, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the right-of-way. The method of pipeline construction used in wetlands would depend largely on the stability of the soils at the time of construction. Wetlands would be crossed by wet or dry open trench lay, or open ditch push-pull methods.

Where wetland soils are saturated and/or inundated, the pipeline may be installed using the push-pull technique, which involves stringing and welding the pipeline outside of the wetland and excavating the trench through the wetland using a backhoe supported by equipment mats. The water that seeps into the trench is used to "float" the pipeline into place, aided by a winch and flotation devices attached to the pipe. After the pipeline is floated into place, the floats are removed, allowing the pipeline to sink into place. Pipe installed in saturated wetlands is typically coated with concrete or equipped with set-on weights to provide negative buoyancy. Mountain Valley has proposed to use aggregate-filled sacks to decrease buoyancy. After the pipeline sinks into position, trench breakers are installed where necessary to prevent the subsurface drainage of water out of the wetland. Then the wetland is backfilled and cleanup completed. Where topsoil has been segregated from subsoil, the subsoil is backfilled first followed by the topsoil. Topsoil is not segregated in saturated wetlands due to the unconsolidated nature of the soils. Equipment mats and timber riprap would be removed from wetlands following backfilling.

For the proposed Project, construction through unsaturated wetlands would be similar to dry upland methods, with one exception; only one travel lane would be used. Up to 1 foot of topsoil from the trench would be segregated where hydrologic conditions allow.

2.4.2.3 Road and Railroad Crossings

The Project would cross 74 roads and 4 railroads. The pipeline would be installed at least 3 feet beneath all roads, and at least 10 feet below all railroads for uncased pipe (about 5.5 feet deep for cased pipe).

Construction across roads and railroads would be conducted in accordance with the permits obtained by Mountain Valley and applicable laws and regulations, including DOT safety standards. Traffic control measures would be coordinated with appropriate state and county transportation and road agencies. Mountain Valley has developed a Project-specific *Traffic Mitigation Plan*, as more fully discussed in section 4.9 of this EIS.

Railroads would be crossed with a conventional bore. In general, crossings of paved roads would also be conventionally bored, so not to disrupt traffic. The process for constructing a conventional bore crossing under roads is the same as previously described for crossing waterbodies. If a paved road is open-cut, any asphalt removed during a road crossing would be disposed of at an approved facility. Mountain Valley would not recycle used asphalt.

Most gravel, dirt, and grass roads would be crossed by the open-cut method. Traffic on roads would be maintained during construction by the use of steel plates or detours. At least one lane of the road being crossed would be kept open to traffic except for brief periods when it would be essential to close the road to install the pipeline. Road users would be notified via signage and flagmen. Most open-cut road crossings require only 1 or 2 days to complete. After pipeline installation, all open-cut road crossings would be restored to pre-construction conditions.

2.4.2.4 Residential Areas

Construction work areas would be within 25 feet of 24 residential structures. (e.g., homes, mobile homes, and cabins). Mountain Valley filed site-specific plans, as discussed in section 4.8 and provided in appendix B.7. As described in section 4.8, we encouraged affected landowners to review the site-specific plans for their properties, and provide comments to the FERC during the draft EIS comment period.

Measures that would be implement to minimize impacts on residences located within 25 feet of the construction right-of-way, include, but are not limited to:

- installing temporary safety fencing for at least 100 feet on either side of the residence and maintaining it throughout active construction in the area;
- installing safety fence and temporary end caps on the pipeline at the end of each work day to prevent overnight access to the trench and pipeline;
- fencing the boundary of the construction work area to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- leaving mature trees and landscaping intact within the construction work area unless the trees and landscaping interfere with the installation techniques or present unsafe working conditions;

- reducing temporary workspaces where possible;
- backfilling the trench as soon as possible after the pipe is installed; and
- completing final cleanup, grading, and installation of permanent ECDs within 10 days after backfilling the trench, weather permitting.

2.4.2.5 Foreign Utilities

The Project route crosses about 121 locations with existing buried pipelines and other foreign utilities (including fiber optic lines, telephone lines, power lines, sewer lines, water lines, etc.) This is an increase from what was reported in the draft EIS due to Project route changes, continued surveys, and coordination with utility companies. Mountain Valley would install the pipelines below existing pipelines and other foreign utilities wherever feasible. Mountain Valley would install the pipeline with at least 12 inches of clearance from any other underground utilities as required by DOT standards at 49 CFR 192.325. Larger spoil piles resulting from greater depth of excavation at the crossing of foreign utilities would be stored within ATWS at each crossing. Construction of those crossings would be monitored by Mountain Valley, and sometimes by representatives of the owner/operator of the other pipeline or utility. Appropriate safety measures would be implemented that meet the standards of the Occupational Safety and Health Administration. To ensure that existing pipelines and other foreign utilities are properly identified, and crossed without damage, the following measures would be implemented:

- contact "One-Call" to locate existing known buried pipelines and other foreign utilities;
- locate existing buried pipelines using a hand-held magnetometer or by probing, as appropriate for the conditions encountered;
- scan the edges of the right-of-way with passive inductive locating equipment;
- provide advance notice to the owner/operators of the foreign pipelines prior to construction, and allowing representatives to be present during work around their pipelines;
- not use mechanized excavation equipment within 3 feet of another buried foreign pipeline, with the excavations completed by hand shoveling;
- keep construction equipment and spoil piles off the centerline of the foreign pipeline;
- support the foreign pipeline for the length of the span exposed;
- inspect the foreign pipeline before and after the pipeline are installed;
- maintain DOT minimum separation distances;
- follow the foreign pipeline operator's requirements; and
- keep a working combustible gas indicator on-site.

2.4.2.6 Agricultural Lands

The Project would cross about 199 acres of agricultural lands. Impacts and mitigation on prime farmland soils are discussed in section 4.2 of this EIS; while impacts and mitigation for agricultural land use are discussed in section 4.8.

Prior to construction, Mountain Valley would conduct surveys to identify and flag existing irrigation systems and drainage tiles. The pipeline would typically be installed below drain titles. During restoration, any irrigation systems or drain tiles damaged during construction would be repaired or replaced.

The pipelines would be buried deep enough to allow for 48 inches of cover in actively cultivated lands. A minimum of 12 inches of topsoil would be segregated from the full right-of-way in agricultural lands, in accordance with Mountain Valley's Plan. Where topsoil is less than 12 inches deep, the actual depth of the topsoil layer would be removed and segregated. If topsoil fill is necessary, it would be locally sourced to prevent invasive species. Other mitigation measures in agricultural lands would include relief from compaction and removal of rocks from topsoil.

2.4.2.7 Rugged Topography

The Project would cross about 1.8 miles of slopes greater than 30 percent. Mountain Valley has developed construction methods for rugged terrain, which include slopes that typically exceed 30 to 35 percent, to allow for the safe operation of equipment, and prevention of severe erosion.

In areas of steep slopes and any side slopes construction, Mountain Valley would employ temporary sediment barriers, such as reinforced silt fences and silt socks, to prevent movement of sediment.. To divert water to vegetated areas or reduce water runoff, Mountain Valley may install temporary slope breakers during grading activities per the Mountain Valley's Plan and the Project-specific E&SC Plan. Additionally, Mountain Valley would install post-construction stormwater controls and permanent slope breakers as needed. Mountain Valley has proposed to implement mitigation and stabilization control measures such as trench breaker daylight drains, cutoff drains, transverse trench drains, rock lined swales, riprap natural drains, riprap slope breakers, trench breaker pass-through drains, brow ditches, geogrid reinforcement, and highwall revetment, steep slope revetment and compact slope breakers.

In areas where the pipeline route crosses laterally along a slope, cut and fill grading, or "two-tone" construction techniques, may be used to create a relatively flat working surface. This would require expanded ATWS. Spoil piles, separated every 50 feet by temporary water bars, may be compacted by bulldozers, then covered by mulch.

2.4.2.8 Karst Terrain

The Project would cross minimal areas of karst geology within 0.25-mile of the Project route. Mountain Valley's karst specialist assessed areas of karst features along the proposed Project route and determined that no impacts on karst formations are anticipated during construction and operation of the Project. In the event that areas of karst are identified during construction, Mountain Valley would implement the measures outlined in section 4.1.4.5;

coordinate with the appropriate state agencies; and conduct monitoring during and post-construction for any subsidence or karst impacts.

2.4.2.9 Winter Construction

Mountain Valley developed a *Winter Construction Plan*[8] to address specialized methods and procedures to protect resources during the winter season. The key elements of this plan include:

- use of special snow plowing equipment within the Project workspaces to prevent mixing of snow and underlying soil;
- clearing of snow from roads without blocking driveways or other access points;
- use of safety fencing around open trenches in areas used for snowmobiling, hiking, and similar activities;
- suspension of backfill and topsoil replacement if unfeasible due to frozen conditions;
- use of mulch and ECDs to stabilize topsoil and subsoil piles; and
- delaying final cleanup activities until soils have thawed.

2.4.3 Aboveground Facility Construction

Construction activities at the proposed compressor station, meter stations, and interconnects would include access road construction; site clearing; grading; putting in foundations; erecting buildings; installing equipment such as compressors and metering facilities; restoration and laying gravel in the yards; and erecting security fencing. Initial work at the aboveground facilities would focus on excavations for reinforced concrete foundations. Subsurface friction piles may be required to support foundations. Forms would be set, rebar installed, and concrete poured and cured according to industry stations. Concrete batches would be tested. Backfill would be compacted.

Equipment and piping would be transported to the sites by truck and off-loaded by cranes and/or front-end loaders. The equipment and piping would then be placed on the foundations, leveled, and secured. Piping would be welded, and welds inspected using radiography, ultrasound, or other non-destructive examination methods. Aboveground piping would be painted. Piping would be hydrostatically tested prior to being put into service. Safety equipment and controls, including emergency shutdown, relief valves, gas and fire detection, and engine overspeed and vibration protection would be calibrated and tested. Pig launchers and receivers and MLVs would be installed.

[8] Mountain Valley's *Winter Construction Plan* was included as appendix 1-J to Resource Report 1 in its November 06, 2018, application. The *Winter Construction Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.

2.5 CONSTRUCTION SCHEDULE AND WORKFORCE

Mountain Valley proposes to begin construction of the Project in 2020 and estimates that it would take up to 32 months to construct, restore, and complete revegetation of its entire Project. Construction of the H-605/H-650 pipeline would be completed using two construction spreads (see table 2.5-1), with an in-service target date of December 2020. The peak construction workforce would be 900 people for the pipeline and aboveground facilities.

TABLE 2.5-1

Construction Spreads for the Southgate Project

Spread Number/Component	Start MP	End MP	Spread Length (miles)	Peak Workforce
Spread 1 - H-605/H-650 pipelines	0	30.4	30.9 a/	300
Spread 2 - H-650 pipeline	30.4	73.2RR	42.8	385
Lambert Compressor Station	0	0	N/A	110

a/ Includes 0.5 mile of H-605 and 30.4 miles of H-605 pipelines.

Construction crews would typically work 10 hours per day, 6 days per week. Work would be conducted during daytime hours (on average, 7:00 a.m. to 7:00 p.m.), or sunrise to sunset whichever is longer, except where the pipe would be installed using the HDD and bore methods, which require around-the-clock operations and typically last a few days to a few weeks. In addition, certain construction activities may extend typical workhours, such as tie-ins, operation of pumps at waterbody crossings, and hydrostatic testing, as these activities require extended and continuous operation until the activity is complete. Construction activities for aboveground facilities would be primarily limited to daytime hours; however, specific situations related to safety, permit compliance, or other non-typical circumstances may necessitate nighttime work.

2.6 ENVIRONMENTAL COMPLIANCE AND MONITORING

2.6.1 Construction Monitoring and Quality Control

During construction, Mountain Valley would provide contractors with all Project design documents, including environmental alignment sheets, and copies of all applicable federal, state, and local permits. Construction would be supervised by a Chief Inspector (CI). Mountain Valley indicates that up to four EIs would be hired per spread who would report to the CI, and whose duties would be consistent with Section II.B of the FERC Plan, including:

- the EI would be a full-time position, separate from other activity inspectors;
- the EI would be responsible for ensuring that the company complies with its construction and environmental mitigation plans, complies with all environmental conditions of the Commission Order, and complies with the environmental conditions of other relevant federal and state permits;

- the EI would have immediate "stop-work" authority for all activities, and would be empowered to take corrective actions to remedy instances of non-compliance; and
- the EI would conduct environmental training for company employees, maintain records, and write reports.

Mountain Valley has agreed to fund a FERC third-party compliance monitoring program during the Project construction phase. Under this program, a contractor is selected by, managed by, and reports solely to the FERC staff to provide environmental compliance monitoring services. The FERC Compliance Monitor would report to the FERC Project Manager on compliance issues and make recommendations on how to deal with compliance issues and construction changes, should they arise. In addition to this program, FERC staff would also conduct periodic compliance inspections during all phases of construction and throughout restoration, as necessary.

2.7 OPERATION AND MAINTENANCE

Mountain Valley would maintain and operate the pipelines and aboveground facilities in accordance with the DOT/Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations at 49 CFR 192, the FERC regulations at 18 CFR 380.15, and the maintenance provisions found in Mountain Valley's Plan, Mountain Valley's Procedures, and the Project-specific E&SC Plan. As required by 49 CFR 192.615, Mountain Valley would establish an Emergency Plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Pipeline safety measures are outlined in section 4.12 of this EIS.

2.7.1 Pipelines

Mountain Valley would maintain a 50-foot-wide permanent operational easement for the H-605 and H-650 pipelines. In accordance with Mountain Valley's Plan, vegetation removal within upland portions of the operational easement would not be done more frequently than every 3 years. In wetland areas, the full width of the permanent right-of-way would not be subject to periodic vegetation maintenance; however, trees that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent right-of-way. To facilitate periodic corrosion and leak surveys in both upland and wetland portions of the permanent right-of-way, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained as frequent as necessary to maintain an herbaceous state. As indicated in Mountain Valley's Plan, in no case would routine vegetation maintenance occur between April 1 and October 14 of any year. No vegetation maintenance activities would be conducted in riparian areas between HDD entry and exit points. Vegetation management is discussed further in section 4.4.

Besides vegetation maintenance, other operational activities on the pipeline right-of-way would include inspections and repairs. Periodic aerial and ground inspections may identify pipeline leaks, erosion or loss of vegetation cover on the right-of-way, and unauthorized encroachment. The cathodic protection system would also be inspected periodically to ensure that it is functioning properly. In addition, pigs are regularly sent through the pipeline to check for corrosion and irregularities in the pipe in accordance with DOT requirements.

2.7.2 Aboveground Facilities

Mountain Valley would perform routine inspections of and maintain all equipment at aboveground facilities, including the Lambert Compressor Station, meter stations, interconnects, MLVs, and pig launchers and receivers. Routine maintenance checks would include calibration of equipment and instrumentation. Safety equipment, such as pressure relief devices and fire and gas detection systems, would be tested for proper operation. Corrective actions would be taken if problems are noted.

The aboveground facilities would be unmanned, with start/stop capabilities controlled from Mountain Valley's Gas Control headquarters. A telemetry system would notify operational personal at local offices and the gas control headquarters of the activation of safety systems or alarms. Maintenance personnel would be dispatched to investigate and take corrective actions.

2.8 FUTURE PLANS AND ABANDONMENT

During public scoping, a comment was submitted regarding the potential for Mountain Valley to further expand the Project and eventually export natural gas. Mountain Valley stated that it has no plans at this time to either expand or abandon the proposed facilities, nor is the Project able or designed to export natural gas. If Mountain Valley proposes any expansion or abandonment of the Project facilities, it would have to seek specific authorization for that action from the FERC. An appropriate environmental review would be conducted, and the public would have the opportunity to comment on Mountain Valley's proposal. Likewise, any proposed abandonment of any facilities approved in these dockets would require additional environmental and regulatory review under section 7(b) of the NGA.

3.0 ALTERNATIVES

3.1 INTRODUCTION

As required by NEPA and Commission policy, we identified and evaluated reasonable alternatives to the Project to determine whether the implementation of an alternative would be environmentally preferable to the proposed action. A reasonable alternative would meet the Project's purpose and would be technically and economically feasible and practical. We evaluated the No Action Alternative, system alternatives, pipeline route alternatives, route variations, and compressor engine type alternatives. An alternative would be environmental preferable if it offers a significant environmental advantage over the proposed action.

To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, geographic information system data, aerial imagery). Where appropriate, we also use site-specific information (e.g., field surveys or detailed designs). Our environmental evaluation considers quantitative data (e.g., acreage or mileage) and uses common comparative factors such as total length, amount of collocation, and land requirements. In recognition of the competing interests and the different nature of impacts that sometimes exist (i.e., impacts on the natural environment versus impacts on the human environment), we also consider other factors that are relevant to a particular alternative and discount or eliminate factors that are not relevant or may have less weight or significance.

We generally consider an alternative to be preferable to a proposed action using three evaluation criteria, as discussed in greater detail below. These criteria include:

1. the alternative meets the stated purpose of the project;

2. is technically and economically feasible and practical; and

3. offers a significant environmental advantage over a proposed action.

The alternatives were reviewed against the evaluation criteria in the sequence presented above. The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the Project. An alternative that cannot achieve the purpose for the Project cannot be considered as an acceptable replacement for the Project.

Many alternatives are technically and economically feasible but not practical. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique, or experimental construction method may not be technically practical because the required technology is not available or is unproven. Economically practical alternatives would result in an action that generally maintains the price competitive nature of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render a project economically impractical.

Alternatives that would not meet the Project's purpose or were not technically/economically feasible or practical were not brought forward to the next level of review.

Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

With regard to the first criterion, Mountain Valley's stated objective for the Project is documented in section 1.1 Purpose and Need. Our analysis of alternatives is based on Project-specific information provided by Mountain Valley, affected landowners, and other concerned parties; comments received during project scoping; publically available information; our consultations with federal and state agencies; and our own research regarding the siting, construction, and operation of natural gas transmission facilities and their impacts on the environment. Unless otherwise noted, we used the same desktop sources of information to standardize comparisons between the Project and each alternative that we evaluated. As a result, some of the information presented in this section relative to the Project may differ from information presented in section 4.0, which is based on data derived from field surveys and engineered drawings.

3.1.1 Public Comments

We received 32 comments during the scoping process and 5 comments following issuance of the draft EIS requesting that we evaluate alternatives for the Project. In response to these comments, we requested that Mountain Valley provide additional environmental information to enable us to compare alternatives to the proposed action. In some cases, in response to stakeholder, agency, and FERC staff comments, and their own assessments, Mountain Valley revised their proposal and incorporated approximately 122 route variations since the scoping process began in Spring of 2018.

Some commenters recommended that we evaluate the potential for energy efficiency, energy conservation programs, and renewable energy (e.g., wind, solar) to eliminate or meet the need for the Southgate Project. We recognize that energy conservation and efficiency programs help to reduce energy demand and that renewable energy is playing an increasing role in meeting the region's energy needs. However, because the purpose of the Project is to transport natural gas, and the generation of electricity from renewable energy sources or the gains realized from increased energy efficiency and conservation are not transportation alternatives, they cannot function as a substitute for the Project and are not considered further in this analysis.

3.2 NO ACTION ALTERNATIVE

The Commission has two courses of action in processing applications under Section 7 of the NGA: 1) deny the requested action (the No Action Alternative); or 2) grant the Certificate with or without conditions. If the No Action Alternative is selected by the Commission, the Project would not be constructed, and the short- and long-term environmental impacts of the Project would not occur. Additionally, if the No Action Alternative is selected, the stated objectives of the Project would not be met. If the Project is not constructed, shippers may seek other means to obtain an equivalent supply of natural gas from new or existing pipeline systems. Because any replacement

project capable of transporting similar volumes of natural gas may result in the expansion of existing natural gas transportation systems or the construction of new infrastructure; both of which are likely to result in impacts comparable to those described in section 4.0 of this EIS, we conclude that in addition to not meeting the Project objective, the No Action Alternative is also not likely to provide a significant environmental advantage. Therefore, we dismiss it from further consideration.

3.3 SYSTEM ALTERNATIVES

System alternatives to the proposed action would make use of existing natural gas transmission systems/facilities to meet the stated purpose of the Project. Implementing a system alternative would make it unnecessary to construct all or part of the Project, although some modifications or additions to an existing transmission system may be necessary. Existing pipeline systems and systems under construction are depicted on figure 3.3-1.

3.3.1 Existing and Approved Natural Gas Pipeline Systems

There are currently two existing FERC-jurisdictional natural gas pipeline transportation systems operating near the Project area: Transcontinental Gas Pipe Line Company LLC (Transco) and East Tennessee. There is also one approved FERC-jurisdictional natural gas pipeline system, the Atlantic Coast Pipeline (ACP) Project that is currently under construction. It consists of 604 miles of natural gas pipeline in West Virginia, Virginia, and North Carolina. The ACP Project is approximately 100 miles east of the proposed Project Dan River and Haw River interconnects. Additionally, one non-jurisdictional pipeline system owned by Cardinal Pipeline Company, LLC (Cardinal Pipeline) is operating near the Project. Without modifications, these pipeline systems currently do not have the available individual capacity, combined available capacity, nor direct physical connection to transport the required volumes of natural gas to the delivery points proposed for the Project. . Therefore, we do not consider use of existing pipeline systems as a technically feasible alternative to the Project.

3.3.2 Modifications of Existing and Approved Natural Gas Pipeline Systems

Since none of the existing or approved pipeline systems in the Project area have the capacity to meet the Project's purpose, each system would require modifications to meet the purpose of the Project. The modifications could include additional pipeline construction to connect to the natural gas supply, delivery area, or both; pipeline construction to create additional transportation capacity; additional compression; or some combination of these options.

3.3.2.1 Transco Pipeline System Alternative

The existing Transco system consists of various diameter pipelines totaling approximately 10,200 miles between Texas and New York. The system has a peak design capacity of almost 15 Bcf/d of natural gas to markets in the Northeast, Mid-Atlantic, and Southeast regions of the United States. The Southgate Project would be located adjacent to the Transco system in Virginia and North Carolina from mileposts (MPs) 0.4 to 32.9.

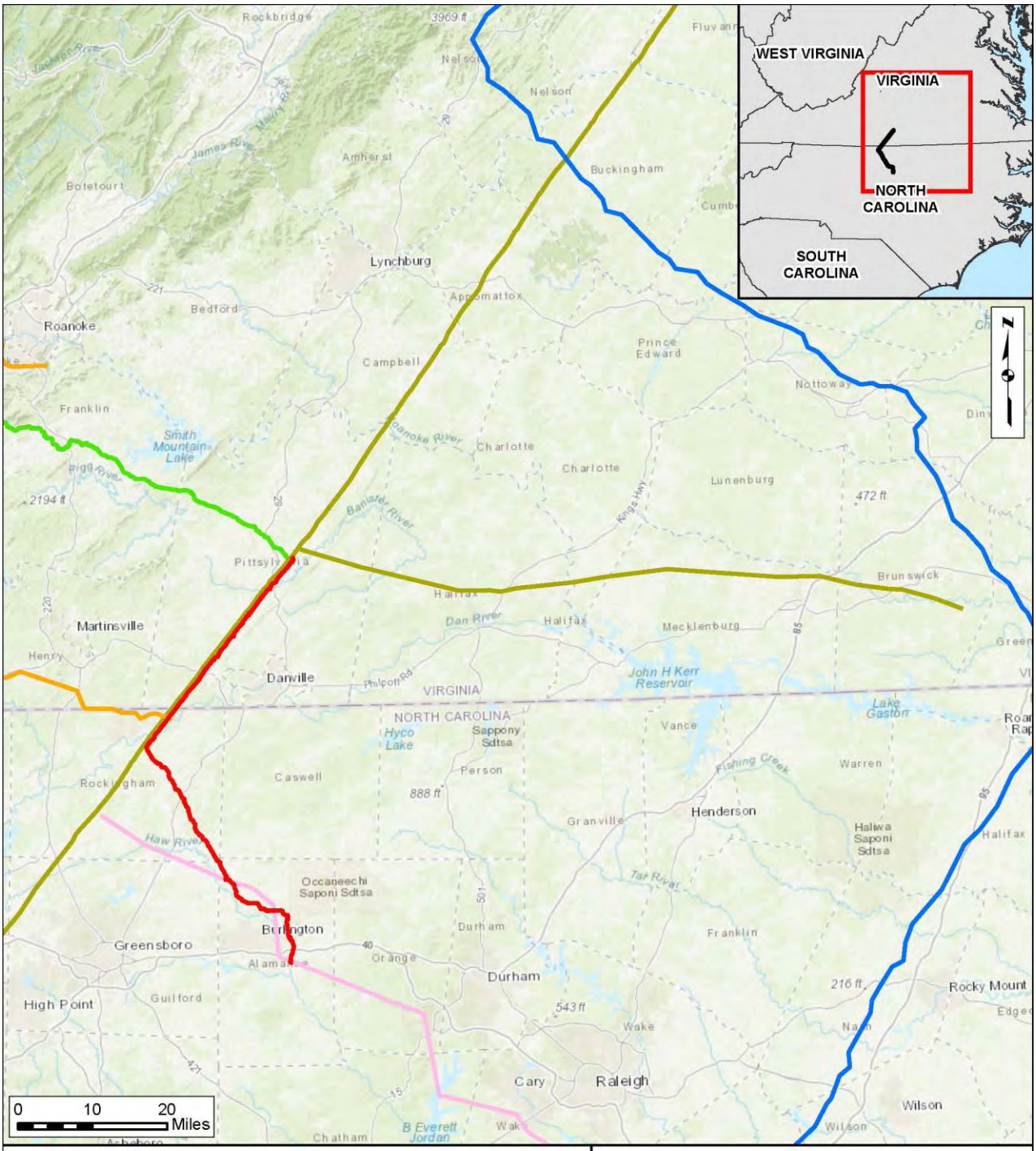


Figure 3.3-1

Southgate Project

System Alternatives

In comments on the draft EIS, Transco noted that although the firm transportation capacity of its system is currently fully subscribed, it could modify its existing system to provide the capacity sought by DENC by collocating a new 37.7-mile pipeline lateral along the existing right-of-way for the Cardinal Pipeline, and modifying an existing compressor station in Rockingham County, North Carolina. Additional system upgrades would likely be necessary before Transco would be able to provide the additional 375,000 dekatherms per day (Dth/d) of firm transportation service on its mainline from the Project's proposed receipt point with the MVP mainline to the interconnection between Transco and Cardinal Pipeline.

Mountain Valley responded to these comments stating that Transco's System Alternative would not meet several of the Southgate Project objectives that DENC considered prior to contracting for capacity on the Southgate Project, including increased competition and resiliency, risk diversification, and a direct physical connection to East Tennessee's interstate pipeline system. DENC agreed with Mountain Valley, stating that the Transco System Alternative would not meet the Southgate Project need with less environmental impact and at a lower cost, noting two reasons: 1) Transco failed to explain how its proposal would resolve Transco's lack of available firm capacity on its mainline; and 2) that its alternative would be unable to meet their timing needs for bringing the Southgate Project's proposed capacity online.

We conclude that undefined modifications would be required along Transco's mainline. Transco did not explain what upgrades would be needed to resolve its mainline system's lack of available firm capacity. The impacts of these upgrades may be less than, similar to, or greater than those that would occur as proposed by the Southgate Project. Therefore, we are unable to determine that this alternative would provide a significant environmental advantage.

Finally, as Mountain Valley and DENC pointed out, beginning the numerous permitting processes anew would cause delays that would be inconsistent with DENC's timing needs for bringing into service this additional capacity. While this last factor was not included as a Southgate Project objective, it is clearly a consideration that could affect the economic feasibility of the Southgate Project. Therefore, this alternative is not considered further in this analysis.

3.3.2.2 East Tennessee System Alternative

The East Tennessee pipeline system has the capacity to transport 1.9 billion cubic feet per day (bcf/d) of natural gas and extends from Nashville, Tennessee, through Virginia, to Eden, North Carolina where it interconnects with the Transco pipeline system. The East Tennessee pipeline system does not connect with the Southgate Project's proposed receipt point with the Mountain Valley Pipeline. The Southgate Project would interconnect with the East Tennessee pipeline system at the LN 3600 Interconnect taking gas to delivery points. To meet the purpose of the Project, modifications to the East Tennessee pipeline system would be required to supply 375 MMcf/d of natural gas to the DENC distribution system. The modifications would include upgrades similar to the Project including approximately 30 miles of pipeline collocated with the Transco pipeline system, 40 miles of new pipeline, and additional compression. These modifications would result in environmental impacts similar to those that would occur as proposed by the Project. Therefore, we conclude that this alternative would not provide a significant environmental advantage.

3.3.2.3 Atlantic Coast Pipeline System Alternative

The ACP Project, currently under construction, consists of 604 miles of natural gas pipeline in West Virginia, Virginia, and North Carolina. As noted above, the ACP Project is approximately 100 miles east of the T-15 Dan River and T-21 Haw River interconnects. In comments on the draft EIS, ACP states that rather than connecting to the western side of DENC's system as proposed by Mountain Valley, deliveries from ACP to DENC could occur on the eastern side of DENC's service territory. ACP contends that the ACP System Alternative could provide the additional gas through a combination of 140,000 Dth/d of available capacity on its system, ancillary facility enhancements, and upgrades to the existing Piedmont system, on which ACP has leased capacity.

As ACP acknowledged, the ACP System Alternative would not connect to the Project's proposed receipt points with the mainline Mountain Valley Pipeline or with East Tennessee's interstate pipeline system. Nor would the ACP System Alternative facilitate deliveries to the Southgate Project's proposed delivery points on DENC's distribution system in Rockingham and Alamance Counties, North Carolina. For these reasons, we find that the ACP System Alternative does not meet the stated purpose of the Southgate Project.

In order to connect the ACP Project with DENC's receipt points, a minimum of 100 miles of new pipeline (and associated compression) infrastructure would be required. Therefore, we conclude that the use of the ACP System Alternative would not provide a significant environmental advantage. For these reasons, the ACP Project is not considered further in this analysis.

3.3.2.4 Cardinal Pipeline System

The Cardinal Pipeline Company, co-owned by affiliates of Transco, Piedmont Natural Gas Company, and Dominion Energy, operates 105 miles of 24-inch-diameter intrastate pipeline in North Carolina originating in Rockingham County at an interconnect with the Transco pipeline system, extending southwest to Wake County. The Cardinal Pipeline Company transports natural gas from the Transco pipeline system to the Dominion Energy distribution system and Piedmont Natural Gas system. To meet the objective of the Southgate Project, modifications to the existing Cardinal Pipeline similar to those described above (i.e., a lateral and compression) would be necessary. Providing the gas to this lateral would either require the use of the Transco system, as described above, or additional pipeline construction. The impacts of these upgrades may be less than, similar to, or greater than those that would occur as proposed by the Project. Therefore, we cannot conclude that this alternative would provide a significant environmental advantage.

3.4 ROUTE ALTERNATIVES AND VARIATIONS

Early in the development of the Project, Mountain Valley considered a pipeline route that was largely collocated with existing utility rights-of-way. Upon more detailed route evaluation and after the determination of the presence of constraints such as residential areas, ponds, and side slopes, Mountain Valley subsequently incorporated minor deviations in the Project route. During the course of the pre-filing and environmental scoping process, Mountain Valley incorporated at least 46 of the 122 route variations into the Southgate route to avoid and/or minimize impacts on specific resources at the request of landowners and stakeholders.

Major route alternatives represent substantial deviations from a proposed route that may offer significant environmental advantages compared to the proposed route. Smaller route alternatives represent deviations to the proposed route between certain mileposts in a particularly sensitive area that may offer a significant environmental advantage to the proposed route. Minor route variations include minor deviations (or reroutes) over a short distance that might avoid a specific resource at that location.

We evaluated three major route alternatives including the Berry Hill Alternative, Lake Cammack East Alternative, and the North-South Alternative. The locations of the major route alternatives are shown on figure 3.4-1. We also evaluated six minor route alternatives including the Haw River Alternative, Haw River West Alternative, Green Level Alternative, Jimmie Kerr Road Alternative, Duke Energy Powerline Extension Alternative, and City of Burlington Alternative. The locations of the minor route alternatives are shown on figures 3.4-2 through 3.4-7. Finally, we evaluated eight minor route variations including the Nicholson Variation, Whitehead Variation, Robert Pollok-Hill View Farms Variation, Moore Variation, Strader Variation, Madren Variation, Taylor East Variation, and Taylor West Variation. The locations of the minor route variations are shown on figures 3.4-8 through 3.4-14.

Mountain Valley incorporated several route variations that we evaluated in the draft EIS into its proposed pipeline route filed with the Commission on October 23, 2019.[1] Therefore, these route variations are incorporated into the Proposed Action and are no longer evaluated in this section. These variations include the Bombardier Variation, Shambley Variation 1, Shambley Variation 2, Martin Marietta Variation, and Town of Haw River Variation.

On October 23, 2019, in response to alternatives considered in the draft EIS, Mountain Valley submitted impact analysis comparison tables for each alternative based on changes in the current proposed route and new information gathered on each alternative or route variation. The revised data represents refinements to the previous data that are derived largely from new 2016 U.S. Geological Survey (USGS) National Land Cover Dataset, revised 2019 pipeline and electrical utility data, and other updated sources. The revisions do not alter our conclusions.

[1] This information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field. Accession number 20191023-5022 contains supplemental project information filed on October 23, 2019. Accession number 20191220-5298 contains revised alignment sheets for the Project.

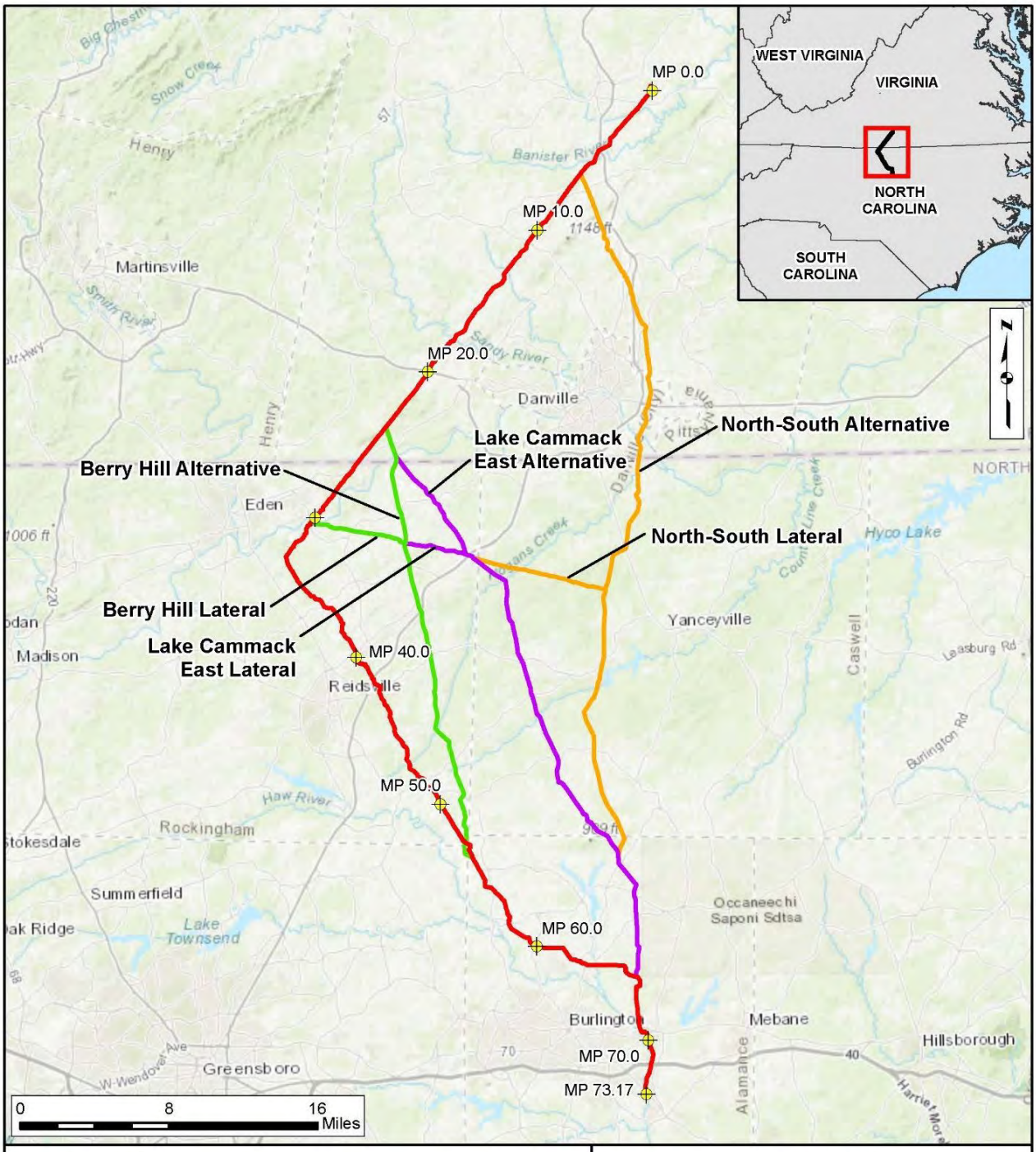


Figure 3.4-1

Southgate Project

Major Route Alternatives

3.4.1 Major Route Alternatives

3.4.1.1 Berry Hill Alternative

Based on stakeholder suggestions to route away from the Eden and Reidsville areas, we evaluated the Berry Hill Alternative. This alternative deviates from the proposed route at MP 23.7 in Pittsylvania County near Berry Hill, Virginia extending southeast 30.1 miles to rejoin the proposed route at MP 53.6 in Alamance County, North Carolina. The alternative includes a 5.4-mile lateral from the T-15 Dan River Interconnect with Dominion Energy, east of Eden, North Carolina to the alternative south of Guerrant Springs Road. Table 3.4-1 provides a comparison between the proposed route and the Berry Hill Alternative, and the location of the alternative is shown on figure 3.4-1.

The Berry Hill Alternative would cross two fewer perennial waterbodies, 0.8 acre less total wetland including 0.6 acre of forested wetland during construction, one less environmental justice area, one less potentially eligible historic property, and one less residence within 25 feet of workspace in comparison to the proposed route. However, the Berry Hill Alternative would be 0.2 mile longer; require a 5.4-mile lateral; and affect seven more residences within 50 feet of workspace. Within the range of the alternative route the proposed route would be collocated with existing rights-of-way for 15.2 miles, or about 50 percent of the total length compared to 4.6 miles or 15 percent of the total length of the Berry Hill Alternative. The Berry Hill Alternative would result in 365.0 acres of impacts during construction compared to the 363.1 acres of the proposed route. The Berry Hill Alternative would also impact about 30 more acres of forested land than would the proposed route. While the Berry Hill Alternative does offer some advantages, we conclude that the environmental advantages, when considered on the whole, are not significant.

TABLE 3.4-1

Comparison of the Berry Hill Alternative and the Southgate Proposed Route

Feature	Berry Hill Alternative	Proposed Route
Total length (miles) a/	30.1	29.9
Length adjacent to existing right-of-way (miles)	4.6	15.2
Land affected during construction (acres) a/	365	363.1
NRHP designated or eligible historic districts crossed (miles)	0	0
Unlisted/potential eligible historic properties (number)	0	1
Landowner parcels crossed (number)	159	159
Residences within 25 and 50 feet of the edge of the construction right-of-way (number)	0 /11	1 / 4
Environmental Justice Areas (number) b/	11	12
Agricultural Land crossed (miles) c/	9.5	10.5
Forested Land affected during construction (acres)	209.3	179.1
Wetlands affected by construction (acres) d/	1.4	2.2
Forested wetlands affected by construction (acres) d/	0.8	1.4
Perennial waterbody crossings (number)	14	16

TABLE 3.4-1

Comparison of the Berry Hill Alternative and the Southgate Proposed Route

Feature	Berry Hill Alternative	Proposed Route
Presence of critical habitat or federally endangered or threatened species (Yes/No). Number of species.	No/0	No/0
Shallow bedrock crossed (miles)	3.8	4.4

a/ Assuming 100-foot-wide construction right-of-way. Includes a 5.4-mile long lateral to T-15 Dan River Interconnect.

b/ U.S. Census Bureau 2017b, 2017c.

c/ Includes pasture/hay and cultivated crops.

d/ National Wetlands Inventory (NWI) and National Hydrography Dataset (NHD) data. Assuming 75-foot-wide construction right-of-way.

3.4.1.2 Lake Cammack East Alternative

This alternative also deviates from the proposed route at MP 23.7 in Pittsylvania County near Berry Hill, extending southeast 43.3 miles on the east side of Lake Cammack and rejoins the proposed route at MP 66.1 in Alamance County, North Carolina. The Lake Cammack East Alternative was considered based on stakeholder suggestions to route away from Eden and Reidsville. This alternative includes an 8.8-mile-long lateral from the T-15 Dan River Interconnect with Dominion Energy, east of Eden to the alternative north of U.S. Route 29. Table 3.4-2 provides a comparison between the proposed route and the Lake Cammack East Alternative, and the locations of the alternative is shown on figure 3.4-1.

The Lake Cammack East Alternative would cross 33 fewer parcels, one less potentially eligible historic property, and two less Environmental Justice Areas in comparison to the proposed route. However, the alternative would require an 8.8 mile lateral; affect one more residence within 25 feet and five more residences within 50 feet of workspace; and impact an additional 2.5 acres of total wetlands, 3.5 additional acres of forested wetlands, and 28.7 additional acres of forested land during construction. Within the range of the alternative route, the proposed route would be collocated with existing rights-of-way for 19.1 miles, or about 44 percent of the total length compared to 7.1 miles or 16 percent of the total length of the alternative. Given the consideration of these factors, we conclude that the Lake Cammack East Alternative does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

TABLE 3.4-2

Comparison of the Lake Cammack East Alternative and the Southgate Proposed Route

Feature	Lake Cammack East Alternative	Proposed Route
Total length (miles) a/	43.3	43.3
Length adjacent to existing right-of-way (miles)	7.1	19.1
Land affected during construction (acres) a/	525.4	525.2
NRHP designated or eligible historic districts crossed (miles)	0	0
Unlisted/Potential Eligible Historic Properties (number)	0	1
Landowner parcels crossed (number)	200	233
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	2 /11	1 / 6
Environmental Justice Areas (Number) b/	16	14
Agricultural Land crossed (miles) c/	13.7	17.2
Forested Land affected during construction (acres)	274.7	246
Wetlands affected by construction (acres) d/	5.4	2.9
Forested Wetlands affected by construction (acres) d/	4.9	1.4
Perennial waterbody crossings (number)	19	18
Presence of critical habitat or federally endangered or threatened species (Yes/No). Number of species.	No / 0	No / 0
Shallow bedrock crossed (miles)	4.3	4.4

a/ Assuming 100-foot-wide construction right-of-way. Includes an 8.8-mile long lateral to T-15 Dan River Interconnect.

b/ U.S. Census Bureau 2017b, 2017c.

c/ Includes pasture/hay and cultivated crops.

d/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.

3.4.1.3 North-South Alternative

The North-South Alternative deviates from the proposed route at MP 6.1 in Pittsylvania County, extending south 63.4 miles to rejoin the proposed route at MP 66.1 in Alamance County. The alternative was developed from suggestions from stakeholders to develop a straight line alternative routed east of Danville, Virginia. This alternative includes a 16.6-mile-long lateral from the T-15 Dan River Interconnect with Dominion Energy, east of Eden, to the alternative route approximately 2.3 miles south of Foster Road. Table 3.4-3 provides a comparison between the proposed route and the North-South Alternative, and the location of the alternative is shown on figure 3.4-1.

The North-South Alternative would cross 9.9 miles less agricultural land and affect two less residences within 25 feet and two less potentially eligible historic properties in comparison to the proposed route. However, the alternative would be 2.3 miles longer; require a 16.6 mile lateral, cross 53 more parcels, affect 11 more residences within 50 feet of workspace; crosses three more streams; and impact 2.3 acres more acres of wetlands (1.4 more acres of forested wetlands), and 131.6 more acres of forested land during construction. Within the range of the alternative route, the proposed route would be collocated with existing rights-of-way for 31.0 miles, or about 50

percent of the total length compared to 25.5 miles or 40 percent of the total length of the alternative. The North-South Alternative would result in 768.7 acres of impacts during construction compared to the 740.4 acres of the proposed route. Given the consideration of these factors, we conclude that the North-South Alternative does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

TABLE 3.4-3

Comparison of North-South Alternative and the Southgate Proposed Route

Feature	North-South Alternative	Proposed Route
Total length (miles) a/	63.4	61.1
Length adjacent to existing right-of-way (miles)	25.5	31.0
Land affected during construction (acres) a/	768.7	740.4
NRHP designated or eligible historic districts crossed (miles)	0	0
Unlisted/Potential Eligible Historic Properties (number)	0	2
Landowner parcels crossed (number)	376	323
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	2 / 23	4 / 12
Environmental Justice Areas (number) b/	25	22
Agricultural Land crossed (miles) c/	15.1	25
Forested Land affected during construction (acres)	464.3	332.7
Wetlands affected by construction (acres) d/	5.5	3.2
Forested Wetlands affected by construction (acres) d/	2.8	1.4
Perennial waterbody crossings (number)	31	28
Presence of critical habitat or federally endangered or threatened species (Yes/No). Number of species.	No / 0	No / 0
Shallow bedrock crossed (miles)	10.5	5.1

a/ Assuming 100-foot-wide construction rights-of-way and 50-foot-wide permanent rights-of-way. Includes a 16.6-mile long lateral to T-15 Dan River Interconnect.

b/ U.S. Census Bureau 2017b, 2017c.

c/ Includes pasture/hay and cultivated crops.

d/ NWI and NHD data. Assuming 75-foot-wide construction rights-of-way and 50-foot-wide permanent rights-of-way.

3.4.1.4 Major Route Alternatives Conclusion

While we did identify major route alternatives that would meet the Project objective and were technically (and probably economically) feasible, we did not identify a major route alternative that would provide a significant environmental advantage, when compared with the corresponding portions of the proposed route.

3.4.2 Minor Route Alternatives

We evaluated six minor route alternatives for the Project pipeline route in response to several public comments received to increase collocation with existing rights-of-way in order to minimize impacts on residences and other areas of public concern. Collocation alternatives developed include the Haw River Alternative, the Haw River West Alternative, the Green Level Alternative, Duke Energy Powerline Alternative, and the City of Burlington Alternative. The Jimmie Kerr Road Alternative was developed in response to public concerns about the area the proposed route traverses from MP 72.0 to 73.0. For minor route alternatives, our comparison of resources affected includes only the area (MP range) where the deviation occurs. A brief analysis of these alternatives is presented below.

3.4.2.1 Haw River Alternative

We considered the Haw River Alternative in response to stakeholder concerns, and from a request by the EPA on September 12, 2019, to utilize existing rights-of-way to avoid or minimize impacts on residences between the Stony Creek Reservoir in Burlington, North Carolina and the Project terminus in Graham, North Carolina. This alternative deviates from the proposed route between MP 63.9 and MP 72.9. The alternative extends southeast paralleling the existing Cardinal Pipeline for 2.2 miles crossing and paralleling the Haw River and the existing Cardinal Pipeline for an additional 3.4 miles. The alternative deviates from the Cardinal Pipeline just south of Interstate 40/85, turning east to cross the Haw River and reconnect with the proposed route at MP 72.9. Table 3.4-4 provides a comparison between the proposed route and the Haw River Alternative, and the location of the alternative is shown on figure 3.4-2.

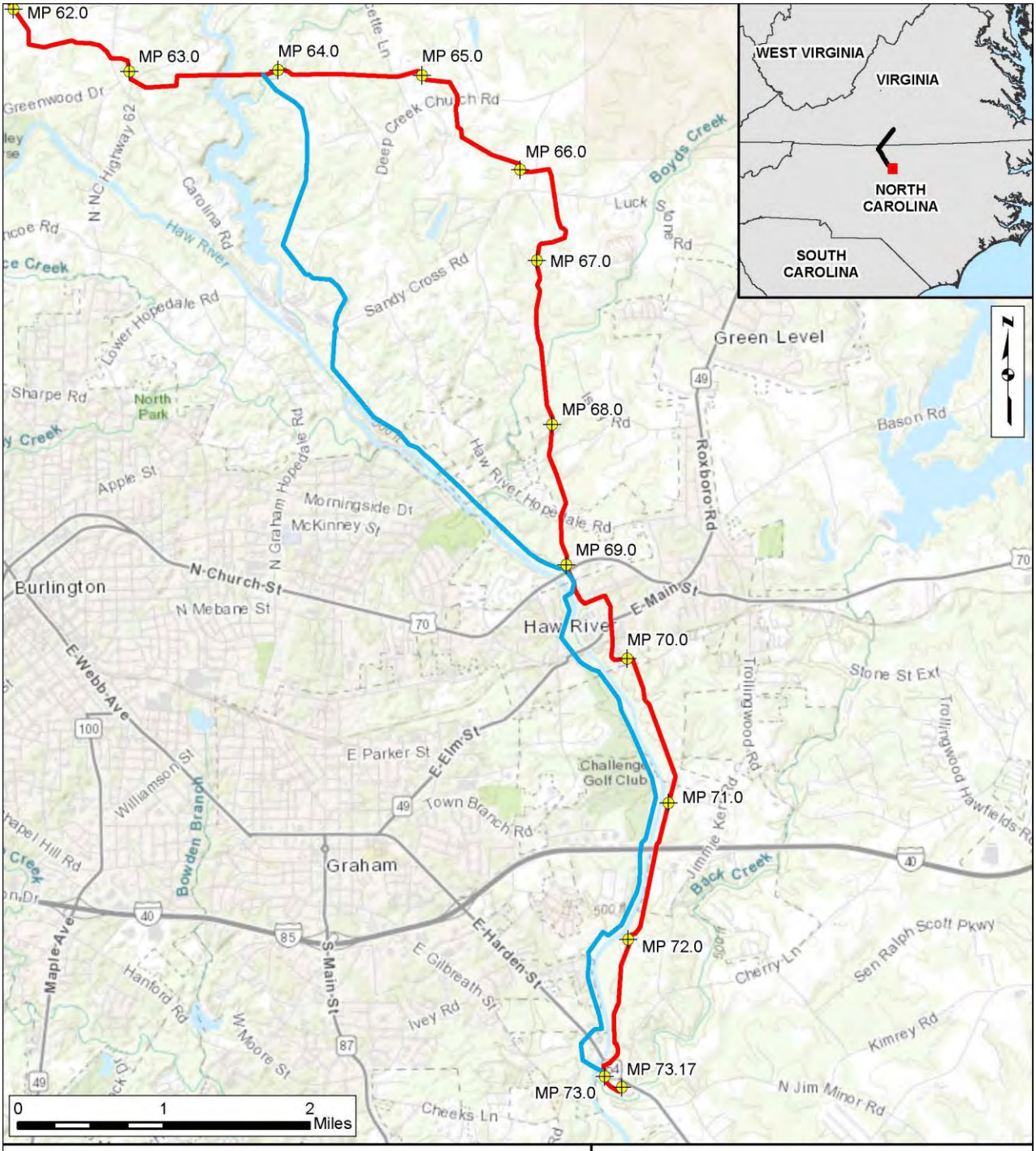
The Haw River Alternative would be collocated for an additional 5.6 miles of rights-of-way; cross 32 fewer parcels, 3.3 fewer acres of forested land, and 12.8 fewer acres of agricultural land; require 9.3 acres less of construction rights-of-way; and has four less residences within 25 and 50 feet of the construction rights-of-way. However, the alternative would cross two additional Environmental Justice Areas, five more waterbodies, affect an additional 6.2 acres of wetland, and is 0.8 mile more in length compared to the proposed route within the range of the alternative. Given the consideration of these factors, we conclude that the Haw River Alternative does offer some advantages and affects less residences, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

TABLE 3.4-4

Comparison of the Haw River Alternative and the Southgate Proposed Route

Feature	Haw River Alternative	Proposed Route
Total length (miles)	8.7	5.7
Construction rights-of-way (acres) a/	105.4	114.7
Total number of parcels crossed	55	87
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	1 / 1	5 / 5
Environmental Justice Areas (number) b/	7	5
Unlisted/Potential Eligible Historic Properties (number)	0	1
Number of waterbodies crossed	24	19
Number of NWI wetlands crossed	9	1
NWI wetlands within construction right-of-way (acres) c/	6.4	0.2
Agricultural Land within construction right-of-way (acres) d/	18.0	30.8
Forested Land affected during construction (acres)	65	68.3
Length adjacent to existing right-of-way (miles)	5.6	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ U.S. Census Bureau 2017b, 2017c.
c/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
d/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Haw River Alternative

Figure 3.4-2

Southgate Project

Minor Route Alternatives
Haw River Alternative

3.4.2.2 Haw River West Alternative

We evaluated the Haw River West Alternative in response to stakeholder concerns, and from a request by the EPA on September 12, 2019, to utilize existing rights-of-way to minimize impacts on residences between Haw River and Graham. This alternative follows the same footprint as the Haw River Alternative between MP 69.1 and MP 72.5 of the proposed route, with a slight variation at the Haw River crossing just south of East Harden Street where it joins the proposed route at MP 73.0. Table 3.4-5 provides a comparison between the proposed route and the Haw River West Alternative, and the location of the alternative is shown on figure 3.4-3.

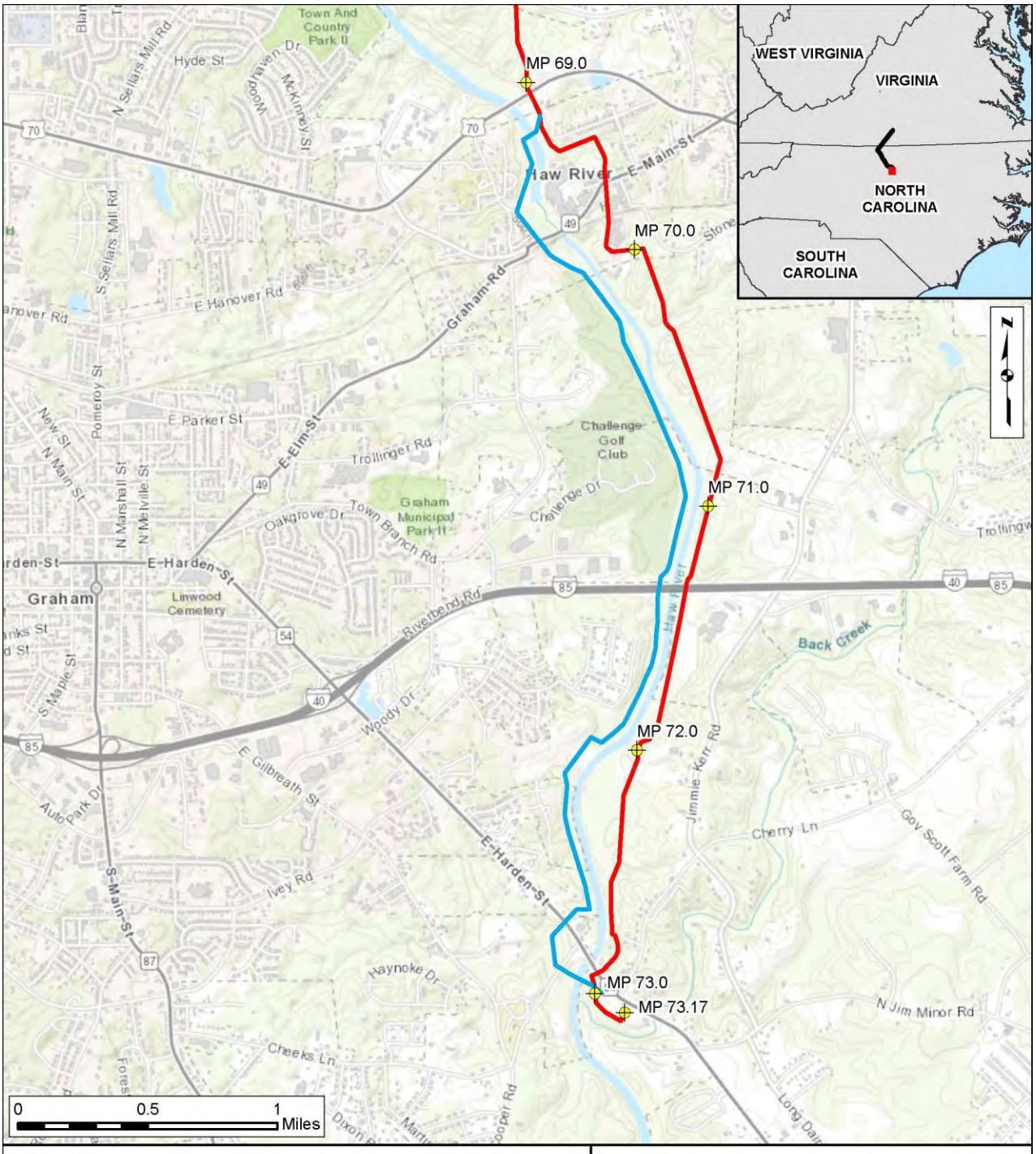
The Haw River West Alternative would be collocated with an existing right-of-way for an additional 3.5 miles, affect 5 less residences within 25 and 50 feet of the construction rights-of-way; cross 11 less parcels; and 6.0 acres less of forested land. However, the alternative would be 0.1 miles longer, require 0.6 acres of construction rights-of-way, include multiple crossings of Haw River; cross an additional three Environmental Justice Areas and five waterbodies; and impact 6.3 more acres of wetland and 0.2 acres of agricultural land compared to the proposed route. Given the consideration of these factors, we conclude that Haw River West Alternative has some advantages and affects less residences, but overall, would result in resource impacts that are similar to the proposed route. Consequently, the alternative does not provide a significant environmental advantage when compared to the proposed route.

TABLE 3.4-5

Comparison of the Haw River West Alternative and the Southgate Proposed Route

Feature	Haw River West Alternative	Proposed Route
Total length (miles)	4.0	3.9
Construction rights-of-way (acres) a/	48.5	47.9
Total number of parcels crossed	32	43
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0 / 0	5 / 5
Environmental Justice Areas (number) b/	6	3
Unlisted/Potential Eligible Historic Properties (number)	0	1
Number of waterbodies crossed	13	8
Number of NWI wetlands crossed	9	0
NWI wetlands within construction right-of-way (acres) c/	6.4	0.1
Agricultural Land within construction right-of-way (acres) d/	6.0	5.8
Forested Land affected during construction (acres)	26.2	32.2
Length adjacent to existing right-of-way (miles)	3.5	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ U.S. Census Bureau 2017b, 2017c.
c/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
d/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Haw River West Alternative

Figure 3.4-3

Southgate Project

Minor Route Alternatives
Haw River West Alternative

3.4.2.3 Green Level Alternative

We evaluated the Green Level Alternative in response to stakeholder concerns and comments to utilize existing rights-of-way to minimize impacts on populated areas in the vicinity of Green Level, North Carolina. This alternative deviates from the proposed route at MP 65.8 and proceeds east and south around the community of Green Level before rejoining the proposed route at MP 70.8. Table 3.4-6 provides a comparison between the proposed route and the Green Level Alternative, and the location of the alternative is shown on figure 3.4-4.

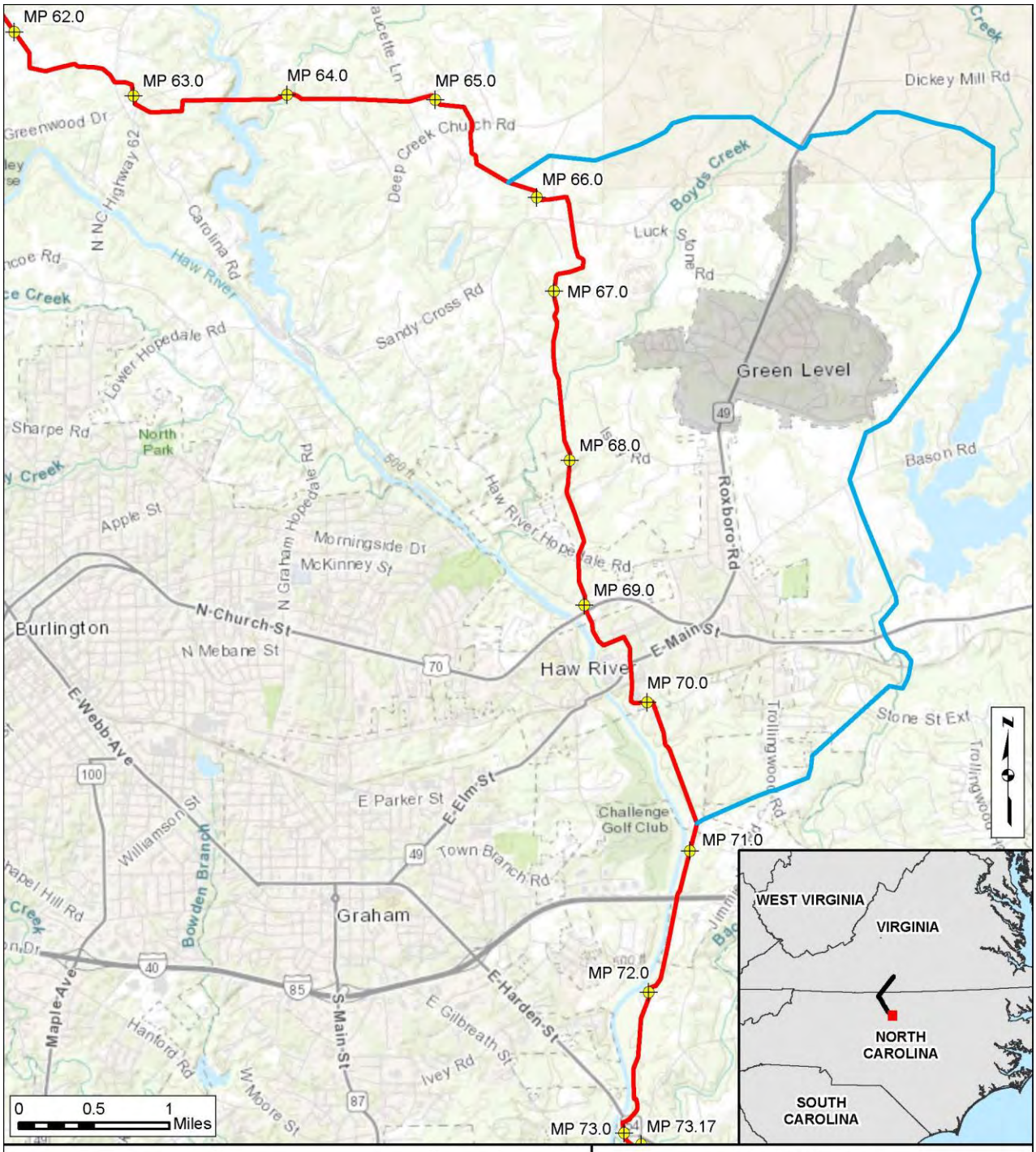
The Green Level Alternative would have three fewer residences within 25 of the workspace; affect one less potentially eligible historic property, and collocate with an additional 1.9 miles of existing rights-of-way in comparison with the proposed route. However, the Green Level alternative would be 4.1 miles longer; require an additional 49.8 acres of construction rights-of-way; cross two more Environmental Justice Areas, and impact an additional 0.2 acre of wetlands, 22.8 acres of agricultural land, and 24.4 acres of forested land compared to the proposed route. Given the consideration of these factors, we conclude that the Green Level Alternative does offer some advantages and affects less residences, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

TABLE 3.4-6

Comparison of the Green Level Alternative and the Southgate Proposed Route

Feature	Green Level Alternative	Proposed Route
Total length (miles)	9.4	5.3
Construction rights-of-way (acres) a/	114.0	64.2
Total number of parcels crossed	56	55
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0 / 0	3 / 3
Environmental Justice Areas (number) b/	6	4
Unlisted/Potential Eligible Historic Properties (number)	0	1
Number of waterbodies crossed	14	13
Number of NWI wetlands crossed	5	1
NWI wetlands within construction right-of-way (acres) c/	0.4	0.2
Agricultural Land within construction right-of-way (acres) d/	37.7	14.9
Forested Land affected during construction (acres)	64.6	40.2
Length adjacent to existing right-of-way (miles)	1.9	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ U.S. Census Bureau 2017b, 2017c.
c/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
d/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Green Level Alternative

Figure 3.4-4

Southgate Project

Minor Route Alternatives
Green Level Alternative

3.4.2.4 Jimmie Kerr Road Alternative

We evaluated the Jimmie Kerr Road Alternative in response to multiple landowner and stakeholder concerns in the area between MP 72 and 73. The Jimmie Kerr Road Alternative originates at MP 71.8 traveling southeast, west, and southwest before rejoining the proposed route at MP 73.1. Table 3.4-7 provides a comparison between the proposed route and the Jimmie Kerr Road Alternative, and the location of the alternative is shown on figure 3.4-5.

The alternative would have two less residences within 25 feet of the workspace compared to the proposed route, however, the alternative would affect three additional parcels, 9.9 acres of agricultural land, and 0.6 acres of forested land compared to the proposed route. Additionally, the alternative would be 0.8 mile longer than the proposed route and require 9.0 acres of additional construction rights-of-way. Given the consideration of these factors, we conclude that Jimmie Kerr Road Alternative does not provide a significant environmental advantage when compared to the proposed route.

TABLE 3.4-7

Comparison of Jimmie Kerr Road Alternative and the Southgate Proposed Route

Feature	Jimmie Kerr Road Alternative	Proposed Route
Total length (miles)	2.2	1.4
Construction rights-of-way (acres) a/	26.4	17.4
Total number of parcels crossed	19	16
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0 / 0	2 / 2
Environmental Justice Areas (number) b/	3	2
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	3	3
Number of NWI wetlands crossed	0	0
NWI wetlands within construction right-of-way (acres) c/	0	0
Agricultural Land within construction right-of-way (acres) d/	12.0	2.1
Forested Land affected during construction (acres)	11.9	11.3
Length adjacent to existing right-of-way (miles)	0	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ U.S. Census Bureau 2017b, 2017c.
c/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
d/ Includes pasture/hay and cultivated crops.

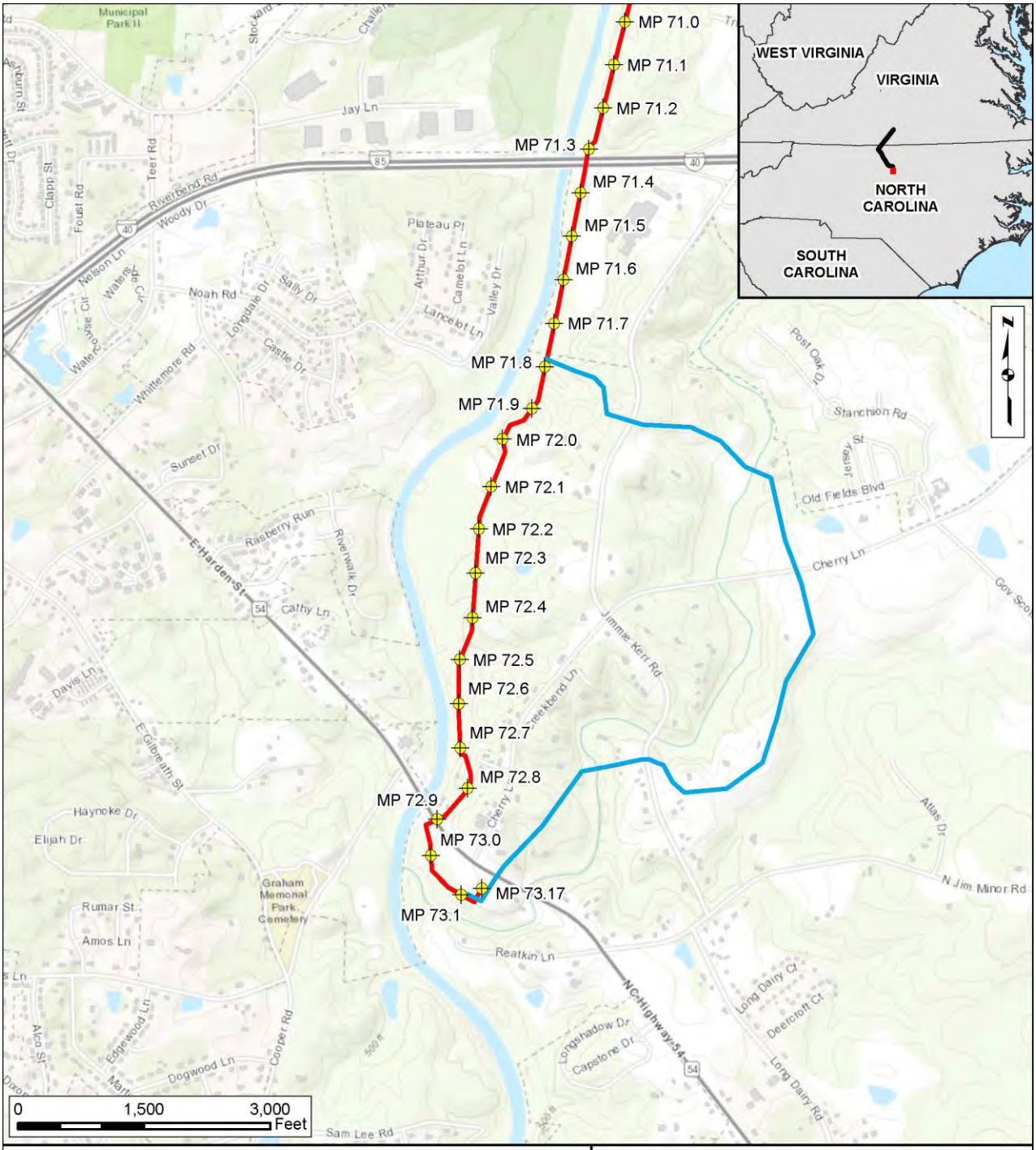


Figure 3.4-5

Southgate Project

Minor Route Alternatives
Jimmie Kerr Road Alternative

3.4.2.5 Duke Energy Powerline Extension Alternative

We evaluated an alternative that would increase collocation with the existing Duke Energy electrical transmission line rights-of-way between MP 58.2 and MP 62.0. The alternative originates at MP 58.2 of the proposed route and extends south, collocated with a Duke Energy electrical transmission line easement, crossing Burch Bridge Isely School Road, and rejoining the proposed route at MP 62.0. Table 3.4-8 provides a comparison between the proposed route and the Duke Energy Powerline Extension Alternative, and the location of the alternative is shown on figure 3.4-6.

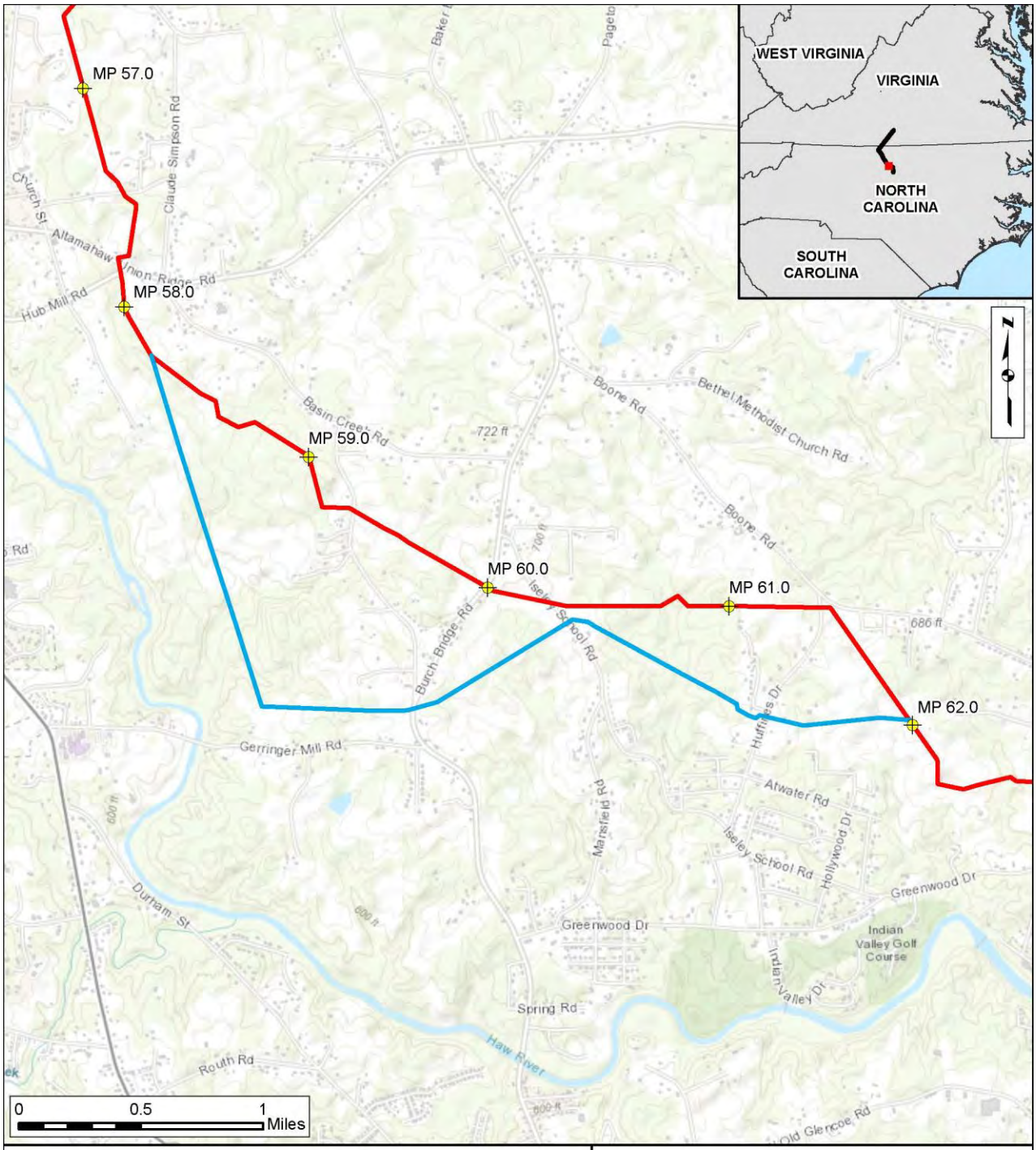
The Duke Energy Powerline Extension Alternative would be collocated for an additional 2.2 miles of rights-of-way, and would impact 5.6 acres less of agricultural land compared to the proposed route. However, the alternative would be slightly longer (0.6 mile); be within 25 feet of one additional residence; cross seven more parcels; and require an additional 7.2 acres of construction rights-of-way. The alternative would impact 14.4 more acres of forested land and cross 5 additional waterbodies compared to the proposed route. Given the consideration of these factors, we conclude that the Duke Energy Powerline Extension Alternative does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

TABLE 3.4-8

Comparison of the Duke Energy Powerline Extension Alternative and the Southgate Proposed Route

Feature	Duke Energy Powerline Extension Alternative	Proposed Route
Total length (miles)	4.4	3.8
Construction rights-of-way (acres) a/	53.3	46.1
Total number of parcels crossed	28	21
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	1 / 1	0 / 0
Environmental Justice Areas (number) b/	3	3
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	10	5
Number of NWI wetlands crossed	2	1
NWI wetlands within construction right-of-way (acres) c/	0.3	0.1
Agricultural Land within construction right-of-way (acres) d/	17.6	23.2
Forested Land affected during construction (acres)	34.3	19.9
Length adjacent to existing right-of-way (miles)	2.5	0.3

a/ Assuming 100-foot-wide construction right-of-way.
b/ U.S. Census Bureau 2017b, 2017c.
c/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
d/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Duke Energy Powerline Extension Alternative

Figure 3.4-6

Southgate Project

Minor Route Alternatives
Duke Energy Powerline
Extension Alternative

3.4.2.6 City of Burlington Alternative

Based on comments from the City of Burlington, submitted on September 16, 2019,[2] we evaluated an alternative that would avoid city property and reduce potential impacts on public water supplies. The alternative originates at MP 61.4 of the proposed route and extends east and south for 3.1 miles, rejoining the proposed route at MP 62.0. Table 3.4-9 provides a comparison between the proposed route and the City of Burlington Alternative. The location of the alternative is shown on figure 3.4-7.

The City of Burlington Alternative is 0.1 mile shorter, would require 0.7 acre less of construction right-of-way, and cross three less waterbodies, 0.3 acre of wetlands, and 4.5 acres of agricultural land compared to the proposed route. However, the alternative would cross 19 more parcels; be within 25 feet of nine residences and within 50 feet of 14 residences; cross 5.3 acres of addional forest land; and be collocated 0.1 mile with existing rights-of-way. Given the consideration of these factors, we conclude that the City of Burlington Alternative does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

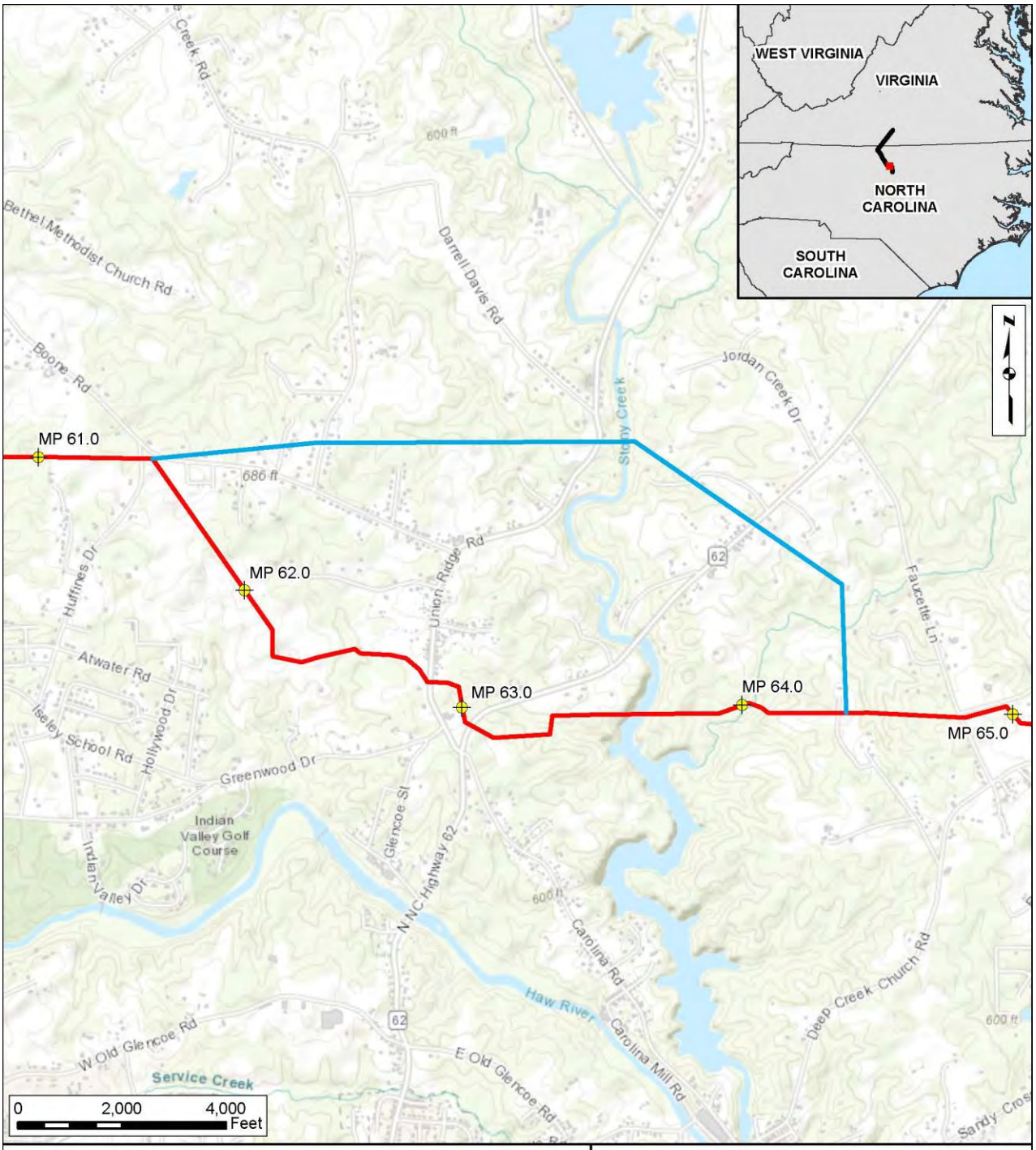
TABLE 3.4-9

Comparison of the City of Burlington Alternative and the Southgate Proposed Route

Feature	City of Burlington Alternative	Proposed Route
Total length (miles)	3.1	3.2
Construction rights-of-way (acres) a/	38.3	39.0
Total number of parcels crossed	34	15
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	9 / 14	0 / 0
Environmental Justice Areas (number) b/	0	0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	2	5
Number of NWI wetlands crossed	1	1
NWI wetlands within construction right-of-way (acres) c/	0.2	0.5
Agricultural Land within construction right-of-way (acres) d/	14.5	19.0
Forested Land affected during construction (acres)	21.2	15.9
Length adjacent to existing right-of-way (miles)	0	0.1

a/ Assuming 100-foot-wide construction right-of-way.
b/ U.S. Census Bureau 2017b, 2017c.
c/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
d/ Includes pasture/hay and cultivated crops.

[2] Accession No. 20190916-5076. This comment can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190916-5076 in the "Numbers: Accession Number" field.



Milepost
Proposed Pipeline Route
City of Burlington Alternative

Figure 3.4-7

Southgate Project

Route Alternatives
City of Burlington Alternative

3.4.2.7 Minor Route Alternatives Conclusion

While we did identify minor route alternatives that would meet the Project objective and were technically (and probably economically) feasible, we did not identify a minor route alternative that would provide a significant environmental advantage, when compared with the corresponding portions of the proposed route.

3.4.3 Minor Route Variations

Route variations are shorter than route alternatives, but are generally longer and more substantial than minor route deviations designed to avoid or further reduce impacts on specific localized resources. We have considered eight route variations that Mountain Valley developed during initial Project planning and throughout the pre-filing and environmental scoping processes, generally in response to stakeholder or FERC staff comments. Many of the variations were assessed at the request of landowners who wanted the route to avoid their property due to sensitive features, such as wells, septic systems, and agricultural operations. As stated in section 4.3 of this EIS, though landowner surveys by Mountain Valley to identify these features are not complete, they are committed to work with landowners to make micro adjustments to the route and workspaces if necessary to avoid and/or ensure protection of all private water wells, septic systems, and sensitive features located in or near the construction workspace. In addition, Mountain Valley would offer water quality testing of any private well within 150 feet of the Project workspace.

Private landowner routing concerns that have been identified during the comment and review process are provided in Table 3.4-10. These landowner concerns have been addressed or evaluated by Mountain Valley. We have also reviewed these concerns and addressed them as appropriate. One landowner concern regarding impacts directly on their property, Pollock-Hillview Farms, is still being considered by Mountain Valley. More information is provided in the sections below.

TABLE 3.4-10

Private Landowner Routing Concerns

Landowner	Nearest MP	Landowner Concern	Resolution Status
Nicholson	3.8	Request re-route due to landowner concerns.	A variation was considered on the Nicholson property, see section 3.4.3.1. The variation does not offer an environmental advantage when compared to the proposed route and is eliminated from further consideration.
Whitehead	4.7	Landowner requested re-route due to concerns about silviculture operation and excessive removal of timber due to workspace layout and additional temporary workspace on their property.	Mountain Valley has removed the use of access road TA-PI-009 and associated temporary workspace on the Whitehead property for the Project. Mountain Valley would also reduce temporary workspace from 100 feet to 75 feet the entire distance on the Whitehead property. ATWS 1049, 1045, and 1046 would remain as part of the Project to assist with crossing of a large wetland, the Banister River, and Highway 29

TABLE 3.4-10

Private Landowner Routing Concerns

Landowner	Nearest MP	Landowner Concern	Resolution Status
Pollok – Hillview Farms	15.0	Landowner and tenant farmer are requesting special provisions due to certified seed operation and potential impact to his operation	Mountain Valley has indicated that they have coordinated with Mr. Pollok to address these concerns, including route adjustments and workspace changes. Mountain Valley has agreed to continue to work with Mr. Pollock to develop a plan to protect his operation.
Taylor	19.5	Request re-route of pipeline through adjacent property. Pipeline would go between their residence and their 10 apartments. Also use of driveway as access road.	The Taylor East and Taylor West Variations were developed by Mountain Valley to avoid or minimize impacts on the the single-family residence and apartment complex on the Talyor property during construction. Variations would result in resource impacts that are similar those of the proposed route and therefore were not adopted. Mountain Valley has eliminated access road TA-PI-049 from the Project.
Moore	33.4	Request re-route due to landowner concerns.	A variation was considered on the Moore property, see section 3.4.3.4. The Moore Variation does not offer an environmental advantage when compared to the proposed route and is eliminated from further consideration.
Strader	40.0	Request re-route due to concern regarding residences on their propery.	Strader Variation was considered. See section 3.4.3.5. Mountain Valley has modified the proposed route to minimize impacts on the property based on meetings with Mr. and Ms. Strader.
Madren	58.4	Landowner is concerned that the Project will cross extensive water and septic infrastructure.	Mountain Valley has recently gained survey access to the property. Mountain Valley has agreed to work with the landowner to reduce or avoid impacts to the infrastructure on the property without modifying the pipeline alignment.
Bombardier	59.0	Requests re-route on property. Congested area off Danieley Wheeler Rd.	A route variation has been adopted by Mountain Valley in this area and the Danieley Wheeler Road crossing.
Shambley	59.4	Requesting pipeline be moved due to newly constructed house within 40 feet of pipeline	A route variation has been adopted by Mountain Valley that minimizes impacts the Shambley property.
Wallace	59.6	The landowner is concerned that the Project would be near their new home and would result in the clearing of large oak trees they would like to keep.	A route variation has been adopted by Mountain Valley in this area and the Danieley Wheeler Road crossing.
Smith	66.3	Requests the route be moved to the edge of their property instead of cutting through the middle	Mountain Valley has adopted a route modification on the Smith property to move the pipeline towards the property line and away from the middle of the property and their residence. Moving the pipeline further west and closer to the property line is not feasible due to residences directly across Sandy

TABLE 3.4-10

Private Landowner Routing Concerns

Landowner	Nearest MP	Landowner Concern	Resolution Status
			Creek Road. Additional route modifications were evaluated at the request of FERC staff; however the routes were not environmentally preferable and would impact additional landowners.
Bollinger		Request relocation of pipeline on property.	Pipeline no longer crosses Bollinger property due to route changes to accommodate a new house at an adjacent property.

3.4.3.1 Nicholson Variation

We evaluated the Nicholson Variation that Mountain Valley developed to avoid or reduce impacts on the Nicholson property and address comments submitted to the FERC Docket on August 21, 2018.[3] This variation deviates from the proposed route at MP 3.65 extending southeast and south before turning northeast, rejoining the proposed route at MP 4.0. Table 3.4-11 provides a comparison between the proposed route and the Nicholson Variation, and the location of the variation is shown on figure 3.4-7.

This variation would affect 0.1 less acres of forested land in comparison to the proposed route. However, the Nicholson Variation would cross one additional parcel; be 0.3 mile longer; affect an additional 4.2 acres of agricultural land; and require an additional 4.2 acres of construction rights-of-way than the proposed route. Given the consideration of these factors, we conclude that the Nicholson Variation does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

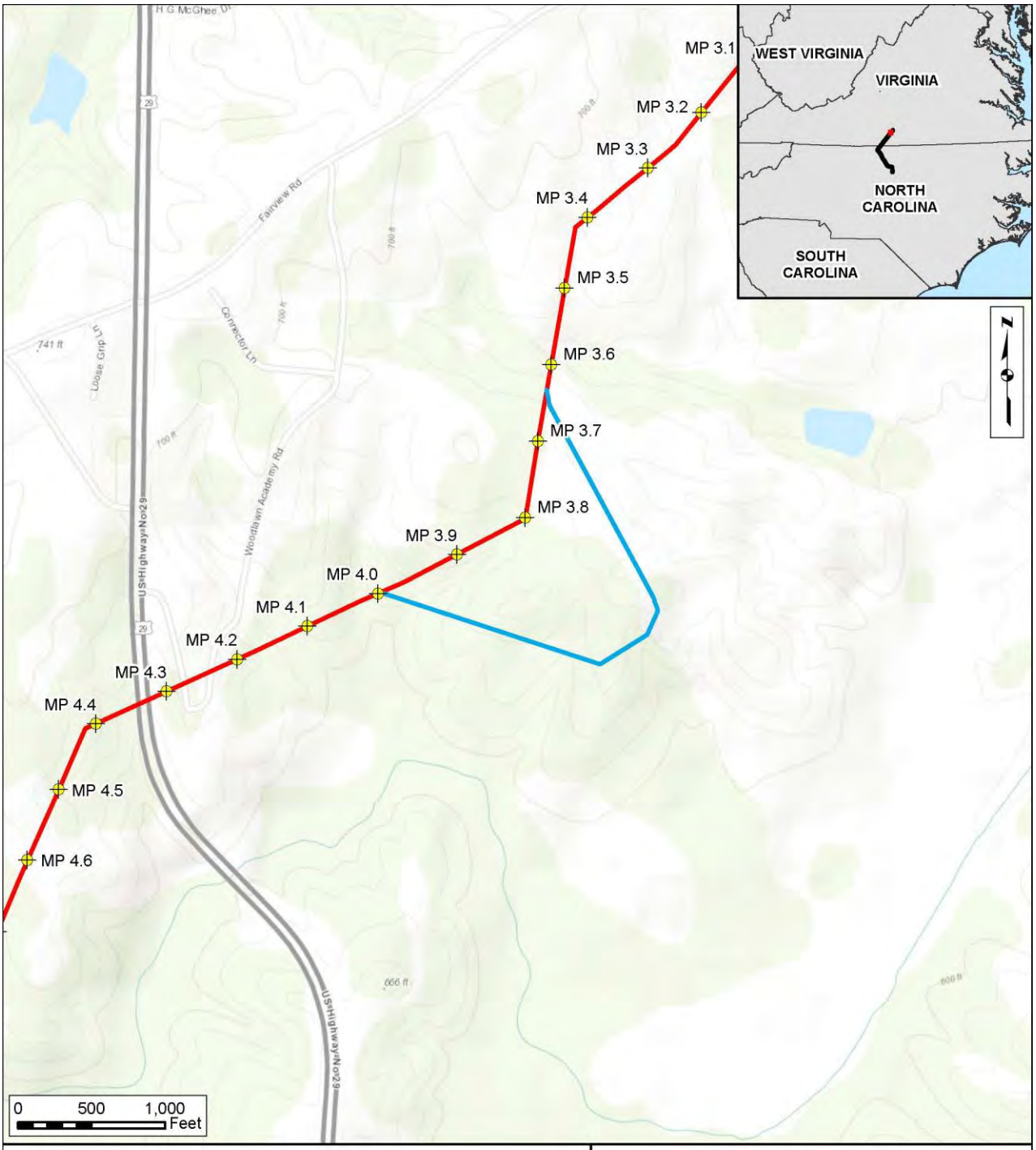
[3] Accession Nos. 20180821-5010, 20180821-5068. These comments can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20180821-5010 or 20180821-5068 in the "Numbers: Accession Number" field.

TABLE 3.4-11

Comparison of Nicholson Variation and the Southgate Proposed Route

Feature	Nicholson Variation	Proposed Route
Total length (miles)	0.7	0.4
Construction rights-of-way (acres) a/	8.9	4.7
Total number of parcels crossed	5	4
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	0	0
Number of NWI wetlands crossed	0	0
NWI wetlands within construction right-of-way (acres) b/	0	0
Agricultural Land within construction right-of-way (acres) c/	6.5	2.3
Forested Land within construction right-of-way (acres)	0	0.1
Length adjacent to existing right-of-way (miles)	0	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Nicholson Variation

Figure 3.4-8

Southgate Project

Minor Route Variations
Nicholson Variation

3.4.3.2 Whitehead Variation

We evaluated the Whitehead Variation that Mountain Valley developed to avoid the Whitehead property and address comments submitted to the FERC Docket on September 11, 2018[4]. This variation deviates from the proposed route at MP 3.65 extending southeast and south before turning to cross U.S. Route 29, rejoining the proposed route at MP 5.1. Table 3.4-12 provides a comparison between the proposed route and the Whitehead Variation, and the location of the variation is shown on figure 3.4-8.

The Whitehead Variation would cross one less waterbody in comparison to the proposed route. However, the variation would be 0.3 mile longer; cross two additional parcels; and impact an additional 5.7 acres of agricultural land. It would also affect an additional 0.2 acre of wetland and 2.7 acres of forested land than the proposed route. Given the consideration of these factors, we conclude that the Whitehead Variation does not offer a significant environmental advantage when compared to the proposed route and is eliminated from further consideration.

TABLE 3.4-12

Comparison of Whitehead Variation and the Southgate Proposed Route

Feature	Whitehead Variation	Proposed Route
Total length (miles)	1.8	1.5
Construction rights-of-way (acres) a/	21.5	18.1
Total number of parcels crossed	12	10
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	1	2
Number of NWI wetlands crossed	1	1
NWI wetlands within construction right-of-way (acres) b/	0.5	0.3
Agricultural Land within construction right-of-way (acres) c/	8.4	2.7
Forest Areas (miles)	0.6	0.3
Forested Land within construction right-of-way (acres)	7.5	4.8
Length adjacent to existing right-of-way (miles)	0	0.6

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.

[4] Accession No. 20180911-5002. These comments can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20180911-5002 in the "Numbers: Accession Number" field.

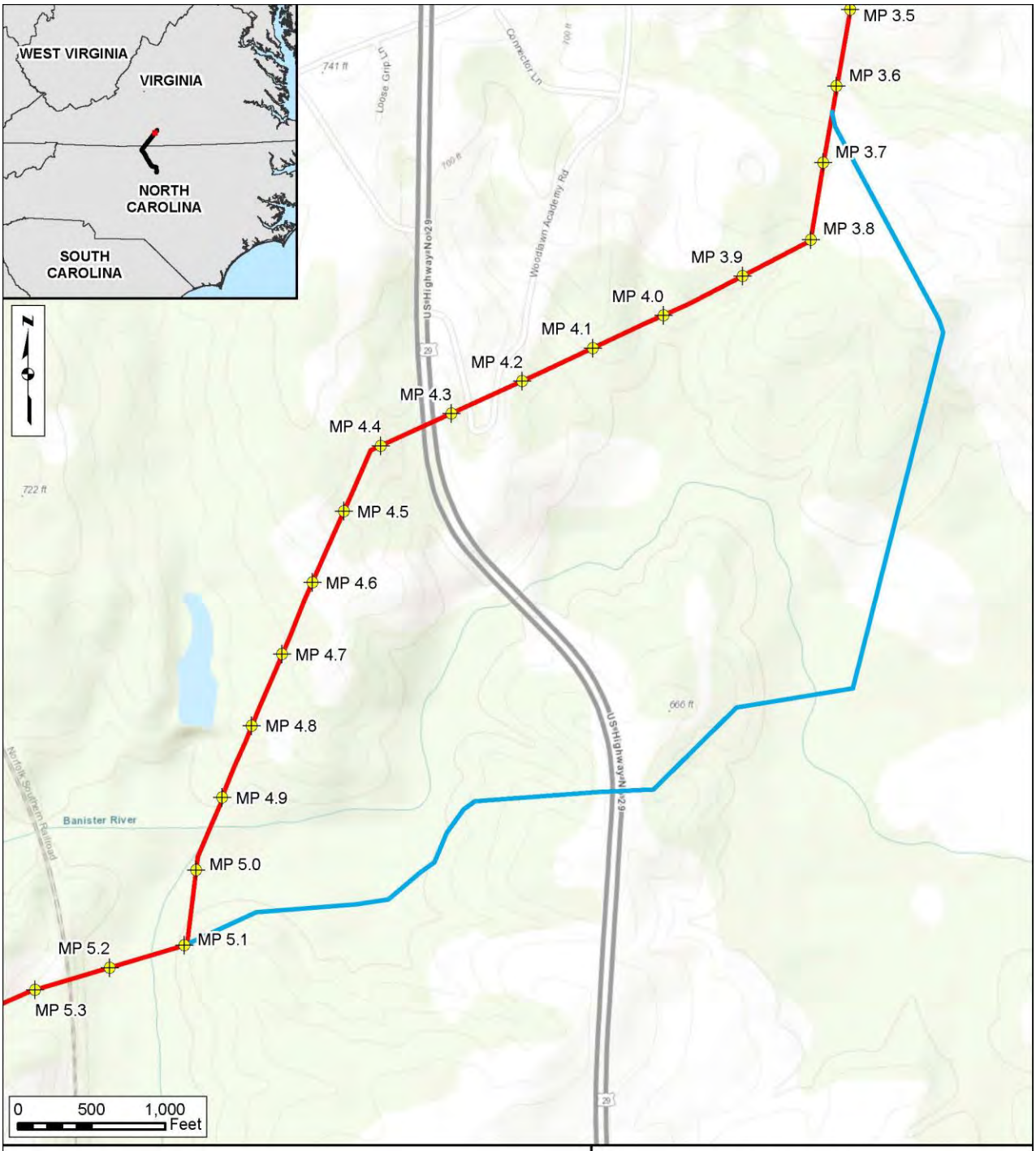


Figure 3.4-9

Southgate Project

Minor Route Variations
Whitehead Variation

3.4.3.3 Robert Pollok-Hill View Farms Variation

We evaluated this variation developed by Mountain Valley to avoid and/or minimize impacts on the Robert Pollok-Hill View Farms. This variation deviates from the proposed route at MP 14.7 extending west of the proposed route, paralleling an existing utility easement, crossing Whitmell School Road/County Road 750, rejoining the proposed route at MP 15.7. Table 3.4-13 provides a comparison between the proposed route and the Robert Pollok-Hill View Farms Variation, and the location of the variation is shown on figure 3.4-9.

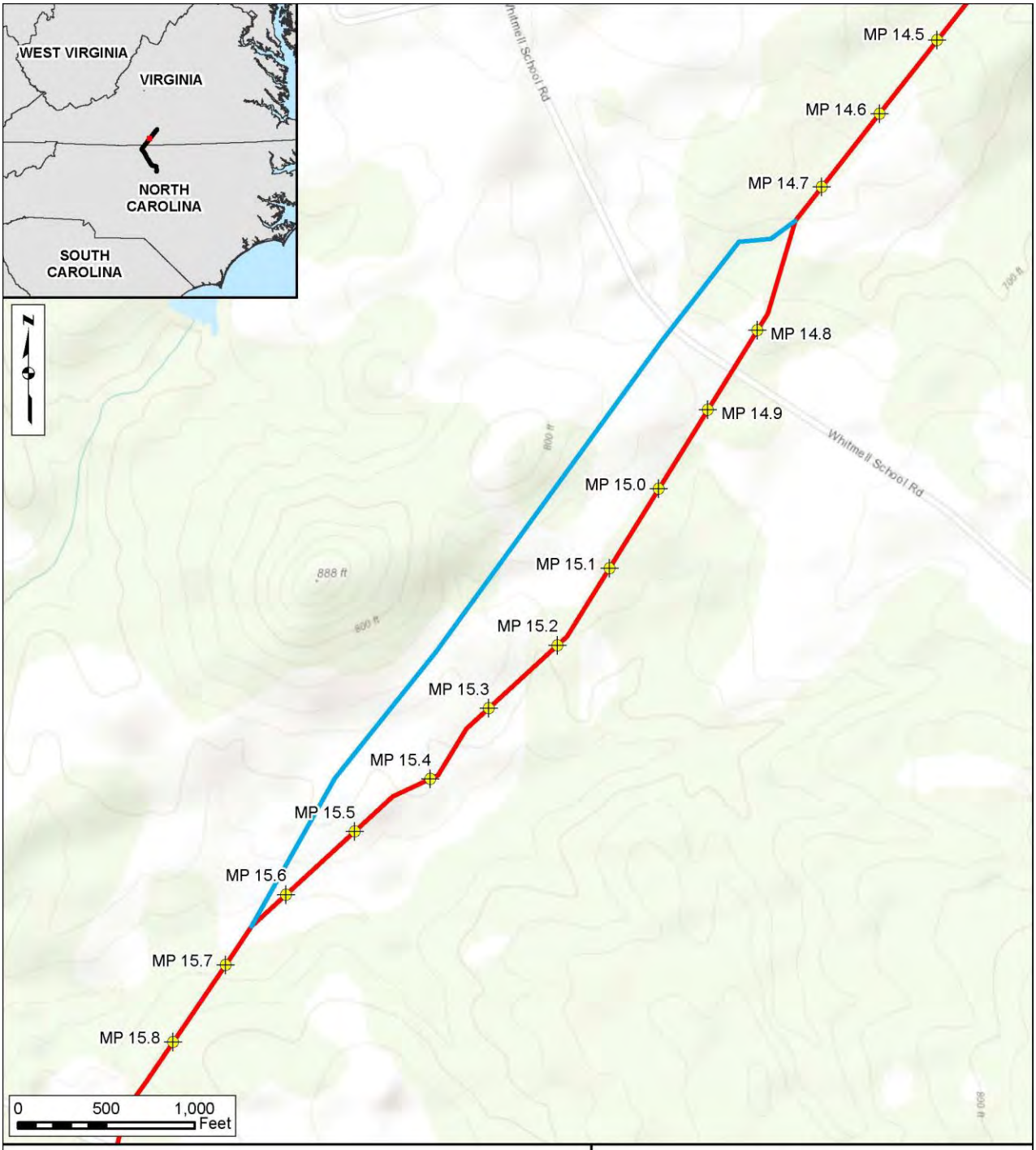
The Robert Pollok-Hill View Farms Variation would affect 0.5 acre less of forest land and collocate with 1.0 mile more of existing rights-of-way in comparison with the proposed route. However, the proposed route would affect 0.4 acre less of agricultural land and cross one less property. While the entire variation was not incorporated into the proposed route, Mountain Valley has meet with Mr. Robert Pollok and has incorporated workspace adjustments at the landowners request to avoid a sediment catch area and a pond on the property. Mountain Valley has also eliminated approximately 1,300 feet of access road and 0.3 acre of temporary workspace on the property between MPs 14.7 and 15.7. Mountain Valley continues to meet with Mr. Robert Pollok to refine the Project footprint and reduce impacts on the property. Given the consideration of these factors, we conclude that the Robert Pollok-Hill View Farm Variation does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route and is eliminated from further consideration.

TABLE 3.4-13

Comparison of the Robert Pollok-Hill View Farms Variation and the Southgate Proposed Route

Feature	Robert Pollok-Hill View Farms Variation	Proposed Route
Total length (miles)	1.0	1.0
Construction rights-of-way (acres) a/	12.1	12.2
Permanent rights-of-way (acres) a/	6.0	6.0
Total number of parcels crossed	6	5
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	0	0
Number of NWI wetlands crossed	0	0
NWI wetlands within construction right-of-way (acres) b/	0	0
Agricultural Land within construction right-of-way (acres) c/	9.5	9.1
Forested Land within construction right-of-way (acres)	2.3	2.8
Length adjacent to existing right-of-way (miles)	1.0	0.0

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Robert Pollok-Hill Farms Variation

Figure 3.4-10

Southgate Project

Minor Route Variations
Robert Pollok-Hill Farms Variation

3.4.3.4 Moore Variation

We evaluated the Moore Variation developed by Mountain Valley to avoid impacts on the Moore property, addressing comments submitted to the FERC Docket on August 20, 2018[5]. This variation deviates from the proposed route at MP 33.1 extending south and southeast crossing Moir Road, turning south and southwest rejoining the proposed route at MP 33.9. Table 3.4-14 provides a comparison between the proposed route and the Moore Variation, and the location of the variation is shown on figure 3.4-10.

The Moore Variation would affect 2.8 miles less of agricultural land, however, the variation would affect 4.6 additional acres of forested land, cross four additional parcels, and would be collocated 0.7 mile less than the proposed route. Given the consideration of these factors, we conclude that the Moore Variation does not offer an environmental advantage when compared to the proposed route and is eliminated from further consideration. Mountain Valley continues to refine the Project footprint and reduce impacts on the Moore property.

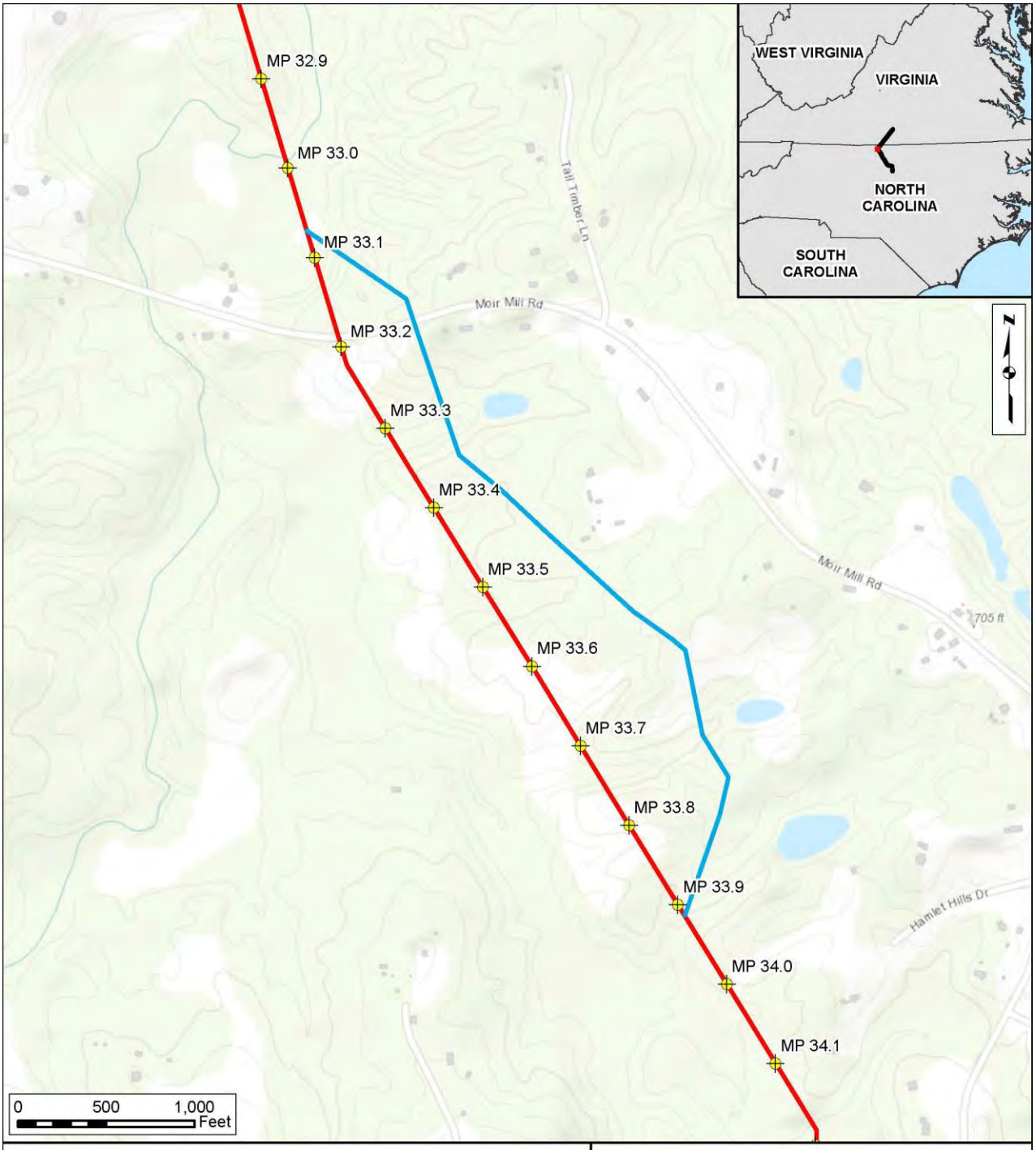
TABLE 3.4-14

Comparison of the Moore Variation and the Southgate Proposed Route

Feature	Moore Variation	Proposed Route
Total length (miles)	0.9	0.8
Construction rights-of-way (acres) a/	11.4	10.4
Total number of parcels crossed	8	4
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	2	2
Number of NWI wetlands crossed	0	0
NWI wetlands within construction right-of-way (acres) b/	0	0
Agricultural Land within construction right-of-way (acres) c/	1.8	4.6
Forest Areas (miles)	0.7	0.3
Forested Land within construction right-of-way (acres)	8.4	3.8
Length adjacent to existing right-of-way (miles)	0	0.7

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.

[5] Accession Nos. 20180821-5010, 20180821-5068. These comments can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20180821-5010 or 20180821-5068 in the "Numbers: Accession Number" field.



Milepost
Proposed Pipeline Route
Moore Variation

Figure 3.4-11

Southgate Project

Minor Route Variations
Moore Variation

3.4.3.5 Strader Variation

We considered this variation developed by Mountain Valley to avoid and/or minimize impacts on residences on the Strader property. This variation deviates from the proposed route at MP 40.0 extending south and southwest, crossing Narrow Gauge Road, turning east and southeast to rejoin the proposed route at MP 41.4. Table 3.4-15 provides a comparison between the proposed route and the Strader Variation, and the location of the variation is shown on figure 3.4-11.

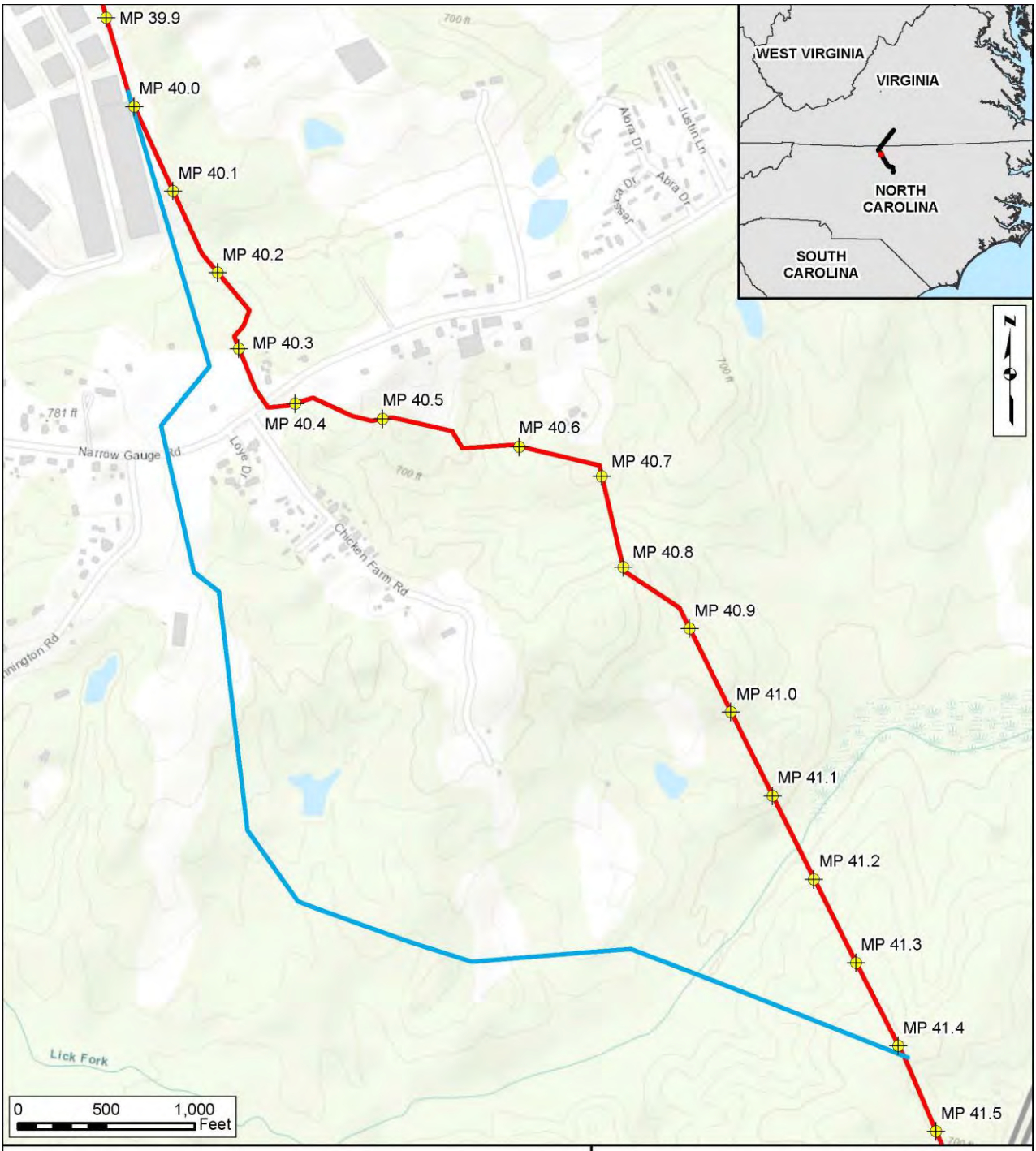
The Strader Variation is not within 50 feet of any residences, whereas the proposed route is within 50 feet of one residence. The Strader Variation would affect two fewer parcels compared to the proposed route. However, the variation would be 0.1 mile longer, and impact an additional 0.1 acre of wetland, 1.5 acres of agricultural land, and 1.6 acres of forest land than the proposed route. While the entire variation was not incorporated into the proposed route, Mountain Valley has modified the proposed route to minimize impacts on the property based on meetings with Mr. and Ms. Strader. The Strader Variation does offer some advantages, but when considering all affected resources, does not offer a significant environmental advantage when compared to the proposed route.

TABLE 3.4-15

Comparison of the Strader Variation and the Southgate Proposed Route

Feature	Strader Variation	Proposed Route
Total length (miles)	1.6	1.5
Construction rights-of-way (acres) a/	19.7	18.1
Total number of parcels crossed	8	10
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	1/1
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	3	3
Number of NWI wetlands crossed	1	1
Total NWI wetland crossing length (feet)	303	243
NWI wetlands within construction right-of-way (acres) b/	0.5	0.4
Agricultural Land within construction right-of-way (acres) c/	3.1	1.6
Forested Land within construction right-of-way (acres)	12.9	11.3
Length adjacent to existing right-of-way (miles)	0	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.



Milepost
Proposed Pipeline Route
Strader Variation

Figure 3.4-12

Southgate Project

Minor Route Variations
Strader Variation

3.4.3.6 Madren Variation

FERC evaluated this variation developed by Mountain Valley to avoid impacts on the Madren property, addressing comments submitted to the FERC Docket on August 23, 2018[6]. This variation deviates from the proposed route at MP 58.1 extending south and southeast, turning east and southeast paralleling an existing electric transmission easement, rejoining the proposed route at MP 58.9. Table 3.4-16 provides a comparison between the proposed route and the Madren Variation, and the location of the variation is shown on figure 3.4-12.

The Madren Variation would impact 1.4 acres less of agricultural land and is collocated with 0.2 miles of additional rights-of-way in comparison to the proposed route. However, the variation would be 0.4 mile longer; require 4.3 acres more of construction rights-of-way; cross one additional parcel; one additional wetland; and impact an additional 4.2 acres of forested land. Given the consideration of these factors, we conclude that the Madren Variation does not offer a significant environmental advantage when compared to the proposed route and is eliminated from further consideration.

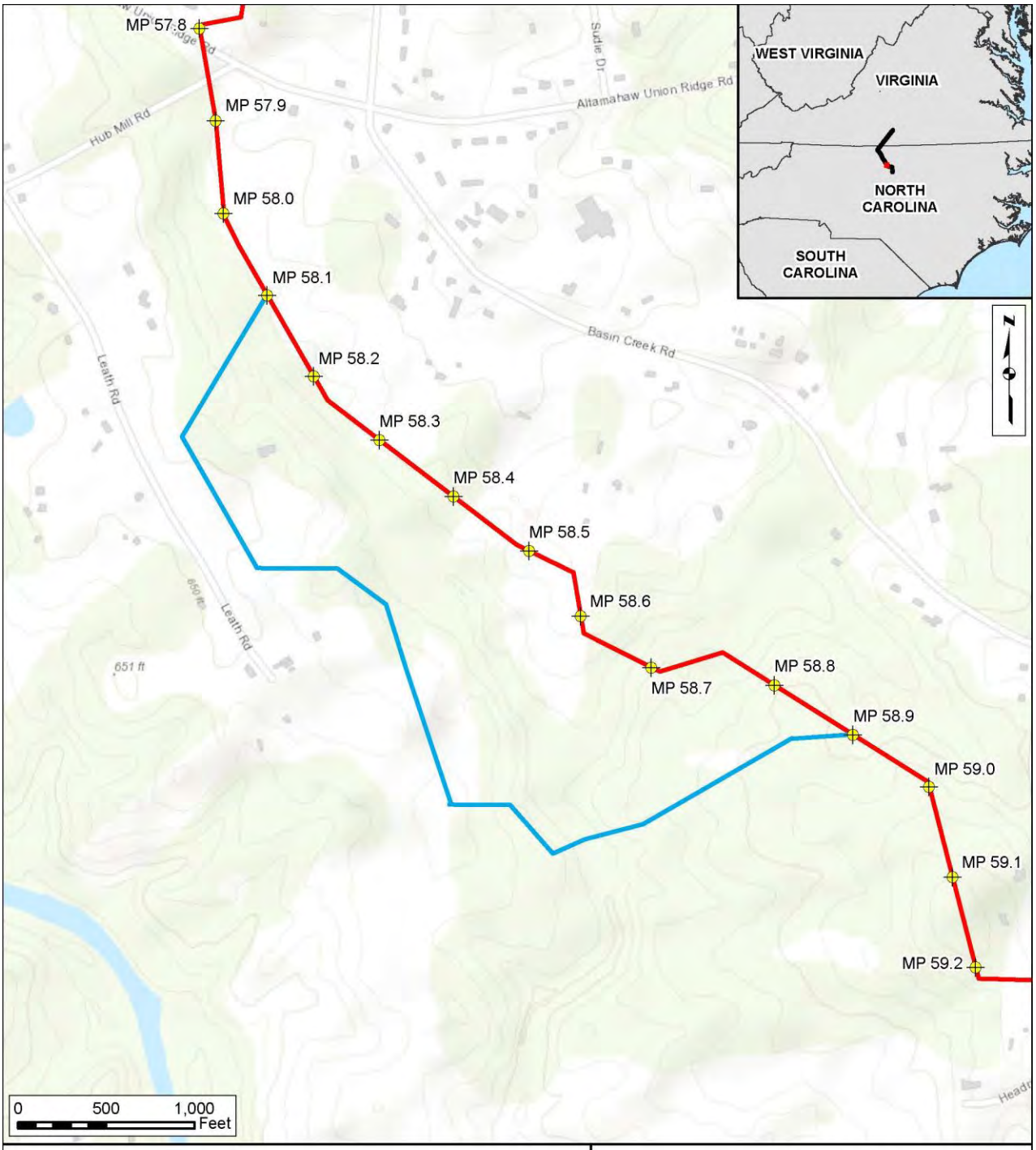
TABLE 3.4-16

Comparison of the Madren Variation and the Southgate Proposed Route

Feature	Madren Variation	Proposed Route
Total length (miles)	1.2	0.8
Construction rights-of-way (acres) a/	14.7	10.4
Total number of parcels crossed	7	6
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	2	1
Number of NWI wetlands crossed	2	1
NWI wetlands within construction right-of-way (acres) b/	0.1	0.1
Agricultural Land within construction right-of-way (acres) c/	3.6	5
Forested Land within construction right-of-way (acres)	9.7	5.5
Length adjacent to existing right-of-way (miles)	0.2	0

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.

[6] Accession No. 20180823-5084. These comments can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20180823-5084 in the "Numbers: Accession Number" field.



Milepost
Proposed Pipeline Route
Madren Variation

Figure 3.4-13

Southgate Project

Minor Route Variations
Madren Variation

3.4.3.7 Taylor East and Taylor West Variations

The Taylor East and Taylor West Variations were developed by Mountain Valley to avoid or minimize impacts on the the single-family residence and apartment complex on the Taylor property during construction. The variations were developed from stakeholder input to minimize impacts from a construction access road (TA-PI-049). We note Mountain Valley has eliminated access road TA-PI-049 from the Project in an effort to reduce construction impacts on the residence and apartment complex.

The Taylor East Variation deviates from the proposed route at MP 19.2 extending east through forested areas rejoining the proposed route at MP 19.6. The Taylor West Variation deviates from the proposed route at MP 19.4 extending northwest and southwest crossing open land and forest to rejoin the proposed route at MP 19.7. Table 3.4-17 provides a comparison between the proposed route and the Taylor East Variation, and Table 3.4-18 provides a comparison between the proposed route and the Taylor West Variation. The locations of the Taylor East and Taylor West Variation are shown on figure 3.4-13.

The Taylor East Variation crosses four less parcels, and 0.4 less acre of agricultural land. However, the variation would require 0.3 acre more of construction right-of-way, 0.1 acres more of permanent right-of-way, cross 2 more waterbodies, and impact 0.4 additional acres of forest land in comparison to the proposed route. The Taylor West Variation crosses one less parcel; however, the variation would require 1.1 acres of additional construction right-of-way, is not collocated with existing rights-of-way, and affects 0.2 acre of additional agricultural land and 0.9 acre of additional forested land.

The Taylor East and Taylor West Variations would result in resource impacts that are similar to the proposed route. Consequently, we conclude the variations do not provide a significant environmental advantage when compared to the proposed route.

TABLE 3.4-17

Comparison of the Taylor East Variation and the Southgate Proposed Route

Feature	Taylor East Variation	Proposed Route
Total length (miles)	0.4	0.4
Construction rights-of-way (acres) a/	5.0	4.7
Total number of parcels crossed	5	9
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	2	0
Number of NWI wetlands crossed	0	0
NWI wetlands within construction right-of-way (acres) b/	0	0
Agricultural land within construction right-of-way (acres) c/	1.9	2.3
Forested land within construction right-of-way (acres)	2.4	2.0
Length adjacent to existing right-of-way (miles)	0	0.2

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.

TABLE 3.4-18

Comparison of the Taylor West Variation and the Southgate Proposed Route

Feature	Taylor West Variation	Proposed Route
Total length (miles)	0.4	0.3
Construction rights-of-way (acres) a/	4.8	3.7
Total number of parcels crossed	3	4
Number of residences within 25 and 50 feet of the edge of the construction right-of-way	0/0	0/0
Unlisted/Potential Eligible Historic Properties (number)	0	0
Number of waterbodies crossed	0	0
Number of NWI wetlands crossed	0	0
NWI wetlands within construction right-of-way (acres) b/	0	0
Agricultural land within construction right-of-way (acres) c/	1.3	1.1
Forested land within construction right-of-way (acres)	3.5	2.6
Length adjacent to existing right-of-way (miles)	0	0.3

a/ Assuming 100-foot-wide construction right-of-way.
b/ NWI and NHD data. Assuming 75-foot-wide construction right-of-way.
c/ Includes pasture/hay and cultivated crops.

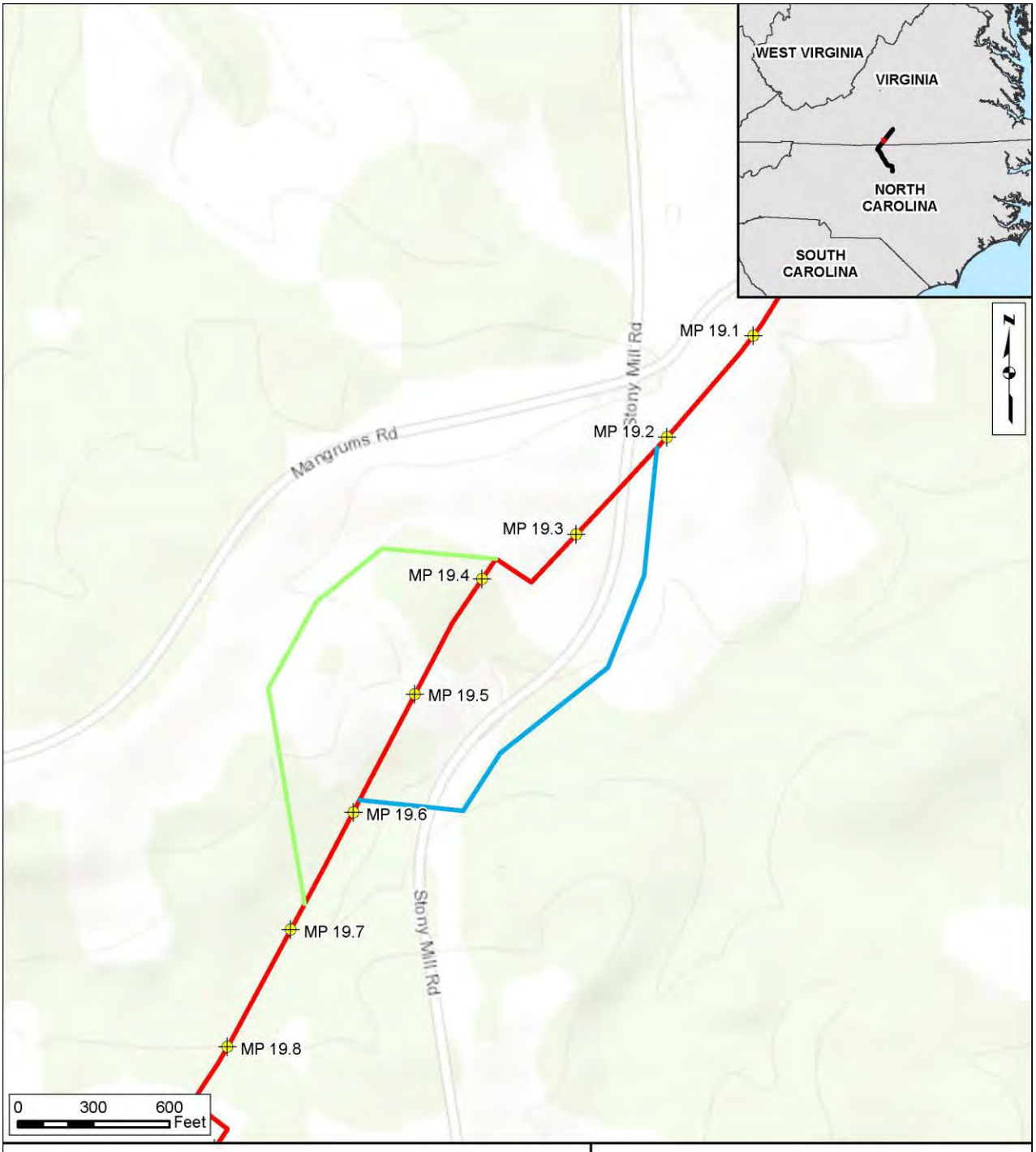


Figure 3.4-14

Southgate Project

Minor Route Variations
Taylor East and Taylor West Variations

3.5 ABOVEGROUND FACILITY ALTERNATIVES

We did not evaluate alternative locations for meter stations because the locations of those facilities are largely determined by interconnections with other pipeline systems and delivery points, and the facilities have a relatively small footprint. Similarly, the locations of proposed MLVs are based in part on PHMSA regulations, and MLVs and other appurtenant aboveground facilities generally occupy only a small footprint within existing or proposed pipeline rights-of-way. Although we considered alternate locations for the Lambert Compressor Station, we found the proposed location of the Lambert Compressor Station to be acceptable, and we did not receive suggested alternatives from affected stakeholders concerning the siting. Given these factors, we are not providing a detailed evaluation of alternative sites for the meter stations, MLVs, or the Lambert Compressor Station.

3.5.1 Electric-driven Compression Alternatives

We evaluated the feasibility of using electric motor-driven compressors at the proposed Lambert Compressor Station as an alternative to the proposed natural gas-fired turbines. An existing high voltage electric transmission system is located approximately 1 mile from the Lambert Compressor Station. Its use would likely require an upgrade as well as a minimum of 1 mile of new, high voltage powerlines, and an additional substation within the Lambert Compressor Station site that would result in an increased size. The extensions of powerlines would have the disadvantages of its own set of environmental impacts with likely clearing of forest, modification of wildlife habitat, ground disturbance for installation of power poles, changes to visual setting, and permanent maintenance of a linear corridor in a grassy or scrub-shrub condition.

The energy needed to run electric-driven compressors would be generated in the region, which includes a variety of power generation sources. A comparison between the emissions associated with the gas-fired turbines and the emissions associated with imported power from the grid is complicated because grid power could be obtained from a variety of power sources (such as fossil fuel and renewable fuels). Further, there would be differences in the contributing fossil fuel-fired generating stations: they may use gas, oil, or coal for fuel; they would have different plant configurations (simple cycle or combined cycle power generation); and the plants would likely have different emission control systems. However, it is possible to provide a generic estimate the emissions of grid power using EPA's emission factors for grid supplied power for the region.

We utilized the EPA's Emissions & Generation Resource Integrated Database (eGRID) as well as EPA's Avoided Emissions and Generation Tool (AVERT) to estimate the hypothetical regional carbon dioxide (CO_2), nitrogen dioxide (NO_2), particulate matter with a diameter less than 2.5 micrometers, and sulfur dioxide (SO_2) emissions that would occur if electric-driven compressor units were installed rather than natural gas-fired compressor units. The eGRID integrates many different federal data sources on power plants to allow for comparison of environmental attributes of electric generation within defined regions of the United States. AVERT uses data that "represents the dynamics of electricity dispatch based on the historical patterns of actual generation in one selected year."[7] Currently, AVERT has data for 2007-2018. A comparison of emissions is provided in table 3.5.1 for 21.6 megawatt (MW) of power, compared

[7] US EPA AVERT, https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert#how

with two Solar turbines and associated equipment that would be used for the compression and transmission of natural gas.

Emissions of NO_2, and SO_2 were signficantly higher using purchased power, while emissions of $PM_{2.5}$ would be about the same. Greenhouse gas (GHG) emissions (as CO2e) varied depending upon the model used. eGRID assumes more of baseload case and would be more accurate if the Lambert Compressor Station was constantly in use while AVERT assumed that the station would run intermittently. It is likely that the electrical power generation would be more than 21.6 MW due to line loss in the electrical transmission system which obviously varies. This would result in a slight increase in purchased power requirements.

TABLE 3.5.1

Comparison of Direct and Indirect Power Generation Emissions

Power Option	Annual Pollutant Emissions (tpy)			
	NO_2	SO_2	$PM_{2.5}$	CO_2e
Natural Gas Turbine Emissions (Direct) a/	34.9	5.4	10.3	123,287
Purchased Power Emissions - eGRID (Indirect) b/	47.3	28.4	NA	76,641
Purchased Power Emissions – AVERT (Indirect) c/	79.3	87.0	9.6	142,000

a/ See table 4.11-3 for detailed information on emissions from each type of emission source at the Lambert Compressor Station. This data included the 2 Solar Taurus turbines, 5 micro-turbines, and fuel gas heater emissions. Assumes 100% of NO_x is converted to NO_2

b/ EPA, 2018a The indirect emission factors for GHG, NOx, and SO_2 are based on EPA data for 2016 for the SRVC eGRID subregion (SERC Virginia/Carolina). eGrid does not have standard factors for $PM_{2.5}$. Assumed 100% of NO_x is converted to NO_2

c/ The indirect emissions calculated using EPA AVERT and are based upon 2018 data for the AVERT Southeast Region.

Although the use of electric units would reduce local environmental impacts, it would result in increased power generation (and emissions) from the regional grid that stretches across 11 southeastern states. These generation sources, if fossil-fuel fired, would increase utilization and/or emissions in those local areas. Based on the available past data for electrical power generation emissions, we cannot conclude that the alternative of using purchased power and electric-driven compression offers a significant environmental advantage over the proposed use of gas-fired turbines.

3.6 ALTERNATIVES CONCLUSIONS

We reviewed alternatives to Mountain Valley's proposal based on our independent analysis and comments received. In all cases, we did not find an alternative that would meet the Project objectives; be technically and economically feasible and practical; and provide a significant environmental advantage over the Project. Based on our findings, we conclude that the proposed Project, as modified by our recommended mitigation measures, is the preferred alternative that can meet the Project's stated purpose.

4.0 ENVIRONMENTAL ANALYSIS

This section of the EIS describes the affected environment as it currently exists and discusses the environmental consequences of the proposed Project. The discussion is organized by the following major resource topics: geology; soils; water resources; wetlands; vegetation; wildlife and aquatic resources; special status species; land use, recreation, special interest areas, and visual resources; socioeconomics (including transportation and traffic); cultural resources; air quality and noise; reliability and safety; and cumulative impacts.

The environmental consequences of constructing and operating the Project would vary in duration and significance. Four levels of impact duration were considered: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction with the resource returning to pre-construction condition almost immediately afterward. Short-term impacts could continue for up to 3 years following construction. This could include the time it takes for herbaceous/shrub vegetation to grow on the right-of-way after restoration. Impacts were considered long-term if the resource would require more than 3 years to recover. For example, although trees would be allowed to regenerate in temporary work areas, it would take decades for them to mature. A permanent impact could occur as a result of any activity that modifies a resource to the extent that it would not return to pre-construction conditions during the life of the project (more than 50 years). The construction and operation of aboveground facilities would have permanent impacts.

When determining the significance of an impact, the geographic, biological, and/or social context in which the effects would occur, as well as the intensity (e.g., severity), were also considered. In the following sections, we address direct and indirect effects collectively by resource. Section 4.13 analyzes the Project's contribution to cumulative impacts.

As part of its proposal, Mountain Valley developed certain mitigation measures to reduce the impact of the Project so that impacts would not be significant. In some cases, we determined that additional mitigation measures could further reduce the Project's impacts. Our additional mitigation measures appear as bulleted, boldfaced paragraphs in the text of this section and are also included in section 5.2. We will recommend to the Commission that these measures be included as specific conditions in any Order the Commission may issue authorizing this Project. We have reviewed our conclusions and recommendations based on supplemental information and commitments from Mountain Valley, as well as public comments we received on the draft EIS. The conclusions in the EIS are based on our analysis of the environmental impact and the following assumptions:

- Mountain Valley would comply with all federal and federally delegated permits;
- the proposed facilities would be constructed and operated as described in section 2.0 of the EIS;
- Mountain Valley would implement the mitigation measures included in its application and supplemental submittals to the FERC; and

- Mountain Valley would comply with our recommended mitigation measures, listed in section 5.2.

In our experience, necessary modifications to a project, both spatial and procedural, are identified after it is authorized. These changes may include additional or different minor workspace configurations, changes to access roads, or even specific construction techniques (e.g., construction across waterbodies). These changes are often identified by the applicant once on-the-ground implementation work is initiated. Any Project modifications would be subject to review and approval from FERC's Director of the OEP to verify compliance with the Commission's Order. Review and approval may also be required by other permitting/authorizing agencies with federal or federally delegated jurisdiction.

4.1 GEOLOGY

4.1.1 Geologic Setting

The Project would be in the Piedmont Upland section of the Piedmont physiographic province in Pittsylvania County, Virginia and Rockingham, Alamance, and Caswell Counties, North Carolina (Fenneman and Johnson, 1946). The Piedmont province is primarily underlain by weathered granite, gneiss, and schist bedrock of Proterozoic to Paleozoic age, with limited outcropping (Fenneman, 1938). The Piedmont Upland section is characterized by gentle slopes along a rolling surface, bounded or cut by valleys of greater depth and steeper slopes. In the Project vicinity, elevations range from 470 to 880 feet above mean sea level (Fenneman, 1938).

4.1.1.1 Surficial Geology

Surficial geology crossed by the Project has not been mapped in detail. However, the USGS *Surficial Materials in the Conterminous United States* map (Soller et al., 2009) depicts the Project area as mass-movement sediments consisting of colluvium, alluvial sediments, and loess, as well as residual materials formed from the weathering of metamorphic, sedimentary, and carbonate bedrock. These sediments range in grain size from clay to boulders, may contain organic material, and are poorly sorted and stratified (Soller and Reheis, 2004). Appendix C.1 and figure 4.1-1 present the surficial geology crossed by the Project.

4.1.1.2 Bedrock Geology

The bedrock along the Project route generally consists of Cambrian to Triassic Period granite, gneiss, sandstone, and schist (USGS, 2018a). Appendix C.2 contains a summary table of the bedrock crossed by the Project and figure 4.1-2 provides an illustration of bedrock types.

4.1.2 Mineral Resources

Information regarding mineral resources in Virginia and North Carolina was obtained though the VADEQ (VADEQ, 2018a); Virginia Department of Mines, Minerals and Energy (VADMME [VADMME, 2018a; 2018b]); USGS (2016a); North Carolina Department of Environmental Quality (NCDEQ, 2018a) and the North Carolina Geological Survey (NCGS [NCGS, 2016]). Based on this review, active, inactive, abandoned, and proposed surface or subsurface extraction and deposits of fuel resources (coal, oil, and natural gas) were not identified within 0.25 mile of any Project workspaces.

Nonfuel mineral resources are extracted in the Project vicinity, including crushed stone, lithium minerals, phosphate, and sand and gravel. Geologic formations in southwest Virginia also have the potential to contain uranium-bearing minerals; however, of uranium occurrences explored to date, only the deposit at Coles Hill is recognized as large enough and of a high enough grade to be potentially economically viable (NRC, 2012). This deposit is located 3.5 miles north of the Lambert Compressor Station. However, in 1982, Virginia enacted a moratorium on uranium mining, requiring that a program to regulate mining be established before the Commonwealth could accept uranium mining permit applications; to date this moratorium remains in place.

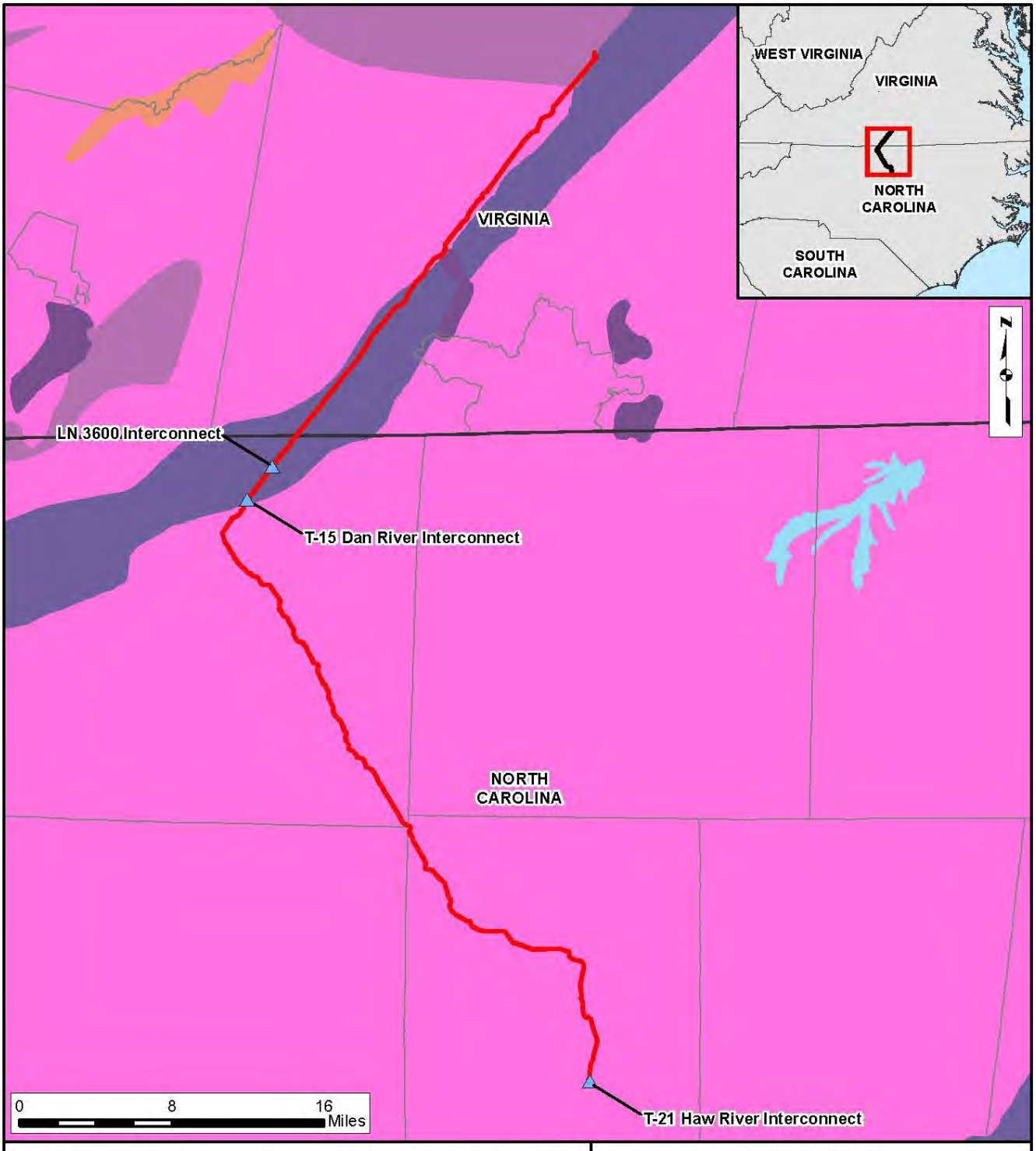


Figure 4.1-1

Southgate Project

Surficial Geology Crossed by the Southgate Project

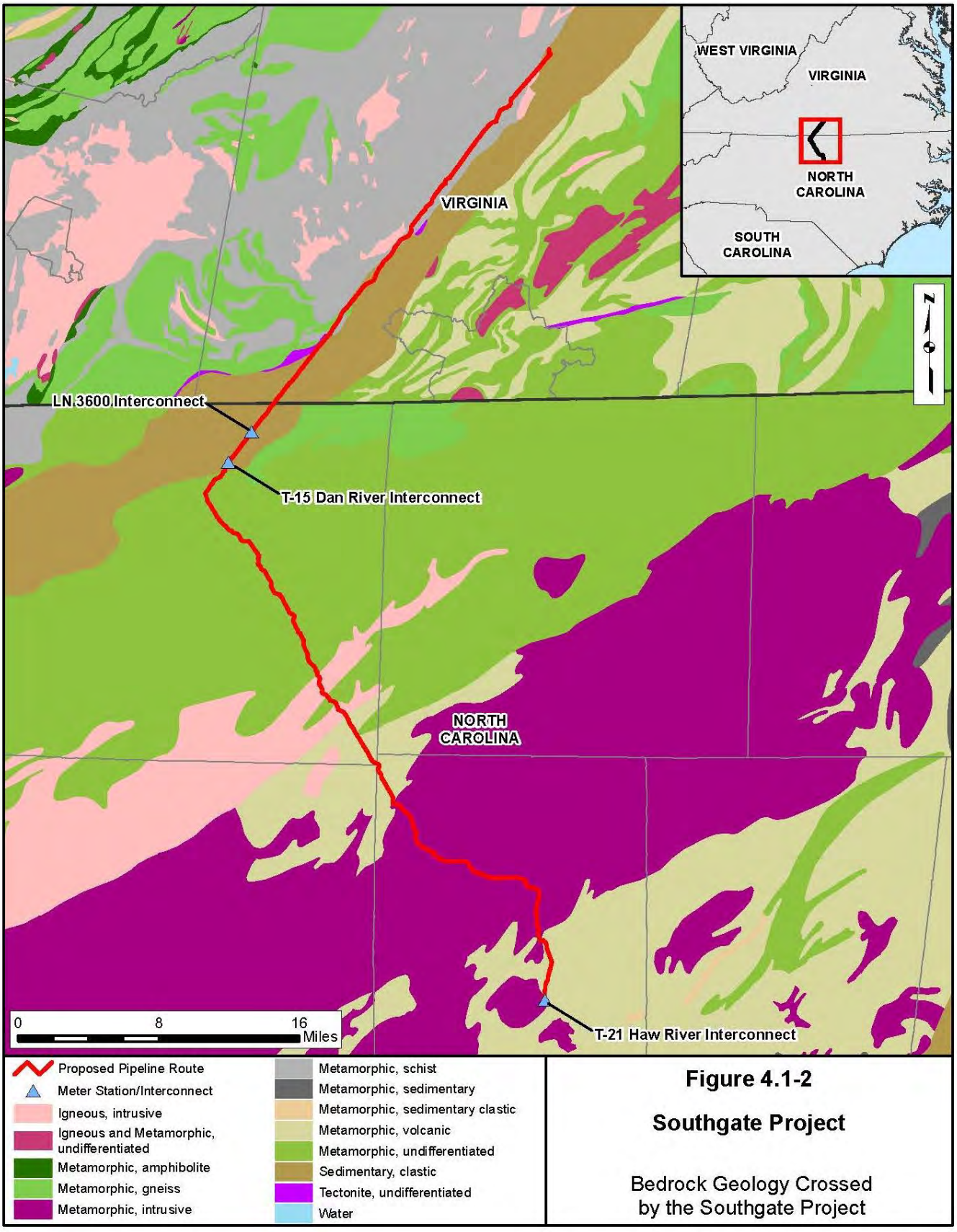


Figure 4.1-2

Southgate Project

Bedrock Geology Crossed by the Southgate Project

The East Alamance Quarry is a crushed stone aggregates operation in Haw River and is owned and operated by Martin Marietta Materials, Inc. (North Carolina Department of Environmental and Natural Resources Permit No. 01-08) on 600 acres of land, 375 acres of which are bound under Permit No. 01-08. This permit also provides limitations on blasting practices at the quarry, restricting maximum peak particle velocities to 1.0 inch per second. The Project permanent easement would be an average of 100 feet from parcels owned by the East Alamance Quarry, and approximately 28.5 feet away at its nearest distance. Based on a review of the East Alamance Quarry mining permit revision (dated April 2019), Mountain Valley understands there to be a 25-foot buffer inside of the property line of Martin Marietta Materials, Inc.-owned parcels that includes all aspects of activity related to mining (e.g. berms, drains, basins, erosion devices etc.). This permit also depicts active mining as occurring another 200 feet inside of the property line, thus increasing the distance between the pipeline and mining activity. Based on these factors, we conclude that the Project would not significantly impact or be affected by the East Alamance Quarry.

The Project pipeline route would also be within 0.2 mile of a USGS-identified plant comprised of a rotary kiln, listed as a bloating materials (lightweight concrete aggregate products) commodity type (USGS, 2011). The site is mapped west of MP 26.6 in Rockingham County, North Carolina; however, an active plant site was not observed based on a review of recent aerial imagery. Further, given the distance from the Project boundary, no impacts from construction or operation of the Project are anticipated.

4.1.3 Paleontological Resources

There is the potential for the discovery of fossils along the Project pipeline route in areas of shallow sedimentary bedrock. Potential fossils that may occur within the Piedmont province include insects, freshwater fish, and dinosaur footprints in Triassic-age rift basin deposits (College of William and Mary, 2018a). Furthermore, the Project would be in the vicinity of Solite Quarry, which straddles the border between North Carolina and Virginia about 9 miles east of the Project boundary near MP 26.1. The Solite Quarry is known to contain preserved reptiles, fish, plant parts, and a variety of insect fossils from the Triassic Period. Fossils found in the Solite Quarry are typically well preserved in sandstone, mudstone, and lacustrine shales from the Cow Branch Formation (College of William and Mary, 2018b). Dinosaur body fossils have not been discovered at the Solite Quarry but the presence of specific trace fossils indicates that dinosaurs did exist in the area (Speights, 2018).

EIs would be trained to respond if suspected paleontological resources are identified during trench excavation or site preparation based on the Project-specific *Unanticipated Discovery Plan for Paleontological Resources*[1]. This plan requires that a paleontologist review any vertebrate fossil discovery before construction may proceed. The paleontologist would determine if the fossil is of scientific significance, and if so they would contact FERC as well as the Virginia Division of Geology and Mineral Resources or the North Carolina Museum of Natural Sciences to develop a

[1] Mountain Valley's Unanticipated Discovery Plan for Paleontological Resources was included as appendix 6-H to Resource Report 6 in its November 06, 2018, application. The Unanticipated Discovery Plan for Paleontological Resources can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.

documentation and recovery plan. Based on comments from the NCDEQ, Mountain Valley contacted North Carolina state agencies to determine the involvement of agency representatives during construction regarding unanticipated discoveries of paleontological resources. Based on correspondence between the NCDEQ and Mountain Valley, the NCDEQ stated it would review and comment on Mountain Valley's Paleontological Unanticipated Discoveries Plan in January 2020; however, NCDEQ's comments on this plan, to date, have yet to be received. Mountain Valley would continue to consult with North Carolina state agencies and would file updated correspondence as received. Given the above-described measures, we conclude that potential impacts on paleontological resources would be avoided or adequately mitigated.

4.1.4 Geologic Hazards

Geologic hazards evaluated for the proposed Project include seismicity (e.g., earthquakes), surface faults, soil liquefaction, landslides, karst terrain, subsidence, shallow bedrock, and the presence of uranium deposits in the Project vicinity. These hazards, as well as the feasibility of utilizing HDD, based on hydrogeologic conditions present in the Project area, are discussed below. The conditions necessary for the development of other geologic hazards, including avalanches and volcanism, are not present in the area of the Project and therefore not discussed.

4.1.4.1 Seismicity

The majority of significant earthquakes around the world are associated with tectonic subduction zones, where one crustal plate is overriding another (e.g., the Japanese islands), where tectonic plates are sliding past each other (such as in California), or where tectonic plates are converging (e.g., the Indian Sub-Continent). Unlike these highly active tectonic regions, the east coast of the United States is a passive tectonic plate boundary located on the "trailing edge" of the North American continental plate, which is relatively seismically quiet when compared with active plate boundaries in the United States, such as the San Andreas fault, a transformative plate boundary, and the Juan de Fuca convergent (subduction) plate boundary, both along the western coast of the United States. Earthquakes, however, do occur in the eastern United States, primarily due to trailing edge tectonics and residual stress released from past, mountain-building events.

The shaking during an earthquake can be expressed in terms of the acceleration as a percent of gravity (g), and seismic risk can be quantified by the motions experienced at the ground surface or by structures during a given earthquake expressed in terms of g. USGS National Seismic Hazard Probability Mapping shows that for the Project area, within a 50-year period, there is a 2 percent probability of an earthquake with an effective peak ground acceleration (PGA) of 6 to 8 percent g; and a 10 percent probability of an earthquake with an effective PGA of 2 to 3 percent g being exceeded (USGS, 2014). For reference, a PGA of 10 percent g (0.1g) is generally considered the minimum threshold for damage to older structures or structures not constructed to resist earthquakes.

The modified Mercalli scale (Modified Mercalli Intensity or MMI) measures the intensity of an earthquake at a particular location while the Richter scale measures the size of the earthquake at its source (USGS, 2016a). In general, modern pipeline systems have not sustained damage during seismic events except due to permanent ground deformation, or traveling ground-wave propagation greater than or equal to a Modified Mercalli Intensity of VIII (similar to a Richter

scale magnitude around 6.8 to 7.0) (O'Rourke and Palmer, 1996; USGS, 2018a). The largest recorded earthquake within 50 miles of the Project had a magnitude of 3.0 with an epicenter approximately 46 miles from the Project in Virginia (USGS, 2019a).

4.1.4.2 Active Faults

The USGS maintains a Quaternary fault and fold database of the United States for any fault or fold with evidence of deformation in the past 1.6 million years (USGS, 2018b). Quaternary faults where there has been displacement in the last 10,000 years are considered to be active by the USGS (USGS, 2019b). The Project does not cross nor would any aboveground facility overlie any Quaternary faults (USGS, 2018b).

Regional faults are presented in table 4.1-1. The Project would be within 100 miles of six USGS-recognized faults and fault zones. The USGS classifies these faults from A to C. Class A faults have geologic evidence that demonstrates tectonic origin either exposed by mapping or inferred from deformational features. The nearest Class A faults to the Project are within the Central Virginia Seismic Zone, 95 miles from the pipeline alignment.

TABLE 4.1-1

Faults and Fault Zones within 100 Miles of the Southgate Project

Fault or Zone Name	Class	Distance	Last Active Period/Era
Central Virginia Seismic Zone	A	95 miles	Quaternary (late Pleistocene) (15 ka)
Pembroke Fault	B	75 miles	Undifferentiated Quaternary (<1.6 ma)
Linside Fault Zone	C	85 miles	No Quaternary Movement Demonstrated
Everona Fault	C	94 miles	No Quaternary Movement Demonstrated
Stanleytown Fault	C	19 miles	Unknown
Hares Crossroads faults	C	65 miles	Unknown

Sources: USGS, 2018b; Crone and Wheeler, 2000; Wheeler, 2006; Law et al, 1994.
ka = thousand years ago
ma = million years ago.

Class B faults have geologic evidence indicative of Quaternary deformation but the fault is not deep enough to be a potential source for earthquakes, or the evidence available is insufficient to assign a fault as either Class C or Class A (USGS, 2018b). There is one Class B fault, the Pembroke Fault, located 75 miles from the pipeline alignment. The evolution for this fault is thought to be dissolution of underlying carbonate bedrock or subsidence induced by collapse of subsurface karst, and not a seismic event (Crone and Wheeler, 2000; Wheeler, 2006).

Class C features are classified as having insufficient evidence to demonstrate the existence of tectonic origin, or slip and deformation. There are four Class C features between 19 and 94 miles from the pipeline alignment (see table 4.1-1).

Due to the relatively low seismic risk and the absence of active faults in the immediate Project vicinity, impacts from seismic activity are not anticipated to affect operation or construction of the Project. Furthermore, the Project facilities would be constructed per the

International Building Code (IBC) 2012 (Chapter 16 and Section 1613), in accordance with federal standards for natural gas pipeline safety (49 CFR 192), and American Society of Civil Engineers (ASCE) 7-10, Minimum Design Loads for Buildings and Other Structures.

4.1.4.3 Soil Liquefaction

Soil liquefaction is a phenomenon often associated with seismic activity in which saturated, non-cohesive soils temporarily lose their strength and liquefy (i.e., behave like viscous liquid) when subjected to forces such as intense and prolonged ground shaking (generally, a PGA of 10 percent g or greater). Due to the low potential for a seismic event that would cause strong and prolonged ground shaking, the potential for soil liquefaction to occur is very low and we conclude the potential for soil liquefaction to impact Project facilities is negligible.

4.1.4.4 Landslides

Landslides are defined as the movement of rock, debris, or soil down a slope. Some landslides develop and move slowly and cause damage progressively over a period of many years. Some landslides move rapidly and can cause damage suddenly. Ground failure and slope failure (slips) are typically associated with steep slopes and may be initiated by precipitation, seismic activity, slope disturbance due to construction, or a change in groundwater conditions, such as a seasonal high groundwater table, and soil characteristics. Landslides could occur during the construction, operation, and maintenance of the Project. Construction factors that may increase the potential for slope failure include trenching along slopes and the burden of construction equipment on unstable surfaces.

An overview of landslide incidence and susceptibility was derived from USGS mapping (USGS, 2016b) and Light Imaging Detection and Ranging (LiDAR) data. The Project would cross 2.0 miles of slopes greater than 30 percent (see appendix C.3) based on Project-specific LiDAR data. In areas of steep slope or side slope construction, Mountain Valley would employ temporary sediment barriers such as reinforced silt fences and silt socks, which would be installed prior to any clearing activities on the right-of-way to prevent movement of sediment. To divert water to vegetated areas or reduce water runoff, Mountain Valley may install temporary slope breakers during grading activities per its Plan and the Project-specific E&SC Plan. Additionally, Mountain Valley would install post-construction stormwater controls and permanent slope breakers as needed**.**

For slopes 32 percent or greater, as identified via LiDAR data, as well as for side slopes that may result in parallel or near parallel pipeline construction and areas of identified historic landslide, Mountain Valley completed additional field assessment and assigned site-specific control measures to these areas in their Landslide Mitigation Report[2]. Mountain Valley has proposed to implement mitigation and stabilization control measures including: trench breaker daylight drains, cutoff drains, transverse trench drains, rock lined swales, riprap natural drains, riprap slope breakers, trench breaker pass-through drains, brow ditches, geogrid reinforcement,

[2] Mountain Valley's Landslide Mitigation Report was included in the October 23, 2019 supplement and updated as attachment 29-1 to the December 16, 2019 response to the December 2, 2019 EIR . The Landslide Mitigation Report can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191216-5158 in the "Numbers: Accession Number" field.

and highwall revetment, steep slope revetment and compact slope breakers. Appendix C.4 lists areas of potential landslide concern and proposed mitigation and/or stabilization control measures. Based on Mountain Valley's characterization of slopes in the Project area and proposed mitigation measures, we conclude that potential Project effects related to landslides would be adequately minimized.

4.1.4.5 Land Subsidence

Subsidence, involving the localized or regional lowering of the ground surface, may be caused by karst formation due to limestone or gypsum bedrock dissolution; sediment compaction due to groundwater pumping and/or oil and gas extraction; and underground mining. Oil and gas well production, underground mines, and large groundwater withdrawals do not occur in the Project area.

Karst features, such as sinkholes, caves, and caverns, can form as a result of the long-term action of groundwater on soluble carbonate rocks (e.g., limestone, marble, and dolostone). These features could present a hazard to the pipeline due to cave or sinkhole collapse. Because karst features provide a direct connection to groundwater, there exists the potential for pipeline construction to impact groundwater from increased turbidity due to runoff of sediment into karst features or from inadvertent spills of fuel or other hazardous materials from construction equipment (see section 4.3.1.7). Karst areas are also associated with seeps and springs, which could experience temporary changes in flow characteristics from construction of the pipeline. Seeps and springs along steep slopes could likewise contribute to and be the cause of landslides or other earth movements.

In the Piedmont province of Virginia, sinkholes occur in narrow marble belts (VADMME, 2015). Based on the Weary and Doctor (2014) 1:500,000-scale digital map of karst in the United States, portions of the Project alignment would cross a marble-containing (karst-susceptible) conglomerate unit.

Mountain Valley completed a Karst Hazard Assessment of potential karst features for the Project. During desktop assessment, Mountain Valley consulted 1:24,000-scale Virginia Division of Geology and Mineral Resources (VADGMR) geologic maps and identified five locations where the conglomerate unit would be crossed by the Project alignment (table 4.1-2). Pedestrian survey was completed within 150 feet of the proposed alignment at these five locations to further assess the environment for the presence of karst terrain. No karst features were identified. Based on this assessment, subsidence hazards from karst terrain are not anticipated to impact the Project during construction or operation.

If karst features are observed during construction, Mountain Valley would employ a karst specialist to conduct a field investigation to inspect and characterize the karst features and potential for subsurface connectivity. The karst specialist would coordinate with the Project geologist to conduct the field inspection and would notify the applicable agencies regarding the karst feature. If the karst feature is determined to have subsurface connectivity and present a potential hazard to pipeline construction and operation, or be a potential conduit to local groundwater resources, appropriate mitigation measures would be identified by a karst specialist, and would be discussed with the applicable agencies prior to implementation.

TABLE 4.1-2

Locations of Field Surveys of Karst-Susceptible Bedrock near the Southgate Project

State	County	From Milepost	To Milepost	Crossing Length	Rock Type	Construction Method
Virginia	Pittsylvania	0.03	1.0	3,696	Conglomerate (covered by terrace deposits)	Open-cut and bore (road crossings)
Virginia	Pittsylvania	14.95	15.70	3,960	Conglomerate	Open-cut and bore (road crossings)
Virginia	Pittsylvania	21.20	21.50	1,584	Conglomerate	Open-cut and bore (road crossings)
Virginia	Pittsylvania	21.80	21.91	581	Conglomerate	Open-cut and bore (road crossings)
Virginia	Pittsylvania	22.12	22.30	950	Conglomerate	Open-cut and bore (road crossings)

Sources: Henika, 1983; Marr, 1984. Price et al, 1980.

4.1.4.6 Shallow Bedrock and Blasting

Areas with shallow bedrock (bedrock within 60 inches of the ground surface) were identified using the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA NRCS, 2018a). The Project pipeline route would traverse approximately 5.5 miles (119.6 acres) of shallow bedrock. Areas of shallow bedrock are listed in detail by milepost in appendix C.5. The potential for blasting exists at all locations where shallow bedrock may be encountered. Blasting may also be required at the Lambert Interconnect and MLV 1 as well as at the LN 3600 Interconnect due to slope and depth to bedrock at both locations.

If unrippable bedrock is encountered, Mountain Valley would first attempt trenching with rock trenching machines, rock saws, hydraulic rams, and jackhammers. If blasting becomes necessary, it typically involves a small scale, controlled, rolling detonation procedure resulting in limited ground upheaval. These blasts do not typically result in large, aboveground explosions. Any required blasting would be conducted in accordance with all federal, state, and local regulations.

Mountain Valley completed a desktop assessment to identify steep slopes (18 degrees or more) with shallow bedrock in its Force Assisted Excavation (FAE) and Slope Stability evaluation.[3] This evaluation included the review of LiDAR data associated with the Project to

[3] Mountain Valley's Force Assisted Excavation evaluation was included as Attachment 5 to Mountain Valley's May 22, 2019 supplemental filing. This information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190522-5174 in the "Numbers: Accession Number" field.

identify slopes greater than 18 degrees and a comparison of the identified slopes in conjunction to areas designated as having a shallow depth to bedrock less than 10 feet below land surface. The areas that satisfied both requirements were assessed to determine the potential for FAE to trigger landslides. Based on this analysis, 19 locations were identified that may require blasting. The purpose of FAE is to fracture and loosen bedrock near land surface to allow for the mechanical removal of bedrock for pipeline installation. This process is intended to leave behind competent bedrock after removal of the fractured pieces associated with the FAE. The use of blasting along slopes has the potential to increase the risk of landslides during pipeline construction. Mountain Valley would deploy a qualified geotechnical engineer or geologist to conduct a site visit at each of these areas after tree clearing and site grading, but before excavation. Actual site conditions would be evaluated and site-specific data collected for further engineering analysis if deemed necessary. Based on this site-specific analysis, mitigation measures would be developed and deployed before, during, and after blasting and ditching to stabilize slopes. Further, blasting conducted in these areas would be confined to the right-of-way alignment during trench excavation and explosives used for blasting would be managed for weight, powder factor, type of explosive and delays implemented to be adjusted for the management of peak particle, longitudinal, vertical and transverse velocities for the reduction in transferred energy to surrounding slopes allowing for the mitigation of potential slope movement.

In order to minimize potential impacts from blasting, Mountain Valley would comply with all federal, state, and local regulations for blasting. Mountain Valley filed a *General Blasting Plan*[4] that describes the measures and BMPs it would implement during construction to reduce and mitigate impacts from blasting. As outlined in the *General Blasting Plan*, Mountain Valley would:

- limit the charge size;
- use heavy mats or other suitable cover to prevent the scattering of debris;
- use seismograph equipment to monitor the velocity of the blasts at select monitoring locations including closest adjacent facilities;
- conduct pre-and post-blast testing and inspections of water wells and structures within 150 feet of blasting area;
- man valves at adjacent pipelines in case of an emergency arising from nearby blasting activities;
- provide verbal and written notification of residents and owners of structures within 150 feet of blasting activities, before blasting activities would begin;
- use warning signals, flags, and barricades;
- conduct pre-blast and post-blast surveys at locations within 150 feet of the blasting activity; and
- use excess rock from blasting to restore the right-of-way, placed as per landowner agreements, or hauled off-site to an approved disposal site.

[4] Mountain Valley's *General Blasting Plan* was included as attachment 3 to Mountain Valley's October 18, 2019 response to the October 3, 2019 FERC Environmental Information Request (EIR). The *General Blasting Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191018-5168in the "Numbers: Accession Number" field.

We have concerns about Mountain Valley's proposed use and disposal of excess rock. Mountain Valley has committed to backfilling the trench with excavated rock material only to the height of the existing bedrock horizon, and where rock is present in soils pre-construction, Mountain Valley would incorporate rock (generated during blasting and trenching) in the backfill to a depth of 4 inches or more below the surface to encourage revegetation. Further, in its General Blasting Plan, Mountain Valley indicates that excess rock may be used in the restoration of disturbed right-of-way limits, with the rock buried within the reclamation limits of the right-of-way. We find this to be inconsistent with our Plan (see section III.E. and V.A.3.) and not conducive to successful restoration of affected lands. Burying rock in locations other than where it originated could impact soil quality, subsurface water flow, and revegetation of affected lands. Therefore, we recommend that:

- **Prior to construction, Mountain Valley should file with the Secretary, for review and written approval by the Director of OEP, a revised *General Blasting Plan* that clarifies it will not bury excess rock fragments generated during trenching or blasting in any location other than where the rock originated. Excess rock fragments not suitable for reburial at the point of origin should be considered construction debris and should be disposed of consistent with our Plan at sections III.E and V.A.3.**

In addition, Mountain Valley's *General Blasting Plan* requires the blasting contractor to prepare Project/site-specific blasting plan(s) for approval by Mountain Valley prior to the use of any explosives. In response to comments on the draft EIS made by the EPA, Mountain Valley stated it would also provide verbal and written notification to any building occupants within 250 feet of blasting activities. Mountain Valley would investigate damage claims associated with blasting and would repair or mitigate damage through agreements with landowners. Refer to section 4.3.1 for a discussion of blasting impacts and mitigation measures for drinking water supplies.

4.1.4.7 Flooding

Flash flooding occurs when there is rapid and substantial increases in water flow rate and water volume within waterbodies or onto adjacent floodplains. Flash flooding can occur after excessive or significant rainfall over a short period of time (less than 6 hours). The occurrence of flash flooding can be within minutes or hours of significant rainfall and is dependent on the size of the contributing watershed after dam or levee failure, and/or the duration of the rain event (NWS, 2010). The National Weather Service (NWS) Flash Flood Guidance estimates that the amount of rainfall needed to generate flash flooding in the counties crossed by the Project is 1.5 to 2.0 inches per hour (National Oceanic and Atmospheric Administration, 2019).

Seasonal and flash flooding hazards are a potential concern where facilities would cross or be near major streams and small watersheds. To minimize or prevent impacts resulting from flash flooding during construction, Mountain Valley would remove any equipment or loose material from potentially affected areas prior to any anticipated significant rain event. Although flooding itself does not generally present a risk to pipeline facilities, bank erosion and/or scour could expose the pipeline or cause sections of pipe to become unsupported. Flooding can also affect the pipeline by increasing buoyancy, causing the pipe to rise toward the land surface where it may become

exposed. Mountain Valley would implement mitigation measures per its Procedures and the Project E&SC Plan, as needed, within floodplains to minimize potential impacts from flood events. These measures may include:

- using concrete coating, gravel-filled blankets, or concrete weights on the pipeline to maintain negative buoyancy; and
- restoring floodplain contours and waterbody banks to their pre-construction condition so that there is no net loss of flood storage capacity.

Given that Mountain Valley would implement measures to prevent or minimize pipeline buoyancy and to restore floodplain contours after completion of construction, we conclude that adverse impacts from flood hazards would be minor during construction and operation of the Project. Refer to section 4.3.2 for further discussion on floodplain storage.

4.1.4.8 Uranium

Marline Uranium Corporation initiated ground surveys in Virginia in 1977 and began to acquire mineral leases in Pittsylvania, Fauquier, Orange, Madison, and Culpeper counties. Geological exploration identified more than 55 occurrences of uranium in Virginia, primarily in the Piedmont and Blue Ridge regions. However, for a uranium occurrence to be considered commercially viable, it must be of sufficient size, appropriate grade, and be amenable to mining and processing (National Research Council [NRC], 2012). Of the sites explored in Virginia to date, only the deposit at Coles Hill is large enough and of a high enough grade to be potentially economically viable.

The Coles Hill deposit is in Pittsylvania County, Virginia, 3.5 miles north of the Lambert Compressor Station (Coles Hill, LLC; NRC, 2012). This deposit is exposed locally but proceeds to dip and extend underground (RTII, 2012). No encounters with the Coles Hill deposit are anticipated as a result of Project-required excavation due to the deposit depth and distance from the Project. The Coles Hill deposit is within a fault-bounded wedge of the sheared and highly potassic calcalkaline Leatherwood Granite, at the northwest margin of the Triassic-age Danville Basin (NRC, 2012). The Project would be 3.5 miles from the Coles Hill deposit, but would cross the Leatherwood Granite at one location (from approximate MP 1.2 to 1.9) and is sited near the western margin of the Danville Basin.

Commenters specifically noted potential uranium occurrences in the vicinity of Judy Byrd Mountain and Perkins Mountain. The pipeline alignment crosses near the base of these mountains at approximate MP 23 and MP 21.7, respectively. Bedrock geology of Judy Byrd Mountain and Perkins Mountain is mapped by the USGS as Triassic-age sedimentary rock of the Newark Supergroup (sandstone, siltstone, conglomerate, and shale). This formation could host roll-front type uranium deposits (mineralized zones between reduced sandstone on the hydrological gradient downside and oxidized sandstone on the hydrological gradient upside); however, the average concentration of uranium in two cataclystic rock samples collected approximately 1,750 feet west of MP 22.5 was approximately 4.7 parts per million (ppm) (USGS, 2019c). For reference, uranium has an average concentration in U.S. soils of about 3 ppm (U.S. Department of Health and Human Services [U.S. DHHS], 2013); and the average concentration of uranium globally in shales is 3.2

ppm, the average concentration in sandstones is 1.4 ppm, and the average concentration in granite is 4.8 ppm (NRC, 2012).

Uranium mobilization in the environment can occur through the exposure of uranium-containing rocks and sediments to the weathering process (physical or chemical), causing uranium to be released from its parent material. Redistribution can further occur via activities and processes that move soil and rock. Therefore, background concentrations of uranium in soils, sediments, shallow bedrock, and groundwater were assessed via a review of publicly available information.

The USGS National Uranium Resource Evaluation (NURE) database contains the results of sediment and water sampling completed under the NURE program from approximately 1975 through 1984. Within 0.5 mile of the Project workspace in Virginia, NURE analyzed 16 sediment samples and 11 groundwater samples[5] for uranium (USGS, 2004). The average concentration of uranium in these groundwater samples was 0.09 micrograms per liter (µg/L) and the highest concentration was 0.388 µg/L; the average uranium concentration in the 16 sediment samples was 8.07 ppm and the highest uranium concentration was 13.6 ppm. The EPA primary drinking water standard (maximum contaminant level [MCL] - the maximum level allowed of a contaminant in water which is delivered to any user of a public water system) for uranium is 30 µg/L. Based on NURE sampling results, uranium concentrations in groundwater near the Project are significantly lower than the EPA MCL.

Based on a review of USGS soil geochemistry data (4,857 sites in the conterminous U.S.), uranium concentrations near the Project in Virginia are approximately 2.0 to 2.2 ppm for a depth of 0 to 5 centimeters (cm) (50 to 60th percentile), 1.5 to 1.8 ppm for the A horizon (30 to 40th percentile), and 2.1 to 2.4 ppm for the C horizon (50 to 60th percentile) (Smith et. al., 2014). This is generally consistent with NURE aeroradiometric data (airborne gamma-ray spectrometry), which estimated concentrations of uranium in shallow bedrock and soils (top few centimeters) in Pittsylvania County to range from approximately 1.0 ppm to approximately 2.6 ppm. We also reviewed rock samples in the National Geochemical Database. In addition to the two previously-referenced samples in the vicinity of MP 22.5, a sample of granitic rock that was collected approximately 1,000 feet east of MP 15 and was found to contain uranium at a concentration of approximately 1.5 ppm. Geochemical information for other rock samples in Pittsylvania County were from locations greater than 0.5 mile from the proposed easement.

The mobility of uranium in soil and its vertical transport (leaching) to groundwater depend on soil properties such as pH, oxidation-reduction potential, concentration of complexing anions, porosity of the soil, soil particle size, and sorption properties, as well as the amount of water available (U.S. DHHS, 2013). The transport and dispersion of uranium in surface water and groundwater are affected by adsorption and desorption of the uranium on surface water sediments. In most waters, sediments act as a sink for uranium and the uranium concentrations in sediments and suspended solids are several orders of magnitude higher than in surrounding water (U.S. DHHS, 2013). In anoxic waters (reductive environment), soluble U(VI) is reduced to U(IV) and deposited into the sediment (U.S. DHHS, 2013). Uranium can also be removed from solution by physical adsorption processes, such as adsorption onto oxides of iron or manganese that occur as

[5] Of the groundwater samples collected, 10 were collected from wells with reported depths ranging from 44 feet to 165 feet and a single sample was collected from a source labeled as a spring.

coatings on the particles of soil and sediment (U.S. DHHS, 2013). This process is reflected in the higher concentrations of uranium present in the NURE sediment data described above.

The sorption of uranium in most soils is such that it may not leach readily from soil surface to groundwater, particularly in soils containing clay and iron oxide although other geological materials such as silica, shale, and granite have poor sorption characteristics (U.S. DHHS, 2013). However, while the main ore minerals of the Coles Hill, and presumably any similar deposits, are easily leachable, they are hosted by hard, granitoid rock that is difficult to crush (NRC, 2012). Uranium is transported poorly from soils to plants; the uptake of uranium by plants is dependent on levels of available (soluble) uranium. Particulate uranium represents an inhalation source for humans, dependent upon concentration and particle size. For particulate uranium to be an inhalation hazard to humans, the particulates must be in the size range of 1–10 micrometers (μm) (U.S. DHHS, 2013).

Based on the types of potential deposits present in Virginia and existing data, it is considered unlikely that deposits with grades in excess of 10,000 ppm uranium occur in Virginia (NRC, 2012), and as described in the above assessment, concentrations of uranium in sediment, soils, shallow bedrock, and groundwater near the Project workspace in Pittsylvania County are comparable to concentrations in environmental media in the conterminous United States. Uranium is generally not highly mobile in the environment, and Mountain Valley would implement their E&SC Plan to address fugitive dust mitigation, stormwater control, and erosion and sediment control measures during ground disturbance activities, which would reduce the mobilization of uranium during Project construction. Project activities would be similar to other roadway and infrastructure projects, including subsurface utilities with which the majority of the pipeline is collocated in Pittsylvania County. Given the linear nature and shallow depth (generally 5.5 to 9 feet below grade) of pipeline construction activities, it is not anticipated that the Project would disturb or mobilize uranium into the environment at concentrations significantly exceeding background concentrations. Therefore, significant impacts on human health and the environment are not anticipated during construction and operation of the Project.

4.1.4.9 HDD Feasibility and Geotechnical Investigations

Mountain Valley has proposed the use of the HDD method to cross sensitive resources at two separate locations (Dan River and Stony Creek Reservoir). Length of an HDD alignment, pipeline diameter, and subsurface material are factors in the technical feasibility of an HDD installation. Subsurface conditions that can affect feasibility of an HDD installation include excessive rock strength and abrasiveness, unconsolidated gravel and boulder materials, poor bedrock quality, solution cavities, and artesian conditions. It is also possible for HDD pipeline installation operations to fail, primarily due to encountering unexpected geologic conditions such as transitioning from coarse unconsolidated materials into bedrock or if the pipe were to become lodged in the hole during pullback operations.

During HDD operations, drilling fluid consisting primarily of water and bentonite clay is pumped under pressure through the inside of the drill pipe and flows back (returns) to the drill entry point along an annular space between the outside of the drill pipe and the drilled hole. Because the drilling fluid is pressurized, in certain conditions it can seep into the surrounding rocks and sediment. Formational drilling fluid losses typically occur when the drilling fluid flows through pore spaces in soil or within fractures in rock formations. Inadvertent returns (IR) of

drilling fluid to the ground surface are more likely to occur in less permeable soils or via fractures or fissures in bedrock. Chances for an IR to occur are greatest near the drill entry and exit points where the drill path has the least amount of ground cover. This can be caused by low soil shear strength and pre-existing fractures in the bedrock formations. A summary of geotechnical investigations and feasibility assessments completed for each proposed crossing follows.

Dan River

The total crossing length of Mountain Valley's proposed Dan River HDD would be 2,523 feet. Mountain Valley completed three geotechnical borings along the proposed alignment to depths of 175 to 176 feet below the ground surface (bgs)[6]. Overburden material was found to be sands, silts, and clays; bedrock was encountered at a depth of 25.5 to 53.3 feet bgs and consisted primarily of sandstone, siltstone and mudstone that extended to the terminal depth of each boring. A proposed depth of cover of 45 bgs would be maintained between the Dan River bed and the proposed alignment. At this depth, the drill path would be within bedrock. Based on available analysis, a majority of the drill path would be within competent bedrock with high rock quality designation values (greater than 50 percent). Mountain Valley's geotechnical contractor determined that the current HDD design is feasible.

A hydrofracture risk assessment determined that there would be an elevated risk of IR near the exit point of the drill. Mountain Valley proposes to expand its mud-receiving pit to include the area with elevated IR potential. Another area of elevated IR risk would be at the highly weathered and fractured rock layer between overburden and competent bedrock which, based on geotechnical information, would be crossed approximately 1,900 feet into the horizontal drill path. The drill would be greater than 8,00 feet from the bank of the Dan River when it crosses this layer, but may underlie wetland W-B18-36.

Stony Creek Reservoir

The total crossing length of Mountain Valley's proposed Stony Creek Reservoir HDD would be 1,619 feet. Mountain Valley completed two geotechnical borings along the proposed alignment to a depth of 176 to 180 feet bgs. Overburden material was found to be sands, silts, and clays; bedrock was encountered at a depth of 18.9 to 25 feet bgs and consisted primarily of sandstone, granite, diorite, quartzite, and schist. A proposed depth of cover of 50 to 55 feet bgs would be maintained between the Stony Creek Reservoir and the proposed alignment. At this depth, the drill would be within bedrock. Based on available analysis, a majority of the drill path would be within competent bedrock with high rock quality designation values (greater than 50 percent). Mountain Valley's geotechnical contractor determined that the current HDD design is feasible.

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[6] Mountain Valley's Geotechnical Report of Subsurface Exploration – Southgate Dan River HDD Crossing and Stoney Creek HDD Crossing was included as attachment 26-1 to Mountain Valley's December 16, 2019 response to the December 2, 2019 FERC Environmental Information Request (EIR). The *General Blasting Plan* was also included in this filing by Mountain Valley. Both plans can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191216-5158 in the "Numbers: Accession Number" field.

A hydrofracture risk assessment determined that there would be an elevated risk of IR near the exit point of drill for the Stony Creek Reservoir HDD crossing. Mountain Valley proposes to expand its mud-receiving pit to include the area with elevated IR potential. Another area of elevated IR risk would be at the highly weathered and fractured rock layer between overburden and competent bedrock which, based on geotechnical information, would be crossed approximately 1,400 feet into the horizontal drill path. The drill would be approximately 350 feet from the bank of Stony Creek when it crosses this layer.

HDD General Impacts and Mitigation

Drilling fluids associated with HDD operations would consist primarily of water and bentonite clay. Mountain Valley would require approval from FERC staff for the use of any additional proposed additives, and all additives would comply with applicable permit requirements. Mountain Valley's *HDD Contingency Plan*[7] specifies the use of instrumentation to monitor drilling fluid pressure and discharge rate, torsional pressure, and annular pressure during pilot hole drilling. Spill kits would be stored on-site, and a vacuum truck would be present prior to and during drilling operations to respond to any potential IR. In addition, containment materials, including straw, fabric filter fence, sand bags and boom and turbidity curtains, would be positioned on-site for immediate use, if necessary. Sediment barriers would also be constructed around the drill entry and exit pits. The *HDD Contingency Plan* requires that regular pedestrian surveys be completed on the land-based sections of drill alignments during drilling operations to facilitate rapid identification and response to an IR. Mountain Valley's *HDD Contingency Plan* would ensure that drill operations are monitored and adjusted to avoid potential IRs, and if one should occur, that the release would be contained to the extent practicable and remediated. We have reviewed Mountain Valley's *HDD Contingency Plan* and find it acceptable.

Based on the above analyses, we conclude that subsurface conditions identified by the geotechnical studies would not render the HDDs infeasible. With consideration of the adopted mitigation measures, we conclude that potential impacts from HDD construction and potential IRs would not be significant.

4.1.5 Geology Conclusions

The Project would traverse a range of geologic conditions and resources. We conclude that construction and operation of the Project facilities in accordance with Mountain Valley's specific *Unanticipated Discovery Plan for Paleontological Resources* and other Project plans would not result in a significant impact on mines, mineral resources, or paleontological resources.

Mountain Valley would reduce the potential for impacts from landslides by following the measures outlined in its Landslide Mitigation Report. In addition, with the implementation of the measures outlined in Mountain Valley's *General Blasting Plan*, *HDD Contingency Plan,* and E&SC Plan, we conclude that impacts on geological resources would be adequately minimized.

[7] Mountain Valley's *Horizontal Directional Drill Contingency Plan* was included as attachment 4 to Mountain Valley's October 23, 2019 supplemental information filing. The *Horizontal Directional Drill Contingency Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191023-5022 in the "Numbers: Accession Number" field.

4.2 SOILS

The soils crossed by the Project were identified and assessed using various data sources including the publicly available Web Soil Survey database. The Web Soil Survey database is a digital version of the original county soil surveys developed by the USDA NRCS (USDA, 2018a). It provides the most detailed level of desktop soils information for general natural resource planning and management. However, it should be noted that the minimum delineation size for many soil surveys is about 1.5 acres, which is over 600 feet of the Project's right-of-way. The Web Soil Survey database provides the proportionate extent of the component soils and their properties for each soil map unit, allowing for an evaluation of potential hazards and soil limitations along the Project. Appendix D identifies by milepost the specific soil units that would be crossed by the Project.

Construction of the Project facilities would temporarily and permanently disturb soils, resulting in increased potential for erosion, compaction, and reduced vegetation following construction. The potential for soil erosion would be minimized through the use of erosion controls and revegetation measures as described in Mountain Valley's Plan and E&SC Plan.

4.2.1 Soil Limitations

Several soil characteristics have the potential to affect or be affected by construction and operation of the Project. These soil limitations include erosion potential, farmland classification, compaction prone soils, rocky soils/shallow depth to bedrock, and poor revegetation potential. Table 4.2-1 lists soil limitations for the Project.

4.2.2 Erosion Potential

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors such as soil texture, structure, slope, vegetation cover, rainfall intensity, and wind intensity can influence the erosion process. Soils most susceptible to erosion by water are typified by bare or sparse vegetation cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Soils typically more resistant to erosion by water include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. Wind erosion processes are less affected by slope angles than water erosion processes. Wind-induced erosion often occurs on dry soil where vegetation cover is sparse and strong winds are prevalent.

Soils were considered to be prone to water erosion if soils were ranked as having a "K factor" of 0.4 (Moderate erosion classification) or greater. The K factor is a quantitative representation of the potential for bare soil to undergo particle detachment and transportation via water. Soils are considered to be prone to wind erosion if they are in wind erodibility groups (WEG) 1 or 2 (USDA, 2018a). The WEG is a quantitative measure for susceptibility to wind erosion based on soil layers, soil moisture, and plant growth as contributing factors.

Construction of the Project would disturb about 34.4 acres of soils classified as being highly erodible by water. None of the soils that would be disturbed by construction of the Project are highly prone to erosion by wind; however construction activities such as clearing, grading, and equipment movement can nonetheless accelerate the erosion process.

TABLE 4.2-1

Summary of Soil Characteristics and Limitations for the Southgate Project

Facility / County, State	Area of Project Workspace Within Designated Soil Classification / Limitation (Acres)						
	Prime Farmland or Farmland of Statewide Importance a/	Compaction Prone b/	Highly Water Erodible c/	Highly Wind Erodible d/	Shallow Depth to Bedrock e/	Low Revegetation Potential f/	Stony / Rocky g/
H-605 Pipeline							
Pittsylvania, Virginia	7.9	0.0	0.0	0.0	0.0	0.0	0.0
H-650 Pipeline							
Pittsylvania, Virginia	360.2	2.6	9.2	0.0	18.5	19.8	18.5
Rockingham, North Carolina	260.7	2.2	16.9	0.0	61.6	0.0	0.0
Alamance, North Carolina	284.2	9.2	0.0	0.0	10.0	0.0	0.0
Cathodic Protection Groundbeds							
Pittsylvania, Virginia	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Rockingham, North Carolina	<0.1	0.0	0.0	0.0	0.0	0.0	0.0
Alamance, North Carolina	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Aboveground Facilities							
Pittsylvania, Virginia							
Lambert Compressor Station / Interconnect / MLV 1 (MP 0.0)	19.1	0.0	0.0	0.0	0.0	0.0	0.0
MLV 2 and 3 (MPs 7.4 and 18.3)	<0.1	0.0	0.0	0.0	0.0	0.0	0.0
Contractor Yards	98.1	0.0	0.0	0.0	0.0	4.1	0.0
Access Roads	35.1	0.0	0.3	0.0	0.5	0.6	0.5
Rockingham, North Carolina							
LN 3600 Interconnect (MP 28.2)	4.6	0.0	0.0	0.0	0.0	0.0	0.0
T-15 Dan River Interconnect / MLV 4 (MP 30.4)	5.1	0.0	0.1	0.0	0.0	0.0	0.0
MLV 5 (MP 42.2)	<0.1	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 4.2-1

Summary of Soil Characteristics and Limitations for the Southgate Project

Facility / County, State	Area of Project Workspace Within Designated Soil Classification / Limitation (Acres)						
	Prime Farmland or Farmland of Statewide Importance a/	Compaction Prone b/	Highly Water Erodible c/	Highly Wind Erodible d/	Shallow Depth to Bedrock e/	Low Revegetation Potential f/	Stony / Rocky g/
Contractor Yards	0.0	10.9	7.4	0.0	10.9	0.0	18.3
Access Roads	28.8	0.3	0.5	0.0	5.2	0.0	<0.1
Alamance County, North Carolina							
MLVs 6 and 7 (MPs 55.1 and 68.2)	<0.1	0.0	0.0	0.0	0.0	0.0	0.0
T-21 Haw River Interconnect / MLV 8 (MP 73.1)	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Contractor Yards	22.1	0.0	0.0	0.0	10.2	0.0	0.0
Access Roads	18.1	0.4	0.0	0.0	0.3	0.3	0.0
Caswell County, North Carolina							
Contractor Yard	23.4	0.0	0.0	0.0	2.4	0.0	0.0
Access Roads	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Project Total	**1,171.7**	**25.7**	**34.4**	**0**	**119.6**	**24.8**	**37.3**
Percent of Project Area h/	**80.0**	**2.0**	**2.0**	**0**	**8.0**	**2.0**	**3.0**

Note: Pig launchers and receivers and Mainline Valves (MLVs) 1, 4, and 8 would be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect); therefore, acreages calculations for the pig launchers and receivers and MLVs are included with those facilities.

a/ Prime farmland includes soils designated by the USDA NRCS as drained and / or reclaimed of excess salts and sodium. No areas of unique farmland or farmland of local importance would be affected by the Project (USDA, 2018b).

b/ Soils with clay loam or finer texture and a drainage class of poor, somewhat poor, or very poor.

c/ Soils with a K factor that is greater than 0.4.

d/ Soils in wind erodibility groups 1 or 2.

e/ Soils that have a depth to bedrock of less than 5 feet (60 inches).

f/ Soils with an average low rating based on factors including but not limited to: drainage class of excessively drained or very poorly drained; K Factor greater than 0.4; and slope greater than 25 percent

g/ Soils with a cobbly, stony, bouldery, shaly, channery, very gravelly, or extremely gravelly modifier to the textural class of the surface layer and / or that have a surface layer that contains greater than 5 percent by weight rock fragments larger than 3 inches.

h/ Totals do not equal 100 percent as not all soils are classified with limitations and certain soils are classified as having multiple limitations.

To minimize soil erosion, the Project would follow BMPs included in Mountain Valley's E&SC Plan. These BMPs may include, but are not limited to:

- installation of slope breakers and trench breakers;
- installation of sediment barriers, such as silt fence and straw bales;
- restoration of soil layering;
- restoration of surface contours; and
- stabilization of disturbed work areas with permanent seeding within seven working days of final grade, weather and soil conditions permitting.

Temporary erosion control devices (ECDs) would be installed immediately following soil disturbance. ECDs would be inspected regularly and would only be removed following the successful revegetation of an affected area. Mountain Valley would also employ permanent ECDs such as trench breakers (at the base of slopes greater than 5 percent and within 50 feet of waterbodies or wetlands) and slope breakers (in all areas except for cultivated lands). In addition, Mountain Valley would implement dust suppression measures, including watering construction areas to reach optimum soil moisture for dust control, thus reducing soil loss due to wind erosion.

4.2.3 Prime Farmland

The USDA (2018b) defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops." Developed land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating).

The NRCS also recognizes unique farmland and farmland of statewide or local importance. Unique farmland is land that is used for production of specific high-value food and fiber crops. Soils may be considered of statewide or local importance if those soils are capable of producing a high yield of crops when managed according to accepted farming methods.

Construction of the Project would disturb approximately 1,172 acres of prime farmland and farmland of statewide importance, of which 182.6 acres are currently in agricultural use (refer to table 4.2-2).

TABLE 4.2-2

Prime Farmland Affected by the Southgate Project

	Area of Project Workspace within Prime Farmland Areas (Acres) a/							
	Mapped Prime Farmland b/		Prime Farmland Currently in Agricultural Use c/		Mapped Farmland of Statewide Importance d/		Farmland of Statewide Importance Currently in Agricultural Use e/	
Facility	Const f/	Oper g/	Const	Oper	Const	Oper	Const	Oper
H-605 Pipeline	6.4	2.2	1	0.6	1.5	0.5	0	0
H-650 Pipeline	394.8	144.1	94.7	31.1	510.2	193	64.9	25
Cathodic Protection Groundbeds	1.0	1.0	<0.1	<0.1	0.8	0.8	0	0
Aboveground Facilities	25.6	8.2	12.2	6.1	4.5	2.6	0.5	0.2
Contractor Yards	81.6	0	0	0	61.9	0	0	0
Access Roads	45.6	4	4.9	0.7	37.6	1.5	4.3	0.1
Project Total h/	**555.1**	**159.4**	**112.9**	**38.6**	**616.7**	**198.5**	**69.7**	**25.3**

Note: Pig launchers and receivers would be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect); therefore, acreage calculations for the pig launchers and receivers are included with those facilities. MLVs 1, 4, and 8 would be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect); therefore, acreage calculations for these MLVs are included with those facilities.

a/ No areas of farmland of local importance or unique farmland would be affected by the Project.

b/ Prime farmland includes soils mapped and designated as prime farmland by the NRCS if drained and/or irrigated and/or reclaimed of excess salts and sodium.

c/ Agricultural land (i.e., cultivated land) within areas identified as prime farmland. Numbers represent actual land in agricultural use.

d/ Farmland of statewide importance is mapped by Web Soil Survey and determined by the appropriate state agencies which may include areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

e/ Agricultural land (i.e., cultivated land) within areas identified as farmland of statewide importance. Numbers represent actual land in agricultural use.

f/ Construction acres include the area affected by construction (i.e., temporary and additional temporary workspace, contractor yards, and access roads) and the area affected by operation of the Project (i.e., facility operation footprint and 50-foot pipeline permanent right-of-way). The 50-foot-wide permanent right-of-way between HDD entry and exit points and railroad rights-of-way are not included in this acreage.

g/ Includes only the operational footprint of the Project facilities and the 50-foot-wide permanent pipeline right-of-way.

h/ Sums may not equal addends due to rounding. Addends consist of six-decimal digits.

Permanent impacts on prime farmland and farmland of statewide importance would be limited to soils within the footprint of new aboveground facilities (approximately 10.8 acres total) and new permanent access roads (5.5 acres total), where soils would be permanently converted to industrial use. These impacts represent less than 0.01 percent of available prime farmland and farmland of statewide importance in Pittsylvania, Rockingham, and Alamance Counties.[8]

Except where land would be permanently converted to industrial use, in areas currently in agricultural use, impacts on prime farmland and farmland of statewide importance would be minimized by implementing BMPs included in Mountain Valley's Plan. These include measures to conserve and segregate the upper 12 inches of topsoil; test and alleviate compaction (generally via discing); and remove excess rock from topsoil. Mountain Valley would also protect and maintain existing drainage tile and irrigation systems, prevent the introduction of weeds, and retain existing soil productivity, thereby minimizing the potential for long-term impacts on agricultural lands.

4.2.4 Compaction Prone Soils

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils; the degree of potential compaction was evaluated based on soil texture and drainage class. Compaction is typically of concern when the moisture content of the soils is high such as in hydric soils or during precipitation events.

Impacts on compaction prone soils would be minimized by limiting construction traffic along the right-of-way. Mountain Valley would also decompact all heavily disturbed areas by tilling and/or discing. Mountain Valley would conduct topsoil and subsoil compaction tests using a penetrometer or other appropriate device at regular intervals in agricultural and residential areas, and elsewhere at the discretion of the EI in areas of heavy compaction. If additional decompaction of the area is required, additional mechanical methods (i.e. deep tilling) would be used following consultation with the landowner and state agencies based on desired land use.

4.2.5 Rocky Soils/Shallow Depth to Bedrock

Soils with textural classifications of cobbly, stony, bouldery, shaly, channery, very gravelly, or extremely gravelly in any layer; or that have a surface layer that contains greater than 5 percent by weight rock fragments larger than 3 inches, may be characterized as stony or rocky soils. Typically, stony/rocky soils do not hold water well and exhibit a low revegetation potential due to low water content and higher seed mortality. Additionally, in areas with shallow bedrock (bedrock within 5 feet of the ground surface), there is increased potential to introduce rocks into the topsoil during construction activities.

Construction of the Project, including the right-of-way, ATWS, access roads, and contractor yards would affect 37.3 acres of soils considered to be stony/rocky and 119.6 acres of shallow bedrock. Aboveground facilities associated with the Project would not affect stony/rocky or shallow to bedrock soils.

[8] Mapped prime farmland and farmland of statewide importance totals 515,021 acres in Pittsylvania County; 253,584 acres in Rockingham County; and 232,316 acres in Alamance County (USDA NRCS, 2018b).

The strength and hardness of shallow bedrock encountered during pipeline construction activities would dictate the techniques used for excavation. Mechanical means, such as ripping or conventional excavation would be prioritized for removal of bedrock prior to any bedrock blasting. However, it is anticipated that blasting may be required in some areas, as detailed in section 4.1.4.6.

Mountain Valley would remove excess rock from topsoil, consistent with its Plan, in all disturbed cultivated and rotated croplands, hayfields, and pastures. According to Mountain Valley's Plan, the trench may be backfilled with excavated rock material only to the height of the existing bedrock horizon. In areas of rocky soils, Mountain Valley stated excess rock would be backfilled to a depth of 4 inches or more in locations where rock was present pre-construction such that it would not inhibit herbaceous growth. Otherwise, excess rock would be disposed at an approved site unless the landowner or land managing agency approves an alternative beneficial reuse.

4.2.6 Poor Revegetation Potential

The revegetation potential of soils is based on the surface texture, drainage class, slope, and erosion potential. The clearing and grading of soils with poor revegetation potential could result in a lack of adequate vegetation following construction and restoration of the right-of-way, which could lead to increased erosion, a reduction in wildlife habitat, and adverse visual impacts.

Construction of the Project, including the right-of-way, ATWS, access roads, and contractor yards would affect 24.8 acres of soils classified as having poor revegetation potential. Aboveground facilities would not affect any soils with poor revegetation potential.

In order to minimize and mitigate potential impacts on soils with poor revegetation potential, Mountain Valley would follow measures in its Plan, such as:

- reseeding would be based on seed mix and rate information received for each county from the local NRCS and State Conservation Districts;
- site-specific soil pH modifiers and fertilizers, as required by landowners or regulatory agencies, would be incorporated into the top 2 inches of soil as soon as practicable;
- standard soil amendments (i.e. lime, fertilizer) would be applied in areas of low revegetation potential where no site-specific requirements are identified, to enhance plant establishment and offset potential nutrient loss;
- specific plant composition for revegetation (i.e. cover crops) requests from landowners would be replanted with those specified species; and
- conducting follow-up inspections to determine the success of revegetation and address landowner concerns and development of a corrective action plan for areas that are not responding to revegetation.

Section 2.0 of this EIS provides additional information regarding inspections, and seed mixes are discussed in section 4.4.

4.2.7 Contaminated Soils

A search of federal and state regulatory databases was conducted and 30 sites of potential contamination concern within 0.25 mile of the Project area were identified.[9] The nearest site with an active or unresolved status, Midway Auto Sales, is approximately 100 feet from the proposed Project workspace near MP 43.6. This site is down-gradient of the Project alignment, and available information describes groundwater contamination only. Based on distance from the proposed construction work area and regulatory status, the Project is not anticipated to be affected by other identified sites. Further discussion of potential contaminated sites is provided in section 4.3.1.

Should contamination be discovered during construction, Mountain Valley would notify the affected landowner, coordinate with the appropriate agencies, and follow the procedures put forth in its *Unanticipated Discovery of Contamination Plan*. We have reviewed this plan and find it acceptable. Mountain Valley's *Unanticipated Discovery of Contamination Plan* provides seven stages of response should contamination be discovered during construction:

- Stage 1 – suspend all work activities and movement of personnel to a safe area;
- Stage 2 – identify immediate threats, notify emergency response, and evacuate as necessary;
- Stage 3 – if safety permits, secure the contaminated area with fencing or flagging and provide site personnel to restrict access as needed;
- Stage 4 – the contractor would notify Mountain Valley and the VADEQ or NCDEQ as appropriate;
- Stage 5 – document the discovery;
- Stage 6 – take remedial action including sampling, remedial action determination, remedial action implementation, and disposal; and
- Stage 7 – records of the unanticipated discovery disposal would be kept in accordance with record keeping requirements.

During construction, facilities and equipment may contain hazardous water or fluids, such as oil and fuel, which could leak or be spilled. Proper storage, containment, and handling procedures, as outlined in the SPCC Plan, would minimize the chance of spills and leaks. Additionally, any soils imported to the site for use as fill would be certified contaminant free prior to use.

[9] The list of hazardous sites within 0.25 mile of the Project was included as part of Mountain Valley's March 05, 2019 response to our February 13, 2019 environmental information request, accession number 20190305-5214. Additional information was provided in Mountain Valley's December 16, 2019 supplemental filing, accession number 20191216-5158. The information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

4.2.8 Soils Conclusions

Construction and operation of the Project would convert about 16.3 acres of prime farmland and farmland of statewide importance to industrial/commercial use. This constitutes a permanent, but minor impact due to the availability of prime farmland and farmland of statewide importance in the vicinity of the Project.

Mountain Valley would implement its Plan, E&SC Plan, SPCC Plan, and *Unanticipated Discovery of Contamination Plan* to minimize Project impacts on soils. Measures in these plans include installation, inspection, and maintenance of ECDs during construction; spill prevention and clean-up measures; topsoil segregation in agricultural and residential areas; soil compaction mitigation; and revegetation of temporary workspaces and the permanent pipeline right-of-way.

Based on the overall soil conditions and the Project's proposed construction and operation methods, we conclude that construction and operation of the Project would not significantly impact or be affected by soils**.**

4.3 WATER RESOURCES

4.3.1 Groundwater Resources

4.3.1.1 Aquifers

The Project is within the Piedmont physiographic province (USGS, 2000). The Project would cross the Early Mesozoic Basin and Piedmont Crystalline-Rock aquifer systems in Virginia and North Carolina (see table 4.3-1). Each aquifer system crossed by the Project is described below. Unconsolidated surficial aquifers consisting primarily of reworked Pleistocene-age glacial sediments and Holocene-age alluvium also overlie both aquifer systems but are discontinuous in extent and character. These surficial aquifers are not commonly used as potable water sources in the Project area but are generally suitable for municipal purposes. North Carolina and Virginia do not have state level aquifer designations or regulations. The Project would not cross any sole source aquifers or principal source aquifer areas.

TABLE 4.3-1

Aquifers Crossed by the Southgate Project

Project/State/ County	Nearest Project MPs	Major Aquifer System Name	Dominant Lithology	Well Yields (gpm)
Virginia				
H-605 Pipeline				
Pittsylvania	0.0 to 0.5	Early Mesozoic Basin aquifers	Sandstone aquifers	3-600 (Highly variable)
H-650 Pipeline				
Pittsylvania	0.0 to 4.3 RR	Early Mesozoic Basin aquifers	Sandstone aquifers	3-600 (Highly variable)

TABLE 4.3-1

Aquifers Crossed by the Southgate Project

Project/State/ County	Nearest Project MPs	Major Aquifer System Name	Dominant Lithology	Well Yields (gpm)
	4.3 to 4.6	Piedmont Crystalline-Rock aquifers	Igneous and metamorphic rock aquifers	3-600 (Highly variable)
	4.6 to 26.1	Early Mesozoic Basin aquifers	Sandstone aquifers	3-600 (Highly variable)
North Carolina				
H-650 Pipeline				
Rockingham	26.1 to 32.5	Early Mesozoic Basin aquifers	Sandstone aquifers	3-600 (Highly variable)
	32.5 to 52.6	Piedmont Crystalline-Rock aquifers	Sandstone aquifers	3-600 (Highly variable)
Alamance	52.6 to 73.2 RR	Piedmont Crystalline-Rock aquifers	Sandstone aquifers	3-600 (Highly variable)

Source: USGS, 2000
gpm=gallons per minute

Piedmont Crystalline-Rock Aquifer System

The Piedmont Crystalline-Rock aquifer system is the most common and widespread aquifer in the region (USGS, 2000). This aquifer system is generally comprised of crystalline metamorphic and igneous rock types, including coarse-grained gneiss and schist; however, fine-grained rocks such as phyllite, and metamorphosed volcanic rock such as volcanic tuff, ash, and lava flows are also common. Unconsolidated saprolite, colluvium, alluvium, and soil overlie the bedrock in most areas. The most significant water supplies in this aquifer system are found within a few hundred feet of the surface. Generally, the water is suitable for drinking; however, iron, manganese, and sulfate can occur locally in elevated concentrations.

Early Mesozoic Basin Aquifer System

The Early Mesozoic Basin aquifer system composes a small portion of the aquifers in the region (USGS, 2000); the Project is in the Dan River-Danville Basin aquifer area. The sedimentary rocks of the early Mesozoic systems generally had considerable effective porosity between grains but due to compaction and cementation, only a small part of the groundwater now flows between pores. Groundwater primarily moves along joints, fractures, and bedding planes. Aquifers in the Early Mesozoic Basin generally yield more water than other non-carbonated aquifers in the Piedmont province and are generally suitable for drinking.

4.3.1.2 Water Supply Wells and Springs

Published, recent data on springs in Virginia and North Carolina are not currently available. Information on public water supply wells was obtained from the EPA's Safe Drinking Water Information System (SDWIS) (EPA, 2016a). Digital location information for public water

supplies was obtained from the VADEQ and the NCDEQ. Based on surveys completed at this time, there are no public water supply wells or springs within 150 feet of the Project. Based on current information there are 34 private wells within 150 feet of the Project. The majority of private wells identified have undetermined use, except for six that have been identified as groundwater testing wells and one that has been identified as a monitoring well. Landowner surveys by Mountain Valley to identify any private wells and springs that are used for potable water on affected properties are ongoing. Therefore, **we recommend that**:

- **Prior to construction, Mountain Valley should file with the Secretary, for review and written approval by the Director of OEP, the locations of all private water wells and springs identified within 150 feet of the Project work areas, including the well's or springs' status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts on the private water wells or springs.**

Construction grading, clearing, trench excavation, and blasting have the potential to affect water well quality through a short-term increase in turbidity at nearby wells and/or springs. Heavy construction equipment and excavation could physically damage wells. Spills of fuels and hazardous substances during construction also have the potential to affect shallow groundwater sources. Additionally, blasting may impact water well yields since vibrations caused by blasting have the potential to locally affect bedrock fractures within the bedrock aquifer, which could temporarily result in diminished well yields and increased turbidity. Details of blasting locations, procedures, and mitigation measures are included in section 4.1.4.7. Potential impacts on wells and shallow groundwater sources are discussed in more detail below in section 4.3.1.7.

If springs are identified that could be affected by construction activities, Mountain Valley would consult with the appropriate regulatory agencies and with individual landowners to minimize impacts. In areas where a public or private water supply well or spring is identified within 150 feet of the Project, Mountain Valley would flag the wellhead or spring as a precaution, and notify the water supply well owner/operator of Project activities prior to commencing construction in that area.

As described in the Project's *Water Resources Identification and Testing Plan*[10], Mountain Valley would offer pre-construction and post-construction water quality and yield testing for all water supply wells located within 150 feet of Project workspaces. With landowners' permission, Mountain Valley would conduct two pre-construction water quality and yield evaluations on water wells and springs. One pre-construction evaluation would be conducted 6 months prior to construction and the second pre-construction evaluation would be conducted 3 months prior to construction. If a landowner does not grant permission for pre-construction testing, Mountain Valley would not conduct post-construction testing as there would no baseline data by which to measure potential changes in water yield and quality.

[10] Mountain Valley's *Water Resources Identification and Testing Plan* was included in the March 05, 2019 filing. The *Water Resources Identification and Testing Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190305-5214 in the "Numbers: Accession Number" field.

Pre-construction and post-construction water quality analysis would test for the target analytes based on EPA guidance on Analytic Methods for Drinking Water (EPA, 2019). The target analytes include: pH, specific conductance, temperature, turbidity, total and fecal coliform bacteria, total dissolved solids, total suspended solids (TSS), hardness, alkalinity, sulfate, chloride, nitrate, bicarbonate, calcium, magnesium, sodium, potassium, iron, manganese, oil and grease, volatile and semi-volatile organic compounds, and hydrocarbons. Mountain Valley has also agreed to conduct water yield testing during the pre-construction and post-construction sampling.

Mountain Valley would evaluate any complaints of damage to water supply wells associated with construction of the Project and identify a suitable settlement with the landowner if damage occurs. If it is determined that suitable potable water is no longer available due to construction-related activities, Mountain Valley would provide adequate quantities of potable water during repair or replacement of the damaged water supply. In the event that an impact occurs to a livestock well, Mountain Valley would provide a temporary water source to sustain livestock while a new water supply well is constructed. In the event that an impact occurs to an irrigation well used for crops, Mountain Valley would compensate landowners for losses in crops resulting from well damage and provide a temporary water source while a new permanent water supply is constructed.

For public water supplies, existing documentation of well production would be used to establish baseline yield. The pre-construction testing program would be updated to include a tailored analysis list that meets the requirements of the public supplier permit and is agreed upon by the public supplier. If it is determined that a long-term solution is required, Mountain Valley would restore the well's water quality and yield to pre-construction conditions by providing the affected public supply source with either a new permanent treatment system, a new on-site well, or a combination of both.

The Project does not propose to use groundwater for hydrostatic testing, dust control, or HDD. However, some groundwater would be removed from the trench during dewatering. Water pumped from the trench during dewatering activities would be released back into the same drainage basin thus not constituting a consumptive use of groundwater from the basin. Mountain Valley would comply with all federal, state, and local agencies permits and requirements for water procurement and water releases, so as to minimize impacts on groundwater resources. Considering the small amount of water withdrawn and released during construction activities, and measures that would be implemented to reduce impacts from water withdrawals and release, the Project would not significantly change the availability of groundwater in the area.

4.3.1.3 Wellhead and Source Water Protection Areas

The 1986 amendment to the Safe Drinking Water Act (SDWA) requires each state to develop and implement a wellhead protection program. In 1996, the SDWA was amended to require the development of a broader-based Source Water Assessment Program (SWAP). The intent of each state's SWAP is to assess contamination threats to all public groundwater and surface water drinking water sources. No wellhead or source water protection areas were identified in Rockingham or Alamance Counties, Virginia or Pittsylvania County, North Carolina.

4.3.1.4 Contaminated Groundwater

Existing contaminated groundwater resources may be encountered during construction of the Project. Contaminated groundwater may pose health and safety concerns to construction workers and potentially elevate environmental risk. The EPA's Facility Registry Service database was used to identify contaminated sites located within 0.25 mile of the Project. Additional federal, state, and local databases containing information of known locations of current and historic contamination were used to identify locations of potential contamination concern. The nearest site with an active or unresolved status, Midway Auto Sales, is approximately 100 feet from the Project workspaces near MP 43.6[11]. This site is listed for a release of gasoline to groundwater that was identified during the removal of an underground storage tank in 1994. Given the nature and the age of the release, as well as media impacted and because the site is topographically down-gradient of the alignment, the potential for Project activities to encounter associated groundwater contamination, if still present, is negligible. Further discussion of potential contaminated sites is provided in section 4.2.7.

Disturbance of contaminated groundwater by construction activities could potentially elevate environmental risk. During construction, facilities and equipment may contain hazardous water or fluids, such as oil and fuel, which could leak or be spilled. Proper storage, containment, and handling procedures, as outlined in the SPCC Plan, would minimize the chance of spills and leaks.

4.3.1.5 General Impacts and Mitigation

The construction of the Project could encounter shallow groundwater during excavation of the trench to install the pipe. Trench dewatering could temporarily alter overland water flow, groundwater recharge, and groundwater levels in the immediate vicinity of the trench. Construction grading, clearing, trench excavation and trench blasting could temporarily alter overland water and groundwater recharge and create minor fluctuations in groundwater levels. Ground disturbance associated with construction could potentially increase erosion and sedimentation and result in elevated levels of turbidity.

Trenches are not expected to inhibit groundwater flow because they would be immediately backfilled following pipeline installation and the pipeline is not large enough to both laterally and vertically impede groundwater flow. In addition, the pipeline would not inhibit water infiltration because the pipe would not be large enough to create an impermeable barrier over the aquifer.

Once construction is complete, Mountain Valley would re-establish vegetation and restore the ground surface to original contours as closely as practicable. Restoration would facilitate establishment of pre-construction overland water flow and recharge patterns. Use of construction

[11] The list of hazardous sites within 0.25 mile of the Project was included as part of Mountain Valley's March 05, 2019 response to our February 13, 2019 environmental information request, accession number 20190305-5214. Additional information was provided in Mountain Valley's December 16, 2019 supplemental filing, accession number 20191216-5158. The information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

practices outlined in Mountain Valley's Plan and Procedures, and the Project-specific E&SC Plan would minimize impacts of the Project.

The Project's SPCC Plan addresses the prevention and mitigation measures that would be implemented to avoid or minimize the potential impacts of a hazardous material spill during construction. Measures outlined in the SPCC Plan include, but are not limited to:

- identification, labeling, and reporting of all potential pollutant sources at the work site;
- regular inspection of containers and tanks for leaks;
- prohibition of fueling, lubricating activities, and hazardous material storage in or adjacent to sensitive areas;
- use of secondary containment for storage of fuels, oils, hazardous materials, and equipment;
- implementation of emergency response procedures, including spill reporting procedures; and
- use of standard procedures for excavation and disposal of any soils contaminated by spillage.

Environmental inspectors would be trained to detect evidence of soil and groundwater contamination (e.g., visible sheen). If contaminated groundwater is encountered during construction, Mountain Valley would implement the measures outlined in its *Unanticipated Discovery of Contamination Plan*. Construction activities would be suspended and the area around potential contamination would be restricted. Sampling and remediation efforts would be undertaken to identify and contain the contamination. Mountain Valley would mobilize an appropriate contractor to segregate and dispose of contaminated soils. Mountain Valley would notify the affected landowner and the appropriate federal or state agency of the contamination and clean-up efforts.

Groundwater contamination from pipeline operations is unlikely because the pipeline would carry methane, a substance lighter than air that would rapidly dissipate in the event of a leak. Additionally, methane has a solubility limit of 3.5 milliliter/100 milliliter of water at a temperature of 17°C, degasses from an aqueous solution, and is considered non-toxic when dissolved in water. As a result, there is no risk of methane dissolution into groundwater. In addition, Mountain Valley would regularly monitor the pipeline for signs of leaks.

As previously stated, blasting has the potential to affect groundwater quality through a short-term increase in turbidity at nearby wells and/or springs. Although no springs have been identified within 150 feet of the Project areas, blasting may impact groundwater yield by altering the discharge to springs in the vicinity of blasting areas. Vibrations caused by blasting also have the potential to locally affect bedrock fractures within the bedrock aquifer, which could temporarily result in diminished well yields and increased turbidity.

In areas of shallow bedrock, Mountain Valley would use mechanical methods to excavate the pipeline trench when possible. However, blasting may be necessary to achieve the required

trench depth if mechanical methods prove to be ineffective or inefficient. Mountain Valley would minimize or avoid impacts on groundwater during blasting by implementing the construction practices outlined in its *General Blasting Plan*. As stated in the *General Blasting Plan*, licensed blasting contractors would conduct the blasting activities in accordance with all applicable permits. Mountain Valley would conduct pre-construction and post-construction water quality testing for groundwater supply resources within 150 feet of the Project's construction workspace, with landowner permission. If it is determined that blasting activities caused an adverse effect to a specific groundwater supply, Mountain Valley would work with the owner to ensure they have water until the damaged supply is repaired or replaced, at Mountain Valley's expense.

4.3.1.6 Groundwater Conclusions

Temporary, minor, and localized impacts could result during trenching activities in areas with shallow groundwater (at depths less than 10 feet below the ground surface). Mountain Valley would implement BMPs to protect groundwater resources, including erosion controls, restoration of the right-of-way, revegetation, and enhanced mitigation BMPs as discussed above.

Mountain Valley would adhere to all applicable federal, state, and local requirements to protect groundwater resources. We conclude that the groundwater mitigation measures proposed by Mountain Valley would adequately avoid or minimize potential impacts on groundwater resources. Therefore, we do not anticipate long-term or significant impacts on groundwater resources as a result of construction or operation of the Project.

4.3.2 Surface Water Resources

The USGS classification for surface waters divides drainage basins into successively smaller hydrologic units. Each hydrologic unit is identified by a unique hydrologic unit code, referred to as a hydrologic unit code (HUC), consisting of two to 12 digits. The Project crosses four sub-basins (8-digit HUC) and six watersheds (10-digit HUC), which are listed in table 4.3-2.

In general, the watersheds crossed by the Project contain development consistent with a rural environment. The watersheds contain forests, open land, agriculture, silviculture, and residential development. Development in the watersheds results in some degradation of water quality. For instance, agricultural runoff or runoff from cleared areas in a typical rain event will cause short-term turbidity in streams. We expect that the water quality and biota within the Project area streams is largely reflective of the degree of upstream development.

TABLE 4.3-2

Watersheds Crossed by the Southgate Project

County	Milepost	Sub-basin (8-digit HUC) a/	Watershed (10-digit HUC)
Virginia			
Pittsylvania	0.0-10.8	Banister River (03010105)	Cherrystone Creek-Banister River (0301010501)
	10.8-19.9	Upper Dan (03010103)	Wolf Island Creek-Dan River (0301010310)
	19.9-26.1		Cascade Creek-Dan River (0301010309)
North Carolina			
Rockingham	26.1-39.7	Upper Dan (03010103)	Cascade Creek-Dan River (0301010309)
	39.7-48.2	Lower Dan (03010104)	Hogans Creek-Dan River (0301010401)
	48.2-52.6	Haw River (03030002)	Headwaters Haw River (0303000202)
Alamance	52.6-56.1	Haw River (03030002)	Headwaters Haw River (0303000202)
	56.1-73.2		Back Creek-Haw River (0303000204)

Sources: VADEQ, 2018c; NCDEQ, 2018c

a/ HUC is a classification system developed by the USGS to classify drainage basins from the regional level to individual watersheds.

4.3.2.1 Protected Watersheds and Public Supply Intakes

North Carolina

The North Carolina Division of Water Resources (NCDWR) Water Supply Watershed Protection Program is a cooperative program administered by local governments which follows statewide management requirements. The program designates critical and protected watershed areas. Critical watershed designations apply to areas upstream of a water supply intake or reservoir where pollution risk is elevated. The designation covers the area extending 0.5 mile, or to the top of the nearest ridgeline (whichever is closest), from the edge of the normal pool elevation. Protected watershed designations apply to areas five miles upstream of the critical watershed designation in a WS-IV water supply area. Watershed designations restrict development density but do not include any additional restrictions for pipelines or specific erosion and sediment control requirements.

One public water supply intake is located within 3 miles downstream of the Project in North Carolina. The City of Burlington water intake in the Stony Creek Reservoir is located 1.8 river miles downstream of the Project. This water intake is further discussed in section 4.3.2.4 below. The Project would cross two designated protected watersheds and one designated critical watershed in North Carolina. The critical watershed and surrounding protected watershed are associated with Stony Creek (WS-II, HUC-10: 0303000204). The second protected watershed is associated with the Haw River (WS-IV, HUC-10: 0303000202). The Project would cross a total of approximately 7.1 miles of designated protected watershed area and 1.5 miles of designated critical watershed area. Mountain Valley would implement mitigation measures specified in its Plan and Procedures, and its Project-specific E&SC Plan to minimize any potential impacts on public water sources.

Virginia

The Virginia Department of Health Office of Drinking Water (VADH-ODW) maintains the SWAP in Virginia for both ground and surface water. Because the program is voluntary and lacks reporting requirements, an accurate database of ground and surface water sources does not exist. The VADEQ classifies 16 waterbodies crossed by the Project as public water supply; however, no public surface water supply intakes are located within 3 miles of the Project in Virginia. As mentioned above, Mountain Valley would implement mitigation measures specified in its Plan and Procedures, and its Project-specific E&SC Plan to minimize any potential impacts on public water sources. Based on past experience, the implementation of proposed mitigation measures and the distance between the pipeline crossings and water supply intake are sufficient to safeguard the water supply intake during pipeline construction and operation. VADEQ classifications are discussed further in section 4.3.2.3.

4.3.2.2 Surface Water Crossings

Mountain Valley's Procedures define waterbodies as any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes. Perennial waterbodies contain water for most of the year. Intermittent streams include those that flow only seasonally or following rainfall events. Ephemeral waterbodies include those that only carry stormwater in direct response to precipitation, with water flowing only during and shortly after large precipitation events.

Mountain Valley's Procedures further categorize waterbodies by their size as minor, intermediate, or major crossings. Minor waterbodies are less than or equal to 10 feet wide at the water's edge. Intermediate waterbodies are greater than 10 feet wide but less than or equal to 100 feet wide. Major waterbodies are greater than 100-feet-wide. Table 4.3-3 summarizes the waterbodies crossed by the Project. A complete list of waterbody crossings pending COE's field review is located in appendix B.5.

A total of 277 waterbodies would be either crossed by the Project or are present within construction workspace. The pipeline would require 223 crossings of waterbodies, four of which are major waterbodies. Access roads for the Project would cross seven minor and one intermediate waterbodies. A total of 46 waterbodies are present in the temporary or permanent workspace but would not be crossed by the pipeline. None of the access road crossings or workspace impacts would affect major waterbodies.

The Project crossings would follow Mountain Valley's Procedures, the E&SC Plan, and NPDES permit requirements. Five crossings would be conducted by four conventional bores and three crossings would be conducted by two HDD crossings. All other crossings would be open cut, dry-ditch crossing methods (dam-and-pump or flume method). All open-cut, dry-ditch crossings would be minor or intermediate waterbodies except the proposed Sandy River crossing, which would be a major waterbody at the crossing location. Additional information regarding the Sandy River crossing is included in section 4.3.2.4. Mountain Valley would determine if it would use the dam-and-pump or flume crossing method at each crossing based on-site conditions. Descriptions of these crossing methods are located in section 2.4.1. All in-stream work would be conducted during low flow periods when practicable.

TABLE 4.3-3

Flow Types of Waterbody Crossings for the Southgate Project a/

Project/ State	FERC Size Classification					Flow Type				
	Minor	Inter-mediate	Major	N/A b/	Total	Pond	Peren	Interm	Ephem	Total
H-605 (VA)	1	0	0	0	1	0	0	1	0	1
H-650 (VA)	41	20	1	6	68	2	38	25	3	68
H-650 (NC)	121	36	3	24	184	3	90	72	19	184
Access Roads (VA)	3	0	0	5	8	0	2	5	1	8
Access Roads (NC)	4	1	0	11	16	0	6	7	3	16
Total	**170**	**57**	**4**	**46**	**277**	**5**	**136**	**110**	**26**	**277**

a/ Some waterbodies would be crossed at more than one location. This table accounts for each crossing of all affected waterbodies.

b/ N/A FERC Classifications are waterbodies which are within the workspace, but are not crossed by the pipeline centerline, road, or aboveground facility.

Abbreviations:

Ephem = Ephemeral

Interm = Intermittent

Peren = Perennial

We received comments on the draft EIS regarding evaluation of trenchless methods across all waterbodies crossed by the Project. During the environmental review process, we evaluated all waterbody crossings proposed by Mountain Valley and in certain cases where we considered a waterbody to be sensitive and a trenchless method feasible, we requested Mountain Valley propose a trenchless method (HDD or conventional bore). In all other cases, we determined a dry-ditch crossing would not result in significant impacts on the waterbody.

Conventional bore and HDD crossing methods both avoid direct impacts on waterbodies by boring underground to cross the waterbody instead of trenching through the streambed and banks. For both crossing methods, Mountain Valley would place boring locations outside of the waterbody and associated riparian area and no disturbance of the waterbody is required. Conventional bore and HDD crossing methods are proposed for crossings where sensitive fish or mussel species presence required the crossing to avoid waterbody disturbance. HDD crossings are typically used for waterbody crossings unless local conditions require a conventional bore. Additional information regarding sensitive species at waterbody crossings is included in section 4.6.5.

Mountain Valley would use HDD crossings at the Dan River (248 feet wide at MP 30.1) in Rockingham County, North Carolina and the Stony Creek Reservoir (296 feet wide at MP 63.6) in Alamance County, North Carolina. Both crossings are major waterbodies. An ephemeral

waterbody (S-A18-17) would also be crossed as part of the Dan River HDD. HDD crossing methods are required for these crossings due to the long distance of each crossing and topographic constraints on pit excavation for a conventional bore crossing. Section 4.1.4.10 contains further description and analysis of the proposed HDD crossings. Potential impacts associated with the HDD method are described further below in section 4.3.2.7.

The conventional bore crossing at Cascade Creek/Dry Creek, Wolf Island Creek, and Deep Creek are proposed due to the potential presence of federal or state-listed aquatic species in these systems. Cascade Creek is a major waterbody, Wolf Island Creek is an intermediate waterbody, and Deep Creek is a minor waterbody. Dry Creek is an intermediate waterbody that would also be crossed by the Cascade Creek conventional bore since the pipeline crossing at this location is at the convergence of Cascade Creek and Dry Creek. An intermittent waterbody (S-A19-269) is within the span of the Wolf Island Creek conventional bore crossing.

In comparison with HDD crossing methods, using conventional bore methods at the Cascade/Dry Creek crossing would result in a substantially shorter crossing length, construction time, and temporary workspace impacts. The proximity of Cascade/Dry Creek to the existing Transco pipeline right-of-way poses additional construction hurdles to an HDD crossing. The Wolf Island Creek crossing does not have sufficient space in the current alignment to accommodate the temporary workspace that would be required for an HDD crossing. Whereas, a conventional bore crossing requires less temporary workspace and would be feasible within the current alignment. Conventional bores require large entry and exit pit excavations at each end of the bore pathway and therefore create the risk of sediment runoff entering the adjacent waterbody. Of greatest risk to the waterbody is the possibility of the borehole collapsing without warning. In such a case the bed of the waterbody could collapse and reroute the waterbody into the bore pathway. As with its other construction methods, Mountain Valley would implement measures to reduce runoff from the construction right-of-way as provided in Mountain Valley's Plan and Procedures, the E&SC Plan, and NPDES permit requirements. Mountain Valley would allow for a vegetative buffer on each side of the waterbody crossing to the extent practicable as noted in the site-specific crossing plans[12]. Mountain Valley would use a casing, if required, to prevent the bore from collapsing. Mountain Valley has developed final site-specific plans for each of the HDD and conventional bore crossings, which we have reviewed and find acceptable.

Mountain Valley's Procedures specify that all extra work areas should be set back at least 50 feet from waterbodies and wetlands. Mountain Valley has proposed ATWSs at 15 locations within 50 feet of a waterbody. Appendix B.3 provides the locations where Mountain Valley proposes less than a 50-foot setback from a waterbody and the site-specific rationale for the requested modification to the Mountain Valley Procedures. Based on our review, and additional

[12] Mountain Valley's site-specific crossing plan for the Sandy River was included as attachment 14-1 to Mountain Valley's May 13, 2019 filing, accession number 20190513-5181. A revised crossing plan was provided at attachment 9-1 to Mountain Valley's December 16, 2019 filing, accession number 20191216-5158. Mountain Valley's site-specific crossing plan for Deep Creek was included in its October 23, 2019 supplemental filing accession number 20191023-5022. This information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

justifications provided by Mountain Valley, we have determined that Mountain Valley has provided adequate justification for the requested ATWSs.

Waterbody crossings would be aligned perpendicular to the axis of the waterbody channel as closely as local conditions and engineering constraints allow. In accordance with Mountain Valley's Procedures, when a pipeline route runs parallel to a waterbody, the Project would maintain a 15-foot buffer of undisturbed vegetation between the waterbody, or adjacent wetland, and the construction workspace, unless local conditions do not allow the setback. Mountain Valley is requesting modification to the FERC Procedures at 23 locations (totaling 0.25 mile) where the Project would parallel a waterbody, or adjacent wetland, and remove vegetation within 15 feet. These locations and removal of vegetation within 15 feet of the waterbody is needed to avoid construction on side slopes, to collocate the pipeline with existing rights-of-way, or to avoid residences. We have reviewed all of the justifications for the parallel locations and find them all to be acceptable. Appendix B.8 includes details for each location.

Mountain Valley would use measures outlined in its Plan and Procedures, as well as the Project-specific E&SC Plan to minimize impacts. We received comments regarding special measures to protect waterbodies where the Project workspace would parallel and remove vegetation within 15 feet of the waterbody.[13] In response to these comments, Mountain Valley stated that enhanced and/or additional ECDs may be required to further protect the resource, thus potentially creating additional maintenance requirements.[14] Mountain Valley did not give specific details about these enhanced erosion control measures and maintenance requirements; therefore, **we recommend that:**

- **Prior to construction, Mountain Valley should file with the Secretary, for review and written approval by the Director of OEP, site-specific plans detailing the enhanced erosion control measures and maintenance requirements for each location where the Project would parallel and remove vegetation within 15 feet of a waterbody**.

Once the pipeline installation is complete, Mountain Valley would restore construction areas and re-establish vegetation in order to prevent erosion and sedimentation along these waterbodies and wetlands. With implementation of Mountain Valley's Plan and Procedures, and our recommendation for Mountain Valley to provide additional details regarding their proposed enhanced erosion control measures prior to construction and subject to review and approval from the Director of OEP, we conclude that impacts on waterbodies and wetlands would be minimized.

[13] See Mountain Valley's response to NCWRC's comments (accession number 20190916-5189) on the draft EIS, accession number 20191023-5022. The information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

[14] See Mountain Valley's December 16, 2019 response to item number 8 in our December 2, 2019 environmental information request, accession number 20191216-5158. The information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

4.3.2.3 Contaminated Sediments and Impaired Waters

CWA Section 303(d) requires that each state review, establish, and revise water quality standards for all surface waters within each state. State classification systems develop monitoring and migration programs to ensure that water standards are attained as designated. Waters that fail to meet their designated beneficial use are considered as impaired and are listed under a state's 303(d) list of impaired waters.

North Carolina

In February 2014, the Eden North Carolina Coal Ash Spill occurred approximately 2.3 river miles upstream from the Project's crossing of the Dan River at MP 30.1 in Rockingham County (EDR, 2018). An estimated 39,000 tons of coal ash spilled from Duke Energy's Dan River Steam Station into the Dan River. In 2015, after extensive clean-up efforts, the EPA determined that the Dan River needed no further ash removal and that no exceedances of human health or ecological screening thresholds associated with coal ash had occurred. Mountain Valley proposes to cross the Dan River via HDD and no in-stream disturbance is anticipated. Due to the clean-up efforts and the HDD crossing, no impacts associated with this coal ash release are expected. Surface water withdrawal from the Dan River is proposed at MP 30.1 for hydrostatic testing, HDD, and dust control. These withdrawals would be conducted at a fixed point on the river, with the intake screened and floated above the stream bed, and maintained at a low enough rate that significant sediment disturbance would not be expected. As a result, the withdrawals would not be expected to have an impact on past coal ash deposits in the sediment.

The NCDEQ lists the Dan River as impaired in North Carolina due to turbidity in the draft 2018 NCDEQ 303(d) list (NCDEQ, 2018b). Due to the use of an HDD crossing method, impacts would be limited to surface water withdrawal. As discussed above, withdrawal and discharge procedures would not be expected to impact turbidity and we do not expect the Project to contribute to further impairment of the Dan River. The majority of other waterbodies crossed in North Carolina have not been assessed for impairment or are classified as Category 3a (Inconclusive Data).

The Project would also comply with the NPDES permits which minimize pollutant discharge. The Project would follow requirements for increased inspections to twice per week for NPDES measures within TMDL limited watersheds. Mountain Valley would coordinate with NCDEQ to ensure that areas with increased inspection schedules are properly identified and schedules are observed.

Virginia

Virginia Antidegradation Policy (9VAC25-260-30) classifies all surface waters into one of three tiers that determines antidegradation protection (additional information is provided in section 4.3.2.6). Tier I crossings require satisfying adopted water quality standards. Tier II crossings permit limited negative effects on water quality only in specific circumstances. The VADEQ considers Tier III waters exceptional quality and increased pollutant discharge is prohibited. Tier I and II crossing requirements are addressed by the E&SC Plan and impacts are not expected to affect water quality. The Project does not cross any Tier III waters in Virginia.

Three waterbodies crossed by the Project in Virginia are designated as Category 4a Impaired (VADEQ, 2018b). Little Cherrystone Creek, White Oak Creek (crossed twice), and Sandy Creek are listed as impaired due to *Escherichia coli*. The VADEQ lists the Dan River in Virginia as impaired due to *Escherichia coli* as well as mercury and polychlorinated biphenyl (PCB) levels in fish tissues. In addition the VADEQ lists the Banister River as being impaired with *Escherichia coli*. However, it should be noted that the portions of the Banister River and the Dan River listed as impaired are downstream from the Project crossing locations. The majority of other waterbodies crossed in Virginia have not been assessed for impairment or are classified as Category 3a (Inconclusive Data).

Mountain Valley would cross impaired waters in Virginia using a dry crossing technique (e.g. flume or dam-and-pump) if there is flowing water at the time of construction. Mountain Valley would use BMPs and measures outlined in Mountain Valley's Plan and Procedures, as well as the Project-specific E&SC Plan to maintain stream conditions and minimize further impairment. Furthermore, Mountain Valley would design and install BMPs in compliance with NPDES permit requirements that control soil erosion and sedimentation down-gradient of construction areas. Once the waterbody crossing is complete, Mountain Valley would restore construction areas and re-establish vegetation in order to prevent erosion and sedimentation along waterbodies.

We do not anticipate that a pipeline installed underneath waterbodies would contribute to the impairment of streams for *E. coli* and therefore would not contribute to the further impairment of Little Cherrystone Creek, White Oak Creek, and Sandy Creek in Virginia. VADEQ commented that hydroseeding could be a contributing factor to PCB concentrations in the Dan River (VADEQ, 2018b). The Project would avoid hydroseeding within 100 feet of direct tributaries to the Dan River.

4.3.2.4 Federal and State Designated Use and Exceptional Waters

National Wild and Scenic Rivers

The Nationwide Rivers Inventory (NRI) designates free-flowing river segments in the United States that possess outstandingly remarkable natural or cultural values, which are considered to be of national significance (NPS, 2017). The National Park Service (NPS) maintains the NRI as a list of river segments that potentially qualify as national wild, scenic, or recreational river areas. In addition to the NRI database, we reviewed the National Wild and Scenic River System database to identify federally designated wild, scenic, or recreational waterbodies.

The segment of the Dan River crossed by the Project is included in the NRI list, but not designated as a National Wild and Scenic River. The NPS consultation indicated that an HDD crossing of the Dan River and implementation of appropriate BMPs would reduce potential impacts on the river and the surrounding landscape. Mountain Valley would install applicable BMPs outlined in the E&SC Plan and would implement the *HDD Contingency Plan* as described in section 4.1.

State Scenic Rivers

Virginia administers the Virginia Scenic River Program to identify, designate, and protect rivers and streams that possess outstanding scenic, recreational, historic, and natural characteristics of statewide significance. The Sandy River is a major waterbody crossed by the Project and qualifies for a potential designation that may result in a scenic river designation in the future. The Project would cross the Sandy River by using a dry crossing method (flume). To decrease visual impacts from the crossing, Mountain Valley would use native seed mixes and hand plant riparian vegetation. In addition, Mountain Valley would coordinate with the VADCR to determine if additional mitigation measures are necessary. Mountain Valley would use applicable BMPs to minimize impacts, as outlined in the E&SC Plan.

The Project does not cross other waters designated in the Virginia Scenic River Program. The Project would cross the Banister River which has a potential Virginia Scenic River Program future designation as a Blueway (a designated recreational water trail). However, the current construction schedule anticipates that the Project would be complete prior to any listing as a Blueway. The Project's effects on boating and recreational use of the Sandy and Banister rivers is discussed in section 4.8.4.1.

North Carolina administers a river designation intended to protect specific rivers with outstanding natural, scenic, educational, recreational, geologic, fish and wildlife, historic, scientific, cultural or other values. The Project does not cross any North Carolina rivers with these designations.

State Designated Use and Exceptional Waters.

Virginia maintains a program administered by VADEQ that uses six primary designations: aquatic life, fish consumption, public water supply, recreation use, shellfishing, and wildlife use. The VADEQ uses additional subcategories in the classification system, but none of the subcategories applies to waters crossed by the Project. The majority of the waters crossed by the Project have not been assessed and default to the basic four classifications (aquatic life, recreation, fish consumption, and wildlife). Waterbodies crossed by the Project include the following classifications: aquatic life, wildlife, fish consumption, and recreation. Some of the waterbodies crossed by the Project are also designated for the public water supply use. Crossings would use applicable BMPs as established in Mountain Valley's Plan and Procedures and the E&SC Plan to minimize impacts.

The NCDWR has established surface water designations that define the best uses to be protected within these waters. The designations identify water quality standards that protect those uses. The Project would cross waters with the following designations:

- Class C: Secondary use for recreation, fishing, wildlife, fish consumption, and aquatic life.
- Critical Area (CA): Area adjacent to a water supply intake or reservoir where risk associated with pollution is greater than from the remaining portions of the watershed.

- High Quality Waters (HQW): Supplemental classification to protect waters rated as exceptional for biological or physical/chemical characteristics.
- Nutrient Sensitive Waters (NSW): Waters needing additional nutrient management due to excessive growth of microscopic or macroscopic vegetation.
- Water Supply II (WS-II): Water sources for drinking, culinary, or food processing where a Water Supply I (WS-I) classification is not feasible. WS-II waters are generally in predominantly undeveloped watersheds. All WS-II waters are also designated HQW and Class C.
- Water Supply IV (WS-IV): Water sources for drinking, culinary, or food processing where a WS-I, WS-II, or WS-III classification is not feasible. WS-IV waters are generally in moderately to highly developed watersheds. All WS-IV waters are also designated Class C.
- Water Supply V (WS-V): Water supplies draining into WS-IV waters, waters used by industry to supply drinking water to employees, or waters formerly used as water supplies. All WS-V waters are also designated as Class C.

All but four of the waters crossed by the Project in North Carolina are designated only as Class C. The two waters designated as WS-II, HQW, NSW, and CA would be crossed by HDD (Stony Creek Reservoir, MP 63.6) or conventional bore (Deep Creek, MP 64), thus minimizing any disturbance to the waterbody. The City of Burlington expressed concern about the potential impacts of an IR into the Stony Creek Reservoir. As discussed in section 4.1.4.9, the HDD should cross into competent bedrock approximately 350 feet from the bank of Stony Creek Reservoir and would remain within competent bedrock, with a depth of cover of 50 to 55 feet, for the length of the reservoir crossing. Based on subsurface conditions and depth of cover, an IR is not likely to occur within or immediately adjacent to the Stony Creek Reservoir. Further, drilling fluids associated with HDD operations would consist primarily of water and bentonite clay; additional additives would require approval by FERC staff prior to use. Mountain Valley would follow its HDD Contingency Plan, which specifies measures to ensure that drilling operations are monitored and adjusted to avoid potential IRs. Therefore, impacts on this reservoir are not expected. In the unlikely event of an IR, the HDD Contingency Plan contains measures to contain and remove the material, if practicable.

The Project would cross one WS-V and NSW designated waterbody (Boyds Creek, MP 67.6) and one WS-IV and NSW designated water (Giles Creek, MP 48.7) via dam-and-pump or flume methods. Crossings would use applicable BMPs as established in the E&SC Plan and Mountain Valley's Procedures. Crossings of these waterbodies would temporarily increase turbidity which could migrate downstream. However, turbidity from a dry crossing is short lasting and would be expected to dissipate within a few hundred feet of the crossing.

As mentioned in section 4.3.2.1 above, the closest surface water intake to the Project is 1.8 miles downstream of the crossing of the Stony Creek Reservoir. No other surface water intakes are within 3 miles of the crossings. Based on the use of an HDD and the distance to the intake, we conclude that the Project is not likely to impact the intake.

The VADGIF and NCWRC maintain state lists of designated trout waters based on aesthetics, productivity, resident fish population, and stream structure. The Project does not cross any VADGIF or NCWRC designated trout waters.

All waterbodies crossed by the Project are designated warmwater fisheries. The FERC requires all in-stream work, except the installation and removal of equipment bridges, be completed in warmwater fisheries between June 1 and November 30 unless expressly permitted or further restricted by an appropriate federal or state agency in writing. Based on results of fish and mussel surveys and correspondence with VADGIF, Mountain Valley proposes a construction window of July 16 through April 14 for surface waterbody crossings in Virginia. NCWRC has agreed that no construction window would be needed for waterbody crossings in North Carolina. Details of specific survey results and agency correspondence are addressed in section 4.6.5.

North Carolina Jordan Lake Riparian Buffer Area

The Jordan Lake impoundment was created in 1983 on the Haw River near the confluence with the Deep River. Jordan Lake provides drinking water to approximately 500,000 people and provides recreational swimming, boating and fishing opportunities to the area. The Jordan Lake impoundment is located 25 miles southeast from the pipeline but the watershed is included in a riparian buffer area as part of a strategy to improve water quality in the lake. The watershed is considered the Jordan Lake Riparian Buffer (JLRB) area and is divided into multiple subwatersheds. The Project crosses the Haw River subwatershed for approximately 24 miles (MP 49-73) in Rockingham and Alamance Counties. Project construction within JLRB area would follow requirements identified in the Jordan Watershed Riparian Buffer Protection Ordinance. Mountain Valley is working with the NCDEQ to complete an application for a 401 Individual Water Quality Certification and Buffer Authorization for impacts proposed within the JLRB area. The application would include a major variance request for specific stream impacts and provide mitigation for impacts as outlined under NCDEQ rules. Mountain Valley has provided variance justification for non-perpendicular waterbody crossings in the JLRB area that appear to meet siting rules. Justifications focused on collocation of the pipeline with existing infrastructure right-of-way, minimizing Project footprint, and avoiding residences or existing infrastructure (e.g. roads, landowner structures). Implementation of Mountain Valley's Plan and Procedures; E&SC Plan; and applicable NPDES and buffer protection requirements would minimize potential impacts on surface waters within the JLRB area. Due to the distance between the Project and the Jordan Lake impoundment and the proposed surface water protection measures, no impacts would be expected to Jordan Lake's water quality or function.

Mountain Valley submitted its Section 401 applications to the NCDEQ in November 30, 2018. On June 3, 2019, NCDEQ issued a letter of denial of the Section 401 Water Quality Certification and JLRB variance for the Project due to procedural issues. Mountain Valley resubmitted a Section 401 and JLRB variance application in August 2019. NCDEQ provided a response that it would require until August 2020 to review and assess Mountain Valley's application. Mountain Valley continues to coordinate with NCDEQ regarding the Section 401 Water Quality Certification and JLRB variance for the Project.

4.3.2.5 Designated Flood Zones

The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps that delineate Special Flood Hazard Areas (SFHA). FEMA defines SFHAs as the area that would be inundated by a 100-year (1 percent annual chance of occurrence) flood event. SFHAs are further categorized into zones. The Project crosses A and AE designated flood zones in Virginia and North Carolina. Zone A is the FEMA designation for areas subject to inundation by the 1-percent-annual-chance flood and where predicted floodwater elevations have not been established. Zone AE areas are subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods and where predicted floodwater elevations above mean sea level have been established (FEMA, 2018). Table 4.3-4 identifies the FEMA flood zones crossed by the pipeline.

No access roads or interconnection meter stations would be located within the FEMA 100-year flood zone in Virginia. Two permanent access road and one interconnection meter station would be located within the FEMA 100-year flood zone in North Carolina. All permanent impacts would occur in the Cascade Creek-Dan River watershed (HUC-10) which totals 10,469 acres in size. Two permanent gravel access roads (PA-RO-082, PA-RO-082A) would occupy a 0.2 acre area but would not create any new floodplain displacement because they are existing roads which do not require improvement. The T-15 Dan River Interconnect/MLV 4 facilities would occupy a 0.8 acre area but site design would be largely at grade and total net floodplain displacement would be zero. Temporary access roads would disturb 6.5 acres within floodplains and may have a temporary impact on flood storage capacity. However, Mountain Valley would restore all temporary impacts after construction and result in no permanent impact to flood storage. Mountain Valley may leave in place some temporary access roads if requested by the landowner or agency. We received comments on the draft EIS expressing concern about impacts of flooding during construction where the Project would occur in a floodplain. Mountain Valley would consider the likelihood of flooding when installing ECDs and would monitor these devices in areas prone to flooding, especially after measurable rain events. Mountain Valley would appropriately adjust erosion control measures as necessary to minimize the impacts from heavy precipitation events. Mountain Valley would prioritize work schedules in order to minimize active construction within flood prone areas. Flood gauges and weather would be monitored for advance notice of flood events. Prior to storm events that could result in flooding, construction equipment would be removed and disturbed areas would be stabilized. Mountain Valley would also obtain all required authorizations and permits from local administrations where the Project occurs in a floodplain (see table 1.4-1 in section 1.4). General impacts and mitigation for flooding is further discussed below in section 4.3.2.7.

TABLE 4.3-4

FEMA 100-year Floodplains Crossed by the Southgate Project

Floodplain Waterbody	Flood Zone a/	Entry MP	Exit MP	Crossing (ft)
Virginia - Pittsylvania County				
H-605 Pipeline		No Flood Zones Crossed.		
H-650 Pipeline				
Little Cherrystone Creek	A	0.3	0.4	556
Cherrystone Creek	AE	1.4	2.2	4,357
Banister River	AE	4.8	5.1	1,260
White Oak Creek	AE	5.1	5.2	771
White Oak Creek	AE	6.6	6.6	174
White Oak Creek	A	8.5	8.6	266
White Oak Creek	A	9.9	9.9	220
Sandy Creek	AE	12.7	12.8	210
Sandy Creek	AE	13.4	13.5 RR	322
Silver Creek	A	15.7	15.7	172
Sandy River	AE	17.6 RR	17.8 RR	250
Trotters Creek	A	23.2 RR	23.2 RR	57
North Carolina – Rockingham County				
Cascade Creek	AE	27.1	27.8	3,761
Dry Creek	AE	27.8	27.8	22
Dry Creek	AE	27.9	28.1	770
Dan River	AE	28.3 RR	28.4 RR	201
Dan River	AE	29.6	29.6	22
Dan River	AE	29.6	30.5	4,741
Dan River	AE	30.5	30.6	315
Rock Creek	AE	30.7	30.7	150
Rock Creek	AE	30.7	30.9	941
Machine Creek	AE	32.1	32.2	37
Machine Creek	AE	32.2	32.2	196
Machine Creek	AE	32.2	32.2	10
Town Creek	AE	32.6	32.7	526
Town Creek	AE	33.0	33.1	470
Town Creek	AE	33.1	33.1	32
Wolf Island Creek	AE	38.6	38.8	886
Lick Fork	AE	41.1	41.2	320
Jones Creek	AE	43.2	43.3	551
Hogans Creek	AE	46.4	46.5	88
Hogans Creek	AE	46.9	47.0	341

TABLE 4.3-4

FEMA 100-year Floodplains Crossed by the Southgate Project

Floodplain Waterbody	Flood Zone a/	Entry MP	Exit MP	Crossing (ft)
Giles Creek	AE	48.6	48.7	353
Haw River	AE	50.8 RR	50.8 RR	264
North Carolina – Alamance County				
Haw River	AE	53.6	53.7	198
Haw River	AE	54.6	54.6	125
Haw River	AE	56.4	56.4	125
Haw River	AE	56.7 RR	56.7 RR	68
Haw River	AE	57.0	57.0	304
Haw River	AE	57.9	57.9	8
Haw River	AE	58.7 RR	58.7 RR	188
Haw River	AE	60.7	60.7	31
Stony Creek Reservoir	AE	63.6	63.6	350
Stony Creek Reservoir	AE	63.6	63.6	4
Deep Creek	AE	63.8	63.9	100
Deep Creek	AE	64.0 RR	64.1 RR	271
Boyds Creek	AE	65.6	65.6	115
Boyds Creek	AE	67.6 RR	67.6 RR	153
Haw River	AE	69.1	69.1	222
Haw River	AE	69.1	69.3	894
Haw River	AE	70.2 RR	70.3	222
Haw River	AE	70.7	70.8	254
Haw River	AE	70.9	70.9	253
Haw River	AE	70.9	71.0	115
Haw River	AE	71.3	71.3	328
Haw River	AE	71.3	71.8	2,536
Haw River	AE	72.5	72.7	1,279
Haw River	AE	72.9 RR	73.1 RR	1.077

Source: FEMA, 2018

a/ Flood Zone A = Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Flood Zone AE = Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods

4.3.2.6 Surface Water Appropriations

Hydrostatic Test Water

Water would be required for the Project to perform hydrostatic testing of the pipeline. Mountain Valley would use a total of 5.9 million gallons of water for hydrostatic test water (see table 4.3.5). A withdrawal location on the Dan River, located at MP 30.1 in North Carolina, would

serve as the primary water source for hydrostatic test water. No surface waters in Virginia would be used for surface water withdrawals. Municipal water sources would be used if conditions in the Dan River are not suitable for withdrawal.

TABLE 4.3-5

Hydrostatic Test Water Sources for the Southgate Project

MP	Required Water (gallons)	Proposed Water Source	Proposed Discharge Watershed
0.0-30.4	3,600,000	Dan River (Primary) Municipal (Secondary)	Roanoke River Basin
30.4-73.2 RR	2,300,000	Dan River (Primary) Municipal (Secondary)	Roanoke River Basin

Mountain Valley would store the test water in tanks prior to pumping it into the pipe. To reduce the total amount of water needed for testing, Mountain Valley would transfer test water from one test section to the next. After hydrostatic testing is complete, Mountain Valley would discharge the water into well vegetated upland locations using NPDES compliant energy dissipating devices.

As the Dan River is known to contain the federally endangered and state-endangered Roanoke logperch, Mountain Valley would obtain written concurrence from the FWS prior to conducting any water withdrawals. See section 4.6.5.3 and 4.7.3.1 for further discussion and recommendations.

The hydrostatic test water would contact only new or cleaned and certified PCB-free pipe. If chemical methods are used to clean pipes, chemical laden water would be collected and disposed of at an approved waste facility. Mountain Valley would adhere with the sampling, monitoring, and effluent limits of the General Virginia Pollutant Discharge Elimination System Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests as applicable to discharges of hydrostatic test water. This includes sampling the water for Total Petroleum Hydrocarbons, Total Organic Carbon, Total Suspended Solis, pH, and Total Residual Chlorine prior to discharge. Prior to construction, Mountain Valley would apply for the applicable permits to discharge hydrostatic test water.

Horizontal Directional Drill Water

The HDD process requires water to be added to a bentonite clay mixture to create drilling fluid. A surface water withdrawal location on the Dan River, located at MP 30.1 in North Carolina, would serve as the primary water source for the Dan River HDD crossing. No surface waters in Virginia would be used for surface water withdrawals. Municipal water sources would be the primary water source for the Stony Creek Reservoir HDD crossing, and would be used as the alternative water source if the Dan River was temporarily not available (see table 4.3-6). Mountain Valley may additionally utilize drilling fluid additives that are safe for use during drinking water well construction (comply with National Sanitation Foundation/American National Standards Institute [NSF/ANSI] standard 60) (NSF International, 2018) and comply with federal and state

requirements. All drilling fluid would be disposed of at an approved facility or recycled in an approved manner in accordance with the *HDD Contingency Plan*. Mountain Valley would separate all water from HDD equipment washing areas from wetlands or waterbodies by drainage barriers to prevent any runoff entry. HDD water withdrawals would be covered under the permits outlined for hydrostatic test water and follow the same procedures.

TABLE 4.3-6

HDD Water Requirements by Crossing for the Southgate Project

HDD Crossing	Required Water Hydrostatic Testing HDD (gallons)	Required Water HDD Operations (gallons)	HDD MP	Water Source
Dan River HDD	60,000	105,000	30.4	Dan River (Primary) Municipal (Secondary)
Stony Creek Reservoir HDD	16,500	105,000	63.8	Municipal (Primary) Dan River (Secondary)

Dust Control

Controlling dust on unpaved roads during construction would require water. Water sprayed on road surfaces would only be sufficient to surface crust and is not expected to create runoff. The lead EI would determine locations and disbursement of dust control spraying based on local conditions. It is anticipated that the Project would require a maximum daily total of 30,000 gallons of water during dry weather. Mountain Valley would obtain water for dust control from the surface water sources describe above or from municipal sources if the Dan River does not have adequate flow. Mountain Valley would follow the same mitigation measures as previously described for hydrostatic test and HDD water use. To minimize aquatic species entrainment on surface water withdrawals, Mountain Valley would screen the intake hose of using mesh sizes of 1 mm, maintain intake velocities below 0.25 feet per second, and withdraw no more than 10 percent of instantaneous flow rate from the channel.

Because Mountain Valley has not yet received concurrence from the FWS to use the Dan River as a water source, and thus, their water sources are not yet finalized, **we recommend that**:

- **Prior to construction, Mountain Valley should file with the Secretary, for review and written approval by the Director of OEP, its final list of water sources to be used for the Project (dust control, hydrostatic testing, and HDD operations), including intake location, waterbody name, withdrawal rate and method, and measures to minimize entrainment of aquatic species. Mountain Valley should also provide written concurrence from the FWS for any water withdrawals from the Dan River.**

4.3.2.7 General Impacts and Mitigation on Surface Water

Construction activities in stream channels and on adjacent banks may affect waterbodies. Clearing and grading of stream banks, in-stream trenching, the installation and removal of temporary crossing structures (e.g., culverts, cofferdams), trench dewatering, and backfilling could

each cause temporary, local modifications of aquatic habitat involving sedimentation, increased turbidity, and decreased dissolved oxygen concentrations; however, in almost all cases, these impacts would be limited to the period of in-stream construction.

In-stream construction would cause a temporary increase in sediments mobilized downstream. The extent of the impact would depend on sediment loads, stream velocity, turbidity, bank composition, and sediment particle size. These factors would determine the density and downstream extent of the turbidity plume. In-stream construction could cause the dislodging and transport of channel bed sediments and the alteration of stream contours. Changes in the stream bottom contours could alter stream dynamics and increase downstream erosion or deposition. Turbidity resulting from the resuspension of sediments due to in-stream construction and erosion of cleared right-of-way areas could reduce light penetration and photosynthetic oxygen production. In-stream disturbance could also introduce chemical and nutrient pollutants from sediments. Resuspension of deposited organic material and inorganic sediments could cause an increase in biological and chemical use of oxygen, potentially resulting in a decrease of dissolved oxygen concentrations in the affected area. Lower dissolved oxygen concentrations could cause temporary displacement of motile organisms, such as fish, and may kill non-motile organisms within the affected waterbody.

The use of HDD crossings reduces impacts at waterbody crossings by avoiding disturbance to the waterbody bed and bank. However, an IR of drilling fluid can occur during accidental escape of fluid through overlying substrate and into the waterbody. Site-specific HDD crossing plans for each crossing outline the measures that would minimize potential impacts of an IR to water quality. The HDD crossing plans, and *HDD Contingency Plan*, also provide procedures to monitor, contain, and clean up any inadvertent drilling fluid release.

The clearing and grading of stream banks could expose soil to erosional forces and would reduce riparian vegetation along the cleared section of the waterbody. The use of heavy equipment for construction could cause compaction of near-surface soils, an effect that could result in increased runoff into surface waters in the immediate vicinity of the proposed construction right-of-way. Increased surface runoff could transport sediment into surface waters, resulting in increased turbidity levels and increased sedimentation rates in the receiving waterbody. Disturbances to stream channels and stream banks could also increase the likelihood of scour after construction.

In order to limit impacts on riparian zones, Mountain Valley would follow measures outlined in Mountain Valley's Plan and Procedures. These measures allow a riparian strip at least 25 feet wide to permanently revegetate with native plant species across the entire construction right-of-way. A corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state; and trees that are located within 15 feet of the pipeline in wetland riparian areas may be cut and removed from the permanent right-of-way. In addition, Mountain Valley would not clear the riparian areas that are between HDD entry and exit points during construction except for a 3-foot-wide path that would be hand cleared to allow for the HDD guide wire, these areas would not be maintained or mowed during operations.

Dewatering of the pipeline trench and conventional bore pits may require pumping of groundwater in areas where there is a high water table. Dewatering may cause minor temporary fluctuations in surface water turbidity. Mountain Valley would minimize or avoid impacts by implementation of the construction practices outlined in its Procedures, the E&SC Plan, and the NPDES permit requirements for North Carolina and Virginia. During construction, discharge of water removed from excavations would be directed to the vegetated land surfaces to control erosion and runoff. If adequate vegetation is absent, water would be filtered through haybale-lined dewatering structures. Because water removed from excavations would be reintroduced in the immediate proximity of excavations, potential dewatering impacts would be localized, temporary, and would not affect surface waters.

Mountain Valley would hydrostatically test the pipeline to verify structural integrity prior to placing the Project into service. Water for hydrostatic testing would be obtained from a single surface water withdrawal location (MP 30.1 Dan River) or from municipal water sources. To minimize or avoid impacts, Mountain Valley would implement, the E&SC Plan and comply with conditions of NPDES permits. To minimize scour, erosion, and sediment transport, hydrostatic test water would be discharged over vegetated land surfaces through energy dissipation devices, filter bags, or hay bale-lined dewatering structures. Additionally, the discharge rate would be regulated using valves and energy dissipation devices. Mountain Valley would adhere to the sampling, monitoring, and effluent limits of the *General Virginia Pollutant Discharge Elimination System Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests* as applicable to discharges of hydrostatic test water.

Blasting may be required within surface water crossings that contain shallow bedrock and can cause a short-term increase in sedimentation. Injury to fish and mussels may also occur from the shockwave created by blasting, however, none of the crossings with sensitive fish or mussel species have the potential to require blasting. To minimize potential blasting impacts on surface waters, Mountain Valley would use blasting as the final option after all other reasonable means of trench excavation are unsuccessful. Blasting at surface waters with intermittent flow, or at crossings of less than 20 feet, would be completed during dry or low flow periods where practicable. Mountain Valley's *General Blasting Plan* details blasting procedures and this plan would minimize any potential sedimentation impacts from the activity.

Flash floods could occur during construction, which could lead to increased erosion and sedimentation in streams. To minimize or prevent impacts resulting from flash flooding during construction, Mountain Valley would remove any equipment or loose material from potentially affected areas prior to any anticipated significant rain event. Additionally, Mountain Valley would implement erosion and sedimentation control measures, such as installing trench breakers and water bars to inhibit water flow along the trench and right-of-way. Mountain Valley would monitor weather conditions during construction and appropriately adjust erosion control measures as necessary to minimize the impacts from heavy precipitation events. In areas with known flood risk, such as floodplains of large rivers, Mountain Valley would prioritize scheduling to minimize the duration of construction within floodplain areas during seasonal high water periods. Upon completion of construction, Mountain Valley would restore the ground surface as closely as practicable to original contours and re-establish vegetation to facilitate restoration of pre-construction overland flow.

4.3.2.8 Surface Water Conclusions

Temporary and localized impacts on surface waters could result from in-stream construction activities and potential erosion and runoff from upland construction. Mountain Valley's Plan and Procedures and E&SC Plan would be implemented to protect surface water resources, including reducing sediment loads, restoring stream habitat, and restoring riparian strips along streams. We conclude that the surface water mitigation measures proposed by Mountain Valley would adequately avoid or minimize potential impacts on surface water resources. Therefore, we do not anticipate long-term or significant impacts on surface water resources because of construction or operation of the Project.

4.3.3 Water Resources Conclusions

The Project is not expected to permanently affect surface or ground water resources. Though temporary impacts would result from the Project, with implementation of BMPs and mitigation proposed by Mountain Valley, as well as our recommendations, we conclude the Project would not significantly affect water resources.

4.4 WETLANDS

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions (COE, 1987). Wetlands serve several functions including, but not limited to flood control, groundwater recharge, maintenance of biodiversity, wildlife habitat, and maintenance of water quality.

Wetlands in the Project area are regulated at the federal and state levels. At the federal level, the COE regulates wetlands under Section 404 of the CWA and Section 10 of the RHA. The EPA shares responsibility to administer and enforce the Section 404 program. The COE delegates wetland activities under Section 401 of the CWA to the appropriate state agencies: the VADEQ in Virginia, and the NCDWR in North Carolina.

At the time of this EIS, Mountain Valley was unable to survey all parcels; therefore, the total acreages given below were determined through a combination of field survey data and a desktop analysis of National Wetlands Inventory (NWI) data, aerial imagery, and nearby conditions of delineated resources. Wetland field survey data is available where access was granted as of August 2019 (approximately 96 percent of the alignment).

4.4.1 Existing Wetland Resources

Mountain Valley conducted surveys to identify and determine the extent of wetlands crossed along the pipeline routes and access roads, or within ATWS, aboveground facility sites, pipe/contractor yards, and staging areas. Based on USGS data, Virginia and North Carolina currently have approximately 1.0 and 5.7 million total acres of existing wetlands, respectively. Mountain Valley delineated wetlands in accordance with the COE 1987 Wetland Delineation Manual (COE, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (COE, 2012). Table 4.4-1

summarizes the wetland types crossed by the Project, and appendix B.6 details each wetland crossing.

Certain wetlands can be considered sensitive or of high or exceptional value because of their ecological quality and high level of functionality. However, no protected wetlands or wetlands of exceptional value have been identified by Mountain Valley in the Project area.

If the Commission authorizes the Project, Mountain Valley would be required to complete all of the remaining field wetland surveys after access is obtained. Mountain Valley would provide the results of these surveys to the permitting agencies, including the FERC, COE, and appropriate state resource agencies (VADEQ and NCDEQ).

Three wetland types as described by Cowardin et al. (1979) would be crossed by the Project including: emergent, scrub-shrub, and forested wetlands.

4.4.1.1 Emergent Wetlands

Palustrine emergent (PEM) wetlands are dominated by erect, rooted, herbaceous, perennial hydrophytic vegetation. Emergent wetlands within the Project area are typically dominated by sedges (*Carex spp*.), jewelweed (*Impatiens capensis*), soft rush (*Juncus effusus*), dark green bulrush (*Scirpus atrovirens*), sensitive fern (*Onoclea sensibilis*), tapertip rush (*Juncus acuminatus*), panicled aster (*Symphyotrichum lanceolatum*), and rice cut grass (*Leersia oryzoides*).

4.4.1.2 Scrub-Shrub Wetlands

Palustrine scrub-shrub (PSS) wetlands are dominated by woody vegetation that is less than 20 feet tall, including shrubs, young trees, and trees or shrubs that are small due to environmental conditions. Scrub-shrub wetlands within the Project area are typically dominated by black willow (*Salix nigra*), red maple (*Acer rubrum*), American sycamore (*Platanus occidentalis*), sweetbay magnolia (*Magnolia virginiana*), black elder (*Sambucus nigra*), smooth alder (*Alnus serrulata*), sedges, sensitive fern, jewelweed, and soft rush.

4.4.1.3 Forested Wetlands

Palustrine forested (PFO) wetlands are dominated by woody vegetation that is equal to or greater than 20 feet tall with a tolerance to a seasonally high water table. Forested wetlands within the Project area are dominated by green ash (*Fraxinus pennsylvanica*), red maple, sweetgum (*Liquidambar styraciflua*), American sycamore, American elm (*Ulmus americana*), willow oak (*Quercus phellos*), swamp dewberry (*Rubus hispidus*), and poison ivy (*Toxicondendron radicans*).

TABLE 4.4-1

Type of Wetland Impacts Associated with the Southgate Project

Type/State a/	Construction (acres) b/	Operation (acres) b/
PEM Wetlands		
Virginia	6.3	0.7
North Carolina	6.5	0.5
Total PEM Wetland Impacts	*12.8*	*1.2*
PSS Wetlands		
Virginia	0.7	0.1
North Carolina	0.6	0.1
Total PSS Wetland Impacts	*1.3*	*0.2*
PFO Wetlands		
Virginia	5.1	1.9
North Carolina	6.5	2.3
Total PFO Wetland Impacts	*11.6*	*4.2*
Total Wetland Impacts	*25.7*	*5.6*

Note: Totals may not sum correctly due to rounding.

a/ PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested (Cowardin et al., 1979).

b/ Construction impacts include those within the operational footprint.

4.4.2 General Impacts and Mitigation

Table 4.4-2 summarizes the impacts of the proposed Project on wetlands. The majority of impacts on wetlands resulting from construction and operation of the Project would be temporary. In accordance with the Mountain Valley's Procedures, Mountain Valley would maintain an herbaceous corridor up to 10 feet wide centered on the pipeline to facilitate periodic corrosion/leak surveys and would selectively cut trees within 15 feet of the pipeline with roots that could compromise the integrity of pipeline coating. This would result in the conversion of 0.2 acre of PSS wetland to PEM wetland, and 4.2 acres of PFO wetlands to PSS and PEM wetlands within the Project's operational right-of-way.

The use of temporary access roads would impact 0.1 acre of wetlands during construction in order to provide access to the construction right-of-way. Wetlands along temporary access roads would be allowed to revert to pre-construction conditions following construction. Two permanent access roads that would be used by Mountain Valley during operation of the Project cross wetlands. Access road PA-RO-082 is an existing gravel road that is 161 feet in length. During operation of the Project, Mountain Valley would use this road to access the Dan River Interconnect and MLV-4. Access road PA-RO-000 is also an existing gravel road that is 4,956 feet in length and would be used to access the LN 3600 Interconnect. No temporary or permanent impacts on wetlands from PA-RO-082 or PA-RO-000 are anticipated as no improvements would occur within the wetlands crossed by the access roads. No impacts on wetlands would occur during construction or operation at the proposed contractor yards. Mountain Valley would consult with appropriate federal and state agencies for compensatory mitigation of permanent wetland impacts.

The primary impact of pipeline construction and right-of-way maintenance activities on wetlands would be the temporary, short-term, and long-term alteration of wetland vegetation and permanent conversion of PFO wetlands to PSS or PEM wetlands and of PSS wetlands to PEM wetlands. Effects on wetlands would be greatest during and immediately following construction. Following construction, wetland areas will be seeded with a wetland mix. To control the spread of noxious weed and invasive plant species within temporarily disturbed wetland areas, Mountain Valley will implement their *Exotic and Invasive Plant Species Control Plan*[15], as well as monitor and control occurrences. Additional detail on noxious weeds and invasive plant species can be found in section 4.5.

During construction, failure to segregate topsoil could result in the mixing of topsoil with the subsoil. This could prevent establishment of appropriate species from existing seed bank and alter nutrient availability and soil chemistry, thereby inhibiting recruitment of native wetland vegetation after restoration.

TABLE 4.4-2

Southgate Project Wetland Impacts by Facility Type

State/Facility	Type a/	Crossing Length (feet) b/	Total Wetland Area Affected During Construction (acres) c/	Total Wetland Area Affected During Operation (acres)
Virginia				
Pipeline Facilities d/	PEM	3,116	6.2	0.7
	PSS	362	0.6	0.1
	PFO	3,152	5.0	1.9
Pipeline Facilities Subtotal		*6,630*	*11.9*	*2.7*
Aboveground Facilities	PEM	0	0.0	0.0
	PSS	0	0.0	0.0
	PFO	0	0.0	0.0
Aboveground Facilities Subtotal		*0*	*0.0*	*0.0*
Access Roads	PEM	17	0.0	0.0
	PSS	110	<0.1	0.0
	PFO	106	0.1	0.0
Access Roads Subtotal		*233*	*0.1*	*0.0*
Contractor Yards	PEM	0	0.0	0.0
	PSS	0	0.0	0.0
	PFO	0	0.0	0.0
Contractor Yards Subtotal		*0*	0.0	0.0
Virginia Subtotal		*6,863*	*12.0*	*2.7*

[15] Mountain Valley's *Exotic and Invasive Species Control Plan* was included in its October 23, 2019 supplemental filing. The *Exotic and Invasive Species Control Plan* can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191023-5022 in the "Numbers: Accession Number" field.

TABLE 4.4-2

Southgate Project Wetland Impacts by Facility Type

State/Facility	Type a/	Crossing Length (feet) b/	Total Wetland Area Affected During Construction (acres) c/	Total Wetland Area Affected During Operation (acres)
North Carolina				
Pipeline Facilities	PEM	2,485	5.9	0.5
	PSS	245	0.6	0.1
	PFO	3,420	6.5	2.3
Pipeline Facilities Subtotal		*6,150*	*13.0*	*2.9*
Aboveground Facilities	PEM	0	0.5	0.0
	PSS	0	0.0	0.0
	PFO	0	0.0	0.0
Aboveground Facilities Subtotal		*0*	*0.5*	*0.0*
Access Roads	PEM	14	<0.1	0.0
	PSS	0	0.0	0.0
	PFO	82	<0.1	0.0
Access Roads Subtotal		*96*	*0.1*	*0.0*
Contractor Yards	PEM	0	0.0	0.0
	PSS	0	0.0	0.0
	PFO	0	0.0	0.0
Contractor Yards Subtotal		*0*	0.0	0.0
North Carolina Subtotal		*6,246*	*13.5*	*2.9*
Southgate Total		**13,109**	**25.5**	**5.6**

Notes: N/A – Not Applicable; Totals may not sum correctly due to rounding.

a/ PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested (Cowardin et al., 1979).

b/ N/A = wetlands not crossed by the centerline but within the construction workspace.

c/ Construction impacts include those within the operational footprint, as well as those within temporary workspaces.

d/ Pipeline facilities include the permanent right-of-way, temporary workspace, and additional temporary workspace.

Other impacts associated with construction of the Project could include local, temporary changes in wetland hydrology and water quality. Increases in turbidity would likely occur during trenching within ponded wetlands, and could potentially be caused by erosion and sediment-laden stormwater runoff from nearby disturbed areas. Temporary removal of wetland vegetation during construction could alter the capacity of wetlands to function as habitat and as erosion control buffers. Heavy equipment operating during construction could result in soil compaction or rutting that would alter water infiltration, hydrology, and potentially inhibiting germination of seeds and the ability of plants to develop root systems. Additionally, discharges from stormwater, dewatering structures, or hydrostatic testing could transport sediments and pollutants into wetlands, affecting water quality.

The effect of the Project on PEM wetlands would be short-term because the emergent vegetation would regenerate quickly, typically within 1 to 3 years. Following revegetation, permanent impacts on PEM wetlands within the right-of-way would be minimal because these areas consist of and would be maintained as open and herbaceous communities. The duration of the impact on PSS and PFO wetlands would be longer term or permanent. Woody vegetation may take several decades for maturation. Vegetation maintenance over the pipeline, would permanently convert it to PEM wetlands. As a result, the Project would convert 4.2 acres of PFO wetlands and 0.1 acre of PSS wetlands to non-forested wetlands during operation. The conversion from one vegetation cover type to another could result in changes in wetland functions and values. In general, affected wetlands would continue to provide important ecological functions such as sediment/toxicant retention, nutrient removal and transformation, flood attenuation, groundwater recharge/discharge, and wildlife habitat. The PFO and PSS wetlands within temporary construction work areas would be allowed to revert to pre-construction conditions following construction; however, due to the time required for these wetlands to regenerate, impacts would be considered long-term to permanent.

Mountain Valley is consulting with the COE and would develop a Compensatory Mitigation Plan to offset permanent wetland impacts, including those that would convert PFO to PEM or PSS wetlands as discussed in section 4.4.4.

Mountain Valley proposes to use the HDD method to install the mainline beneath two wetlands (W-B18-36 and W-B18-39) near MP 30.3 in conjunction with the Dan River crossing. Use of the HDD method would reduce mechanical clearing, and eliminate the need for trenching and operating heavy construction equipment within these wetlands. Mountain Valley would conduct limited hand clearing at this location to create a 3-foot-wide footpath for personnel to lay an HDD guide wire between the entry and exit points.

Federal and state agencies require "sequencing" when proposing a project that may affect wetlands. Sequencing involves three steps. First, wetlands must be avoided to the maximum extent practicable. Second, if avoidance is not an option, impacts must be minimized to the maximum extent practicable. Third, if wetland impacts are unavoidable, wetland replacement or compensatory mitigation is required via the CWA to replace lost wetland functions and values.

Mountain Valley routed its respective pipelines and sited its associated aboveground facilities to avoid wetlands to the maximum extent practicable. As discussed in sections 3.4 and 3.5, we reviewed several potential route alternatives and variations to Mountain Valley's proposal, in response to input from FERC staff, affected landowners, agencies, and other stakeholders to avoid or minimize impacts on environmental resources including, in many cases, wetlands. Based on the proposed and recommended pipeline routes and configuration of aboveground facilities, we have determined that wetland impacts have been avoided to the maximum extent practicable.

Where wetland impacts could not be avoided, Mountain Valley would implement specialized wetland construction procedures within wetlands as described in Mountain Valley's Procedures and section 2.4.2.2. Additional wetland protection measures include, but are not limited to:

- using one traffic lane for construction equipment in non-saturated wetlands;

- using low ground pressure equipment or equipment/timber mats to prevent rutting or soil mixing;
- storing all hazardous materials, including fuels, chemicals, and lubricating fluids, a minimum of 100 feet from any wetland boundary;
- prohibiting parking or refueling of vehicles within 100 feet of a wetland unless the on-site EI determines that there is no practicable alternative and secondary containment structures are used;
- restoring pre-construction contours to maintain the original wetland hydrology; and
- prohibiting the use of herbicides or pesticides within 100 feet of wetlands or waterbodies except as specified by the appropriate land management or state agency.

There are four locations where Mountain Valley is requesting a greater than 75-foot-wide construction corridor in wetlands due to utility lines, road crossing, and extensive HDD operations. The locations where these modifications would be located for the Project are identified in appendix B.3 and B.8. We have reviewed these locations and find that the expanded construction corridor at these four locations is adequately justified.

Following construction, Mountain Valley would ensure that all disturbed wetland areas are successfully revegetated. Along with any additional agency permit requirements, we would not consider revegetation successful until:

- the affected wetland satisfies the current federal definition for a wetland;
- vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
- the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and
- invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

In accordance with Mountain Valley's Procedures, Mountain Valley would conduct routine wetland monitoring for a minimum of 3 years to assess the success of wetland revegetation. As applicable, specific monitoring requirements required by other permitting agencies would also be implemented. Three years after construction (or sooner if determined to be successful), Mountain Valley would file a report with the Secretary identifying the status of wetland revegetation efforts and documenting success as defined above. Where revegetation is not successful at the end of 3 years, Mountain Valley would develop and implement remedial revegetation plans, in consultation with a professional wetland ecologist, to actively revegetate any unrestored wetland and continue revegetation efforts and file annual reports until wetland revegetation is deemed successful by the appropriate state and federal agencies.

4.4.3 Extra Workspaces within 50 Feet of Wetlands

Mountain Valley's Procedures specify that all extra work areas should be set back at least 50 feet from wetlands. Mountain Valley has requested modifications to their Procedures at ATWS at 15 locations within 50 feet of a wetland boundary. Appendix B.3 provides the locations where Mountain Valley proposes less than a 50-foot setback from a wetland and the site-specific rationale for the requested modification from Mountain Valley's Procedures. We have reviewed these ATWS locations and find them acceptable.

4.4.4 Compensatory Mitigation

In accordance with Mountain Valley's Procedures and the CWA Section 404(b)(1) Guidelines, Mountain Valley would avoid wetlands along the proposed pipeline whenever possible. Where impacts on wetlands cannot be avoided, the COE requires mitigation to replace the loss of wetland functions and values.

As discussed in section 4.4.2, construction and operation of the Project would permanently convert 4.2 acres of PFO wetlands and 0.1 acre of PSS wetlands to other wetland types. As part of the Section 404 CWA permitting process, Mountain Valley may be required to develop a Compensatory Mitigation Plan to mitigate unavoidable wetland impacts. The *Compensatory Mitigation Plan* would be subject to review and approval by the District Engineer for the COE, Norfolk District in Virginia and Wilmington District in North Carolina. Mitigation amounts may change as field surveys are completed; Mountain Valley would submit any changes in mitigation to the COE for approval.

Mountain Valley submitted a *Compensatory Mitigation Plan* to the COE in November 2018. The COE is still reviewing Mountain Valley's Plan and will continue to work with Mountain Valley to determine the appropriate type and amount of mitigation needed for Mountain Valley's wetland impacts in Virginia and North Carolina. For unavoidable wetland impacts in Virginia and North Carolina, Mountain Valley plans to purchase wetland and stream credits from approved mitigation banks in the respective states. The in-lieu fee program may also be considered in Virginia. Mountain Valley would provide proof of compensatory mitigation credit purchase to the COE prior to construction.

According to Mountain Valley's filing on October 23, 2019, there are 133 wetlands (5.6 acres) with permanent impacts requiring mitigation, 56 in Virginia (2.7 acres) and 77 in North Carolina (2.9 acres). The operational easement would permanently affect these wetlands, and these are addressed in Mountain Valley's wetland permit applications to the COE districts. Appendix B.6 lists these wetlands.

4.4.5 Wetlands Conclusions

Permanent impacts on wetlands would include the conversion of forested wetlands to scrub-shrub or emergent wetlands within the pipeline permanent easement. In addition, long-term to permanent impacts on woody vegetation would occur as it may take several decades for the vegetation to reach maturation. While minor adverse and long-term effects on wetlands would occur, with adherence to Mountain Valley's Procedures and implementation of BMPs, we

conclude that construction and operation of the Project would result in minor impacts on wetlands that would be appropriately mitigated and reduced to less than significant levels. In addition, the COE could require Mountain Valley to offset unavoidable impacts on wetlands through the creation, restoration, enhancement, or preservation of at least an equal amount of wetlands through implementation of an agency-approved *Compensatory Mitigation Plan*.

4.5 VEGETATION

4.5.1 Existing Vegetation Conditions

Ecoregions are areas that have similar environmental resources and characteristics, including geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology (EPA, 2013). These characteristics provide a useful means for classifying and describing vegetation resources within the Project area. The Project is located wholly within the Piedmont Region, sitting between the Appalachian Mountains and the Atlantic coastal plain and stretching from New Jersey in the north to central Alabama in the south. The Project area has been heavily used as cropland; however, many of these areas have regrown into successional forests.

Vegetation community types in the Project area were classified based on a review of aerial photography, existing land use classifications, and field surveys. Managed or developed land classes include agricultural land, commercial, industrial, and residential areas and represent about 21 percent of the proposed land that would be required for the Project. Of the approximately 94 percent of vegetated areas within the Project footprint[16], the majority (about44 percent) consists of forested upland, followed by herbaceous/scrub-shrub upland (about 39 percent); less than 2 percent of the pipeline Project area is within wetland vegetation communities. Wetlands crossed by the Project are discussed in section 4.4.

The Project would cross through three major natural upland vegetation cover types: agricultural land, forested land, herbaceous/scrub-shrub as shown in table 4.5-1. Common species observed within the construction and operational workspace are included in the table below.

[16] Vegetated areas noted here include agriculture and silviculture lands, which are also included in the managed or developed land classes percentage provided above; agriculture and silviculture lands account for approximately 15 percent of the total Project acreages.

TABLE 4.5-1

Upland Vegetation Cover Types Associated with the Southgate Project

Class Name	Description	Construction (acres)	Operation (acres)
Agricultural	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops. Also includes active cropland, orchards, vineyards, or hay fields.	199.3	66.1
Upland Forest	Non-wetland forested and woodland communities supporting a dominance of tree cover. Representative species include: red oak (*Quercus rubrum),* white oak (*Quercus alba)*, willow oak*,* American beech (*Fagus grandifolia)*, red maple, and evergreen trees such as pitch pine (*Pinus rigida)*, Virginia pine (*Pinus virginiana),* and Loblolly pine (*Pinus taeda)*.	618.3	237.4
Upland Herbaceous/ Scrub-Shrub	Non-wetland native grasslands or areas of shrubs less than 15 feet tall. Herbaceous vegetation is usually greater than 80 percent of total vegetation and can be used for grazing, but not intensely managed. Dominant herbaceous species included: orchard grass (*Dactylis glomerata)*, red fescue (*Festuca rubra)*, common velvet grass (*Holcus lanatus)*, Japanese stilt-grass (*Microstegium vimineum)*, Kentucky blue grass (*Poa pratensis)*, meadow false rye grass (*Schedonorus pratensis)*, white clover (*Trifolium repens)*, wingstem (*Verbesina alternifolia)*, and giant ironweed (*Veronia gigantea)*. Dominant scrub-shrub species included Allegheny blackberry (*Rubus allegheniensis),* dogwoods (*Cornus spp.)*, willows (*Salix spp.)*, spicebush (*Lindera benzoin)*, blueberry (*Vaccinium spp.)*, and black elder (*Sambucus nigra)*.	549.5	131.5

4.5.2 Vegetation Communities of Special Concern or Value

Mountain Valley consulted with federal and state resource agencies to identify sensitive or protected vegetation types, natural areas, and unique plant communities in the Project area. The FWS identified two federally listed plant species potentially occurring in the Project area in North Carolina: small whorled pogonia (*Isotria medeoloides)* and smooth coneflower (*Echinacea laevigata).* The small whorled pogonia is considered rare, and is found in leaf litter along small intermittent streams in hardwood and conifer-hardwood forests.. The smooth coneflower is also rare, and is found on roadsides and other open areas with plenty of sunlight. Its current range is limited to within the states of Virginia, North Carolina, South Carolina, and Georgia. These species are discussed further in section 4.7.

The Virginia Department of Conservation and Recreation, Division of Natural Heritage (VADCR-DNH) identified three species of rare plants that have historically occurred near the Project area: American blueheart (*Buchnera americana)*, Downy phlox (*Phlox pilosa)*, and Piedmont Barbara's-button (*Marshallia obovata)*. The North Carolina Natural Heritage Program (NCNHP) identified one state-listed rare plant species, cliff stonecrop (*Sedum glaucophyllum)*, that is known to occur in Rockingham County. In Virginia, species classified as rare do not have

any legal status and are not afforded state protections. Similarly, in North Carolina, the NCWRC requires monitoring of species of special concern but there is no legal protection from take for these species. We discuss potential Project impacts on these species in section 4.7.2.

The NCNHP identified the Dry-Mesic Oak-Hickory Forest and Mesic Mixed Hardwood Forest communities near the Project area, which may contain sensitive and/or protected species. However, these communities were found either outside the Project area or already disturbed. Impacts on these forest communities would also be minimized due to collocation with an existing right-of-way. Mountain Valley would minimize impacts on forest habitat through adherence to its Plan and Procedures. We discuss potential Project impacts on sensitive and/or protected species in section 4.7.

4.5.3 Noxious Weeds and Invasive Plant Species

Invasive species are those that display rapid growth and spread, becoming established over large areas (USDA, 2017). Most commonly, they are exotic species that have been introduced from another part of the United States, another region, or another continent, although some native species that exhibit rapid growth and spread are also considered invasive. Invasive plant species can change or degrade natural vegetation communities, which can reduce the quality of habitat for wildlife and native plant species. Similar to invasive species, noxious weeds are frequently introduced but are occasionally native. Noxious weeds are defined as those that are injurious to commercial crops, livestock, or natural habitats and typically grow aggressively in the absence of natural controls (USDA, 2017). Clearing and excavation associated with construction of the Project would expose the topsoil to exotic or invasive species seeds and increase the potential for their introduction or spread along the right-of-way.

Mountain Valley used the VADCR-DNH Virginia Invasive Plant Species List and the North Carolina Invasive Plant Council List (Virginia Invasive Species Council, 2005; North Carolina Invasive Plant Council, 2016) to identify possible invasive plant species that could occur in the Project area. Mountain Valley documented noxious weeds on accessible tracts during field surveys conducted in 2018 and 2019. To date, Mountain Valley has completed surveys along approximately 96 percent of the Project workspace. Mountain Valley documented exotic or invasive species in most of their surveys conducted in Virginia and North Carolina. The most common exotic or invasive species documented in Virginia included Japanese honeysuckle, Chinese lespedeza, Japanese stilt-grass, Chinese privet, tree of heaven, multiflora rose, spotted knapweed, and Johnson grass. The most common exotic or invasive species documented in North Carolina included Japanese honeysuckle, Japanese stilt-grass, multiflora rose, Chinese privet, and tree of heaven.

4.5.4 Impacts and Mitigation

Table 4.5-2 lists the amount of vegetation cover types that would be affected by construction and operation of the proposed Project. Construction of the Project, including the construction right-of-way, ATWS, aboveground facilities, contractor yards, and access roads would affect 1,392.6 acres of vegetated lands. This would include agricultural land (14 percent), upland herbaceous/scrub-shrub (40 percent), PEM and PSS wetlands (1 percent), upland forested land (44 percent), and forested wetland (less than 1 percent). Following construction, vegetation

in temporary construction areas would be allowed to revert to pre-construction vegetation conditions. Of the 1,392.6 acres of vegetation affected during construction of the Project, 440.6 acres (32 percent) would be affected by the operation of the Project, including routine mowing in the maintained pipeline rights-of-way, conversion of vegetation within the aboveground facility sites, and permanent access roads. Vegetation cover types that would be affected by operation of the Project include agricultural land (15 percent), upland herbaceous/scrub-shrub (30 percent), PEM and PSS wetlands (less than 1 percent), upland forested land (54 percent), and forested wetland (1 percent). We discuss impacts on wetlands further in section 4.4.

Tree clearing within temporary construction work areas is considered a long-term, permanent impact because it may take several decades for these areas to resemble the forest vegetation that was present before construction. See section 4.8 for additional information on land use impacts.

We received comments regarding the effects of tree removal on air quality, impacts on large and old (100-year-old) trees, and the potential for mitigation to compensate for the removal of trees. Construction could result in the removal of large and older individual trees that have intrinsic aesthetic value and may currently provide a visual barrier for residential areas. Mountain Valley would follow measures outlined in its Plan, which requires that they avoid removal of mature trees and landscaping within residential areas unless necessary for safe operation of construction equipment, or as specified in landowner agreements. An easement agreement between a company and a landowner would typically negotiate and specify compensation for losses resulting from construction, including losses of decorative and ornamental trees. In general, removal of trees would result in the loss of carbon sequestration capacity since forest habitat would be permanently removed and converted to herbaceous right-of-way; however, in temporary workspaces, over time, arboreal vegetation will regenerate and provide carbon sequestration. Since forested areas are common and well represented throughout the region and in the immediate vicinity of the Project, we anticipate a very minor loss of carbon sequestration capacity, and impacts on air quality, if any, should be indiscernible. Further discussion of impacts on air quality are discussed in section 4.11.

We received a comment from the Roanoke River Basin Association (RRBA), which suggested mitigation for tree removal at a 5:1 ratio to offset the GHG effects of pipe leakage. The RRBA estimated that five new trees should be planted for every tree removed for construction of the pipeline right-of-way. Their estimate is based on their findings of 1% leakage rates of methane gas from other pipelines. RRBA states that methane is 25 times stronger than carbon dioxide in its effect as a greenhouse gas, and while it would be better to eliminate pipe leakage, the leakage should be offset with tree mitigation until the pipe leakage can be eliminated. We note that Virginia has 15.72 million acres of forestland (Virginia Department of Forestry [VADOF]) and North Carolina has 18.8 million acres of forests (North Carolina Forestry Association [NCFA]). Within this context, we conclude that impacts on forests would be long-term but would not be significant.

TABLE 4.5-2

Vegetation Communities Affected by Construction and Operation of the Southgate Project f/ g/

Facility County, State	Agricultural Land a/		Upland Forest b/		Upland Herbaceous / Scrub-shrub c/		Herbaceous / Scrub-Shrub Wetland d/		Forested Wetland d/		Total Vegetation Acreage e/	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Virginia												
H-605 Pipeline Right-of-Way h/	1.1	0.6	3.6	1.7	0.7	0.4	0.0	0.0	0.0	0.0	5.4	2.6
H-650 Pipeline Right-of-Way h/	51.3	25.8	139.9	69.8	97.8	49.4	6.9	0.8	4.7	1.9	300.6	147.7
Additional Temporary Workspace i/	15.4	0.0	47.5	0.0	31.3	0.0	0.0	0.0	0.2	0.0	94.4	0.0
Cathodic Protection Groundbeds	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	0.0	0.0	1.1	1.1
Permanent Aboveground Facilities												
Lambert Compressor Station & Interconnect / MLV 1	13.0	4.8	4.9	3.1	1.3	0.7	0.0	0.0	0.0	0.0	19.2	8.6
Contractor Yards	0.0	0.0	3.0	0.0	84.8	0.0	0.0	0.0	0.0	0.0	87.8	0.0
Temporary and Permanent Access Roads h/	4.3	0.7	4.9	0.3	21.2	0.7	0.1	0.0	0.1	0.0	30.6	1.7
Virginia Subtotal e/	**85.1**	**31.9**	**203.8**	**74.9**	**238.2**	**52.3**	**7.0**	**0.8**	**5.0**	**1.9**	**539.1**	**161.8**
North Carolina												
H-650 Pipeline Right-of-Way h/	67.3	34.1	310.8	162.2	150.4	73.5	5.7	0.6	5.6	2.3	539.8	272.7
Additional Temporary Workspace i/	41.0	0.0	95.7	0.0	56.2	0.0	0.8	0.0	0.9	0.0	194.6	0.0

TABLE 4.5-2

Vegetation Communities Affected by Construction and Operation of the Southgate Project f/ g/

Facility County, State	Agricultural Land a/		Upland Forest b/		Upland Herbaceous / Scrub-shrub c/		Herbaceous / Scrub-Shrub Wetland d/		Forested Wetland d/		Total Vegetation Acreage e/	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Cathodic Protection Groundbeds	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.6	0.6
Permanent Aboveground Facilities												
LN 3600 Interconnect	0.0	0.0	0.3	0.2	4.3	0.7	0.0	0.0	0.0	0.0	4.6	0.9
T-15 Dan River Interconnect / MLV 4	0.0	0.0	0.0	0.0	4.6	0.8	0.5	0.0	0.0	0.0	5.2	0.8
T-21 Haw River Interconnect / MLV 8	0.0	0.0	0.0	0.0	1.3	0.6	0.0	0.0	0.0	0.0	1.3	0.6
Contractor Yards	0.0	0.0	0.2	0.0	58.9	0.0	0.0	0.0	0.0	0.0	59.1	0.0
Temporary and Permanent Access Roads h/	5.8	0.0	7.6	0.1	34.8	3.0	0.0	0.0	0.0	0.0	48.2	3.1
North Carolina Subtotal e/	**114.1**	**34.1**	**414.6**	**162.5**	**311.1**	**79.2**	**7.0**	**0.6**	**6.5**	**2.3**	**853.3**	**278.7**
Vegetation Acres Total e/	**199.2**	**66.0**	**618.4**	**237.4**	**549.3**	**131.5**	**14.0**	**1.4**	**11.5**	**4.2**	**1,392.4**	**440.5**

Note: Pig launchers and receivers will be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect); therefore, acreage calculations for the pig launchers and receivers are included with those facilities. Mainline valves (MLVs) 1, 4, and 8 will be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect); therefore, acreage calculations for MLVs 1, 4, and 8 are included with those facilities.

a/ Cultivated land (e.g., tobacco, soybeans, hay, corn).

b/ Upland forest and wooded lands, including those being managed for forest products (i.e., silviculture).

c/ Utility rights-of-way, grasslands, open fields, vacant land, herbaceous and scrub uplands, non-forested lands, golf courses, and municipal land.

d/ Palustrine emergent, palustrine scrub-shrub and palustrine forested wetlands as identified from field delineations where access is available and NWI where survey access not available (see section 4.4.2)

TABLE 4.5-2

Vegetation Communities Affected by Construction and Operation of the Southgate Project f/ g/

Facility County, State	Agricultural Land a/		Upland Forest b/		Upland Herbaceous / Scrub-shrub c/		Herbaceous / Scrub-Shrub Wetland d/		Forested Wetland d/		Total Vegetation Acreage e/	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper

e/ Sums of addends may not equal totals due to rounding.

f/ Construction acres includes the area affected by construction (i.e., temporary and additional temporary workspace, contractor yards, and access roads) and the area affected by operation of the Project (i.e., facility operation footprint and 50-foot pipeline permanent right-of-way). The 50-foot-wide permanent right-of-way between horizontal directional drill entry and exit points are not included in this acreage. Acreage includes a three-foot path between the HDD entry and exit workspace areas to allow for placement of the HDD guide wire.

g/ Includes only the operation footprint of the Project facilities, the 50-foot-wide permanent pipeline right-of-way in uplands, except in wetland areas where the operation width has been reduced to 10 feet in emergent wetlands, scrub-shrub wetlands, and within 25 feet of waterbodies; and 30 feet in forested wetlands. The 50-foot-wide permanent right-of-way between horizontal directional drill entry and exit points and within railroad rights-of-way are not included in this acreage.

h/ Includes the 50-foot-wide permanent right-of-way and temporary workspace areas.

i/ Includes ATWS areas for both the H-605 and H-650 pipelines. ATWS areas to be used for construction of aboveground facilities are included in the acreage calculations for the applicable aboveground facilities.

4.5.4.1 Pipeline Facilities

The extent of impacts on vegetation from the pipeline construction would vary depending on the type of vegetation affected and the area and frequency of vegetation maintenance conducted during operation. The primary effect of pipeline construction would be cutting, clearing, and/or removing 1,136.5 acres of existing vegetation, of which 597.5 acres would be forested uplands. The remaining vegetation would include 176.1 acres of agricultural lands, 338.1 acres of upland herbaceous/scrub-shrub and 24.9 acres of wetlands (including 11.5 acres of forested wetlands and 13.4 acres of non-forested wetlands). Secondary impacts associated with disturbances to vegetation could include increased soil compaction and erosion, increased soil temperature and dryness, increased potential for the introduction and establishment of non-native and invasive species, and physical damage to nearby trees. See section 4.4 for a discussion of mitigation measures for impacts on wetlands.

Clearing activities would include the removal of vegetation within the proposed construction workspace by mechanical or hand cutting methods. During clearing activities, Mountain Valley would cut down brush and trees into the construction area to minimize damage to trees and structures adjacent to the workspace, and would take care to avoid damaging adjacent tree limbs and feeder roots. Mountain Valley would conduct selective side-trimming on trees adjacent to the construction area where necessary for safety. Stumps would be cut as low to the ground as possible. Stumps would be removed along the trench line, and selectively in other construction areas to allow for the safe installation of the pipeline.

As described in section 2.4.1, Mountain Valley states that merchantable timber would be cut to useable lengths and stacked on the edge of the right-of-way to a maximum height of 4 feet with openings every 200 feet, which Mountain Valley believes would allow the safe passage of wildlife. Typically, cut timber would be disposed in accordance with landowner wishes; unless Mountain Valley purchases the timber as part of its compensation agreements. Mountain Valley further states that brush cleared from the construction corridor would be open burned, windrowed, chipped/mulched on the right-of-way, or hauled off for disposal at an approved location. Mountain Valley would determine methods and locations for the collection, containment, and disposal of brush and timber during construction in coordination with the landowner. Open burning would not be conducted without landowner approval. Disposal of brush and timber for beneficial reuse would not result in adverse environmental impact and would be subject to compliance with landowner approval, permit requirements, and local regulations.

Mountain Valley's proposed timber and brush disposal methods do not comply with the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan*, section III.E.; specifically, in regards to the lack of details describing the timeframe for the windrowing of timber along on the right-of-way . Windrowed timber along the right-of-way is considered construction debris and would serve as visual impact and a barrier to smaller wildlife. Furthermore, the FERC requires that beneficial reuse of excess construction debris must not result in adverse environmental impact. Therefore, **we recommend that:**

- **During construction and prior to the Project in-service approval, Mountain Valley should remove and dispose of timber and debris from the right-of-way. Mountain Valley must ensure that any beneficial reuse of timber that is not removed and remains on or adjacent to the right-of-way, as agreed to by the landowner, is located at access points where the landowner can reasonably retrieve timber without any inadvertent impacts on the restored right-of-way, in accordance with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan*, section III.E.**

Topsoil would be segregated during construction within cultivated or rotated agricultural lands, and at the landowner's request in other areas. Impacts on agricultural lands would be temporary to short-term because these areas are disturbed annually to produce crops and would typically return to their previous condition shortly following construction, cleanup, and restoration. Following pipeline installation, topsoil would be returned in order to mitigate impacts on subsequent crop production.

Construction in herbaceous and scrub-shrub uplands would remove the vegetative ground cover over the entire width of the construction right-of-way. Lands currently dominated by herbaceous growth would revegetate quickly, often within one growing season after seeding and otherwise typically within 3 years. Areas of scrub-shrub vegetation would likely require 3 to 5 years to regain its woody composition.

The majority of vegetation affected by construction of the Project would be upland forested land, which would result in long-term impacts. Construction in forested uplands would remove the tree canopy over the entire width of the construction right-of-way, which would change the structure and environment of the underlying and adjacent areas. Forested uplands within the maintained right-of-way, including areas of silviculture and tree farms, would be permanently converted to an herbaceous cover type. Lands adjacent to the right-of-way would remain forested; however, they could experience reduced habitat value compared to pre-construction conditions. The creation of edge habitat could increase the risk of invasive species and other impacts on wildlife species. The regrowth of shrubs and trees within the temporary workspaces would reduce the edge effect and provide connectivity between adjacent forested tracts to some extent (Tewksbury et al., 2002).

Soils that were previously shaded by the tree canopy would receive increased amounts of light, which could lead to drier soils and higher soil temperatures until vegetation returns. Trees on the edge of the right-of-way might be subject to mechanical damage and roots could be affected by soil disturbance and compaction, all of which could result in the decreased health and viability of some trees and root systems. Some edge trees that were previously within dense forested stands

may also lack stability following removal of adjacent supporting trees, which could result in increased susceptibility to wind damage.

Following construction, Mountain Valley would seed the construction workspace and allow natural succession to revegetate workspaces disturbed by construction in accordance with its Plan and Procedures. Mountain Valley would use and apply a seed mix that incorporates recommendations from the local soil conservation authority, the landowner, or land management agency, including:

- using a native seed mixture with specific varieties based on specific sites and area of adaptation;
- applying seed at suggested rates;
- applying seed within the recommended seeding dates; and
- providing appropriate temporary erosion control measures when seeding cannot be implemented within the recommended seeding dates.

To control the spread of noxious weed species within the Project area, Mountain Valley developed an *Exotic and Invasive Plant Species Control Plan*[17] in coordination with VADCR[18] and NCNHP[19], which includes implementation of the following measures:

- thoroughly clean all construction equipment prior to mobilization to the Project construction area and when moving between construction spreads that may have different concentrations of exotic or invasive species presence;
- store segregated topsoil from portions of the right-of-way known to contain exotic or invasive species separate from less contaminated topsoils;
- use weed-free mulch (i.e., straw, hay, or other erosion control materials) during construction, sediment erosion control, and restoration efforts;
- monitor the right-of-way during and after construction for exotic or invasive species infestations or spread; and
- promptly reseed all disturbed areas after final grading is completed using native species within seed mixes in consideration of recommendations from local soil conservation authorities.

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[17] Mountain Valley's *Exotic and Invasive Species Control Plan* was included as was included in the October 23, 2019 supplemental filing. The *Exotic and Invasive Species Control Plan* can be viewed on the FERC website at http://www.ferc.gov/. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191023-5022in the "Numbers: Accession Number" field.

[18] Virginia DCR Guidance for invasive species control measures is available at: https://www.dcr.virginia.gov/natural-heritage/factsheets#invasives.

[19] Invasive Exotic Plants of North Carolina (published by North Carolina Department of Transportation) includes the control for invasive plants in the state and is available at: https://connect.ncdot.gov/resources/Environmental/Compliance%20Guides%20and%20Procedures/Invasive_Exotic_Plants_Manual_May_2012.pdf.

Once construction is complete, Mountain Valley would monitor and address occurrences of noxious and invasive weed species for 2 years post-construction. Mountain Valley would determine control measures for infestations in consultation with the VADCR and NCNHP. These measures could include hand cutting, mechanical removal, or the use of non-persistent and biodegradable herbicides, applied by locally certified personnel. If the use of herbicide is specified for use by federal or state agencies near streams or wetlands, then Mountain Valley would utilize herbicide applications approved for aquatic use.

In accordance with Mountain Valley's Plan and Procedures, Mountain Valley would conduct follow-up inspections of all disturbed areas to determine the success of revegetation. FERC inspectors would also complete inspections to determine compliance with Mountain Valley's Plan and Procedures, and to ensure certificate conditions are being met. Revegetation in non-agricultural areas would be considered successful when the density and cover of non-nuisance vegetation are similar to adjacent, undisturbed lands. In agricultural areas, revegetation would be considered successful when, upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field unless otherwise specified in the easement agreement. Mountain Valley would file with the Secretary quarterly activity reports documenting the results of revegetation for at least 2 years following construction.

Mountain Valley would mow or clear vegetation within the operational right-of-way every 3 years. However, Mountain Valley proposes to maintain an herbaceous corridor up to 10 feet wide centered on the pipeline to facilitate periodic corrosion/leak surveys.

4.5.4.2 Aboveground Facilities, Contractor Yards, and Access Roads

Construction of the proposed aboveground facilities would disturb about 30.3 acres of vegetation including 13.1 acres of agricultural land, 11.5 acres of upland herbaceous/scrub-shrub, 5.3 acres of forested uplands, and 0.5 acre of wetlands. Following construction, 4.9 acres of agricultural land, 2.6 acres of upland herbaceous/scrub-shrub, and 3.4 acres of forested uplands would be permanently converted to developed land for operation of the aboveground facilities. The remaining 19.4 acres of construction workspace would be stabilized, seeded, and allowed to revegetate in accordance with Mountain Valley's Plan and Procedures.

Construction of the Project access roads and contractor yards would disturb about 78.8 acres of vegetation. The open uplands affected during construction would be allowed to revert back to pre-construction conditions. The majority of the access roads are existing roads including paved roads and access ways, gravel roads, and unimproved dirt roads. Tree trimming would be selectively conducted along the existing access roads, as necessary. Seventeen access roads would be retained for operation of the Project and would result in the permanent conversion of about 4.9 acres of vegetation, including 0.7 acre of agricultural land, 3.8 acres of upland herbaceous/scrub-shrub, and 0.4 acre of forested upland.

4.5.4.3 Interior Forest

Interior forest has been described as forested areas greater than 300 feet from the influence of forest edges or open habitat (Robbins, 1988; Rosenberg, et al., 1999; Ontario Ministry of Natural Resources, 2000; Jones et al., 2001; Rodewald, 2001). Interior forest is considered important

because a variety of plant and wildlife species of concern depend upon the conditions present (within the interior forest environment) to thrive; and intact expanses of interior forest are generally decreasing in the United States (Landowner Resource Center, 2000; Riitters and Wickham, 2012).

Interior Forest Fragmentation and Edge Effects

Interior forests were identified by Mountain Valley using aerial imagery of the Project area taken in April 2018. Constructing the Project would create a new, cleared corridor in areas of interior forest where the rights-of-way would not be collocated with existing linear corridors. Clearing or fragmentation of interior forests creates more edge habitat and smaller forested tracts, which can impact characteristics of vegetation communities including their suitability for wildlife. We received multiple comments on the draft EIS stating that we should more fully analyze impacts on interior forest.

The term "edge effect" is commonly used to describe the physical and biological effects that open, disturbed, or developed lands, including pipeline corridors, have on adjacent vegetation. . Clearings adjacent to forested areas increase sunlight and wind within the forest, which can cause trees to become less healthy due to increased wind shear, drying out the interior of the forest close to the edge, and changes in air temperature, soil moisture, and light intensity. These changes can in turn encourage growth of opportunistic species, including non-native invasive species, that may displace species more acclimated to non-edge habitat (Murcia, 1995). Fragmentation of forested areas can result in the loss of high habitat value interior forest and the plant and animal species associated with that habitat. Conversely, forest edges also play a key role in ecosystem functions, including the dispersal of plants and wildlife, the spreading of fire, as corridors for wildlife movements, and in shaping vegetation composition and structure. As edges and newly cleared areas begin to revegetate, they generally support herbaceous and shrub species, including various species of berries, which are productive habitat for the species that exploit these conditions. Over time, the edge is partially sealed by proliferating second growth, and microclimatic gradients lessen in intensity.

Edge effects have been documented as extending from as little as a few meters into a forest patch, to more than several hundred meters, depending on the stressor, the effect being measured, the intervening habitat type and the sensitivity of the attribute (e.g., Batáry and Báldi, 2004 ; Murcia, 1995 ; Wood et al., 2006). Habitat fragmentation has the strongest negative effects on ecosystems with high productivity and biomass accumulation, such as wet tropical and wet temperate forests. Much more research on edge effects has occurred in tropical systems than in other regions. Evidence suggests that negative edge effects on biodiversity are much stronger in tropical than in temperate systems (Fahrig, 2003). However, this observation may be based on a lack of research in temperate regions.

A conservative definition of edge habitat would be forest within 300 feet of open or non-forest habitat (Environment Canada, 2013). However, studies (e.g., Harper et al., 2005) have shown that this distance and the magnitude of the edge effect within edge habitat can vary. Variation in the distance and magnitude may be influenced by factors such as the forest type, the type of clearing adjacent to the forest habitat, whether the clearing is maintained, prevailing wind directions along the clearing, and the general climate of the area. Harper et al. (2005) found that the edge influence associated with some maintained clearings (e.g., pipeline rights-of-way) was

less than 150 feet due to a "sidewall" of dense vegetation growth along the interface of the forest and the clearing.

The landscape along the route of the Project is generally fragmented by existing roads, utility rights-of-way, residential and commercial development, pastures, and agriculture. Mountain Valley would collocate about 49 percent (36.8 miles) of the pipeline route with existing linear corridors. The route would pass through portions of 26 blocks of interior forest (4 blocks in Virginia and 22 blocks in North Carolina)[20] in sections where the pipeline route would not be collocated with other existing corridors. Construction of the Project would impact 49.3 acres of interior forest (4.1 acres in Virginia and 45.2 acres in North Carolina). The maximum amount of interior forest that would be cleared from an individual block would be about 12.8 acres.

After construction, Mountain Valley would maintain the 50-foot-wide permanent right-of-way in an herbaceous state, but would allow trees and shrubs within the temporary construction areas to revegetate. A total of 18.5 acres of interior forest would be permanently converted to an herbaceous state as part of the permanent right-of-way (1.3 acres in Virginia and 17.2 acres in North Carolina). The remaining acreage cleared during construction would revegetate as edge habitat. Though it would take years for forest to regenerate.

In areas where the pipeline is collocated with existing cleared corridors, clearing of the edge habitat could extend the edge effect into adjacent interior forest and thereby convert a portion of the existing interior forest into edge habitat. Mountain Valley would allow the temporary construction workspace at the edge of the 50-foot-wide permanent right-of-way to regenerate as edge forest, though as previously stated, this would take years. Mountain Valley has voluntarily committed to working with VADCR, the Virginia Forest Conservation Partnership, and NCWRC regarding additional mitigation for clearing interior forest.

4.5.5 Vegetation Conclusions

Based on our review of the potential impacts on vegetation as described above, we conclude that the primary impact from construction and operation of the Project would be on forested lands. However, given the high level of collocation with existing, maintained rights-of-way through the majority of large forested areas crossed by the proposed pipeline routes, and the extensive distribution of similar vegetation communities adjacent to the proposed right-of-way, we conclude that impacts on vegetation, including forested areas, would be adequately reduced to less than significant levels. In addition, impacts on forested and non-forested vegetation types, as well as the introduction or spread of noxious weeds or invasive plant species, would be further mitigated through adherence to the measures outlined in Mountain Valley's Plan and Procedures, and other mitigation measures described above.

[20] We use the term "block" here to describe any contiguous expanse of forested area that is at least 300 feet from non-forested habit (i.e., surrounded by ≥ 300 feet of edge habitat).

4.6 WILDLIFE AND FISHERIES

4.6.1 Terrestrial Wildlife

The Project is located in the Piedmont Region of south-central Virginia and northcentral North Carolina and contains diverse wildlife habitats suitable for commonly found large and small mammals, reptiles and amphibians, and birds (raptors, waterfowl, and songbirds) of the region. Federal and state special status species (i.e., endangered, threatened, and species of concern) are described in section 4.7.

Wildlife is generally dependent on available habitat, which is typically directly linked to existing vegetation cover types. As described in sections 4.3.3, 4.4, and in the sections below, the Project would cross several upland and wetland vegetation cover types. These include forested, scrub-shrub, and herbaceous uplands; and herbaceous, scrub-shrub, and forested wetlands.

Table 4.6-1 identifies the terrestrial wildlife species commonly associated with the vegetation cover types that would be crossed by the Project.

TABLE 4.6-1

Wildlife Species Commonly Associated with Vegetation Communities Affected by the Southgate Project

Habitat Type	Wildlife Species
Upland Forest	***Mammals:*** *Big Brown Bat, Bobcat, Eastern Chipmunk, Eastern Gray Squirrel, Fox Squirrel, Eastern Red Bat, Gray Fox, Red Fox, Striped Skunk, White-Tailed Deer;* ***Birds:*** *Acadian Flycatcher, Barred Owl, Black-And-White Warbler, Blue Jay, Blue-Headed Vireo, Common Raven, Great Horned Owl, Hooded Warbler, Ovenbird, Pileated Woodpecker, Red-Bellied Woodpecker, Red-Shouldered Hawk, Scarlet Tanager, Wild Turkey;* ***Herpetofauna:*** *Eastern Box Turtle, Northern Copperhead, Spotted Salamander, White-Spotted Slimy Salamander, Wood Frog*
Upland Scrub-Shrub	***Mammals:*** *Eastern Cottontail, Red Fox, White-Footed Mouse, White-Tailed Deer;* ***Birds:*** *Eastern Towhee, Brown Thrasher, Cooper's Hawk, Eastern Screech Owl, Indigo Bunting, Song Sparrow, White-Eyed Vireo, Yellow-Breasted Chat;* ***Herpetofauna:*** *Northern Black Racer, Northern Rough Greensnake*
Upland Herbaceous	***Mammals:*** *Coyote, Groundhog, Meadow Vole, Red Fox, White-Tailed Deer;* ***Birds:*** *Eastern Meadowlark, American Kestrel, Eastern Bluebird, Grasshopper Sparrow, Vesper Sparrow, Wild Turkey;* ***Herpetofauna:*** *Eastern Gartersnake, Northern Brownsnake, Milksnake*
Wetland	***Mammals:*** *American Beaver, Bobcat, Mink, Muskrat, Raccoon, River Otter, Virginia Opossum, White-Tailed Deer;* ***Birds:*** *Common Yellowthroat, Great Blue Heron, Green Heron, Red-Winged Blackbird, Swamp Sparrow, Tree Swallow, Wood Duck;* ***Herpetofauna:*** *Spring Peeper, Bullfrog, Eastern Painted Turtle, Eastern Red-Spotted Newt, Green Frog, Snapping Turtle, Spotted Salamander, Upland Chorus Frog*
Agricultural Land	***Mammals:*** *Deer Mouse, Groundhog, Raccoon, White-Tailed Deer;* ***Birds:*** *Brown-Headed Cowbird, Barn Swallow, Horned Lark, Mourning Dove;* ***Herpetofauna:*** *Eastern Ratsnake. Eastern Gartersnake*

Source: NCWRC, 2018a; VADGIF, 2018

4.6.1.1 Terrestrial Wildlife Impacts and Mitigation

Pipeline Facilities

Upland forest comprises the largest component of the wildlife habitat crossed by the pipeline right-of-way (about 44 percent; actual acreages are provided in table 4.5-1). Three types of upland forest habitat would be affected: deciduous, evergreen, and a mix of deciduous and evergreen. Upland forests contain a wide variety of wildlife species, attributable to the diverse range of habitat types that forests provide, from the overhead canopy of the forest trees to the understory vegetation and forest-floor detritus. Tree and shrub layers provide food and cover for birds and larger mammals, such as white-tailed deer. Forest hardwood species such as oaks, beech, and poplar, produce acorns and seeds, which are important food sources for many bird and mammal species. Fallen trees and limbs give rise to insects, which also serve as important food sources, and the dense leaf litter and other detritus within the understory provide food and cover for invertebrates, amphibians, reptiles, and smaller mammals.

Herbaceous and scrub-shrub uplands and agricultural lands comprise the second and third largest components of wildlife habitat crossed by the Project (at 39.5 percent and 14.3 percent, respectively). Agricultural land and other non-forested upland habitats, such as idled croplands, hayfields, and old fields and pastures provide nesting, denning, and foraging habitat for grassland birds, upland game birds, and small to large mammals. Utility rights-of-way maintained in early successional communities also provide nesting and foraging habitats for grassland bird species and serve as grazing habitat for deer. These lands are, in turn, also prime hunting grounds for predator species such as foxes, coyotes, and raptors.

Constructing the Project would disturb about 1,393 acres of wildlife habitat, including agricultural lands. The temporary and permanent loss and/or conversion of habitat and the general disturbance created by the use of construction equipment would impact wildlife. This impact would vary depending on the type and quantity of habitat affected and the ability of species to leave Project work areas and successfully utilize adjacent habitats.

Constructing the Project may result in limited mortality of less mobile animals, such as small rodents, reptiles, amphibians, and invertebrates, which may not be able to relocate from the immediate construction area. In addition, during pipeline installation, there is potential for wildlife to be injured by falling into an open trench. Open trenches containing standing water could prove hazardous to smaller, less mobile animals. Mountain Valley would implement the following measures to reduce construction-related injury or mortality of wildlife:

- provide pre-construction training of personnel regarding the potential presence of wildlife within the Project area and protocols for delaying or stopping work should wildlife be present within active workspace areas;
- maintain breaks or gaps in temporary spoil piles and pipe stringing to facilitate wildlife migration through the construction corridor;
- install bi-directional ramps within open trench areas, at intervals of approximately 0.1 mile, to facilitate exiting of the trench by wildlife traveling in either direction;

- inspect workspaces and the trench in active construction areas prior to the start of each construction day to ensure that wildlife is not present; if wildlife is present, construction activities would be delayed in that area to allow the animals present to move outside of the workspace;
- inspect equipment left within the workspace prior to the start of each construction day to ensure that no wildlife is present within or under the equipment;
- prohibit direct handling of wildlife with the exception of relocation of injured or immobile animals by the environmental inspector(s);
- prohibit direct handling of any state or federally listed rare species unless otherwise approved by the applicable regulatory agencies;
- regulate equipment speed on access roads to minimize the potential for wildlife mortality; and
- require disposal of construction debris according to federal, state, and local regulations, and practice of good housekeeping to prevent garbage from attracting opportunistic wildlife and predators.

We expect that mobile wildlife would relocate to similar adjacent habitats during Project construction. However, displaced wildlife could experience inter- and intra-specific competition, lower reproductive success, and overall increased rates of stress, injury, and mortality if adequate adjacent habitat was not available. Where similar adjacent habitat is present, displacement impacts would generally be short-term. Wildlife would be expected to return and colonize successfully restored habitats that were temporarily affected by construction. Based on our restoration monitoring efforts for other natural gas infrastructure projects, we have found that wetland and upland herbaceous and shrub vegetation typically restore to pre-construction conditions in a relatively short time (i.e., between 1 to 5 years). Therefore, construction impacts on most mobile species occupying these habitats would be temporary.

The impacts on forest-dwelling wildlife species would be greater because forest habitat takes a comparatively longer time to regenerate within the revegetated temporary workspace. Restoring the temporary construction areas to forest habitats similar to that which existed prior to construction could take several decades, depending on site-specific conditions, such as rainfall, elevation, grazing, and weed introduction. Forest would be permanently removed within the operational right-of-way.

As noted in section 4.5.4.3, we received comments expressing concerns regarding the Project's impact on interior forest. We define interior forest and discuss the general effects of forest fragmentation in that section. Fragmentation of forest habitat can affect all orders of wildlife. Impacts on wildlife generally associated with habitat fragmentation include displacement, avoidance, and increased predation. For example, smaller species, such as reptiles and amphibians could experience greater impacts from habitat fragmentation as they are relatively less mobile and generally more averse to crossing wide corridors due to the increased risk of predation. Conversely, habitat fragmentation can increase wildlife migration and the fitness of species that can adapt to disturbance.

Forest habitat fragmentation generally affects interior dwelling birds by creating dispersal barriers, resulting in smaller suitable microhabitats, smaller population sizes, and reduced species diversity (Degraaf and Healy, 1990; Environment Canada, 2013). Newly opened corridors within forest habitat may expose forest-nesting birds to increased nest predation pressure from both mammalian and avian predators (including raccoons, jays, and crows) and to brood parasitism by brown-headed cowbirds. This in turn could affect avian reproductive output and result in long-term impacts on avian populations within these newly-created corridors. However, overall breeding bird density and richness generally are higher in disturbed habitats. Increased abundances near edges are generally more common than decreases or negative edge responses (Villard, 1998; Sisk and Battin, 2002). Many wildlife species forage opportunistically for insects and fruit in forest patches (Greenberg et al., 2007).

Beyond the suitability of the converted habitat for indigenous wildlife, there is also an edge effect that penetrates some distance into the adjacent forest. The extent of the edge effect reported in hundreds of research articles is highly variable, both because different species respond differently and because abiotic factors such as edge orientation and edge contrast may influence the effect. Ultimately, the impact would depend on the life histories and habitat preferences for the indigenous species. As stated above, the response may be negative (for forest interior species), neutral (for habitat generalists), or positive (Ries and Sisk, 2004) (see additional discussion in section 4.5).

The Project would be collocated with existing utility corridors for 49 percent (36.8 miles) of the Project right-of-way. Collocating reduces the amount of fragmentation and new edges by shifting the existing forest edge as opposed to creating a completely new corridor. As noted in section 4.5.4.3, in areas where the Project is not collocated, the right-of-way would pass through interior forest habitats. In Virginia, the Project would directly impact 4.1 acres of interior forest. In North Carolina, the Project would directly impact about 45.2 acres of interior forest. In total, the Project would impact about 629.9 acres of forest habitat (including forested wetland) during construction. Removal of forest habitat, including areas of silviculture and tree farms, for the operation of the Project would be permanent. The time needed for forested wildlife habitats to recover within the temporary right-of-way would be long-term. However, the relatively small size of the interior forest habitat blocks that would be affected would minimize the amount of interior forest habitat being converted to edge habitat at any one location. Therefore, impacts on wildlife species would not result in long-term or significant population-level effects, given the stability of local populations and the abundance of available habitat adjacent to the proposed right-of-way. Nonetheless, to further minimize impacts, Mountain Valley has voluntarily committed to working with VADCR, the Virginia Forest Conservation Partnership, and NCWRC regarding mitigation for clearing interior forest.

Noise generated by the Project is discussed in detail in section 4.11.2.3. Noise levels along the construction right-of-way would vary depending on the phase of work, equipment in use, distance from noise receptors, and intervening topography and vegetation outside the right-of-way. Wildlife species rely on aural cues for courtship and mating, prey location, predator detection, and/or homing. These functions could be affected by noise resulting from construction and operation of the Project. Specifically, construction noise could lead to nest abandonment, which in turn can lead to egg failure, reduced juvenile growth and survival, or malnutrition or starvation of the young. During construction, the effects of noise on wildlife would be greatest immediately

adjacent to the construction right-of-way. As described previously, construction along the right-of-way proceeds through a particular habitat and then moves along to the next one, usually within 6 to 12 weeks. Therefore, construction noise impacts would be temporary.

Blasting along the right-of-way may be necessary during construction where bedrock is present at depths less than the proposed pipeline trench depth (see section 4.1.4.7). Generally, noise levels produced during blasting are instantaneous and vary based on a number of factors, including the type and amount of explosives used, the depth below-ground of the explosives, and whether noise mitigation is applied. Potential impacts of blasting would be similar to those from general construction noise. Typical construction blasting operation noise levels have been documented at about 94 dBA at a distance of 50 feet; whereas construction equipment noise levels would typically be around 85 dBA at 50 feet when the equipment is operating at full load (FHWA, 2006a). Although slightly louder than typical construction equipment, blasting activities would be infrequent and over very short durations. Blasting typically involves a small scale, controlled, rolling detonation procedure resulting in limited ground upheaval. The blasts do not typically result in large, above ground explosions. Nonetheless, blasting in proximity to bird nests, during sensitive periods, for example, may cause adults to abandon nests, which could lead to egg or nestling mortality. Mountain Valley has prepared a Project-specific *General Blasting Plan* and would coordinate with appropriate federal and state agencies prior to conducting blasting operations to minimize impacts related to blasting.

While pipelines have no operational noise associated with them, during the operation of the pipeline, noise emissions also would be generated during monitoring and maintenance activities, such as vegetation clearing on the permanent right-of-way, or during ground or air surveillance of the pipeline, as required by DOT regulations. Surveillance activities could cause startle effects in wildlife in proximity to the pipeline; however, these activities would be infrequent and short-term in duration. The effects on wildlife due to noise emissions would be minimal and highly localized.

Artificial lighting used during construction and at the aboveground facilities of the Project during operation would generate light pollution. Ecological light pollution refers to artificial lighting that affects natural patterns of light and dark in ecosystems, which in turn may affect wildlife (Longcore and Rich, 2004). The effects of ecological light pollution may include disorientation in nocturnal animals, disrupting migratory patterns of birds, altering seasonal day-length cues, which some wildlife may rely on as a trigger for critical behavior (e.g., migration).

Mountain Valley would only use artificial lighting as necessary during pipeline construction between the hours 7:00 am and 7:00 pm (on average) except for during emergencies or limited instances of 24-hour construction activities (e.g., HDD). Therefore, light pollution during construction would be minimal or, in the instances of the HDD activities, only for a relatively short duration.

To increase the speed and success of restoration of wildlife habitat, Mountain Valley would implement right-of-way restoration measures contained in Mountain Valley's Plan and Procedures, E&SC Plan, and solicit guidance from the USDA NRCS, VADCR, and NCWRC to restore the pipeline corridor using native seed mixes, including species beneficial to pollinators, specific to the Project locations. Mountain Valley would allow the right-of-way adjacent to a 10-

foot-wide center strip, maintained to facilitate periodic corrosion/leak surveys over the pipeline, to grow as scrub-shrub habitat, which would provide a more gradual transition between the pipeline corridor and surrounding forested habitat. Additionally, Mountain Valley would follow the recommendations of VADCR and NCWRC to only conduct maintenance mowing of the right-of-way center strip during the non-growing season between October 15 and April 1.

Aboveground Facilities, Contractor Yards, Access Roads

Agricultural lands and non-forested uplands combined would comprise the majority of wildlife habitat that would be affected by construction of the aboveground facilities. Approximately 44 percent of the lands affected by aboveground facilities would occur on agricultural lands and 38 percent would occur on herbaceous/scrub-shrub upland habitat. Upland forest habitat would comprise approximately 17 percent of the habitat affected by aboveground facilities, leaving less than 2 percent that would occur in wetland habitat. As noted in section 4.4.2, aboveground facilities and access roads would permanently affect approximately 0.1 acre of wetlands.

Approximately 98 percent of the contractor yard acreages would occur in herbaceous/scrub-shrub upland habitat. The remaining 2 percent would occur in forested upland habitat.

Access roads would cross agricultural, upland forest, open upland, and both herbaceous/scrub-shrub and forested wetland habitats. Approximately 71 percent of the acreage necessary for access roads would cross herbaceous/scrub-shrub upland habitat. Wetland habitat would only incur temporary impacts related to use of temporary access roads and would comprise less than one percent of the acreage necessary for access roads. Total acreages for the different components of the Project are provided in table 4.5-2.

The permanent footprint at the Lambert Compressor Station, and other aboveground facilities would be converted to developed land. Areas used for temporary and additional workspace at each facility would be restored and maintained as open land or allowed to revert to pre-construction land use cover. Following construction, Mountain Valley would restore and reseed any previously vegetated areas affected at contractor yards (unless approved in writing by the landowner). Use of access roads by construction personnel would temporarily displace wildlife species, and there would be the potential for a minor increase in wildlife fatalities along access roads due to the temporary increase in traffic during construction. We expect wildlife would return to the restored areas at aboveground facilities, contractor yards, and access roads post-construction. Wildlife habitat within the permanent footprint at aboveground facilities, which would be enclosed by fencing, and permanent access roads would be limited primarily to supporting songbirds and small mammals.

The Lambert Compressor Station would generate noise on a continuous basis once in operation, which would be limited to the general vicinity of the facilities. In addition, Transco's Compressor Station 166 is located approximately 600 feet north, and the Transco's Compressor Station 165 is located within a half mile of the location proposed for the Lambert Compressor Station. Noise levels associated with compressor unit venting activities required for maintenance and emergency shutdown unit ventings would occur infrequently and would be short-term in

duration. Section 4.11.2.3 provides a more in-depth description of noise levels associated with the Lambert Compressor Station.

Effects on wildlife from chronic noise may vary by species (e.g., Barber et al., 2009; Francis et al., 2011a, b; Francis et al., 2012; Blickley et al., 2012). Noise levels decrease exponentially with distance from the source and this decrease is accelerated within forested areas relative to the type of forest and the extent of understory present (Huisman and Attenborough, 1991). A mix of forest, open agricultural land, and developed industrial land would surround the Lambert Compressor Station. Mountain Valley would employ noise mitigation measures, such as compressor building walls, roof, doors, and ventilation systems designed to reduce noise emissions, turbine exhaust and intake silencers and breakouts, compressor unit venting silencers, and underground suction and discharge piping. The noise levels that wildlife would be exposed to beyond the compressor station property boundary would vary based on the distance from the facility. In the years following initial construction, wildlife tolerant of the operational noise associated with the new and existing compressor station facilities would remain in the area, while other species would likely move into similar available habitat farther from the noise source.

Mountain Valley would use downward facing, shielded lighting fixtures as required for security and operations purposes during operations at the aboveground facilities. Additionally, the Lambert Compressor Station would be located near existing compressor stations that are illuminated by artificial lighting in a similar capacity as would be required for the Lambert Compressor Station. As such, wildlife in the area are likely tolerant of artificial lighting at this location. Therefore, the effects of artificial lighting on wildlife would be sufficiently minimized.

As with the pipeline right-of-way, Mountain Valley would implement post-construction restoration measures at aboveground facilities, contractor yards, and access roads to increase the speed and success of restoration of wildlife habitat. Mountain Valley would follow guidelines contained in its Plan and Procedures and solicit guidance from the USDA NRCS, VADCR, and NCWRC to restore these areas using native seed mixes, including species beneficial to pollinators, specific to the Project locations. We expect wildlife would return to the restored areas post-construction.

4.6.2 Sensitive and Managed Wildlife Habitats

Sensitive or managed wildlife habitats such as national forests and wildlife refuges, state forests and parks, wildlife management areas, and reserve program lands are generally established to protect lands and waters that have a high habitat value for wildlife, or for public hunting, trapping, fishing, and other compatible recreational uses. The Project would not cross any National Wildlife Refuges, Wildlife Management Areas, or other federally protected lands. The Project would not come within 3 miles of any state Wildlife Management or Game Lands in North Carolina but would pass within a mile of the White Oak Mountain Wildlife Management Area in Virginia between approximate MPs 0.0 and 1.3. The Project would also cross multiple state-managed or private conservation areas, including three North Carolina Forest Legacy Areas (MPs 26.1 to 36.3, MPs 42.2 to 48.4, and contractor yard CY25) and a Piedmont Land Conservancy Easement (MP 37.7). The Forest Legacy Program was created by the U.S. Congress to protect environmentally important forest lands that are threatened by conversion to non-forested uses

(NCFS, 2017a). The Piedmont Land Conservancy easements are voluntary legal agreements entered into by private landowners to protect their property from development.

4.6.2.1 Sensitive and Managed Wildlife Habitat Impacts and Mitigation

The Project would not impact wildlife within the White Oak Mountain Wildlife Management Area. State Highway 57 and State Route 703 run between the Project right-of-way and the Wildlife Management Area. The impacts on wildlife within the North Carolina Forest Legacy Areas and Piedmont Land Conservancy Easement would be consistent with those of the corresponding habitats in other portions of the Project right-of-way. Within the North Carolina Forest Legacy Areas, the Project route would primarily be collocated with an existing utility right-of-way and contractor yard CY25 would be in an area of primarily open or previously cleared land. The Project would cross a mixture of non-forested upland habitats and would impact 152.9 acres of deciduous, evergreen, and mixed forested habitat and 6.3 acres of forested wetland. The land crossed within the Piedmont Land Conservancy Easement would consist of an approximately 0.1-mile stretch comprised of 0.3 acre of early successional forest edge habitat.

The Project would also pass through about 3 miles of the Virginia Piedmont Forest Block Complex Important Bird Area (IBA) between MPs 22.7 and 25.7. The IBA Program is an international initiative developed to identify, protect, and manage critical areas associated with vital bird habitat and associated biodiversity (Audubon, 2019). IBAs are sites that provide essential habitat to one or more bird species for at least one portion of their life history (e.g., during breeding, wintering, and/or migrating). Areas designated as IBAs support species of conservation concern (e.g., threatened, endangered, or rare species), species with limited or restricted ranges, and/or species that are vulnerable because their populations are concentrated in one habitat type or occur in high concentrations due to congregation. The National Audubon Society administers the IBA Program in the United States in partnership with BirdLife International. The Forest Block Complex IBAs were established as a means to protect viable populations of priority bird species by establishing a network of forested landscapes along the Atlantic Flyway, which the Project would cross[21].

However, the portion of the Virginia Piedmont Forest Block Complex IBA that would be crossed by the Project is not a uniform block of forested habitat. The block is currently crossed by U.S. Highway 311, multiple state roads, a railroad right-of-way, an electrical transmission right-of-way, and an additional existing right-of-way with which the Project would be collocated. The block contains approximately 15,567 acres of forested habitat based on a National Land Cover Database (NLCD) review (Homer et. al., 2015). Construction activities would clear approximately 60.4 acres of forested edge habitat along an existing right-of-way and operation of the Project would permanently convert approximately 16.7 acres of the forested edge habitat to herbaceous or scrub-shrub habitat. This would equate to a long-term decrease of 0.4 percent of the forested habitat and permanent loss of 0.1 percent of the forested habitat in the block of the Virginia Piedmont Forest Block Complex through which the Project would pass. Given that the Project route would affect primarily forest edge habitat, would be primarily collocated with an existing

[21] The Atlantic flyway is one of four broad areas (in addition to the Mississippi, Central, and Pacific flyways) that contain the routes of migrating birds from summer nesting sites throughout North America, including the Arctic, to their wintering grounds in southern North America, the Caribbean, and South America. In the United States, the Atlantic flyway generally consists of the states along the east coast, including North Carolina and Virginia.

right-of-way, and would impact a relatively low proportion of forested habitat within the forest block, we conclude the effects of the Project on wildlife within sensitive and managed wildlife areas would not be significant.

4.6.3 Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Colonial Nesting Birds

4.6.3.1 Migratory Birds

Migratory birds are protected under the MBTA (16 United States Code [U.S.C.] 703-711). The MBTA, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, or nests unless authorized under a FWS permit. Bald and golden eagles are protected under the BGEPA (16 U.S.C. 668-668d). Executive Order (EO) 13186 directs executive departments and agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the FWS. The EO states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and that particular focus should be given to addressing population-level impacts.

On March 30, 2011, the FWS and the FERC entered into a Memorandum of Understanding that focuses on avoiding and minimizing adverse impacts on migratory birds, with a focus on species of concern, and strengthening migratory bird conservation through enhanced collaboration. This voluntary agreement does not waive legal requirements under the MBTA, BGEPA, ESA, Federal Power Act, NGA, or any other statutes and does not authorize the take of migratory birds.

The FWS created the Birds of Conservation Concern (BCC) list (FWS, 2008) with the goal of preventing or removing the need for additional ESA bird listings by implementing proactive management and conservation actions and coordinating consultations in accordance with EO 13186.

A variety of migratory birds and BCC use or could use the habitats affected by the Project. These birds use these habitats for resting (stopover), sheltering, foraging, breeding, and/or nesting. The Project would be in the North American Bird Conservation Initiative (NABCI) Bird Conservation Region (BCR) 29 (BCR 29: Piedmont; NABCI, 2018). Table 4.6-2 lists 17 Project-specific migratory bird species of concern with preferred nesting habitat that would potentially be affected by the Project. These include BCC species, species listed as conservation priorities in the BCR 29 Implementation Plan (Watson, 2014), species listed in the Virginia Wildlife Action Plan (VADGIF, 2015) and North Carolina Wildlife Action Plan (NCWRC, 2015) as species of greatest conservation need, and species listed by the NCNHP (2018a) as species with conservation concerns.

TABLE 4.6-2

Migratory Bird Species of Concern Potentially Present within the Southgate Project Area

Common Name	Source a/	Project County	Preferred Nesting Habitat b/	Primary Nesting Season
Acadian flycatcher	NCWAP	Rockingham; Alamance	Moist hardwood forests, usually near a creek or in bottomland forests.	Apr 21 to Aug 15
American kestrel	NCWAP	Rockingham; Alamance	Fields, pastures, open farmland.	Mar 15 to Jul 31
American woodcock	BCR 29 Plan; NCWAP VADGIF	Pittsylvania; Rockingham; Alamance	Habitat consists of young forests and abandoned farmland mixed with forested land. Generally considered an edge species.	Apr 1 to Aug 31
bald eagle	BGEPA; BCC; NCWAP	Pittsylvania; Rockingham; Alamance	Nests in trees among forests adjacent to large water bodies	Jan 1 to Aug 31
barn owl	NCWAP	Rockingham; Alamance	Open farmland; nests in manmade structures.	Feb. 1 to Jul 31
brown-headed nuthatch	BCC; BCR 29 Plan; NCWAP	Rockingham; Alamance	Mature and open longleaf pine stands; at least locally common in open loblolly, shortleaf, and pond pine stands, less so in Virginia pine. In the Piedmont, birds favor thinned or more open pine stands, such as in residential areas, golf courses, margins of lakes and ponds, and edges.	Apr 15 to Aug 15
eastern whip-poor-will	BCC; BCR 29 Plan	Pittsylvania	Forests and woodlands; no nest built, eggs laid on flat ground.	May 1 to Aug 15
grasshopper sparrow	BCR 29 Plan; NCNHP	Pittsylvania; Rockingham; Alamance	Fallow fields, pastures, hayfields, grasslands, and other areas dominated by graminoid vegetation.	May 15 to Aug 15
Kentucky warbler	BCC; BCR 29 Plan; NCWAP	Pittsylvania; Rockingham; Alamance	Prefers deep shaded woods with dense, humid thickets, bottomlands near creeks and rivers, ravines in upland deciduous woods, and edges of swamps; nests on ground or within a few inches of it	May 1 to Aug 15
Louisiana waterthrush	NCWAP	Rockingham; Alamance	Streams and rivers associated with hardwood forests	Mar 15 to Aug 15
northern bobwhite	BCR 29 Plan; NCWAP	Pittsylvania; Rockingham; Alamance	Fallow fields, pastures, hayfields, grasslands, and other areas dominated by graminoid vegetation	Apr 15 to Aug 31
prairie warbler	BCC; BCR 29 Plan	Pittsylvania; Rockingham; Alamance	Shrubby pastures, low pines; nest usually in a tree (such as pine, cedar, sweetgum, oak), 1-45' above the ground	May 1 to Jul 31

TABLE 4.6-2

Migratory Bird Species of Concern Potentially Present within the Southgate Project Area

Common Name	Source a/	Project County	Preferred Nesting Habitat b/	Primary Nesting Season
prothonotary warbler	BCR 29 Plan; NCWAP	Rockingham; Alamance	Wooded swamps, wetlands, river bottom hardwoods; Nest site usually 5- 10' up (sometimes 3-30' up), above standing water in hole in tree or stump.	May 15 to Jul 31
red-headed woodpecker	BCR 29 Plan; NCWAP	Rockingham; Alamance	Groves, farm country, orchards, shade trees in towns, large scattered trees; nests in tree cavities	May 10 to Sep 10
willow flycatcher	NCNHP	Rockingham	Open country, mainly in wide valleys with streamside thickets and corridors of trees adjacent to fields; marshes with shrubs and small trees	June 1 to Aug 15
wood thrush	BCC; BCR 29 Plan	Pittsylvania; Rockingham; Alamance	Mainly deciduous woodlands; nest placed in vertical fork of tree (usually deciduous) or saddled on horizontal branch, usually about 10-15' above the ground, sometimes lower, but rarely as high as 50'.	May 1 to Aug31
Yellow-throated warbler	NCWAP	Rockingham; Alamance	Mesic forests; swamps, bottomlands, streamside groves, and some pinelands	Mar 15 to Jul 15

a/ BCC: Included as 2008 Bird of Conservation Concern for Bird Conservation Region 29 (FWS, 2008); BCR29 Plan: Considered a priority species in the 2014 BCR 29 Implementation Plan (Watson, 2014). VAFWIS: Virginia Fish and Wildlife Information Service. NCNHP: North Carolina Natural Heritage Program's database; NCWAP: North Carolina Wildlife Action Plan. BGEPA = Bald and Golden Eagle Protection Act.

b/ acreages of habitat that would be affected by the Project are provided in tables 4.5-1 and 4.8-1.

Generally, the migratory bird species of concern listed in table 4.6-2 are experiencing population declines due to habitat loss and fragmentation. Loss and fragmentation of forested habitat could negatively affect species such as the brown-headed nuthatch, prothonotary warbler, willow flycatcher, and wood thrush; however, clearing associated with the Project could eventually provide habitat for species such as the American woodcock, eastern whip-poor-will, grasshopper sparrow, northern bobwhite, and prairie warbler.

4.6.3.2 Migratory Birds Impacts and Mitigation

If construction occurs during the nesting season, increased human presence and noise from construction activities could disturb actively nesting birds resulting in incidental take of migratory bird species. Impacts would likely not be significant for non-nesting birds, as these individuals could temporarily relocate to avoid construction activities. However, construction activity near active nests during incubation or brood rearing could result in nest abandonment; which, in turn,

could lead to overheating, chilling, or desiccation of unattended eggs or young; and subsequently nestling mortality; premature fledging; and/or ejection of eggs or young from the nest. Additionally, loss and/or conversion of existing habitat and the subsequent displacement of birds could affect mating, nesting, rearing, foraging, and predator avoidance behaviors. As a result, migratory birds could experience increased predation, competition, and rates of stress, injury, and mortality.

Mountain Valley has attempted to minimize the loss of migratory bird habitat by collocating the Project route with existing rights-of-way or previously disturbed habitat for approximately 49 percent of the proposed route and reducing the width of the construction right-of-way to 75 feet where the pipeline would cross waterbodies or wetlands. Mountain Valley would attempt to minimize Project impacts on nesting migratory birds by conducting construction-related vegetation clearing outside of the peak migratory bird nesting season within each state (March 15 through August 15 in Virginia and April 1 through August 31 in North Carolina).

During operation of the Project, Mountain Valley would coordinate with the VADGIF, NCWRC, and local conservation districts to develop right-of-way mowing schedules and conservation practices beneficial to bird species (and other wildlife) that may use the Project right-of-way as nesting or foraging habitat. Due to recommendations from VADCR and NCWRC, Mountain Valley has proposed to modify its Plan to restrict maintenance clearing or mowing of the right-of-way between April 1 and October 15 of any year.

Conducting vegetation clearing outside of the peak migratory bird nesting season would minimize incidental take of nesting migratory birds. If avoiding the migratory bird nesting season during construction-related clearing becomes infeasible, Mountain Valley would consult with the FWS to identify measures to implement to minimize impacts on migratory birds. Mountain Valley would file these communications in their weekly construction status reports. Construction and operation of the Project would have short-term to permanent effects on migratory bird habitat. Impacts on non-forested upland habitat by construction of the pipeline would be short-term and temporary, since these areas would return to their herbaceous or scrub-shrub vegetative cover within 1 to 2 years post-construction. Impacts on forested habitat would be long-term to permanent, as forested habitat cleared for construction would likely require several decades to recover and forested habitat in the permanent right-of-way would be permanently converted to herbaceous or non-forested habitat for the operational life of the Project. Approximately 629.9 acres of forest habitat (including forested wetland) would be affected by construction of the Project, 241.6 acres of which would be permanently converted to herbaceous or scrub-shrub habitat for the operational life of the Project.

Given the steps Mountain Valley would take to attempt to minimize Project impacts on migratory birds, and the relatively low percentage of forested habitat generally and interior forest habitat specifically that would be affected in comparison with available forested habitat in the vicinity of the Project (as described in sections 4.5.4.3 and 4.6.1.1), we conclude Project impacts on migratory birds would be minimized to the extent practicable and not significant.

4.6.3.3 Bald and Golden Eagles

The Project would not cross any known bald eagle (*Haliaeetus leucocephalus*) concentration areas (FWS, 2018a). Additionally, no bald eagle nests are located within 0.5 mile of the Project footprint in either Virginia or North Carolina based on assessments of the FWS Virginia Field Office's Bald Eagle Map Tool (FWS, 2018a), the Center for Conservation Biology Virginia Bald Eagle Nest Locator (Center for Conservation Biology, 2018), and the NCNHP Data Explorer (NCNHP, 2018a). According to information provided by VADGIF, the closest known bald eagle nest exists approximately 8 miles from the Project right-of-way in Pittsylvania County. Golden eagles are not known to nest in the eastern United States and are primarily only found in the western mountainous regions of Virginia and North Carolina during migration or in winter (Katzner et al, 2012).

4.6.3.4 Bald and Golden Eagles Impacts and Mitigation

Although there are no currently documented bald eagle nests within 0.5 mile of the Project footprint, the possibility exists that bald eagles could build nests in the vicinity of the Project prior to the start of construction. To account for this possibility, and in order to ensure that impacts on bald eagles would be minimized, Mountain Valley would conduct bald eagle nest surveys during the winter prior to the beginning of construction within 0.5 mile of the Project rights-of-way. We provide a recommendation below that Mountain Valley file the results of the bald eagle nest surveys with the Secretary prior to the beginning of construction.

If bald eagle nests were discovered during the pre-construction winter nest surveys, Mountain Valley would follow measures adapted from the FWS National Bald Eagle Management Plan Guidelines (FWS, 2007) and the Virginia Department of Game and Inland Fisheries Bald Eagle Guidelines for Landowners (VADGIF, 2012) between December 15 and July 15. The measures Mountain Valley would follow include:

- restricting blasting or any use of explosives to greater than 0.5 mile (or 1 mile in open areas) from an active nest during the nesting season (December 15 through July 15);
- maintaining a buffer of at least 660 feet between Project-related activities and the nest;
- restricting all vegetation clearing and ground disturbance within 660 feet of the nest to outside of the nesting season; and
- maintaining any established landscape buffers between Project-related activities and active nests.

Based on Mountain Valley's intent to conduct nest surveys and implement the noted protective measures, we conclude Project impacts on bald eagles would be avoided or minimized sufficiently.

4.6.3.5 Colonial Nesting Birds

In BCR 29, colonial nesting birds commonly consist of wading birds such as great blue herons, great egrets, and other smaller herons and egrets that nest in multispecies colonies in trees

and shrubs in close proximity to waterbodies. In North Carolina, population trends of some smaller herons and egrets such as little blue herons, tri-colored herons, and snowy egrets indicate declines in the numbers of nesting pairs but the causes of these declines are unknown (NCWRC, 2015). Wading bird habitat in the Piedmont Region generally consists wetland areas associated with ponds, lakes, reservoirs, and rivers (Hunter et. al., 2006). The primary threat to wading bird populations is habitat loss and degradation due to land clearing and construction activities associated with human development (Hunter et. al., 2006; NCWRC, 2015).

4.6.3.6 Colonial Nesting Birds Impacts and Mitigation

Mountain Valley received a recommendation from the NCWRC in August of 2018 (NCWRC, 2018b) to avoid construction activities within 0.5 mile of any active colonial nesting bird rookeries. The NCWRC further recommended that Mountain Valley conduct surveys for rookeries within 0.5 mile of the Project rights-of-way during the winter months prior to construction. Mountain Valley has accordingly committed to conducting the rookery surveys concurrently with the bald eagle nest surveys. Additionally, Mountain Valley would maintain established landscape buffers between Project-related activities and active rookeries and would refrain from construction activities within 0.5 mile of any rookery between February 15 and July 31. Therefore, we conclude Project impacts on colonial nesting birds would be avoided or minimized to the extent practicable.

Based on Mountain Valley's intent to conduct bald eagle and rookery surveys, and implement the noted protective measures, we conclude Project impacts on bald eagles and colonial nesting birds would be avoided or minimized to the extent practicable. However, Mountain Valley has not yet identified areas where these measures would be necessary. Therefore, **we recommend:**

- **In order to identify locations where additional protection measures would be needed, and to inform compliance monitoring, Mountain Valley should file with the Secretary, the results of the pre-construction bald eagle nest and colonial rookery surveys prior to construction.**

4.6.4 Game Species

Big game species that may be present in the vicinity of the Project include white-tailed deer and wild turkey. Other game species, such as furbearers, game birds, and small game, may be found in the Project area. Furbearers include American beaver, common raccoon, gray fox, muskrat, red fox, and striped skunk. Small game species within the Project area include species such as eastern gray squirrel, fox squirrel, groundhog, and Virginia opossum. Game birds in the vicinity of the Project would potentially include both upland birds, such as the American woodcock and mourning dove, as well as waterfowl, such as the American black duck, American coot, blue- and green-winged teal, Canada goose, northern pintail duck, and sora.

4.6.4.1 Game Species Impacts and Mitigation

Impacts on game species would be similar to the general impacts on wildlife discussed previously. Following construction, game species could utilize the newly established rights-of-way for foraging and travel. Restored pipeline rights-of-way generally provide an opportunity for

developing high quality feeding areas for game species, especially if noxious weeds are adequately controlled and native forage seeding is successful. In general, large and small game species would be expected to return to habitats they vacated after construction and restoration efforts are completed, and harvest success rates would likely be similar to pre-construction success rates.

The new pipeline rights-of-way could increase access to remote hunting areas, which could result in increased hunting success. Increased public recreation along cleared rights-of-way in the hunting season, especially near crossings of existing access points, has been documented elsewhere (Crabtree, 1984). This increased access to previously inaccessible hunting areas could also result in trespassing on private lands, and an increase of poaching of game and non-game wildlife.

4.6.5 Fisheries and Aquatic Resources

The Project would cross freshwater waterbodies, including perennial, intermittent, and ephemeral streams. No marine or estuarine waterbodies would be crossed or affected by the Project. Refer to section 4.3 for additional information regarding waterbodies; table 4.3-4 summarizes the waterbodies crossed by the Project. As described in section 4.3.2.1, constructing and operating the Project would require 224 waterbody crossings, many of which provide aquatic habitat and support fisheries. The H-650 pipeline would cross 125 perennial waterbodies but the H-605 pipeline would not cross any perennial waterbodies.

The character of fisheries and aquatic habitats are typically influenced by water temperature (warmwater or coldwater), fishing uses (commercial or recreational), and migration patterns (anadromous and catadromous fish species). Warmwater streams are generally capable of supporting a high diversity of fish assemblages, including suckers, sunfishes, and catfishes, and other species that are able to tolerate water temperatures greater than 68°F. The Project would only cross warmwater fisheries. In addition to supporting fisheries, crossed waterbodies support other aquatic species including mussels and other invertebrates. Fish and aquatic species commonly found in the waterbodies crossed by the Project are listed in table 4.6-3.

TABLE 4.6-3

Typical Fish and Aquatic Species within the Southgate Project areas a/

Fish
bowfin, central stoneroller, American shad, American eel, blue ridge sculpint, redbreast sunfish, rosyside dace, mountain redbelly dace, white catfish, pirate perch, white sucker, yellow bullhead, brown bullhead, flier, satinfin shiner, whitefin shiner, gizzard shad, bluespotted sunfish, creek chubsucker, redfin pickerel, chain pickerel, swamp darter, Johnny darter, tessellated darter, sawcheek darter, cutlip minnow, speckled killifish, eastern mosquitofish, eastern silvery minnow, northern hog sucker, longnose gar, green sunfish, pumpkinseed, warmouth, bluegill, white shiner, crescent shiner, blueside shiner, largemouth bass, spotted sucker, white perch, striped bass, blacktip jumprock, notchlip redhorse, golden redhorse, shorthead redhorse, bluehead chub, bull chub, golden shiner, whitemouth shiner, highfin shiner, comely shiner, redtip shiner, spottail shiner, coastal shiner, swallowtail shiner, orangefin madtom, margined madtom, yellow perch, piedmont darter, chainback darter, shield darter, black crappie, eastern blacknose dace, brassy jumprock, creek chub, eastern mudminnow

TABLE 4.6-3

Typical Fish and Aquatic Species within the Southgate Project areas a/

Freshwater Mussels
Carolina lance, eastern elliptio, northern lance, variable spike, box spike, Atlantic spike, lake fingernailclam, swamp fingernail clam, pond fingernail clam, long fingernail clam, Adam peaclam, ridgedback peaclam, ubiquitous peaclam, triangular peaclam, eastern floater, river fingernail clam, Herrington fingernail clam, grooved fingernail clam, striated fingernail clam, eastern pondhorn, paper pondshell
Invertebrates - Crayfish
acuminate crayfish, Carolina ladie crayfish, devil crayfish, rocky river crayfish, sandhills spiny crayfish, variable crayfish, Atlantic slope crayfish, sickle crayfish, digger crayfish, white river crayfish, red swamp crayfish, Carolina sandhills crayfish, Croatan crayfish
Sources:
NCNHP 2016; 2018a; NCWRC 2015; VADGIF 2015, 2018
a/ Typical fish and aquatic species; list is not intended to be comprehensive.

4.6.5.1 Fisheries of Special Concern

Federally or state-listed endangered, threatened, or candidate fish or aquatic species, coldwater fisheries, and fisheries with significant economic value resulting from the presence fish stocking programs, or commercial harvesting are all considered fisheries of special concern. In the Commonwealth of Virginia, the VADEQ has water use classifications that include propagation and growth of a balanced indigenous population of aquatic life. In North Carolina, NCDEQ designated Outstanding Resource Waters based on the functional value and use of a waterbody. Federally or state-listed endangered, threatened, or candidate fish and aquatic species are addressed in section 4.7.

The Project would cross 21 perennial waterbodies containing fisheries of special concern: 2 in Virginia, and 19 in North Carolina. Recreational fishing is a large economic driver in both Virginia and North Carolina. However, the Project would not cross any trout waterbodies or coldwater fisheries and the Project would not directly affect fishing rivers or streams suggested by the VADGIF (VADGIF, 2019a) or fishing access locations suggested by the NCWRC (NCWRC, 2019a). Therefore, aside from potential temporary disruptions of fishing in the vicinity of the waterbody crossings during construction, we do not expect the Project to incur more than minor and temporary impacts on recreational fisheries in Virginia or North Carolina. Table 4.6-4 summarizes the crossings of waterbodies containing fisheries of special concern, including waterbody name, location, fishery of special concern, and crossing restrictions.

TABLE 4.6-4

Fisheries of Special Concern Crossed by Southgate Project

County	MP	Waterbody ID	Stream Name	Proposed Crossing Method	Fishery Type	Restricted In-stream Construction Window a/
Virginia						
Pittsylvania	4.9	S-E18-3	Banister River	Dry Crossing	Potential Occurrence of Freshwater Mussels	July 16 – April 14 b/
	17.7	S-E18-44	Sandy River	Dry Crossing	Potential Occurrence of Freshwater Mussels	July 16 – April 14 b/
North Carolina						
Rockingham	27.3	S-A18-42	UNT Cascade Creek	Dry Crossing	Potential Occurrence of Protected Freshwater Mussel and Fish Species	None c/
	27.5	S-A18-40	Cascade Creek	Conventional Bore	Potential Occurrence of Protected Freshwater Mussel and Fish Species	None c/
	27.5	S-A19-273	Dry Creek	Conventional Bore	Potential Occurrence of Protected Freshwater Mussel and Fish Species	None c/
	30.1	S-A18-17	Dan River	HDD	Potential Occurrence of Protected Freshwater Mussel and Fish Species	None c/
	31.3	S-B18-95	Rock Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	32.2	S-A18-147	Machine Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	32.7	S-A18-153-	UNT Town Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	32.7	S-A18-151	Town Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	38.8	S-A18-8	Wolf Island Creek	Conventional Bore	Potential Occurrence of Protected Freshwater Mussel and Fish Species	None c/
	41.2	S-B18-56	Lick Fork	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	43.3	S-A18-176	Jones Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	47.0	S-C18-76	Hogans Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	48.7	S-A18-60	Giles Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
Alamance						
	52.7	S-B18-94	UNT Haw River	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	53.7	S-A18-84	UNT Haw River	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/

TABLE 4.6-4

Fisheries of Special Concern Crossed by Southgate Project

County	MP	Waterbody ID	Stream Name	Proposed Crossing Method	Fishery Type	Restricted In-stream Construction Window a/
	58.7	S-C18-11	UNT Haw River	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/
	63.6	S-B18-16	Stony Creek Reservoir	HDD	Potential Occurrence of Freshwater Mussels	None c/
	64.1	S-A19-331	Deep Creek	Conventional Bore	Potential Occurrence of Freshwater Mussels	None c/
	67.6	S-A18-233	Boyds Creek	Dry Crossing	Potential Occurrence of Freshwater Mussels	None c/

Note: MP listed for access roads is nearest pipeline MP.

a/ Restricted In-Stream Construction Windows are the date ranges in which in-water construction is allowed to occur.

b/ As stipulated by VADGIF; July 16 – April 14 is the VADGIF mandated warmwater habitat construction window; in-water work, except that required to install or remove equipment bridges, must be completed between these dates in Virginia waterbodies.

c/ Based on the results of aquatic surveys at the proposed waterbody crossings, NCWRC will not request any time-of-year restrictions for construction in the waterbodies crossed by the Southgate Project (contingent on Mountain Valley using HDD or conventional bore crossing methods for the waterbodies noted as such within this table).

Virginia's Marine Resources Commission (VMRC) notified the Commission that it will exert its jurisdiction over all proposed crossings of perennial streams with a drainage area equal to or greater than 5 square miles or with a mean annual in-stream flow of 5 cubic feet per second. This jurisdiction is based on the state of Virginia's ownership of submerged lands (Code of Virginia Title 28.2, Subtitle III, Chapter 12, Article 1, § 28.2-1204) and is administered under its Submerged Lands Permit (see table 1.4-1). Eight proposed crossings in Virginia fit these parameters: Little Cherrystone Creek (MP 0.4), Cherrystone Creek (MP 1.7), Banister River (MP 4.9), White Oak Creek (MPs 5.0, 5.1), Sandy Creek (MP 12.8), Sandy River (MP 17.7) and Trotters Creek (MP 23.2). The VMRC provides the following recommendations to protect freshwater aquatic resources at each of the VMRC jurisdictional stream crossings. The recommendations are standard VMRC in-stream permit conditions and, as noted in the sections below and other applicable sections of this EIS, will be followed by Mountain Valley.

- An HDD inadvertent release contingency plan must be provided for any crossings utilizing a directional drill crossing method.
- No in-stream construction shall be conducted during any recommended time-of-year restrictions of any year unless waived by VADGIF in writing.
- In-stream construction activities shall be accomplished during low flow periods utilizing dam-and-pump or flume methods; stream bottoms and adjacent lands shall be restored to their original contours and natural conditions within 30 days; and all excess materials shall be removed to an upland site and contained to prevent its reentry into state waters.
- Erosion and sediment control measures shall be in conformance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992, and shall be employed throughout construction.
- If blasting is necessary, at any of the crossings, VADGIF shall be notified a minimum of 48 hours in advance of the blasting.
- If karst landscape features are encountered at any stream crossings, VADCR shall be notified.
- VADGIF shall be contacted for any work in trout waters to avoid conflicts with trout stocking activities.

4.6.5.2 Fisheries of Special Concern Impacts and Mitigation

Impacts on fisheries of special concern would be the same as those described below for impacts on general fisheries and aquatic resources. Mountain Valley would implement erosion and sediment control BMPs described in its E&SC Plan at all crossings of waterbodies containing fisheries of special concern. Mountain Valley would also adhere to all federal and state permit conditions, including those regarding the minimization of impacts on fisheries of special concern including adhering to the recommended work window for in-water construction in Virginia (see

table 4.6-4; North Carolina agencies have stated no work windows would be required for in-water construction in North Carolina).

Mountain Valley would attempt to minimize impacts on fisheries by relocating all aquatic species, including fishes, freshwater mussels, crayfish, reptiles, and amphibians, from the construction areas. All fish and freshwater mussel relocations would be supervised by qualified, professional biologists in possession of applicable federal and/or state permits. The NCWRC stated it would confer with Mountain Valley regarding relocation methods once it reviews the results of Mountain Valley's aquatic species surveys. Standard protocols for mussel relocations in Virginia are outlined in the Freshwater Mussel Guidelines for Virginia (FWS and VADGIF, 2018). The methods stipulate that mussels within the direct project footprint or within imminent danger from project impacts may be relocated to suitable habitat. The direct Project footprint is defined as the area of potentially disturbed substrate, any zone of heavy equipment operation, plus the distance downstream that may experience significant sedimentation from construction. The guidelines further stipulate that the reach from which mussels should be relocated is at least 100 meters including the Project footprint. Suitable habitat is generally defined as an area upstream of the Project impacts that already harbors mussels. At least two relocation surveys are required. The first must occur within 30 to 45 days of in-stream construction activities and the second must occur within 30 days of in-stream construction activities and at least 7 days after the first relocation survey. If a protected species is found during the relocation surveys, additional surveys would be required until no protected species are found.

4.6.5.3 General Fisheries and Aquatic Resources Impacts and Mitigation

Constructing and operating the Project could temporarily impact fisheries and aquatic resources through physical hindrances or by creating inhospitable environmental conditions. Construction activities such as installing dams for dry waterbody crossings and culverts for access roads could disrupt the movement of indigenous aquatic life and species that normally migrate through the areas. However, Mountain Valley would use appropriate methods at waterbody crossings to maintain water flow conditions and allow fish passage. Mountain Valley would install appropriately-sized culverts, aligned with the natural stream flow direction, to allow fish passage, maintain low or normal water flow, and withstand any expected high flows. As discussed in greater detail below, sedimentation and turbidity, alteration or removal of in-stream and stream bank cover, stream bank erosion, introduction of water pollutants, water depletions, and entrainment of small fishes and fry during water withdrawals could increase the rates of stress, injury, and mortality experienced by fish and other aquatic life. In general, fish would migrate away from these activities. This displacement could lead to a temporary increase in competition for habitat and food and could affect fish survival and health. The degree of impact on fisheries from construction activities would depend on the waterbody crossing method, the timing of construction, and the characteristics of aquatic species present.

Sedimentation and Turbidity

Increased sedimentation and turbidity resulting from in-stream and adjacent construction activities could displace and impact fish and aquatic resources. Sedimentation could smother fish eggs and other benthic biota and alter stream bottom characteristics, such as converting sand, gravel, or rock substrate to silt or mud. These habitat alterations could reduce juvenile fish

survival, spawning habitat, and benthic community diversity and health. Increased turbidity could also temporarily reduce dissolved oxygen levels in the water column and reduce respiratory functions of in-stream biota. Turbid conditions could also reduce the ability for biota to find food sources or avoid prey. The extent of impacts from sedimentation and turbidity would depend on sediment loads, stream flows, stream bank and stream bed composition, sediment particle size, and the duration of the disturbances. Mountain Valley proposes to use dry crossing techniques for all waterbodies that would not be crossed using HDD or bore methods.

While several factors can influence the effectiveness of dry-ditch construction across waterbodies, if the crossings are properly installed and maintained during construction and restoration, the levels of sediment and turbidity produced are typically minor. A study conducted by the USGS (Moyer and Hyer, 2009) investigating the effects of dry-ditch waterbody crossings on downstream sediment loading found that short-term increases in turbidity downstream of construction did occur, but the magnitude of the increase was small and considered to be minimal compared to increased turbidity associated with natural runoff events. Other literature (e.g., Reid et. al., 2004) assessing the magnitude and timing of suspended sediment produced from dry-ditch crossing methods indicates the duration of increased sedimentation would be mostly short-term (i.e., less than 1 to 4 days) and remain near the crossing location (i.e., an approximate downstream distance of a few hundred feet).

Benthic invertebrates, some benthic fishes, and freshwater mussels could also be affected by elevated turbidity and suspended sediments. Aquatic invertebrates, including insect larvae, would generally be unable to avoid work areas. However, these areas would rapidly recolonize as a result of upstream drift and new egg deposition from adults within days to months (Brooks and Boulton, 1991; Matthaei and Townsend, 2000). As noted in section 4.6.5.2, Mountain Valley would relocate all aquatic species, including fishes, freshwater mussels, crayfish, reptiles, and amphibians, present in the waterbody crossing construction area under the direction of qualified, professional biologists in possession of applicable federal and/or state permits.

In addition to in-stream construction, runoff from disturbed areas adjacent to the stream can also generate in-stream turbidity. Mountain Valley would establish 50-foot construction buffers at all waterbody crossings using erosion and sediment control devices as approved by the VADEQ and NCDEQ and provided in its E&SC Plan. Mountain Valley would leave the vegetation within these buffers intact during the initial clearing of the upland right-of-way. Mountain Valley would hand-fell all trees within the buffer but would not remove the root systems or otherwise disturb the vegetation in the buffer. Mountain Valley would only clear the buffer areas immediately prior to construction commencing at the waterbody crossing and would stabilize the cleared buffer area immediately upon completing construction at the crossing. Waterbody crossings would be conducted by separate construction crews that specialize in stream and wetland crossings. Mountain Valley's use of HDD, bore, or dry crossing techniques and maintenance of riparian buffers would limit downstream sedimentation and turbidity resulting from in-stream and adjacent construction activities and thereby limit the potential impacts on fisheries and aquatic resources.

Inadvertent Releases during Horizontal Direction Drilling and Impacts of Conventional Boring

Conventional bore and HDD crossing methods both avoid direct impacts on waterbodies by boring underground to cross the waterbody instead of trenching through the streambed and banks. For both crossing methods, Mountain Valley would place boring locations outside of the waterbody and associated riparian area and no disturbance of the waterbody is required. Conventional bore and HDD crossing methods are proposed for crossings where sensitive fish or mussel species presence required the crossing to avoid waterbody disturbance. Further discussion of conventional bore impacts and mitigation are provided in section 4.3.2.2.

The HDD method could result in a release of drilling fluid into a waterbody. Although drilling fluid consists of non-toxic materials (see section 4.1.4.10), if inadvertently released into a waterbody, the drilling fluid could settle on the streambed and temporarily inundate bottom habitat. Benthic organisms and spawning and nursery habitat could be adversely affected by the settling of drilling fluids. Additionally, an inadvertent release of drilling fluid would result in turbidity and suspension of drilling fluids in the water column, affecting aquatic biota as described above for turbidity impacts. Mountain Valley would implement protocols provided in its *Horizontal Directional Drill Contingency Plan* to readily detect an inadvertent release of drilling fluid and take immediate action to minimize impacts on aquatic habitat.

Loss of Stream Bank Cover

Stream bank vegetation, large woody debris, rocks, and undercut banks are known cumulatively as riparian habitat. Riparian habitat provides valuable structure and opportunities for fish and stream biota. Open-cut crossings would temporarily remove shading over this habitat making the locations less suitable for aquatic biota. Consequently, fish and other stream biota would likely be displaced to similar habitat upstream or downstream of the pipeline crossing.

Mountain Valley would minimize clearing of trees and other riparian vegetation to include only what is necessary to construct and operate the Project safely. Mountain Valley would minimize impacts on riparian vegetation by narrowing the width of the standard construction rights-of-way at waterbody crossings to 75 feet, and would locate ATWS at least 50 feet from waterbody banks (Mountain Valley would be required to request deviations from the FERC Procedures where it is infeasible to do such). Once construction is complete, streambeds and banks would be stabilized and restored to pre-construction conditions to the fullest extent possible in compliance with Mountain Valley's Procedures.

Stream banks would be revegetated with native vegetation seed mixes based on the vegetative community present prior to construction. Mountain Valley would keep trees clear from a 10-foot-wide corridor directly over the pipeline, which would be mowed at a frequency sufficient to keep the corridor in an herbaceous state, and selectively remove trees as needed over a 30-foot-wide corridor to prevent tree roots from damaging the pipeline. However, trees could regenerate in the temporary construction work areas, allowing much of the ecological function of the riparian conditions (e.g., bank stabilization, filtration, shade, future large wood, and organic input) to return.

After construction and restoration, stream bank shrub and riparian tree species would be expected to re-establish over several months to a few years. Streambed biota, such as invertebrates that serve as food sources for fishes, would be expected to recolonize the affected areas within days to months (Brooks and Boulton, 1991; Matthaei and Townsend, 2000) or longer for some species (Wallace, 1990). Thus, impacts on stream banks should be mostly short-term, except within the permanent operational pipeline easement where the conversion of forest to shrub vegetation would be permanent. The recovery of riparian habitat in forested areas of temporary construction workspaces would be long-term because of the time it would take for trees to regenerate and mature.

Fuel and Chemical Spills

An inadvertent release of fuel or oil or other hazardous materials from construction equipment into waterbodies could impact fish and aquatic species. A leak of hazardous material into a waterbody could result in direct mortality to aquatic species, altered behavior, changes in physiological processes, or changes in food sources. In turn, ingestion of large numbers of contaminated fish or aquatic species could impact other species located higher in the food chain that prey on these biota.

Mountain Valley would implement its SPCC Plan, which would include preventive measures such as personnel training, equipment inspection, and refueling procedures to reduce the likelihood of spills, as well as mitigation measures such as containment and cleanup to minimize potential impacts should a spill occur. Adherence to the SPCC Plan would largely prevent a large spill from occurring near surface waters because construction equipment fueling and bulk hazardous material storage would be prohibited within 100 feet of the waterbody banks. In addition, portable equipment such as water pumps would be placed in secondary containment structures in order to contain any leaks or spills.

Hydrostatic Testing and Water Withdrawals

Mountain Valley proposes to use water from the Dan River as the primary water source for hydrostatic testing of the pipeline and dust control (see section 4.3.2.6). Mountain Valley estimates it would require about 3,600,000 gallons for Construction Spread 1 (MPs 0.0 to 30.4) and about 2,300,000 gallons for Construction Spread 2 (MPs 30.4 to 73.2). If required, additional water would be acquired from approved municipal sources. Mountain Valley would minimize crushing, entrainment, or impingement of mussels and fishes associated with water intake pumps by following guidance from VADEQ pertaining to screen size and through-screen intake velocity protective of aquatic organisms. Mountain Valley would use temporary floating, screened intake pumps with screen mesh sizes no larger than 0.039 inches and intake velocities of 0.25 feet per second or less. Mountain Valley would also withdraw no more than 10 percent of the instantaneous flow rate from source waterbody, which would in part serve to minimize downstream impacts if the withdrawals are conducted during low flow conditions.

Mountain Valley would minimize impacts from water withdrawals by adhering to the measures in Mountain Valley's Procedures and E&SC Plan. The measures outlined in these plans prohibit water withdrawal from and discharges into exceptional value waters or waters that provide habitat for federally listed threatened and endangered species, unless approved by applicable

resource and permitting agencies; therefore, Mountain Valley is coordinating with the FWS to obtain written concurrence to use the Dan River as a water source. Other measures include screening and positioning water intakes at the water surface to minimize the entrainment of fish and other biota; maintaining adequate flow rates to protect aquatic species; placing water pumps in secondary containment devices to minimize the potential for fuel spills or leaks; regulating discharge rates; and using energy dissipating devices and sediment barriers to prevent erosion. Mountain Valley would obtain and comply with all state water withdrawal and discharge permits.

Blasting

The effects of blasting on aquatic biota varies by species (Yelverton et al., 1975), but generally relatively small organisms and those close to the blast or near the sediment surface experience higher mortality (Yelverton et al., 1975; Munday et al., 1986). Non-lethal effects may include eye distension, hemorrhage, hematuria, and damage to bodily systems (Hastings and Popper, 2005; Godard et al., 2008; Carlson et al., 2011; Martinez et al., 2011).

Mountain Valley would attempt to avoid blasting during waterbody crossings. If blasting is deemed necessary, Mountain Valley would follow the measures outlined in its *General Blasting Plan* including isolating the work area from the surrounding waterbody prior to setting off charges. That plan indicates that Mountain Valley would prepare and implement Project-specific blasting plans, in coordination with federal and state agencies, to minimize impacts on aquatic species. The locations where blasting would potentially be necessary are discussed in section 4.1.4.7.

4.6.6 Wildlife and Fisheries Conclusions

Mountain Valley would minimize impacts on wildlife and habitat by following the measures outlined in its Plan and Procedures, and other BMPs, by routing the pipeline to minimize impacts on sensitive areas, collocating the pipeline with other rights-of-way where feasible, and reducing the construction right-of-way through wetlands. Based on our review of the potential impacts discussed above, we conclude that constructing and operating the Project would not significantly impact wildlife, terrestrial habitats, migratory birds, or fisheries and aquatic resources.

4.7 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Special status species are afforded protection by law, regulation, or policy by federal and/or state agencies. For the purposes of this EIS, special status species include federally listed species that are protected under the ESA or are proposed for such listing by the FWS; federal species of concern; and species that are state-listed as threatened, endangered, or have been given certain other state designations.

Impacts on endangered, threatened, and other special status species would be similar to those listed in section 4.6 for wildlife and aquatic species. However, impacts on special status species may be greater than impacts on other wildlife and vegetation because these species may be more sensitive to disturbance; more specific to a habitat; and less able to move to unaffected suitable habitat since such habitat may not be available within a reasonable proximity, may not be

available at all, or may exist only in small tracts. Potential impacts that could affect the conservation needs of a species or decrease the viability of a population include habitat fragmentation, loss, or degradation; decreased breeding or nesting success; increased predation or decreased food sources; and injury or mortality.

4.7.1 Federally Listed Threatened, Endangered, and Other Species of Concern

Federal agencies are required by the ESA Section 7(a)(2) to ensure that any action authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed threatened or endangered species or species proposed for listing, or result in the destruction or adverse modification of designated critical habitat. As the lead federal agency, the FERC is responsible for determining whether any federally listed endangered or threatened species or any of their designated critical habitats are near the proposed action, and to determine the proposed action's potential effects on those species or critical habitats. None of the waters crossed by the Project are managed by the National Marine Fisheries Service (NMFS). Consequently, consultation with the NMFS is not required.

For actions involving major construction activities with the potential to affect listed species or critical habitats, the lead federal agency must prepare a BA. The lead federal agency must submit its BA to the FWS and, if it is determined that the action may adversely affect a federally listed species, the lead agency must submit a request for formal consultation to comply with Section 7 of the ESA. We have determined that the Project would not be likely to adversely affect any listed species. We are submitting this EIS as our final BA and requesting concurrence from the FWS for our determinations of effect for federally listed species potentially affected by the Project in accordance with Section 7 of the ESA.

Mountain Valley informally coordinated with the FWS regarding federally listed species and designated critical habitat in the Project areas. Mountain Valley also communicated with the VADCR-DNH, VADGIF, NCNHP, and NCWRC. Based on these communications and a review of the FWS' Information for Planning and Conservation (IPaC) database and other publicly available information, eight federally listed or otherwise sensitive species were identified as occurring or possibly occurring in the Project areas. Table 4.7-1 lists the federally threatened, endangered, and other federal species of concern that are known to occur or could occur within the Project areas. None of the identified species have designated critical habitat in the Project area.

The Project would not affect any federally threatened, endangered, or special status species of birds. Bald and golden eagles are not listed species under the ESA; however, they are protected under the MBTA and BGEPA. Federal protection of bald and golden eagles and their presence in the vicinity of the Project is discussed in section 4.6.1.1.

TABLE 4.7-1

Federal Endangered, Threatened, or Other Special Status Species Known to Occur or Potentially Occurring in the Southgate Project Area a/, b/

Common Name	Scientific Name	Status b/	Determination of Effect
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	T	Not Likely to Adversely Affect
Fish			
Roanoke logperch	*Percina rex*	E	Not Likely to Adversely Affect
Mussels			
Atlantic pigtoe	*Fusconaia masoni*	PT	Not Likely to Adversely Affect
Green floater	*Lasmigona subviridis*	SC	Adverse impacts are not likely
James spinymussel	*Pleurobema collina*	E	Not Likely to Adversely Affect
Yellow lampmussel	*Lampsilis cariosa*	SC	Adverse impacts are not likely
Plants			
Small whorled pogonia	*Isotria medeoloides*	T	Not Likely to Adversely Affect
Smooth coneflower	*Echinacea laevigata*	E	Not Likely to Adversely Affect

Sources: NCNHP, 2016; NCNHP, 2017; NCWRC, 2015; Roble, 2016; Townsend, 2018; VADGIF, 2015.

a/ Nine additional listed species were noted by federal and state agencies as potentially being present in the Project counties; however, the species are not known to occur in the portions of the counties that would be crossed by the Project and they are therefore not listed in this table. The species are listed here: Cape Fear shiner (*Notropis mekistocholas*), eastern big-eared bat (*Corynorhinus rafinesquii macrotis*), eastern small-footed bat (*Myotis leibii*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii rafinesquii*), Schweinitz's sunflower (*Helianthus schweinitzii*), southeastern bat (*Myotis austroriparius*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and yellow lance (*Elliptio lanceolata*).

b/ E = Listed Endangered; T = Listed Threatened; PT = Proposed Threatened; SC = Species of Concern .

4.7.2 Mammals

4.7.2.1 Northern Long-eared Bat

The northern long-eared bat is federally threatened and state threatened in Virginia. The current range includes Pittsylvania County but does not extend into Rockingham or Alamance Counties (FWS, 2019). It hibernates during the winter in small crevices and cracks within caves and mines with constant temperatures, high humidity, and no air currents. In the summer, the northern long-eared bat roosts singly or in colonies beneath the bark or in cavities or crevices of live and dead trees (snags). Males and non-reproductive females may also roost in caves or mines during the summer. As previously described, the Project would involve the clearing of forest, which has the potential to affect sensitive bat species and their habitat, including roosting trees and hibernacula. Generally, construction activities and noise/vibrations from equipment also has the potential to disturb nearby roosting and hibernating bats.

In January of 2016, the FWS finalized a rule under authority of Section 4(d) of the ESA that provides measures that are necessary and advisable to provide for the conservation of the

northern long-eared bat. The rule prohibits purposeful take[22] of the species throughout its range except to remove it from human structures or to otherwise protect human health or property. The rule generally allows incidental take of northern long-eared bats in Virginia[23] but prohibits incidental take in the following circumstances:

- actions are prohibited if they cause take of bats within the hibernacula or alter the environment of a hibernacula in a manner that causes incidental take;
- tree removal activities are prohibited at any time of year within 0.25 mile of the entrance/exit of a known, occupied hibernacula; and
- tree removal activities are prohibited from destroying a known, occupied maternity roost tree, or any tree within a 150-foot radius of a maternity roost tree, between June 1 and July 31 (all tree removal activities may resume outside of this date range, including removal of the maternity roost tree).

No hibernacula or maternity roosts are known to be present in the vicinity of the Project. However, the FWS requested that Mountain Valley conduct surveys in the Project area to augment bat occurrence data in this region. Mountain Valley conducted desktop and targeted field surveys for bats in 2018. Mountain Valley's *Bat Survey Study Plan* was approved by the FWS, VADGIF, and NCWRC in July of 2018 and Mountain Valley conducted targeted mist net and acoustic surveys during July and August of 2018. No federally listed bat species were documented during these surveys in Virginia or North Carolina.

Mountain Valley also conducted searches for bat portals (entrances to hibernacula) in the vicinity of the Project area between June 2018 and August 2019. Mountain Valley was granted access by landowners to approximately 94 percent of the Project area in Virginia and 92 percent of the Project area in North Carolina. No potential hibernacula were documented during these portal surveys, but approximately 3.2 miles of the Project route has not been surveyed to date due to lack of access permission. Mountain Valley conducted desktop surveys of these areas and found no suitable hibernacula habitat. Mountain Valley will continue to seek access to the unsurveyed areas and provide any subsequent reports to FWS, VADGIF, NCWRC, and FERC upon completion. Given that there are no known hibernacula and maternity roosts in the survey area, the lack of suitable habitat in unsurveyed areas, and with the application of the 4(d) rule for this species, we have determined that the Project *may affect but is not likely to adversely affect* the northern long-eared bat.

[22] From Section 3(18) of the Federal Endangered Species Act: "The term 'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

[23] Virginia and North Carolina are within the portion of the United States that is designated under the final 4(d) rule as the white-nose syndrome (WNS) zone (i.e., U.S. counties within 150 miles of positive counties/districts containing WNS-infect hibernacula). As of May 31, 2018, the WNS zone encompassed the entire northeast, upper Midwest, and much of the southeast United States (FWS, 2018b). WNS is a fungal disease that affects many hibernating U.S. bat species. WNS has resulted in 90 to 100 percent mortality in bats affected by the disease in the eastern United States. The final 4(d) rule allows incidental take outside of the white-nose syndrome zone and specifies conditions in which incidental take is prohibited inside of the zone.

4.7.3 Fish

4.7.3.1 Roanoke Logperch

The Roanoke logperch (*Percina rex*) is federally endangered and state-endangered in Virginia and North Carolina. It is known to occur in Pittsylvania County in Virginia and Rockingham County in North Carolina (FWS, 2019). Roanoke logperch typically exist in low-density populations and inhabit medium-to-large sized warm, clear streams and small rivers of moderate to low gradient. Adults usually occupy riffles, runs, and pools containing sand, gravel, or boulders that are free of silt. Young-of-year congregate in mixed-species schools in shallow habitat underlain by sand and gravel along stream margins (FWS, 2015).

Roanoke logperch are not known to occur in any of the waterbodies that would be crossed by the Project in Virginia. The FWS and VADGIF advised Mountain Valley that fish surveys within waterbodies that would be crossed in Virginia would not be required (VADGIF, 2019b). The Project would cross three waterbodies in Rockingham County that are known to contain Roanoke logperch (Dan River, Cascade Creek, and Wolf Island Creek) and Mountain Valley proposes to use water from the Dan River as the primary water source for hydrostatic testing of the pipeline and dust control (see section 4.3.2.6). Impacts on Roanoke logperch could result from in-water work that would result in turbidity and downstream sedimentation in streams that contain suitable habitat or from crushing, entrainment, or impingement during water withdrawals. Mountain Valley is assuming Roanoke logperch are present in the three aforementioned waterbodies and is currently proposing to use HDD to cross the Dan River and conventional bore techniques to cross Cascade and Wolf Island Creeks, both of which would avoid any direct impacts on the waterbody and aquatic habitat. The NCWRC advised Mountain Valley that as long as the Dan River, Cascade Creek, and Wolf Island Creek are crossed using HDD or conventional bore, no time-of-year restrictions for construction would be required for these waterbodies or any other waterbody crossings in North Carolina. Sections 4.6.5.3 and 4.3.2.7 discuss the impacts on aquatic species from conventional bores and HDD crossing methods and the steps Mountain Valley would take to minimize such impacts. Mountain Valley has developed an *HDD Contingency Plan* detailing methods it would follow to reduce the likelihood of an IR affecting aquatic habitat or minimize the impacts associated with a potential drilling fluid release within a waterbody. We find this Plan acceptable. Mountain Valley is coordinating with the FWS to obtain written concurrence from the agency to use the Dan River as a water source Section 4.6.5.3 describes the measures Mountain Valley would implement during water withdrawals to avoid or minimize impacts on Roanoke logperch and other aquatic species.

We received a comment from the FWS regarding whether the Project would impact waterbodies containing protected species by crossing tributaries upstream of these waterbodies but within close enough proximity to allow sedimentation from the crossings to reach the waterbodies. The Project would cross tributaries upstream of the Dan River, Cascade Creek, and Wolf Island Creek. Mountain Valley would cross the tributaries using open-cut, dry-ditch crossing methods (dam-and-pump or flume method). In-stream construction can cause sedimentation and turbidity, which could negatively impact the aquatic biota downstream of the crossings. However, as noted in section 4.6.5.3, studies by USGS (Moyer and Hyer, 2009) and others (e.g., Reid et. al., 2004) indicate the effects of dry-ditch waterbody crossings on downstream sediment loading are generally short-term in duration (i.e., less than 1 to 4 days) and remain near the crossing location

(i.e., an approximate downstream distance of a few hundred feet). The closest crossing of a tributary to the Dan River, Cascade Creek, or Wolf Island Creek would be upwards of 1,350 feet (or approximately 0.25 mile); therefore, we do not anticipate crossings of tributaries upstream of these waterbodies would impact Roanoke logperch or other aquatic species.

In general, upland construction has the potential to result in additional sedimentation in watersheds that contain Roanoke logperch. Additional sedimentation has the potential to alter Roanoke logperch habitat and result in adverse impacts on individuals (see section 4.6.5.3). During construction, Mountain Valley would implement erosion and sediment control measures described in Mountain Valley's Plan and Procedures as well as its E&SC Plan which were designed in coordination with Virginia and North Carolina state resource agencies. Mountain Valley's Plan and Procedures contain performance-based standards for erosion control measures that are designed to keep sediment from leaving the right-of-way and thereby minimize sediment runoff into nearby streams and tributaries. Mountain Valley would use sediment barriers along sloped sections of the construction right-of-way and maintain 50-foot construction buffers at all waterbody crossings. Mountain Valley would maintain vegetation within the buffers intact during the initial clearing of the upland right-of-way. Mountain Valley would only clear the buffer areas immediately prior to construction commencing at the waterbody crossing, and would stabilize the cleared buffer area immediately upon completing construction at the crossing.

Given the trenchless methods proposed to cross Roanoke logperch waterbodies, and Mountain Valley's implementation of measures as described in its Plan and Procedures to prevent upland erosion and runoff into streams and as described in its *HDD Contingency Plan* to protect aquatic habitat from the potential negative effects of an IR, we have determined the Project *may affect but is not likely to adversely affect* the Roanoke logperch.

4.7.4 Mussels

4.7.4.1 James Spinymussel

The James spinymussel is federally endangered and state-endangered in Virginia and North Carolina (FWS, 2019; NCNHP, 2016; Roble, 2016). It is a small mussel (less than 3 inches in length) found in clear, free-flowing streams that are free of silt (FWS, 2019). The James spinymussel is only known to occur in Rockingham County, in the Dan River and its tributaries (FWS, 2019).

4.7.4.2 Atlantic Pigtoe

The Atlantic pigtoe is proposed for listing as threatened under the ESA and is listed as state threatened in Virginia and state-endangered in North Carolina (FWS, 2019; NCNHP, 2016; Roble, 2016). Critical habitat is also proposed for the species in Virginia and North Carolina including within the Dan River; however, the Project would not cross the portion of the Dan River that is proposed as critical habitat nor any of the other waterbodies proposed as critical habitat (FWS, 2019). The Atlantic pigtoe is a small (less than 2 inches in length) mussel typically found in gravel and coarse sand in silt-free, moderate-flowing creeks and rivers (FWS, 2018e). It has been documented in Pittsylvania, Rockingham, and Alamance Counties but it is not known to occur in the sections of waterbodies that would be crossed by the Project (FWS, 2019).

4.7.4.3 Green Floater

The green floater is a federal species of concern and is listed as state threatened in Virginia and endangered in North Carolina (FWS, 2019; NCNHP, 2016; Roble, 2016). It is a small mussel (less than 2 inches in length) found in sand and gravel substrates of clean, calm portions of streams and rivers (NCWRC, 2019b; VADGIF, 2015). It has been documented in Pittsylvania and Rockingham counties but is not known to occur in waterbodies crossed by the Project (FWS, 2019; NCWRC, 2019b).

4.7.4.4 Yellow Lampmussel

The yellow lampmussel is a federal species of concern and is listed as a state species of very high conservation need in Virginia and endangered in North Carolina (FWS, 2019; NCNHP, 2016; Roble, 2016). It is not known to occur in Pittsylvania County (FWS, 2019) but has been recorded in Deep Creek in Alamance County upstream of the proposed Project crossing (NCWRC, 2018c). The yellow lampmussel occurs in many different habitat types; however, it is most often found in sandy substrate downstream of large boulders in medium sized rivers and medium-to-large sized creeks with relatively fast flow (NCWRC, 2019c).

4.7.4.5 Mussels Summary

Mountain Valley conducted surveys between April and October in 2019 for freshwater mussels consistent with FWS and NCWRC guidance and the VADGIF Draft Freshwater Mussel Survey Guidelines for Virginia. Based on direction from the VADGIF and NCWRC, Mountain Valley conducted mussel surveys in the Banister and Sandy rivers in Virginia and at 19 waterbody crossings within the Dan and Haw River basins in North Carolina. Survey protocols stipulated that surveys be conducted throughout a 30-meter zone encompassing the area of direct impact of the waterbody crossing and extend 100 meters upstream and 300 meters downstream of the area of direct impact, for a total surveyed area of 340 meters. Live mussels were observed in the Banister River, Dan River, an unnamed tributary to the Haw River, Stony Creek Reservoir, and Boyds Creek; however, no federally listed mussel species were documented during the surveys (table 4.7-2; ESI, 2019a, b). Surveyors did not observe any live or deadshell mussels within any of the other waterbodies that were surveyed.

TABLE 4.7-2

Results of Freshwater Mussel Surveys Conducted at Southgate Project Waterbody Crossings in Virginia and North Carolina in 2019

County	MP	Stream Name	Protected Mussels Observed
Virginia			
Pittsylvania	4.9	Banister River	No **a/**
Pittsylvania	17.7	Sandy River	No
Rockingham	27.3	UNT to Cascade Creek	No
Rockingham	27.5	Cascade Creek	No
Rockingham	30.1	Dan River	No **a/**
Rockingham	31.3	Rock Creek	No
Rockingham	32.2	Machine Creek	No

TABLE 4.7-2

Results of Freshwater Mussel Surveys Conducted at Southgate Project Waterbody Crossings in Virginia and North Carolina in 2019

County	MP	Stream Name	Protected Mussels Observed
North Carolina			
Rockingham	32.7	Town Creek	No
Rockingham	33.0	Town Creek	No
Rockingham	38.8	Wolf Island Creek	No
Rockingham	41.2	Lick Fork	No
Rockingham	43.3	Jones Creek	No
Rockingham	47.0	Hogan's Creek	No
Rockingham	48.7	Giles Creek	No
Rockingham	50.8	UNT to Haw River	No **a/**
Alamance	52.7	UNT to Haw River	No
Alamance	53.7	UNT to Haw River	No
Alamance	58.7	UNT to Haw River	No
Alamance	63.6	Stony Creek Reservoir	No **b/**
Alamance	64.1	Deep Creek	No
Alamance	67.6	Boyds Creek	No **a/**

a/ eastern elliptio (*Elliptio complanata*) mussels, which are not protected at the federal or state level, observed during surveys.

b/ paper pondshell (*Utterbackia imbecillis*) mussels, which are not protected at the federal or state level, observed during surveys.

In general, impacts on mussels could result from turbidity and habitat alteration from in-water work and sedimentation caused by runoff from upland construction. These potential impacts are more fully described in the aquatic and fisheries discussion in section 4.6.5.3. Although no protected mussels were found during surveys, Mountain Valley would avoid in-water construction impacts on the Dan River by using the HDD crossing method and in Deep Creek by using conventional bore to install the pipeline. Mountain Valley's *HDD Contingency Plan* details methods it would follow to reduce the likelihood of an IR affecting aquatic habitat or minimize the impacts associated with a potential drilling fluid release within the Dan River. Sections 4.6.5.3 and 4.3.2.7 discuss the impacts on aquatic species from HDD and conventional bores and provides steps Mountain Valley would take to minimize such impacts. Section 4.6.5.3 discusses measures Mountain Valley would implement during water withdrawals from the Dan River, should the FWS not object, to avoid impacts on mussels and other aquatic species.

Mountain Valley would relocate non-listed mussels observed during the aquatic surveys in 2019. If previously undocumented protected species are found during the relocation surveys, Mountain Valley would coordinate with the FWS, VADGIF, and NCWRC to relocate the individuals as described in section 4.6.5.2 and conduct additional surveys until no further protected species are found.

Mountain Valley would further reduce potential impacts on freshwater mussels downstream of crossings by implementing measures in its Plan, Procedures and E&SC Plan. These include the measures described in section 4.7.3.1 to minimize downstream sedimentation and turbidity associated with construction in uplands and at the waterbody crossings, which can lead to, among other things, smothering of mussels (see section 4.6.5.3). With implementation of the measures described here and in the noted sections and given that no listed or sensitive mussel

species were documented during the surveys conducted at the waterbody crossings throughout the Project area, we have determined that the Project *may affect, but is not likely to adversely affect* the James spinymussel and the Atlantic pigtoe. We also determine that adverse impacts on the green floater and yellow lampmussel are unlikely.

4.7.5 Plants

4.7.5.1 Small Whorled Pogonia

The small whorled pogonia (*Isotria medeoloides*) is federally threatened, state-endangered in Virginia, and threatened in North Carolina. It is a member of the orchid family and occurs on upland sites in mixed-deciduous or mixed-deciduous/coniferous forests that are generally in second- or third-growth successional stages. Where it is found, populations are typically small, consisting of less than 20 plants (FWS, 1992).

Correspondence with the FWS indicated small whorled pogonia might be present within the Project area in Rockingham and Alamance Counties and recommended that Mountain Valley conduct surveys for the species (FWS, 2018c, 2018d). If small whorled pogonia occurs in the Project right-of-way, it could be vulnerable to removal during clearing and grading, or trampling and crushing by foot traffic or movement of heavy machinery. Right-of-way clearing could also adversely affect small whorled pogonia habitat by altering light exposure or hydrology or by increasing sedimentation and runoff in the vicinity of the right-of-way. The nearest documented occurrence to the Project area is in Guilford County, North Carolina (NCNHP, 2019a). Mountain Valley identified approximately 271 acres of potentially suitable habitat in the Project area using desktop Geographic Information System (GIS) analysis and soils data. Mountain Valley conducted field surveys of approximately 125.7 acres of potential small whorled pogonia habitat in 2018 and approximately 72.3 acres of potential small whorled pogonia habitat in 2019, including new areas resulting from Project reroutes and areas that were previously inaccessible due to lack of access permission. Field surveyors documented a total of approximately 45.0 acres of suitable habitat for small whorled pogonia. No small whorled pogonia plants were observed. However, approximately 14.7 acres were surveyed outside of the optimal survey window for the plant. Therefore, Mountain Valley documented where suitable habitat may occur and will conduct surveys at these locations in 2020 during the appropriate survey window (mid-May through early-July). If surveyors document the presence of small whorled pogonia during the 2020 surveys, Mountain Valley will consult with the FWS regarding appropriate avoidance and minimization measures to implement for the Project. Due to Mountain Valley's commitment to follow minimization measures required by FWS if individuals are found during the 2020 surveys, we have determined that the Project *may affect, but is not likely to adversely affect* the small whorled pogonia.

4.7.5.2 Smooth Coneflower

The smooth coneflower (*Echinacea laevigata)* is federally listed as endangered and state-listed as threatened in Virginia and endangered in North Carolina. It generally occurs in well-drained soils of open woods, cedar barrens, roadsides, clearcuts, utility line rights-of-way, and dry limestone bluffs (FWS 1995). This species is not known to occur in Virginia Project areas but

may be present in North Carolina, as it has been previously documented in Rockingham County (FWS, 2019; NCNHP, 2019a).

The FWS recommended surveys for the smooth coneflower along the North Carolina portion of the Project area (FWS, 2018d). As with small whorled pogonia, smooth coneflower could be vulnerable to removal during clearing and grading, or trampling and crushing by foot traffic or movement of heavy machinery. Right-of-way clearing could also adversely affect smooth coneflower habitat by increasing sedimentation and runoff in the vicinity of the right-of-way. Mountain Valley identified approximately 88.3 acres of potentially suitable habitat in the Project area using desktop GIS and soils data. Mountain Valley conducted field surveys of approximately 57.4 acres of potential smooth coneflower habitat in 2018 and approximately 7.3 acres of potential smooth coneflower habitat in 2019 including new areas resulting from Project reroutes and areas that were previously inaccessible due to lack of access permission. No suitable habitat for smooth coneflower or smooth coneflower plants were documented. However, Mountain Valley was not able to survey approximately 2.1 acres with potentially suitable habitat due to a lack of access. Therefore, Mountain Valley plans to complete surveys for smooth coneflower in 2020. If surveyors document the presence of smooth coneflower during the 2020 surveys, Mountain Valley will consult with the FWS regarding appropriate avoidance and minimization measures to implement for the Project. Due to Mountain Valley's commitment to follow minimization measures required by FWS if individuals are found during the 2020 surveys, we have determined that the Project *may affect but is not likely to adversely affect* the smooth coneflower.

4.7.6 Federally Listed Threatened, Endangered, and Other Species of Concern Conclusions

Our determinations of effects described above are based on current information available for the species in the Project area. To date, Mountain Valley has not completed all surveys or provided survey results to the Commission for federally listed bat hibernacula, small whorled pogonia, or smooth coneflower along the Project survey corridor. Therefore, **we recommend that**:

- **Mountain Valley should <u>not begin</u> construction activities <u>until</u>:**

  a. Mountain Valley files with the Secretary the results of all outstanding biological surveys;

  b. the staff completes ESA consultation with the FWS; and

  c. Mountain Valley has received written notification from the Director of OEP that construction or use of mitigation may begin.

4.7.7 State-Listed and Special Concern Species

As identified in table 4.7-3, 12 species listed as either endangered or threatened in Virginia and/or North Carolina were identified as occurring or potentially occurring in the Project area. Eight of these are federal species and were previously discussed. An additional 15 species are identified as rare, significantly rare, species of concern, or species of greatest conservation need in

Virginia and/or North Carolina. In Virginia, species classified as rare or species of greatest conservation need do not have any legal status and are not afforded state protections. Similarly, in North Carolina, the NCWRC requires monitoring of species of special concern but there is no legal protection from take for these species. Nonetheless, Mountain Valley is currently consulting the Virginia and North Carolina resource agencies regarding avoidance and minimization measures for the different tiers of state-listed species.

TABLE 4.7-3

State-Listed Fish, Plant, and Wildlife Species Occurring or Potentially Occurring in the Southgate Project Area

Common Name	Scientific Name	Status	
		Virginia a/	North Carolina b/
Mammals			
Eastern red bat	*Lasiurus borealis*	W(IV)	
Eastern small-footed bat	*Myotis leibii*	W(I) c/	SC,SGCN c/
Hoary bat	*Lasiurus cinereus*	W(IV)	
Little brown bat	*Myotis lucifugus*	E c/	SR, SGCN
Northern Long-eared bat	*Myotis septentrionalis*	T	T, SGCN
Silver-haired bat	*Lasionycteris noctivagans*	W(IV)	
Tri-colored bat	*Perimyotis subflavus*	E	SR, SGCN
Fish			
Riverweed Darter	*Etheostoma podostemone*		SC
Roanoke logperch	*Percina rex*	E	E, SGCN
Amphibians			
Four-toed salamander	*Hemidactylium scutatum*		SC, SGCN
Mole salamander	*Ambystoma talpoideum*	W(II)	SC, SGCN
Mussels			
Atlantic pigtoe	*Fusconaia masoni*	T	E, SGCN c/
Eastern Creekshell	*Villosa delumbis*		SR,SGCN
Eastern Lampmussel	*Lampsilis radiata*		T, SGCN
Green Floater	*Lasmigona subviridis*	T	E, SGCN
James Spinymussel	*Parvaspina collina*	E c/	E, SGCN
Savannah lilliput	*Toxolasma pullus*		E, SGCN c/
Yellow Lampmussel	*Lampsilis cariosa*	W(II)	E, SGCN
Arthropods			
Carolina ladle crayfish	*Cambarus davidi*		SR
Greensboro burrowing crayfish	*Cambarus catagius*		SC, SGCN
Plants			
American Bluehearts	Buchnera americana	R	
Cliff Stonecrop	Sedum glaucophyllum		SR

TABLE 4.7-3

State-Listed Fish, Plant, and Wildlife Species Occurring or Potentially Occurring in the Southgate Project Area

Common Name	Scientific Name	Status	
		Virginia a/	North Carolina b/
Downy phlox	Phlox pilosa	R	
Piedmont Barbara's-button	Marshallia obovate var. obovate	R	
Small whorled pogonia	Isotria medeoloides	E c/	T
Smooth coneflower	Echinacea laevigata	T c/	E

Sources: Townsend, 2018; Roble, 2016; NCNHP, 2016; NCNHP, 2017; VADGIF, 2015; and NCWRC, 2015

a/ Virginia Status. E = Listed Endangered; T = Listed Threatened; R = Rare, including both Critically Imperiled and Imperiled state ranking; W (I) = Wildlife Action Plan, Tier I; W (II) = Wildlife Action Plan, Tier I; W (III) = Wildlife Action Plan, Tier III; W (IV) = Wildlife Action Plan, Tier IV

b/ North Carolina Status. E = Listed Endangered; T = Listed Threatened; SC = Species of Special Concern; SR = Significantly Rare; SGCN = Species of Greatest Conservation Need as listed in the Wildlife Action Plan

c/ Species not known to occur within the Project area (by State).

4.7.7.1 Mammals

Seven state-listed species of bats (including the federally threatened northern long-eared bat) potentially occur within the Project area. The little brown bat and tri-colored bat are both listed as endangered in Virginia. Each of the species potentially occur in Pittsylvania County and the little brown bat, eastern red bat, hoary bat, silver-haired bat, and tri-colored bat may also occur in Alamance and Rockingham counties. As noted in section 4.7.1, Mountain Valley conducted desktop and targeted field surveys for bats in Virginia and North Carolina in 2018. A single juvenile female tri-colored bat was captured during surveys in Virginia but otherwise no other state threatened or -endangered bat species were documented. No roost trees for tri-colored bats are known to occur in the Project area. Mountain Valley coordinated with the VADGIF to develop avoidance, minimization, or mitigation approaches to reduce potential impacts on state-listed bats and bat habitat. As part of these measures, Mountain Valley adjusted the layout of contractor yard CY-01 so that no workspaces would be within the Transco Road Net Conservation Area near MP 0.0. Additionally, Mountain Valley would restore all temporary access roads; allow previously forested temporary workspaces to naturally regrow as forest habitat; and only conduct maintenance mowing of the right-of-way between October 15 and April 1. Given the 2018 survey results thus far and Mountain Valley's planned efforts to avoid or minimize impacts on state-listed bats and bat habitat, we conclude the Project would not likely significantly impact state-listed bat species in Virginia or North Carolina.

4.7.7.2 Fish

Two state-listed fish species, the Roanoke logperch and the riverweed darter, potentially occur in the Project area. The Roanoke logperch is discussed in section 4.7.3. The riverweed darter is a species of special concern in North Carolina and is known to occur in Rockingham County within the Dan River watershed in clear, swift-flowing portions of waterbodies containing

medium sized gravel, rubble, or small boulders, especially among rocks covered with riverweed (*Podostemum ceratophyllum*) (Tracy, 2014). The Project could affect the riverweed darter by altering suitable habitat during construction at waterbody crossings and through turbidity and downstream sedimentation in streams that contain the species. As noted in section 4.7.3, Mountain Valley would cross the Dan River using HDD and Cascade and Wolf Island creeks using conventional bore. The NCWRC notified Mountain Valley that it would not require fish surveys but requested that any state-listed species or species of greatest conservation need encountered during freshwater mussel surveys be reported (NCWRC, 2018c). Given Mountain Valley's planned approach to use HDD or conventional bore to cross the waterbodies that may contain state-listed fishes and its adherence to measures within its *HDD Contingency Plan* and the measures referred to in section 4.3.2.7 to minimize impacts from conventional boring, we conclude the Project would not likely significantly impact state-listed fish.

4.7.7.3 Amphibians

Two state-listed amphibian species, the four-toed salamander and the mole salamander, potentially occur in the Project area. Both are species of special concern and species of greatest conservation need in North Carolina (NCWRC, 2015). The mole salamander is also listed as a Tier II species (very high conservation need) in the Virginia Wildlife Action Plan (VADGIF, 2015). The four-toed salamander was historically known to occur in Alamance County, is currently known to occur in Rockingham County, and is likely to occur in Pittsylvania County. Likewise, the mole salamander is known to occur in Rockingham and Pittsylvania counties. Though their local population levels are unknown, both species typically inhabit small wetland communities associated with headwaters in hardwood and mixed-species forests and seasonal (fish free) pools of floodplains within riparian forests (NCWRC, 2015; VADGIF, 2015).

Mountain Valley performed a desktop habitat assessment of the Project area in Rockingham and Alamance Counties to determine whether the right-of-way would cross suitable breeding habitat for the four-toed and mole-salamanders. Mountain Valley used aerial imagery to assess 157 wetlands and 297 streams that had been identified within the proposed Project right-of-way during aquatic resource surveys. Mountain Valley considered suitable four-toed salamander habitat as being comprised of areas with slow moving streams (either perennial or intermittent) connected with or in proximity to wetlands and large wetland complexes and flood plain areas with forested habitat potentially harboring standing water. Mountain Valley considered suitable mole salamander habitat as being comprised of seasonal or permanent ponds and wetlands in close proximity to mature forest with limited previous disturbance from human development such as roadways or agricultural fields. Based on these parameters, Mountain Valley determined that 75 wetlands, 5 ponds, and 55 streams could potentially provide breeding habitat for four-toed salamanders and 34 wetlands, 19 ponds and 8 streams could potentially provide breeding habitat for mole salamanders. Mountain Valley continues to consult with the NCWRC and VADGIF regarding the necessity of field surveys for four-toed and mole salamanders in the Project area.

Potential effects of the Project on these species would primarily occur during construction in areas with suitable habitat. Clearing of vegetation could alter habitat conditions making certain areas unsuitable. Additionally, large equipment and vehicles could injure or kill individuals. Because these species are mobile, they would likely avoid construction areas. Construction activities would be temporary and Mountain Valley would restore temporary work areas in these

habitat types to pre-construction conditions in accordance with Mountain Valley's Plan and Procedures. Although the Project could result in alteration of habitat and/or direct mortality of individuals unable to flee the work area, we conclude the Project would not significantly impact the mole and four-toed salamanders due to the short duration of construction activities in any one area and Mountain Valley's commitment to restore wetland and riparian areas to pre-construction conditions. Nonetheless, Mountain Valley continues to coordinate with the NCWRC and the VADGIF regarding the potential impacts of the Project on these two species.

4.7.7.4 Mussels

Three state-listed mussel species, in addition to the four species discussed in section 4.7.4, potentially occur in the Project area. The eastern creekshell and eastern lampmussel are both known to occur in Alamance County in the Haw River basin. The Savannah lilliput may also occur in the Haw River basin, but records for this species are very sparse. NCWRC requested that Mountain Valley include the Savannah lilliput as a species that could potentially be present within the Project area (NCWRC, 2018c). Potential impacts of the Project on mussels are described in section 4.7.4. As noted in 4.7.4, Mountain Valley conducted surveys between April and October of 2019 for freshwater mussels. Freshwater mussels were documented in 5 of the 21 waterbodies surveyed at the direction of the VADGIF and NCWRC. No listed or sensitive mussels were documented in the Project area..

Section 4.7.4.5 discusses potential Project impacts on freshwater mussels, including references to sections 4.6.5.3 and 4.3.2.7, which discuss potential impacts on aquatic species from HDD and conventional bores and provides steps Mountain Valley would take to minimize such impacts. Mountain Valley would relocate freshwater mussels present in the direct Project footprint at the waterbody crossings to suitable habitat upstream of Project impacts (see section 4.7.4.5). Mountain Valley would further minimize potential impacts on freshwater mussels downstream of crossings by implementing measures in Mountain Valley's Plan and Procedures. These include the measures described in section 4.7.3.1 to minimize downstream sedimentation and turbidity associated with construction in uplands and at the waterbody crossings, which can lead to, among other things, smothering of mussels (see section 4.6.5.3). With implementation of these measures and given that no listed or sensitive mussel species were documented during the surveys conducted at the waterbody crossings throughout the Project area, we conclude that the Project would not likely significantly impact state-listed freshwater mussels.

4.7.7.5 Arthropods

Two species of crayfish classified in North Carolina as significantly rare (Carolina ladle crayfish) and as a species of special concern (Greensboro burrowing crayfish) may occur in the Project area. The Carolina ladle crayfish occurs along the banks of freshwater creeks and streams under large rocks or in burrows and is thought to only exist in the eastern upper Piedmont Region of North Carolina (Cooper, 2000). It has been documented in Rockingham County within 6 miles of the Project area. The Greensboro burrowing crayfish occurs exclusively in burrows (i.e., it has never been documented in open surface waters) along stream banks and along floodplains within the Haw River basin (Cooper, 2010). It has not been documented in the counties crossed by the Project, but the full distribution of the species is unknown due to a lack of targeted surveys (NCWRC, 2018c). No sensitive species of crayfish are known to occur in the Project area in

Pittsylvania County. Based on guidance from the NCWRC, Mountain Valley conducted surveys in Rockingham and Alamance Counties for Carolina ladle crayfish in 2019 in conjunction with its mussel surveys. Carolina ladle crayfish were documented in streamside burrows of 13 of the 17 waterbody crossings surveyed (table 4.7-4; the Dan River and Stony Creek Reservoir crossings were not surveyed for crayfish because, per NCWRC guidance, crayfish surveys are limited to perennial first, second, or third order streams[24] and the Dan River and Stony Creek Reservoir are seventh and fourth order streams, respectively). Mountain Valley is coordinating with the NCWRC regarding the necessity of field surveys for the Greensboro burrowing crayfish.

Table 4.7-4

Results of Crayfish Surveys Conducted at Southgate Project Waterbody Crossings in North Carolina in 2019

County	MP	Stream Name	Rare Crayfish Observed
Rockingham	27.3	UNT to Cascade Creek	No
Rockingham	27.5	Cascade Creek	No
Rockingham	31.3	Rock Creek	Yes
Rockingham	32.2	Machine Creek	Yes
Rockingham	32.7	Town Creek	Yes
Rockingham	33.0	Town Creek	Yes
Rockingham	38.8	Wolf Island Creek	Yes
Rockingham	41.2	Lick Fork	Yes
Rockingham	43.3	Jones Creek	Yes
Rockingham	47.0	Hogan's Creek	Yes
Rockingham	48.7	Giles Creek	No
Rockingham	50.8	UNT to Haw River	Yes
Alamance	52.7	UNT to Haw River	Yes
Alamance	53.7	UNT to Haw River	Yes
Alamance	58.7	UNT to Haw River	Yes
Alamance	64.1	Deep Creek	No
Alamance	67.6	Boyds Creek	Yes

Potential effects of the Project include crushing of crayfish individuals and burrows by construction equipment and smothering of individuals and burrows by sediment runoff from the construction right-of-way. Mountain Valley would reduce potential impacts on crayfish species by implementing measures in Mountain Valley's Plan and Procedures, and E&SC Plan, including narrowing the construction right-of-way at waterbody crossings, minimizing construction equipment crossings of waterbodies, and controlling sediment runoff from the construction right-of-way.

Although the Project could result in direct mortality of individuals we conclude the Project would not significantly impact the Carolina ladle crayfish and Greensboro burrowing crayfish due to the relatively limited area of direct impact at the waterbody crossings, the short duration of construction activities in any one area, and Mountain Valley's commitment to restore wetland and riparian areas to pre-construction conditions. With the implementation of the measures contained in Mountain Valley's Plan and Procedures, and E&SC Plan, we conclude that the Project would not significantly impact the Carolina ladle crayfish or the Greensboro burrowing crayfish.

[24] A first-order stream is the source (or headwaters) of a waterbody; the order level increases (i.e., second-order, third-order, etc.) downstream at each confluence with another waterbody (Strahler, 1952).

4.7.7.6 Plants

The VADCR-DNH (2018) identified three species of rare plants that have historically occurred near the Project area and for which potentially suitable habitat occurs in the vicinity of the Project along the entire proposed right-of-way: American blueheart (*Buchnera americana)*, downy phlox (*Phlox pilosa)*, and Piedmont Barbara's-button (*Marshallia obovata)*. American blueheart occurs primarily along the edges of wet depressions, limestone glades, prairies, moist sandy soils, and open woods. Nine populations are documented in Pittsylvania County (VADCR-DNH, 2018). Downy phlox occurs in open areas, such as prairies and woodlands. Four populations are documented in Pittsylvania County. Piedmont Barbara's-button occurs in dry, open woodlands, roadsides, and pine savannahs. Five populations have been documented in in Pittsylvania County (VADCR-DNH, 2018).

The NCNHP (2018b) identified one state-listed rare plant species, cliff stonecrop (*Sedum glaucophyllum)*, known to occur in Rockingham County. Cliff stonecrop is native to the Appalachian Mountains and grows on lightly shaded limestone outcrops in soils that are damp but well-drained. According to correspondence from NCNHP (2019b), construction of the Project would not impact any known populations of cliff stonecrop.

Species present in the construction right-of-way could be vulnerable to removal during clearing and grading, or trampling and crushing by foot traffic or movement of heavy machinery. Mountain Valley conducted surveys for these species in June of 2019. Following guidance from VADCR, surveyors targeted areas where the Project right-of-way could be collocated with existing maintained rights-of-way that provides open canopy habitat. Desktop habitat assessments identified approximately 230.4 combined acres of potential habitat for all three species. Surveyors were able to access approximately 169.9 acres with the remaining acreage remaining inaccessible because surveyors were not granted landowner access. Field surveyors identified a combined 12 habitat patches, totaling approximately 11.9 acres, that contained low potential habitat for the three species. No individual plants of any of the species were observed.

Mountain Valley would implement its Plan and Procedures, and *Exotic and Invasive Plant Species Control Plan* to avoid or minimize impacts on these three plant species in the Project areas that were not surveyed due lack of access. In the absence of survey results, VADCR would not provide Mountain Valley with mitigation or minimization guidance beyond requesting that Mountain Valley avoid any areas that contain the plants (Mountain Valley, 2019). With the implementation of the measures contained in Mountain Valley's Plan and Procedures and *Exotic and Invasive Plant Species Control Plan*, and the low potential for presence of American blueheart, downy phlox, and Piedmont Barbara's-button in the areas that have not been surveyed, we conclude that the Project would not significantly impact these species.

4.7.7.7 Conclusions for State-Listed and Other Sensitive Species

Based on Mountain Valley's commitment to implement mitigation measures in its Plan, and Procedures, avoidance of sensitive habitat, and its consultations with the NCWRC and VADCR, we conclude that the Project would not significantly impact the state-listed bats, fish, salamanders, freshwater mussels, crayfish, and plants that may be present within the Project area.

4.8 LAND USE, SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

4.8.1 Land Use

This section discusses the lands required to construct and operate the Project, the current use of those lands, crossings of recreational and special interest areas, and visual resources in the Project area.

Land uses crossed by the Project are generally classified into the following categories and definitions:

- agricultural: crop land, pasture/hay fields, and vineyards/orchards;
- forested/woodland: upland and conifer forests, and deciduous woodlands, forested wetlands;
- industrial/commercial: manufacturing or industrial plants, paved areas, landfills, mines, quarries, utilities, roads, railroads, and commercial or retail facilities;
- silviculture: wooded lands being managed for forest products (i.e., pine plantations);
- open land: utility rights-of-way, grasslands, range lands, scrub-shrub uplands, golf courses, and recreational (non-forested) land, scrub-shrub, and emergent wetlands, and unmanaged lands;
- residential: houses, farmsteads, apartments, mobile home parks, and residential subdivisions; and
- other: ponds, reservoirs, lakes, rivers, and streams.

Table 4.8-1 summarizes the amount of each land use that would be affected by constructing and operating the Project. Constructing the Project would impact 1,465.9 acres of land. Approximately 79 percent of this land would be utilized for the pipeline facilities, including the construction right-of-way (59.1 percent) and additional temporary extra workspace (20 percent). The remaining acreage affected during construction would be associated with contractor yards, access roads, and aboveground facilities and cathodic protection beds. Following construction, lands outside of the permanent right-of-way, such as extra workspace areas, contractor yards, and temporary access roads, would be allowed to revert to previous land uses. The primary land uses affected by construction would be forested/woodland (42.1 percent) and open land (38.4 percent). Agricultural, silviculture, industrial/commercial, other and residential would make up the remaining 19.5 percent of land types affected during construction.

Operating the Project would permanently impact 450.0 acres. The permanent easement would account for 431.6 acres or 95.9 percent of land affected. The remaining 18.4 acres or 4.1 percent of permanent impact would be associated with aboveground facilities, cathodic protection beds, and permanent access roads.

TABLE 4.8-1

Land Uses Affected by Construction and Operation of the Southgate Project (acres) a/ b/

Facility County, State	Forested Land		Open Land		Agricultural Land		Commercial / Industrial		Silviculture		Residential		Other		Total e/	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
H-605 Pipeline Right-of-Way c/																
Pittsylvania, VA	3.5	1.7	0.7	0.4	1.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	5.3	2.6
H-650 Pipeline Right-of-Way c/																
Pittsylvania, VA	143.1	71.0	104.7	50.2	51.3	25.8	2.5	1.3	1.5	0.7	2.8	1.2	1.3	0.0	307.3	150.3
Rockingham, NC	185.5	96.5	77.2	34.9	33.0	17.2	5.0	2.7	2.7	1.4	0.8	0.3	1.6	0.0	305.7	152.9
Alamance, NC	123.5	64.2	78.9	39.2	34.3	16.9	3.3	1.6	4.7	2.4	2.9	1.4	0.6	0.0	248.3	125.8
Pipeline Subtotal	***455.6***	***233.4***	***261.5***	***124.7***	***119.7***	***60.5***	***10.8***	***5.6***	***8.9***	***4.5***	***6.5***	***2.9***	***3.5***	***0.0***	***866.6***	***431.6***
Additional Temporary Workspace																
Pittsylvania, VA	47.2	0.0	31.	0.0	15.4	0.0	0.1	0.0	0.4	0.0	0.4	0.0	0.0	0.0	94.8	0.0
Rockingham, NC	57.0	0.0	25.7	0.0	25.6	0.0	0.2	0.0	0.2	0.0	0.7	0.0	0.0	0.0	109.4	0.0
Alamance, NC	37.1	0.0	31.3	0.0	15.4	0.0	1.4	0.0	2.2	0.0	1.3	0.0	0.0	0.0	88.7	0.0
ATWS Subtotal d/	***141.3***	***0.0***	***88.3***	***0.0***	***56.4***	***0.0***	***1.7***	***0.0***	***2.8***	***0.0***	***2.4***	***0.0***	***0.0***	***0.0***	***292.9***	***0.0***
Permanent Aboveground Facilities																
Lambert Compressor Station	4.9	3.1	1.3	0.7	13.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1	8.6

TABLE 4.8-1

Land Uses Affected by Construction and Operation of the Southgate Project (acres) a/ b/

Facility County, State	Forested Land		Open Land		Agricultural Land		Commercial / Industrial		Silviculture		Residential		Other		Total e/	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
LN 3600 Interconnect	0.3	0.2	4.3	0.7	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	4.6	0.9
T-15 Dan River Interconnect	0.0	0.0	5.1	0.8	0.1	0.0	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.8
T-21 Haw River Interconnect	0.0	0.0	1.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.6
Aboveground Facilities Subtotal	***5.2***	***3.3***	***12.0***	***2.6***	***13.1***	***4.9***	***<0.1***	***<0.1***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***30.3***	***10.9***
Contractor Yards																
Pittsylvania, VA	3.0	0.0	84.8	0.0	0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.1	0.0
Rockingham, NC	0.0	0.0	12.2	0.0	0.0	0.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.8	0.0
Caswell, NC	0.0	0.0	24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.9	0.0
Alamance, NC	0.2	0.0	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.1	0.0
Contractor Yards Subtotal	***3.2***	***0.0***	***143.8***	***0.0***	***0.0***	***0.0***	***27.8***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***174.8***	***0.0***
Temporary and Permanent Access Roads																
Pittsylvania, VA	5.1	0.2	21.3	0.7	4.3	0.7	4.2	0.6	0.0	0.0	2.9	0.0	0.0	0.0	27.7	2.3

TABLE 4.8-1

Land Uses Affected by Construction and Operation of the Southgate Project (acres) a/ b/

Facility County, State	Forested Land		Open Land		Agricultural Land		Commercial / Industrial		Silviculture		Residential		Other		Total e/	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Rockingham, NC	3.1	0.0	25.7	2.9	4.0	<0.1	2.3	0.1	0.0	0.0	4.4	0.0	0.0	0.0	39.5	3.1
Alamance, NC	3.3	0.1	8.7	0.1	1.8	<0.1	5.0	0.1	0.6	0.0	1.6	0.0	<0.1	0.0	21.0	0.3
Caswell, NC	0.5	0.0	0.4	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.3	0.0
Access Road Subtotal	***11.9***	***0.3***	***56.2***	***3.8***	***10.1***	***0.7***	***11.4***	***0.8***	***0.6***	***0.0***	***9.2***	***0.0***	***<0.1***	***0.0***	***99.5***	***5.7***
Project Total e/ f/	**617.4**	**237.1**	**563.5**	**132.9**	**199.3**	**66.1**	**51.8**	**6.5**	**12.5**	**4.5**	**18.1**	**2.9**	**3.5**	**0.0**	**1,465.9**	**450.0**

Note: Pig launchers and receivers will be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect), therefore, acreages calculations for the pig launchers and receivers are included with those facilities. MLVs 1, 4, and 8 will be within other aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect), therefore, acreage calculations for MLVs 1, 4, and 8 are included with those facilities.

a/ Construction acres includes the area affected by construction (i.e., temporary and additional temporary workspace, contractor yards, and access roads) and the area affected by operation of the Project (i.e., facility operation footprint and 50-foot pipeline permanent right-of-way). The 50-foot-wide permanent right-of-way between HDD entry and exit points and within railroad rights-of-way are not included in this acreage.

b/ Includes only the operation footprint of the Project facilities, the 50-foot-wide permanent pipeline right-of-way in uplands, except in wetland areas where the operation width has been reduced to 10 feet in emergent wetlands, scrub-shrub wetlands, and within 25 feet of waterbodies; and 30 feet in forested wetlands. The 50-foot-wide permanent right-of-way between HDD entry and exit points and within railroad rights-of-way are not included in this acreage.

c/ Includes the 50-foot-wide permanent right-of-way and temporary workspace areas.

d/ Includes ATWS areas for the pipeline facilities. ATWS areas to be used for construction of aboveground facilities are included in the acreage calculations for the applicable aboveground facilities.

e/ Sums may not equal the total of addends due to rounding. Addends consist of six-decimal digits.

f/ Project totals includes 1.8 acres of temporary and permanent impacts associated with cathodic protection beds.

4.8.1.1 Pipeline Facilities

Constructing and operating the pipeline would temporarily and permanently impact land uses. Mountain Valley proposes to generally use a 100-foot-wide construction right-of-way, consisting of 50 feet of permanent right-of-way and 50 feet of temporary construction workspace. In wetland areas, Mountain Valley proposes to use a 75-foot-wide construction right-of-way. Various ATWS would be used for Project construction, in addition to the construction right-of-way. As discussed in section 2.3.3, Mountain Valley identified several areas where site-specific conditions would require the use of extra workspace outside of the 100-foot-wide construction right-of-way. Based on our review of the site-specific conditions and identified workspaces, we find these to be acceptable. Additional discussion of these extra workspace areas is presented in section 4.4.4.

Where the pipeline would be collocated with existing pipelines or electric transmission lines, the construction right-of-way could consist of a portion of the existing, cleared permanent right-of-way and some additional new right-of-way (see table 2.3-1). The land retained as new permanent right-of-way would generally be allowed to revert to its former use, except for forested land as discussed below. Also, activities such as the construction of permanent structures, including houses, house additions, garages, patios, pools, or the planting of trees, would be prohibited. To facilitate pipeline inspection, operation, and maintenance, the entire permanent right-of-way in upland areas would be maintained in an herbaceous/scrub-shrub vegetated state. Mowing would occur no more than once every 3 years, but a 10-foot-wide strip centered over the pipeline might be mowed annually. However, as discussed in section 4.6.1.4 annual mowing would not be allowed during bird nesting season.

Forested Land

Forest land that would be affected by the Project consists mainly of mixed-deciduous and evergreen forests (see section 4.5.1). About 597 acres of forested land would be cleared within the pipeline right-of-way and ATWS. Impacts on forest land would be long-term and permanent. Trees within temporary construction work areas would be cleared, but following construction, these lands would be allowed to naturally revert to forest through natural successional processes; however, impacts on forest resources in these areas could take 30 or more years to return to pre-construction conditions. Following construction, the maintained portion of the right-of-way would be permanently converted to open land.

Silviculture

Mountain Valley has identified seven tracts containing pine plantations that would be affected by the Project. These areas include loblolly pines and other hardwood species. Similar to forest lands, impacts on pine plantations would be long-term and permanent. During construction about 11.8 acres of pine plantation would be cleared. If requested by the landowner, cleared trees would be placed at the edge of workspaces for use/removal by the landowner. To ensure that trees left at the edge of workspace do not result in additional impacts, in section 4.5.4.1 we have recommended that Mountain Valley place any timber for beneficial reuse at access points where the landowner can reasonably retrieve timber without any inadvertent impacts on the restored right-of-way. Several landowners expressed concern about access to their pine

plantations. Mountain Valley has committed to working with landowners to maintain property access. Landowners would need to coordinate with Mountain Valley to coordinate safe travel of heavy logging equipment across the right-of-way. Once construction is complete, areas not affected by permanent right-of-way (7.3 acres) would be allowed to be replanted; however, given that it typically takes 30 or more years for trees to mature, this would result in a long-term impact to these areas. During operation of the Project, trees within the permanent right-of-way would not be permitted to regrow, resulting in a loss of future marketable timber for the life of the Project on 4.5 acres. However, Mountain Valley would compensate landowners for any temporary and permanently lost timber. Normal logging operations would be permitted to continue during operation of the Project.

Agricultural Land

Agricultural lands in the Project area are generally used for the production of crops including: tobacco, soybeans, sorghum, barley, oats, wheat and corn; forage production that includes: greenchop, grass silage, haylage and hay; vegetable production for potatoes and sweet potatoes; orchards, livestock and poultry (USDA Natural Agricultural Statistics Services, 2012). Prime farmlands and statewide important farmlands are addressed in section 4.2.2.7. Constructing the Project would temporarily preclude agricultural practices and could affect future crop productivity. Fields would generally be taken out of production for one growing season while the pipeline is constructed. Mountain Valley would compensate landowners for lost production and crop damages due to construction of the Project as negotiated with the landowners. Construction activities such as clearing, grading, trenching, stripping, and backfilling would potentially affect agricultural lands by causing soil erosion, damaging surface or subsurface irrigation or drainage systems, and by degrading fertile soils through mixing and compaction. These impacts could result in direct loss of crops or pasture, as well as reduced crop productivity in future planting seasons.

To avoid and minimize impacts on agricultural lands, Mountain Valley would implement numerous measures as identified in its Plan including measures that address soil segregation, soil compaction, and irrigation systems and would adhere to all other applicable federal, state, and local permit requirements. Mountain Valley would compensate landowners for lost production and crop damages due to construction of the Project as negotiated with the landowners. Additionally, Mountain Valley would coordinate with landowners to ensure they have access to all agricultural areas outside of the right-of-way during construction, including those areas across the right-of-way. Crops, other than trees, would be allowed to be cultivated within both the construction and permanent rights-of-way once construction has been completed. Mountain Valley would work with landowners to replace and return features of their property that needed to be removed for construction, including fences for livestock. As such, unless the land is used for tree-related farming, no permanent change in land use or permanent reduction in the amount of land available for cultivation would be associated with the pipeline right-of-way. Mountain Valley would conduct post-construction monitoring to evaluate the recovery of revegetation. While issues such as compaction could result in impacts on crop yields if not properly mitigated, adherence to measures outlined in Mountain Valley's Plan would limit these impacts on the short-term. According to Mountain Valley's Plan, revegetation would be considered successful once the affected agricultural area has "crop growth and vigor" that is similar to adjacent undisturbed portions of the same field. With the implementation of Mountain Valley's impact avoidance and minimization measures and its commitment to compensate farmers for lost crops, impacts on

agricultural lands would be minor. During the scoping period, one landowner, Robert Pollok on tract VA-PI-099.000, identified his farm as a certified seed farm, and requested that Mountain Valley implement additional mitigation measures. As discussed in section 4.8.2, Mountain Valley would work with the landowner during easement negotiations to identify any specialized mitigation measures requested by the landowners. Additionally, Mountain Valley assessed a potential route variation within the tract to determine if a more environmentally preferable route could be identified (see section 3.4.3.3).

Open Lands

Open lands that would be affected by the Project include open fields, existing utility rights-of-way, herbaceous and scrub-shrub uplands, non-forested lands, emergent and scrub-shrub wetlands, and non-paved roads. Similar to agricultural lands, constructing and operating the Project would temporarily preclude activities on open lands. However, these impacts would be temporary and would be minimized by the implementation of Mountain Valley's Plan. Following construction, most open land would return to pre-construction conditions within 2 years.

Industrial/Commercial Land

Industrial/commercial land uses could be temporarily affected during construction of the pipeline Project by increased dust from exposed soils, construction noise, and traffic congestion. Mountain Valley would implement several mitigation measures to minimize impacts on commercial land uses including coordinating driveway crossings with business owners to provide access across the construction right-of-way, timing construction to avoid peak use, and expediting construction in these areas.

Mountain Valley would ensure access for emergency vehicles during road crossings by using temporary platforms across the pipeline trench as needed. Road surfaces would be restored as soon as practicable so that normal access could resume, and commercial land uses would be restored to pre-construction conditions, or as specified in landowner agreements.

As discussed in section 4.9.4, Mountain Valley has developed and would implement a *Residential Access and Traffic Mitigation Plan*.

Residential Land

As currently designed, 8.9 acres of residential land would be affected by construction of the pipeline portion of the Project. Following construction, 2.9 acres of residential land would be within the permanent pipeline right-of-way and would be subject to restrictions on planting large trees (over 15 feet) and the placement of certain structures. The remaining 6.5 acres of affected residential land would be restored to pre-construction conditions and would not be subjected to any restrictions. In restoring properties, Mountain Valley would adhere to its Plan and any specific requirements identified by landowners agreed to during negotiations. In most cases, property owners would be able to use the permanent right-of-way as they did before construction as long as the use does not conflict with Project operation and the terms of the landowner's negotiated easement agreement. A more detailed discussion regarding residential lands can be found below in section 4.8.3.

4.8.1.2 Aboveground and Other Facilities

Mountain Valley would use 30.3 acres to construct the aboveground facilities. As described previously, table 4.8-1 summarizes the land uses affected by constructing and operating the aboveground facilities. The MLVs and pig launchers/receivers would be located within the pipeline permanent operational easement or would be within the foot print of other aboveground facilities. The erection of aboveground facilities would permanently convert 10.9 acres existing land use to industrial/commercial land use. This would include the permanent conversion of 4.9 acres of agricultural land to industrial use. As described previously, landowners would be compensated for any temporary and permanent crop loss. Associated temporary workspace associated with construction of aboveground facilities would experience both short-term and long-term impacts.

4.8.1.3 Contractor Yards

Mountain Valley's eight proposed contractor yards would affect a total of 248.7 of acres of land. Of that total, 216.1 acres would be open land and 29.1 acres would be commercial or industrial land and 3.5 acres of forested land. Following construction, all of the yards would be restored and returned to their previous condition and land use. However, because forested areas can take 15 to 30 years to recover, impacts on forested lands would be long-term to permanent.

4.8.1.4 Access Roads

Mountain Valley proposes to use 160 (new or existing) roads to access construction workspace (see appendix B.4). Use of these roads would temporarily affect a total of about 99.5 acres of land and would permanently affect a total of about 5.7 acres of land. Of the 160 access roads that would be used during construction, 119 are existing roads. The existing surface of these roads vary from simple two-track or dirt roads to finished concrete or asphalt roads. Mountain Valley stated that 113 of the existing roads would need improvements such as adding stone or gravel, installing culverts, grading, or widening. Mountain Valley would construct 41 new access roads to construct the Project, affecting about 5.6 acres of land. Following construction, all temporary access roads would be returned to pre-construction conditions unless otherwise negotiated with the landowner.

Mountain Valley would use 17 roads to operate the Project including 7 existing roads and 10 new roads. The land use types that would be affected by construction of permanent roads includes agricultural, forested, open land, and some developed land. Overall, the construction of new permanent roads, modifications to existing roads, and the use of these roads that would permanently impact about 5.7 acres of land.

4.8.2 Land Ownership and Easement Requirements

Pipeline operators must obtain easements from existing landowners to construct and operate authorized facilities, or acquire the land on which the facilities would be located. Easements can be temporary, granting the operator the use of the land during construction (e.g., extra workspaces, temporary access roads, contractor yards), or permanent, granting the operator the right to operate and maintain the facilities once constructed.

Mountain Valley would need to acquire new easements or acquire the necessary land to construct and operate the new pipeline. These new easements would convey both temporary (for construction) and permanent (no greater than 50-feet-wide for operation) rights-of-way to Mountain Valley.

An easement agreement between a company and a landowner typically specifies compensation for losses resulting from construction, including losses of non-renewable and other resources, damages to property during construction, and restrictions on existing uses that would not be permitted on the permanent right-of-way. Compensation would be fully determined through negotiations between Mountain Valley and the landowner. Mountain Valley identified that it has based its offerings on a market study conducted by a licensed real estate appraiser.

If an easement cannot be negotiated with a landowner and if the Project is approved by the Commission, Mountain Valley may use the right of eminent domain granted to it under section 7(h) of the NGA and the procedure set forth under the Federal Rules of Civil Procedure (Rule 71A) to acquire the necessary property rights to construct and operate its Project. This right would apply to all Project-related workspace covered by an approval, including the temporary and permanent rights-of-way, aboveground facility sites, contractor yards, access roads, and extra workspaces. Mountain Valley would still be required to compensate the landowner for the right-of-way and damages incurred during construction. However, the level of compensation would be determined by a court according to federal or state law.

4.8.3 Existing Residences, Commercial and Industrial Facilities, and Planned Developments

4.8.3.1 Existing Residential, Commercial and Industrial Facilities

As currently designed, about 18.1 acres of residential land would be affected by construction of the pipeline and use of access roads. Construction work areas would be within 50 feet of 70 occupied and unoccupied residential structures (including homes, mobile homes, and cabins). In addition to these residential structures, 143 other associated structures such as sheds and barns, would be within 50 feet of the Project, including 43 structures that would be within construction work areas. Mountain Valley would work with landowners to either protect, purchase or relocate structures within the proposed construction right-of-way. No occupied residences would be removed to construct the pipeline. Appendix E.2 lists residences and other associated structures within 50 feet proposed construction work areas.

Residences within 50 feet of construction work areas would be affected by equipment noise and vibration, potential access delays, potential impacts on septic systems, and other general construction inconveniences (dust). In addition to the previously described impacts, the driveways of several residences would be partially or wholly within the construction work area. In order to ensure access to these homes during construction, Mountain Valley would provide access through the safety fencing. As described previously, operation of the Project would preclude the placement of many permanent structures within the permanent easement. In general, as the distance to the construction work area increases, the impacts on residences decrease.

Septic systems are self-contained, underground wastewater treatment systems that dispose of household wastewater on-site. Septic systems are common in rural areas, including those crossed by the Project. The locations of existing and planned septic systems are not available in a public database. Mountain Valley is conducting landowner interviews on all affected properties to identify septic systems. Landowner interviews, to date, have identified one septic tank and one septic tank water line within the Project workspace. The septic tank location would be avoided with an adjustment to the construction workspace. The water line cannot be avoided and would be protected with matting during construction.

Septic systems could be damaged by heavy equipment operating above the system or through accidental contact with machinery during excavation activities. Mountain Valley would attempt to avoid and minimize impacts on any septic systems in the construction workspace. Mountain Valley has provided minor pipeline deviations to avoid septic systems and would continue to work with landowners to avoid septic systems as they are identified. Specific alternative routes proposed to avoid septic systems thus far are detailed in section 3.0. If avoidance is not possible, Mountain Valley would work with individual landowners to relocate or replace septic systems prior to construction. In the event that a septic system is damaged during construction, Mountain Valley would repair or replace the septic system. Surveys are ongoing for septic systems in the Project area.

To reduce impacts on residences within 50 feet of construction work areas, Mountain Valley would implement numerous measures including:

- notifying residents in advance of construction activities;
- installing temporary safety fencing for at least 100 feet on either side of the residence and maintaining it while the trench is open;
- preserving as many trees and as much landscaping as possible;
- segregating topsoil where appropriate or as negotiated with landowner;
- maintaining utility service during construction activities;
- constructing only during daylight hours, except where special conditions require otherwise; and
- restoring lawn areas and landscaping after backfill.

Additionally, Mountain Valley prepared and would adhere to site-specific *Residential Construction Plans* (see appendix B.7) for 24 residential structures (9 of which are occupied residences) currently identified as within 25 feet of construction work areas (including those within the construction workspace) or where a plan was requested by a landowner or agency. Table 4.8-2 lists all occupied residences within 25 feet of construction workspace. A complete list of structures within 50 feet of the Project can be found in appendix E.2.

TABLE 4.8-2

Occupied Residences within 25 feet of Southgate Project Workspace a/

Milepost	Building Type	Closest Feature	Distance from workspace limit (feet)	Residential Construction Plan Number a/
Pittsylvania County, Virginia				
0.0	House	Temporary Access Road (Existing)	22	RSS-H650-045
Rockingham County, North Carolina				
32.5	House	Temporary Access Road (Existing)	20	RSS-H650-025
39.6	House	Temporary Access Road (Existing)	12	RSS-H650-046
44.1	House	Temporary Access Road (Existing)	3	RSS-H650-026
46.1	House	Temporary Access Road (Existing)	18	RSS-H650-027
Alamance County, North Carolina				
67.1 RR	House	Construction Workspace	16	RSS-H650-051
67.3 RR	House	Temporary Access Road (New)	18	RSS-H650-028
67.3 RR	House	Temporary Access Road (New)	8	RSS-H650-028
69.6 RR	House	Construction Workspace	13	RSS-H650-050

a/ Residential Construction Plans are provided in appendix B.7.

Because of the increased potential for construction of the Project to disrupt these residences and to ensure that property owners have adequate input to a construction activity occurring so close to their homes, in the draft EIS we requested that a signed site-specific residential plan be provided for all residences within 10 feet of construction workspace or new access roads. Mountain Valley made several route modifications that resulted in three of the residences to be located farther than 10 feet of construction work space. A signed plan was provided for the remaining residence at MP 67.3.

We have reviewed the site-specific plans, mitigation, and associated workspace justifications, and have found them acceptable. Our experience has shown that when Project sponsors maintain communication with landowners during construction and restoration phases, issues in and near residential areas can be effectively managed and resolved. Mountain Valley has developed landowner complaint resolution process as part of its *Public, Stakeholder, and Agency Participation Plan* that it would implement during Project construction and restoration. Mountain Valley would track all calls and/or emails that it receives including the individuals name and details of the issues or problems. Mountain Valley would contact the landowner to understand the issue and if possible, resolve the problem. Otherwise, the issue will be elevated to a Project representative, who will contact the landowner within 3 business days. All complaints and follow-up correspondence would be documented, and any action required to resolve the issue would be discussed with the affected landowner and/or complainant. We find these procedures to be

acceptable and to ensure proper documentation of landowner concerns, we are recommending in section 5.2 that Mountain Valley file weekly reports with us to document complaints and resolution status.

Commercial structures in close proximity to pipeline construction could also experience short-term disruptions as a result of in-street construction, detours, or restricted access due to lane closures. These impacts and corresponding mitigation measures are discussed in more detail in section 4.9.4. Implementation of Mountain Valley's general construction methods for working near residences and commercial areas, such as boring of public roadways, avoidance of road closures, development of Mountain Valley's *Traffic Mitigation Plan*, and the landowner complaint resolution process would minimize disruption to residential and commercial areas to the extent practicable. With the implementation of the mitigation measures outlined in this section, as well as the implementation of the measures within the residential site-specific plans, we conclude construction impacts would be adequately minimized.

4.8.3.2 Planned Developments

Mountain Valley contacted local planning agencies and identified one planned residential and commercial development within 0.25 mile of the Project. The Granite Mill Project includes the redevelopment of an abandoned mill to include new apartments and commercial space. Mountain Valley proposed to use access road TA-AL-187, an existing road through the redevelopment site. However, after the issuance of the draft EIS, Mountain Valley determined that there were other available access points to the right-of-way and therefore determined that the access road was no longer needed. Therefore, no direct impacts on the Granite Mill Project site are expected.

4.8.4 Recreation and Special Interest Areas

The Project would not cross any federally designated or managed lands. The Project is outside of any Coastal Zone Management Act areas. However, portions of the Project would cross and would be located within 0.25 mile of state and municipal recreation or special interest areas (see table 4.8-3 below).

Construction of the Project could alter the visual character of a recreational or special interest area by removing existing vegetation and disturbing soils; these potential impacts are discussed in section 4.8.6. Construction could also generate dust and noise, which could be a nuisance to recreational users. Construction could also interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing hikers while using trails.

In general, impacts on recreational and special interest areas would be temporary and limited to the period of active construction, which typically would only last a few days to several weeks in any one area. These impacts would be minimized by implementation of Mountain Valley's Plan and Procedures. In addition, Mountain Valley has proposed specific mitigation measures and is continuing to consult with the owners and managing agencies of recreation and special interest areas regarding the need for specific construction mitigation measures.

TABLE 4.8-3

State and Municipal Recreational and Special Interest Areas within 0.25 mile of the Southgate Project

Name of Area	Land Ownership and Management	MP	County	State	Pipeline Crossing Length (feet)	Distance From Project (feet)	Area Affected (Acres)		Crossing Method / Special Construction
							Constr	Oper	
Designated Banister River Segment / Future Blueway	State Designated	4.3	Pittsylvania	VA	N/A	1,162 feet southeast of MP 4.3	N/A	N/A	N/A
Banister River Future Blueway	Upper Reach Roanoke River Basin Association	4.9	Pittsylvania	VA	48	0	0.1	0.0	Dry Crossing – Dam-and-pump, Flume
Easement	Virginia Outdoors Foundation	14.1	Pittsylvania	VA	N/A	914 feet southeast of MP 14.0	N/A	N/A	N/A
Designated Sandy River Segment	State Designated	17.7	Pittsylvania	VA	85	0	0.2	0.0	Dry Crossing – Dam-and-pump Flume
Berry Hill Industrial Park	Pittsylvania Regional Industrial Facility Authority (i.e., Commonwealth of Virginia)	22.3 – 24.8	Pittsylvania	VA	13,608	0	41.2	15.2	Conventional open-cut
Dan River Trail / Nationwide Rivers Inventory	North Carolina Watercraft Trail	30.1	Rockingham	NC	N/A (HDD)	0	0.0	0.0	HDD
Draper Landing River Access Site	City of Eden	30.1	Rockingham	NC	N/A	0.0	0.0	0.0	N/A
Conservation Easement	Piedmont Land Conservancy	37.7 – 38.0	Rockingham	NC	139	0	0.3	0.1	Conventional open-cut
Ace Speedway	Private	56.9	Alamance	NC	N/A	94 feet west of MP 56.9	N/A	N/A	N/A
Area of Interest (AOI) Study Area – Land being considered during the master planning process	North Carolina Division of Parks and Recreation	58.7	Alamance	NC	N/A	1,134 feet southwest of MP 58.7	N/A	N/A	N/A

TABLE 4.8-3

State and Municipal Recreational and Special Interest Areas within 0.25 mile of the Southgate Project

Name of Area	Land Ownership and Management	MP	County	State	Pipeline Crossing Length (feet)	Distance From Project (feet)	Area Affected (Acres)		Crossing Method / Special Construction
							Constr	Oper	
Mitigation Easement	North Carolina Division of Mitigation Services	60.7	Alamance	NC	N/A	551 feet north of MP 60.7	N/A	N/A	N/A
Planned Regional Trail	North Carolina Division of Parks and Recreation	68.6	Alamance	NC	Unknown	0	Unknown	Unknown	Conventional open-cut
Mountains-To-Sea Trail	North Carolina Division of Parks and Recreation	68.9 – 69.3	Alamance	NC	0	450 feet northwest of MP 69.1	N/A	N/A	N/A
Mountains-To-Sea Trail	North Carolina Division of Parks and Recreation	69.6	Alamance	NC	N/A (conventional bore)	0	0.0	0.0	Conventional Bore
Planned Haw River Trail / Nationwide Rivers Inventory	Haw River Trail Partnership	69.7 – 73.1	Alamance	NC	N/A	190 feet west of MP 71.6	N/A	N/A	N/A
Challenge Golf Club	Private	70.0 – 71.3	Alamance	NC	N/A	440 feet west of MP 71.3	N/A	N/A	N/A
Haw River Sanitary District Facility	Town of Haw River	70.2	Alamance	NC	186	0	0.3	0.2	Conventional open-cut
Easement	North Carolina Clean Water Trust Fund	71.4 – 71.7	Alamance	NC	N/A	177 feet west of MP 71.6	N/A	N/A	N/A
Easement	North Carolina Clean Water Trust Fund	71.8	Alamance	NC	N/A	446 feet west of MP 71.8	N/A	N/A	N/A
Graham Paddle Access – Haw River Trail	City of Graham	72.9	Alamance	NC	N/A	220 feet northwest of ATWS 1692 near MP 72.9	N/A	N/A	N/A

If an area is not physically crossed by the pipeline the crossing length and impact acreages are listed as N/A (Not Applicable)

Construction periods could coincide with a variety of hunting seasons in Virginia and North Carolina. Hunting may occur on public and private lands throughout the Project area. During construction, hunting would not be permitted within construction workspaces. Mountain Valley would coordinate with landowners regarding any conflicts with planned hunting activities. Additionally, all workers would be required to wear high visibility vests and hardhats. Workers would be trained regarding hunting season. Once construction is complete, all hunting activities would be permitted to resume. Impacts on hunting and hunting areas would be temporary and minor.

4.8.4.1 Other Special Use Lands

Several trails and special use lands were identified as being within 0.25 miles of the Project, but not crossed by the Project. These include an area of interest (AOI) being studied by the North Carolina Division of Parks and Recreation, a planned Haw River Trail/Nationwide Rivers Inventory, a Virginia Outdoors Foundation easement, two North Carolina Clean Water Trust Fund Easements, a mitigation easement, and the Graham Paddle Access – Haw River Trail. These areas range from 170 feet to more than a 1,000 feet from the construction workspace. No direct impacts are anticipated to these areas due to construction. Some areas may experience minor noise, air, and visual impacts, depending on their proximity to the work areas. However, these would be temporary and minor.

The Dan River would be crossed by the Project near MP 30 and the Haw River would be within 0.25 mile of the Project. Both rivers are candidates to be added as a National Wild and Scenic River. Mountain Valley would cross the Dan River using an HDD. Mountain Valley also plans to use the Dan River as a source of water for construction. However, mitigation measures would be put in place to limit the volume and impacts on aquatic life. No impacts on recreational activities are anticipated based on water withdrawal activities. There may be temporary noise or visual impacts on recreationalists using the river within close proximity to the Project; however, these impacts would be temporary (HDD typically takes 3 to 6 months to complete) and minor. The Haw River is 190 feet west of the Project, so we do not anticipate there would be impacts on the river or its users.

We received comments regarding potential impacts on the Draper Landing River Access Site, a recently built boat ramp site in the City of Eden near the Dan River HDD site. The boat ramp would be about 0.25 miles west of the proposed HDD crossing site, near the Route 700 Bridge. While the boat ramp itself would not be affected by the Project, access to the boat ramp may be hindered. A portion of the gravel road leading to the boat ramp would also be used as a temporary access road by the Project (TA-RO-081). Additionally, Mountain Valley proposes to use a 4.3 acre area as an ATWS, a portion of which includes the road leading the Draper Landing Boat Ramp. This could hinder the public's ability to access the boat ramp. This is the only major boat and recreational access to the Dan River in this area. Since this ATWS is part of the HDD construction workspace, work in this area could occur over several weeks or months.

To avoid adverse impacts on public accessibility to the Dan River in this area, Mountain Valley has reduced the ATWS at this location to remove the Draper Landing Boat Ramp access road, and the associated split-rail fence from the Project workspace. Mountain Valley would install temporary signage during construction to alert construction personnel that access to the Draper Landing Boat Ramp must remain open while utilizing access road TA-RO-081. In addition,

Mountain Valley would utilize jersey barriers, if needed, to ensure that access to the Draper Landing Boat Ramp is not inhibited during construction.

Segments of the Banister River are identified as a VADCR scenic river. The segment of the Banister River crossed by the Project at MP 4.9 is listed as a future Blueway (a designated recreational water trail). However, the current construction schedule anticipates that the Project would be complete prior to Blueway status. The Banister River would be crossed using a dry crossing method (e.g. dam-and-pump or flume). The Project would also cross the Sandy River at MP 17.7 using an open-cut dry crossing method. As previously stated in section 4.3.2, Mountain Valley would reduce permanent visual impacts at the crossing by using native seed mixes and hand planting riparian vegetation. We find these measures acceptable. In addition, Mountain Valley would coordinate with the VADCR to determine if the state may recommend any additional mitigation measures.

While there would be minor impacts on the rivers during construction, these impacts would be short-term with the implementation of Mountain Valley's Procedures for the stream crossing. Boaters would be temporarily restricted from traversing sections of a river during construction. Mountain Valley would notify users of any closings through websites, at upstream access areas, and/or using other methods based on recommendations from the VADCR and would establish a temporary path around the construction site for users of the rivers. The river crossings would take 5 to 10 days to complete. No boat ramps are within close proximity to the crossings. It is not anticipated that the river crossings would impact a significant number of boaters. Overall, the crossings of the Banister River and Sandy River is expected to have temporary minor impacts on recreational use. No impacts on the rivers would be expected during operation and Mountain Valley would restore the area and riparian vegetation crossed to pre-construction conditions except for a 10 foot-wide herbaceous strip over the centerline.

The Project would cross a planned regional trail in Alamance County, North Carolina at MP 68.6 using the open-cut method. No information was available on the timing of construction for the regional trail. However, if the trail is completed prior to the start of construction of the Project, impacts associated with the crossing would include temporary closure of the trail during the open-cut crossing (typically 3 to 7 days), construction noise and dust, and a visual change to trail users since the area is currently a mix of forest and open land. The effects on trail users would be limited to the period of active construction and would be minor. Permanent visual impacts associated with tree clearing is discussed further in section 4.8.6.

The Project would also cross the North Carolina state hiking trail, the Mountains-to-Sea Trail, at MP 69.6. At this crossing location, the trail is a paved road (Stone Street) in the town of Haw River. The trail/road would be crossed by conventional bore resulting in no direct impacts on the trail or its use. However, users would experience some impacts from construction noise and dust and visual impacts associated with personnel and equipment.

The Ace Speedway is 94 feet west of the Project right-of-way near MP 56.9. The facility hosts various events including stock car racing from March through September, as well as other special events and races throughout the year. A private gravel road provides access to the speedway from Altamahaw Racetrack Road. Mountain Valley would also use this road as a temporary access road (TA-AL-159A). Based on the Ace Speedway 2019 Racing Schedule, races typically take place on Friday and Saturday nights with gates opening at 4:00 pm (Ace Speedway

2019). As previously stated, a typical construction workday would end around 7:00 pm, on average. This would result in overlap for use of the road between construction crews and attendants of the speedway. Temporary effects on the facility include additional traffic along the access road that could result in delays for racers and attendants of the racetrack. Road maintenance may also be required more often due to Project-related equipment. In order to minimize impacts on the facility and its users, Mountain Valley would coordinate with the landowner regarding timing and use of the road. Mountain Valley would also maintain the road and restore it as necessary to maintain its condition.

The Challenge Golf Club is 0.1 mile west of MP 71.3 and Project-related impacts are not anticipated for the golf club. Temporary impacts on the golf club's viewshed would be minimal due to the contours of the area and surrounding vegetation.

In general, recreation areas and special use areas crossed by the Project are expected to experience some temporary impacts during construction, such as clearing of trees, noise, dust, and limited access which may prevent or curtail recreational activities. Users of these areas such as hikers, wildlife enthusiasts, sightseers, bikers, and other recreationalists may be prevented from use of the immediate area around the temporary right-of-way during construction. Nearby recreation areas and special use areas are expected to experience similar temporary impacts as areas are crossed, but as the distance to the construction work area increases, these impacts would generally decrease.

Mountain Valley would continue to consult with the appropriate federal, state, and managing agencies to develop and implement measures to mitigate and reduce impacts on these areas as needed. Direct access to some entry points within these areas may be temporarily limited or restricted due to increased traffic or road closures during construction. For further discussion of transportation impacts and mitigation measures, refer to section 4.9.4.

4.8.4.2 Specialty Crops

Several pine plantations were identified by Mountain Valley as being crossed by the Project and are discussed in section 4.8.1. Mountain Valley has not identified any specialty crop farms within the Project area.

4.8.5 Hazardous Waste Sites

Using data from the EPA, the VADEQ, and NCDEQ, Mountain Valley identified 30 sites of potential contamination concern within 0.25 mile of the Project.[25] None of the sites would be crossed by the proposed Project. The nearest site with an active or unresolved status, Midway Auto Sales, is approximately 100 feet from the Project workspaces near MP 43.6. This site is listed for a release of gasoline to groundwater that was identified during the removal of an underground storage tank in 1994. Given the nature and the age of the release and because the site

[25] The list of hazardous sites within 0.25 mile of the Project was included as part of Mountain Valley's March 05, 2019 response to our February 13, 2019 environmental information request, accession number 20190305-5214.. Additional information was provided in Mountain Valley's December 16, 2019 supplemental filing, accession number 20191216-5158. The information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

is topographically downgradient of the alignment, the potential for Project activities to encounter associated groundwater contamination, if still present, is negligible. While Mountain Valley does not anticipate any concerns associated with the hazardous sites, if any hazardous materials are encountered during construction, Mountain Valley would implement its Project-specific SPCC Plan and *Unanticipated Discovery of Contamination Plan*. See section 4.2.7 and 4.3.1.5 for a more detailed discussion of potential hazardous waste sites.

4.8.6 Visual Resources

Visual resources represent the aesthetic quality of the landscape as perceived subjectively by the viewer. Visual resources within the Project areas are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development.

4.8.6.1 Pipeline Facilities

Visual impacts associated with the construction right-of-way and extra workspaces include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting (if required), and machinery and tool storage. Other visual effects could result from the removal of large individual trees that have intrinsic aesthetic value (e.g., loblolly pines); the removal or alteration of vegetation that may currently provide a visual barrier; or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture.

Visual impacts would be greatest where the pipeline route parallels or crosses roads and the pipeline right-of-way may be seen by passing motorists; from residences within close proximity to the construction workspace or where vegetation used for visual screening or for ornamental value is removed; and viewsheds where the pipeline is routed through forested areas. Portions of the pipeline would be collocated or adjacent to existing pipeline and/or utility rights-of-way. As a result, the visual aesthetic along those portions of the Project route have been previously affected by other similar activities. As stated above, there are residences that would be within 25 feet of pipeline construction workspace (including access roads). Visual impacts on these residents would be more noticeable given their close proximity to construction activities, including clear views of equipment and personnel. The greatest potential visual impact would result from the removal of large specimen trees, which would take longer than other vegetation to regenerate and would be prevented from re-establishing on the permanent right-of-way.

The areas that would be crossed by the pipeline are predominately agricultural land and forested lands. The duration of visual impact from clearing would be shortest in open areas where the re-establishment of vegetation following construction would be relatively rapid (generally less than 3 years). The duration would be greater in forested land, which would take many years or decades to regenerate. The forested setting would also help to minimize the number of visual receptors along the forested portion of the right-of-way. After construction, all areas disturbed by the pipeline would be restored, and areas outside of the permanent right-of-way would be returned to pre-construction conditions in compliance with federal, state, and local permits; landowner agreements; and Mountain Valley's easement requirements.

4.8.6.2 Aboveground Facilities

The most visible features of the Project would be the aboveground facilities. A typical compressor station would consist of five structures (compressor unit-turbines building, two electrical control buildings, air compressor building, and an office), pig launchers/receivers, electric utilities, lighting fixtures, graveled yard with piping, surrounded by a chain-link security fence. Interior yard equipment would include gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, hears, and auxiliary micro-turbines. The equipment at a typical interconnect and interconnection would consist of custody-transfer flow meter, pressure/flow regulator, over pressure protection, isolation block valves, and associated instrumentation and control devices. The meter runs would be within a graveled yard surrounded by a fence. There would also be an electric utility hook-up.

Most of the MLVs would be within the permanent right-of-way easement for the pipeline. Usually, the valves are buried, with aboveground extensions. The MLVs would be equipped with valve actuators for remote operation.

The new Lambert Compressor Station would be within an area that is currently a mix of agriculture and forested land. Once constructed, the compressor station would be surrounded by trees on three sides shielding the compressor station from public view. Additionally, there are no homes or major roadways within 0.5 mile of the station. The closest residence is about 0.6 miles southeast of the compressor station site. This residence would not have direct views of the site during construction or operation due to existing vegetation around the compressor station site and near the residence. There are several other homes southwest of the compressor station that are about 500 feet from the pipeline right-of-way. The compressor station would not be visible from these residences due to natural vegetative screening. Given that views of the compressor station would be limited and there are no direct views of the site from residences, construction of the compressor station is not expected to result in any significant permanent impacts on visual resources.

Out of the four new interconnects, one would be within the footprint of the Lambert Compressor Station and visual impacts would be the same as described above for the compressor station. The LN 3600 Interconnect would be constructed at MP 28.2 in an area that is currently open and forested uplands. The closest residence is about 0.7 mile southeast of the interconnect with forested vegetation preventing views of the interconnect from the residence. The Willow Oaks Plantation, a meeting and wedding venue site, is less about 0.2 mile north of the interconnect; however, existing forested vegetation would prevent any direct views of the Project facility. No significant visual impacts are anticipated from construction and operation of the interconnect. The T-15 Dan River Interconnect would be constructed near MP 30.4 within an area that is currently open land. There are two residences less than 0.1 mile south of the interconnect; however, the land use between is predominantly forested and would provide a natural visual screening of the interconnect site and it would not be visible to the residents. The interconnect is about 180 feet east of South Fieldcrest Road and would be visible to motorists along the road; however, there are several other developed areas adjacent to the interconnect site, and the addition of the interconnect site would not represent a significant change to the existing viewshed. The T-21 Haw River Interconnect at MP 73.1 would be constructed within open land, 160 feet south east of an existing industrial site, and adjacent to Route 54. There are two residences that could have direct views of

the interconnect site. An additional residence is also across the road (about 250 feet north) from the interconnect site; however, that residence has an existing tree line screening it from the road and the proposed interconnect site. The first residence is about 180 feet to the east of the site. The existing terrain on the edge of the property will likely shield the interconnect site from being in direct view from the residence; therefore, no significant impacts are anticipated. The other home is across the road, about 310 feet northeast of the proposed location. Given the flat terrain of the area, and the lack of trees or other potential natural screens, this residence is likely to have direct views of the interconnect site and result in a minor change to the viewshed of the residents.

In general, the impacts on visual resources resulting from the construction and operation of the MLVs would be minimal as each site is small (typically less than 0.1 acre) and would be operated within the pipeline operational right-of-way or within a proposed aboveground facility (e.g., interconnect sites). MLVs along the operational right-of-way would be enclosed in a chain-link security fence. For ease of access, most of the MLV sites are near public roads and would be visible to passing motorists. However, given the small size of these sites, this change to the viewshed would be minor. One MLV site (MLV 6) near MP 55.1 would be within 400 feet of several residences, with the closest home about 140 feet to the east. Given the existing land use (agricultural and open land) and the existing terrain, the MLV site would be visible to these residences. However, the surrounding landscape also includes other homes, sheds, and residential fences. Therefore, the addition of the MLV is not likely to cause a significant visual impact.

4.8.6.3 Contractor Yards

The contractor yards would be located on agricultural, open, industrial, and forested lands. Minor grading and addition of gravel may occur at the contractor yards. Minor tree clearing would be required at three of the contractor yards (CY-03, CY-22, and CY-26B); however, these clearing activities would not represent a significant visual change. Contractor yards would be used to store trailers, vehicles, pipe, and other construction-related materials during construction. Six of the nine yards currently proposed are within 0.25 miles of residences. However, while CY-26A, CY-26B, and CY-25 are located within 0.25 miles of residences, existing trees lines and topography would result in no visual impacts to those residents. The CY-08 site is located along Barnes Street in Reidsville, North Carolina. There are two industrial commercial sites located on either side of the proposed contractor yard site. Additionally, there are several residences and small businesses across the street from the contractor yard site. While most of the contractor yard would be screened from the road and residences because of existing trees, some tree clearing is proposed, which would result in views of portions of the contractor yard to drivers and residences. However, given the existing industrial facilities already in these areas, the changes would be minor. There are four residences across the road from and with a direct view of the CY-22 site and there are two residences across the road about 200 feet south of the CY-19 site with direct view of the site. While residents would be able to observe the activities at these locations, the contractor yards would only be used during construction. Once construction is complete, the contractor yard sites would be returned to their pre-construction conditions. Therefore, any impacts associated with the contractor yards would be temporary and minor.

4.8.6.4 Access Roads

Most of the existing roads are currently paved, graveled, or have dirt surfaces and would require minor improvements, and would not have a significant impact on aesthetics. Several of

the temporary access roads and permanent access roads that Mountain Valley proposes to construct or modify would require extensions of existing roads. Construction of these roads would require some tree clearing in addition to grading and graveling. Temporary access roads would be returned to pre-construction conditions unless another arrangement is mutually agreed upon with the landowner. For access roads that require tree clearing, there would be a long-term localized visual change to the landscape. Several access roads would be in close proximity to homes and the homeowners may notice an increase in traffic from construction vehicles, including worker vehicles are larger construction equipment.

Given the limited amount of clearing (11.8 acres) that would be needed, as well as the limited footprint (typically 25 feet in width) of any single access road, and the temporary nature of increase traffic along these roads, we conclude that visual impacts from access roads would be minor.

4.8.6.5 Scenic Byways

The Project route would cross the Virginia Scenic Byway (Route 58) at MP 20.0 in Pittsylvania County. The byway would be crossed using a bore. Construction equipment and personnel would be visible to passing motorists during construction of the pipeline. While this would be a temporary impact, clearing of trees within the right-of-way and along the edge of the road would be a permanent change in the view by motorists traveling along the roadway. However, tree clearing would be adjacent to an open field; therefore, this change would be minor.

The Colonial Heritage Byway (Route 150) would be crossed at MP 48.4 in Rockingham County, North Carolina. The road would be crossed using a bore. Personnel and equipment would be visible to passing motorists during construction. A forested area about 190 feet from the roadway edge would be cleared for the pipeline right-of-way leading to the crossing, which would cause a long-term and permanent change to the viewshed visible to motorists traveling along the road. However, given the existing open areas, this would not represent a significant impact.

4.8.7 Land Use, Special Interest Areas, and Visual Resources Conclusions

Land use-related impacts associated with the Project would include the disturbance of existing uses within the rights-of-way during construction and maintenance of new permanent right-of-way for operation of the Project. Additional land would be disturbed by construction of the aboveground facilities, and land within the facility footprints would be permanently retained for operation. The primary land use types affected would be forested, agricultural land, and open lands. In forested areas, trees and shrubs would be removed from the construction work areas and the maintained portion of the right-of-way would be permanently converted to a non-forested condition. Land outside of the permanent pipeline easement would be allowed to revert to its prior condition, although this process would take many years. Impacts on agricultural lands would be short-term and limited to the growing season concurrent with construction. Following construction, agricultural practices within the pipeline right-of-way would be allowed to resume. Impacts on open land areas would be temporary and short-term, and would be minimized by the implementation of Mountain Valley Plan. Open land areas within the temporary and permanent right-of-way are expected to revert to their pre-construction land use after completion of construction. However, some activities, such as the building of new structures, would be prohibited on the permanent right-of-way.

4.9 SOCIOECONOMICS

Constructing and operating the Project may affect the socioeconomic character of communities near the proposed facilities. These potential impacts include temporary population increases and new employment opportunities, increased demand for housing and public services, impacts on tourism and local businesses, transportation impacts, environmental justice, and revenues associated with sales and payroll taxes. For the purposes of our socioeconomic analysis, the Project area consists of the three counties crossed by the Project.

4.9.1 Population and Employment

Table 4.9-1 provides information on population levels and trends for counties that would be affected by Project.

TABLE 4.9-1

Population Levels and Trends in the Southgate Project Area a/

Project/Location	2017 Population Estimate	2010 Population Density (persons/sq. mi.)	Change in Population (2000-2010) Percent	Change in Population (2010-2017) percent
Virginia	**8,470,020**	**214.5**	**13.0**	**5.9**
Pittsylvania	61,258	63.2	2.9	-3.5
North Carolina	**10,273,419**	**211.3**	**18.5**	**7.7**
Rockingham	90,949	160.7	1.9	-2.9
Alamance	162,391	383.0	15.5	7.5

a/ U.S. Census Bureau, 2017a

Mountain Valley estimates that it would take 10 to 12 months to construct the Project and an additional 2 years to complete restoration. Mountain Valley estimates that the peak construction workforce would be 860 people for the pipeline and 185 people for construction of the aboveground facilities (see table 4.9-2). Mountain Valley estimates that 55 percent of the workforce would be local hires, while the remaining workforce would relocate from outside the Project area.

TABLE 4.9-2

Estimated Workforce for the Southgate Project

Construction Spread	County/State	Peak Construction Workforce	Peak Local Workers	Peak Non-local Workers
Pipelines				
Spread 1	Pittsylvania, VA Rockingham, NC	485	267	218
Spread 2	Rockingham, NC Alamance, NC	375	206	169
Pipeline Subtotal		*860*	*473*	*387*
Aboveground Facilities				
Lambert Compressor Station/Lambert Interconnect /MLV 1	Pittsylvania, VA	110	61	49
Interconnects **a/**	Rockingham, NC Alamance, NC	75	442	33
Aboveground Facility Subtotal		*185*	*103*	*82*
Project Total		***1,045***	***576***	***469***

a/ Mountain Valley estimates a workforce of about 25 workers per interconnect

We estimate that during construction there could be a maximum of 469 non-local workers that would relocate into the Project area. This represents a total population increase of less than 1 percent within the Project area. Due to the relatively short duration of Project construction, most non-local workers are not expected to bring their families with them to the Project area. Since the Project construction workers would be spread out along two separate pipeline spreads within three counties, we conclude that the Project would not have a significant effect on any one counties' population. Additionally, Mountain Valley would hire four new permanent employees to operate and maintain the Project facilities. The effects of these permanent employees would be minor in regard to population levels within the counties crossed by the Project.

In Virginia, the unemployment rate in Pittsylvania County (4.5 percent) is slightly higher than the state rate of 3.2 percent (BLS, 2018). In North Carolina, the unemployment rates in Rockingham County is higher than (5.2 percent) and Alamance County is equal to (4.3 percent) the state rate of 4.3 percent. During peak construction, up to 589 local workers could be employed on the Project. This represents 0.4 percent of the total civilian workforce in the affected counties. Given the short duration of construction, any increase in local employment rates from construction of the Project in these counties or the surrounding areas would be temporary and minor, and the Project is unlikely to noticeably affect local unemployment rates.

4.9.2 Housing

Based on U.S. Census Bureau data, there are about 3,213 units available for rent in the affected counties (U.S. Census Bureau, 2016b) and there is a vacancy rate of 3.6 percent in Pittsylvania County, 7.5 percent in Alamance County, and 8.9 percent in Rockingham County. In

2017, there were about 2,118 hotel and motel rooms and an additional 407 recreational vehicle (RV) and campground spaces available in the Project area (see table 4.9-3).

TABLE 4.9-3

Existing Housing Accommodations in the Southgate Project Area

Project/ County	Rental Vacancy Rate (percent) a/	Units Available for Rent b/	Units for Seasonal Recreation b/	Hotel/ Motel Facilities c/	Hotel/ Motel Rooms c/	RV and Campground Locations d/	RV and Campground Spaces d/
Virginia							
Pittsylvania	3.6	239	899	3	160	5	172
North Carolina							
Rockingham	8.9	1,197	1,165	15	603	4	147
Alamance	7.5	1,777	284	26	1,355	3	88
Project Total	***NA***	***3,213***	***2,312***	***44***	***2,118***	***12***	***407***

a/ U.S. Census Bureau, 2016a

b/ U.S. Census Bureau, 2016b

c/ HotelMotels.info, 2018; Bing Maps, 2018; Experience Danville Pittsylvania County, 2018; Visit Rockingham County, 2018; Visit Alamance County, 2018.

d/ Go Camping America, 2018; RV Clubs, 2018; Experience Danville Pittsylvania County, 2018; Visit Rockingham County, 2018; Visit Alamance County, 2018.

Mountain Valley would not provide or construct any housing during construction. Instead, non-local construction workers would find housing in vacant rental units, including houses, apartments, mobile home parks, hotels/motels, campgrounds, and RV parks. The influx of about 469 non-local construction workers would represent a 5.8 percent increased demand for available accommodations in the Project area. Local workers would not need housing, as they would commute from their existing homes. Given the relatively short duration of construction and the number of housing units available, we conclude that the Project would not have significant adverse impacts on housing.

4.9.3 Public Services

Constructing the Project would increase demands on local public services and facilities. Local police may be needed to assist in maintaining traffic flow during construction or may need to respond to emergencies associated with pipeline construction. Fire departments may be needed in response to Project-related emergencies. Increased need for medical services would be mainly due to any illness or injury of workforce personnel. Additionally, police, fire, or medical service needs may also increase due to the influx in personnel (e.g. increase in traffic stops, traffic accidents, general medical needs). Table 4.9-4 summarizes the medical, police, and fire protection facilities in the counties within the study area.

TABLE 4.9-4

Public Services in the Counties Affected by the Southgate Project

Project/State/ County	Number of Fire Departments a/	Number of Hospitals / Hospital Beds b/	Number of Police & Sheriff Departments c/	Number of Public Schools d/
Virginia				
Pittsylvania	21	1 / 50	3	19
North Carolina				
Rockingham	16	2 / 339	6	25
Alamance	8	1 / 238	6	36
Project Total	**45**	**4 / 627**	**15**	**80**

a/ Pittsylvania County Schools, 2018; Rockingham County Schools, 2018; Alamance County Schools, 2018.
b/ Pittsylvania County Sheriff, 2018; Rockingham County Sheriff, 2018; Alamance County Sheriff, 2018.
c/ USA Fire & Rescue, 2018; Carolinas Fire Page, 2018; Pittsylvania County GIS, 2018; Pittsylvania County, 2018.
d/ AHD (American Hospital Director), 2018.

All of the counties affected by the Project contain areas that are designated as health professional shortage areas (HPSA) and as medically underserved areas/populations (MUA/P). HPSA or MUA/P designation indicates a shortage of health care professionals or facilities (primary care, dental, and mental health) at either the county level as a whole or for particular census tracts within the county that contain low-income populations who are underserved by primary medical care. There are several larger metropolitan areas in adjacent counties such as Martinsville, Virginia, Dansville, Virginia, and Greensboro, North Carolina that have additional hospitals and medical facilities and are within a 40 to 60 minute drive from the Project. Given the number of hospital beds available in the Project area and the surrounding areas, there are sufficient medical services to serve the proposed peak construction workforce of 1,045 workers.

Each county within the Project area has numerous fire and police departments. Mountain Valley would work with local fire departments, police departments, and emergency first responders to address any Project impacts.

Few non-local workers are expected to relocate their families to the Project area. Given the low number of children expected to relocate, local schools should be able to absorb any additional children moving to the area because of the Project.

The communities in the Project area have adequate public service infrastructure to meet the potential needs of non-local workers who relocate temporarily. Therefore, we conclude that the Project would not significantly impact public services.

4.9.4 Transportation and Traffic

Constructing the pipeline route would require crossing 74 public roadways and 4 railroads. A complete list of roads and railroads affected by the Project, including proposed crossing methods, is provided in appendix E.1.

Most paved roads and all railroads crossed by the Project would be crossed by conventional bore. Where roads are bored, impacts on users would be minimal since there would be no direct impacts on the road surface. Some gravel or grass/dirt two-track roads crossed would be open-cut (see appendix E.1). Use of the open-cut method across a road generally requires a temporary road closure and establishment of detours. If no detour is feasible, Mountain Valley would create temporary travel lanes or install steel plates over the open-cut area to ensure continued traffic flow during construction. At least one lane of the road being crossed would be kept open to traffic except for brief periods when it would be essential to close the road to install the pipeline. Mountain Valley would coordinate with local police departments in areas of high traffic volume to avoid traffic flow interruptions and ensure the safety of pedestrians and vehicles and passing emergency vehicles. Mountain Valley would also employ traffic control measures, such as flagmen and signs. After pipeline installation, all roads crossed would be returned to their pre-construction condition and use.

Construction impacts on Project area roads would include disruption to traffic flow due to the movement of construction equipment, materials, and crew members and damage to local roads from the movement of heavy construction equipment and materials. Additionally, traffic and commute times may increase due to construction of the Project. The primary impact would occur as workers and equipment move into the Project area at the beginning of the day and leave the area at the end of the day. Specifically, slow moving or large construction equipment may cause delays throughout the day when moving into the Project area or moving between sites; however, these delays would be temporary. Public roads used by construction vehicles to get to and from workspaces could experience increase sediment tracking/build-up and surface damage. Mountain Valley would minimize and mitigate the trackout of sediment from the access roads or workspaces onto paved roads using rock construction entrances. If sediment or other loose material is tracked onto paved roads, Mountain Valley contractors would sweep or vacuum to remove from the road. During construction, Mountain Valley would inspect roads periodically and, if damages occur as a direct result of Project-related activities, would repair them as appropriate and in accordance with the applicable permit. Following construction, roads would be restored to their original conditions unless otherwise directed by the landowner, county, or state agency. Therefore, we conclude that construction activities would result in temporary to short-term impacts on transportation infrastructure.

During the draft EIS comment period, we received comments expressing concern that a cleared right-of-way would result in increased use of ATVs. Mountain Valley would address unauthorized off-road vehicle and ATV use on Project rights-of-way by adhering to Section VI of its Plan, which includes measures such as signs, fences/gates, and slash, timber, and boulder barriers.

4.9.5 Property Values and Insurance

We received several comments during the scoping period regarding the potential effect of the Project on property values and home insurance. Specific issues mentioned include devaluation of property if encumbered by a pipeline easement; being the responsible party for property taxes within a pipeline easement; paying increased landowner insurance premiums for Project-related effects; the inability to obtain home insurance or charges of higher premiums if the property is

encumbered by a pipeline easement; and negative economic effects resulting from changes in land use (e.g., loss of timber production within the permanent right-of-way).

To address these comments, we conducted a review of available literature to assess potential Project impacts. A 1994 paper compared data from nine towns in Connecticut traversed by natural gas pipelines operated by Algonquin and Tennessee Gas Pipeline companies since the 1960s, with a Southwestern pipeline through a planned community near a major city. The Connecticut study assessed 1,171 home sales between 1986 and 1991. The Southwestern study looked at 2,212 home sales between 1988 and 1991. The results of the studies for both Connecticut and the Southwestern pipeline were essentially the same. No systematic pattern of measureable or significant negative impacts on home sale prices were observed for residences close to a natural gas pipeline (Kinnard et al., 1994). Portland State University evaluated the impact of the South Mist Pipeline Extension (SMPE) in Clackamas and Washington Counties, Oregon on residential sales between 2004 and 2008. Based on sales price data for 10,642 single-family residential properties located within 1 mile of the pipeline, the study found that proximity to the pipeline had no statistically or economically significant impact on residential property values (Fruits, 2008). A 2011 study analyzed sales data from approximately 1,000 residential properties in Arizona to test whether proximity to a natural gas pipeline had an effect on real estate sales prices. The study compared sales prices for properties encumbered by or adjacent to a natural gas transmission pipeline with comparable properties not along a pipeline right-of-way. The study was unable to identify a systematic relationship between proximity to a pipeline and sales price or property values (Diskin et al., 2011). Lastly, Wilde et al. (2014) published a study of the effects the Kern River Pipeline had on property values within the subdivision of Summerlin near Las Vegas, Nevada, based on home sales and data reviewed at the Clark County Assessor's office. Looking at sales between 1991 and 1996 of representative three bedroom single-family houses, the study found that properties closest to the pipeline sold on average for higher prices than properties farther away.

Generally, the value of a tract of land, with or without a dwelling, is dependent on many variables, including the size of the tract, improvements, land use, views, location, and nearby amenities, and the values of adjacent properties. The presence of a pipeline, and the restrictions associated with an easement, may influence a potential buyer's decision whether or not to purchase that property. If a buyer is looking for a specific use, which the presence of the pipeline renders infeasible, then the buyer may decide against purchasing that property in favor of another tract without a pipeline and more suitable to their objectives. This would be similar to other buyer-specific preferences, such as nearby shopping centers, relative seclusion, or access to a high quality school district. Based the studies we reviewed, we conclude that the specific preferences of the buyer would determine if the presence of a natural gas pipeline would or would not significantly reduce property values. Further, for the studies we reviewed, the presence or proximity of a natural gas pipeline did not exert a systemic negative effect on housing resale prices.

Negotiated easement agreements compensate landowners and generally establish terms for addressing damages caused by Project construction and operation. These easement agreements can also include indemnification language, which means that the company, not the landowner, would be responsible for any damages or injuries resulting from pipeline construction and operation. If the applicants cannot reach agreements with landowners, and the Commission authorizes the projects and issues Certificates, the applicants may use the power of eminent

domain, granted by the U.S. Congress under Section 7(h) of the NGA, to obtain easements. However, in those cases, a local court would decide on the value of the easements.

Regarding the potential for insurance premium adjustments associated with pipeline proximity, on other projects, we have examined concerns that insurance premiums would increase and/or insurance companies would not insure properties due to pipeline proximity. These concerns were examined by contacting insurance offices to pose the question. We asked whether the presence of a utility crossing would change the terms of an existing or new residential insurance policy, which types of utilities may cause a change, how a policy might change, and what factors would influence a change in the policy terms, including the potential for a policy to be dropped completely. Results of this initial investigation suggested that the potential for a residential insurance policy to be affected could exist, but the extent of any action and corresponding corrective action would depend upon several factors, including the terms of the individual landowner's policy and the terms of the pipeline company's own policy. Insurance company contacts were not able to speak directly to the potential factors that could cause a change in a policy (e.g., type of utility, proximity of residence to utility), or provide quantitative information on the potential change in a policy premium (in dollars or percent). Further, we have requested in some previous projects, including the Atlantic Sunrise Project, FERC Docket No. CP15-138-000 (FERC, 2016b), PennEast Pipeline Project, FERC Docket No. CP15-558-000 (FERC, 2017), and Constitution and Wright Interconnect Projects, FERC Docket Nos. CP13-499-000 and CP13-502-000 (FERC, 2014), that the pipeline company notify us of any landowner-reported instances where property insurance was either dropped, denied, or had rates affected due to the presence of a pipeline. To date, the only project that has completed construction is the Atlantic Sunrise Project, and there have been no such reports. In 2016, INGAA released a study, conducted by Integra Reality Resources (IRR), of selected FERC-jurisdictional natural gas transmission pipelines throughout the county and their impact on property values and insurance rates (INGAA, 2016). IRR contacted the corporate offices of State Farm, Allstate, and Farmers, the three largest home insurers in the nation. Representatives of all three companies indicated that proximity to a pipeline was not taken into consideration when underwriting a homeowner's policy. In addition, premiums would not increase because a pipeline was installed on a property. There is no evidence that insurance companies view properties with pipeline easements any different than properties without easements. As such, there is no conclusive evidence indicating that insurance premiums would be affected by the presence of a natural gas pipeline easement.

We conclude that the Project would not have a significant adverse impact on property values; and would not affect the ability of homeowners to obtain fair market base priced insurance.

4.9.6 Tourism

Tourism opportunities occurring in the Project area include state and local special interest areas discussed in section 4.8, as well as other tourism-dependent businesses including agro- (small farms, seasonal farm stands, pumpkin patches, etc.) and hiking, boating, and other outdoor recreation) activities. We received several comments during scoping expressing concern that construction of the Project would impact tourism, particularly outdoor recreation. Travel-related spending supports local economies, and many people are employed by activities related to tourism (see table 4.9-5).

TABLE 4.9-5

Travel-Related Economic Contributions in the Southgate Project Area

State / County	Travel-Related Expenditures ($ million)	Travel-Related Local Tax Receipts ($ million)	Travel-Related Employment	Percent of Total Employment
Virginia				
Pittsylvania a/	73.3	2.14	660	2.2
North Carolina				
Rockingham b/	70.9	1.7	570	1.4
Alamance b/	180.0	3.1	1,400	1.8
Project Area Total	**324.2**	**6.9**	**2,630**	**1.7**

a/ VATC, 2016
b/ VisitNC, 2016

Scheduled construction of the Project would overlap with the peak tourism season and could impact public access to tourist attractions and accommodations. Construction contractors could increase competition for vacant rental units, hotel/motel rooms, and camping spots that would otherwise be procured by visitors to the Project area. However, as explained above in section 4.9.2, we conclude that available temporary housing is sufficient to accommodate the expected influx of workers and other housing needs.

As discussed in section 4.8.2, the Project is not expected to result in significant impacts on any recreation areas. No significant impacts on hunting, fishing, hiking, and other similar outdoor recreation are anticipated. Any impacts on recreation during construction would be temporary. Overall, impacts on tourism are expected to be minor and limited to the period of construction.

4.9.7 Economy and Tax Revenue

Table 4.9-6 below summarizes the economic characteristics of the counties affected by the Project.

TABLE 4.9-6

Existing Economic Conditions in the Southgate Project Area

Project/Location	Per capita income (dollars) a/	Civilian Workforce b/	Unemployment Rate (percent) b/	Top Three Industries a/
Virginia				
Pittsylvania	22,650	29,542	4.5	Construction, Educational and Health Services, Manufacturing
North Carolina				
Rockingham	21,298	41,106	5.2	Arts and Entertainment, Education and Health Services, Manufacturing
Alamance	23,989	79,767	4.3	Construction, Educational and Health Services, Manufacturing

TABLE 4.9-6

Existing Economic Conditions in the Southgate Project Area

Project/Location	Per capita income (dollars) a/	Civilian Workforce b/	Unemployment Rate (percent) b/	Top Three Industries a/
Project Totals		**150,415**		

a/ U.S. Census Bureau 2017a
b/ BLS 2018

Mountain Valley estimates that the total capital cost of the Project would be about $464 million. About $68 million would be spent directly in Virginia and $113 million in North Carolina. The remaining expenditures would occur outside of the Project area. Mountain Valley estimates that the total construction payroll would be $38.7 million in Virginia and $65.6 million in North Carolina. Based on workforce projections, Mountain Valley estimates that $0.9 million in income tax revenues would be generated by construction payroll in Virginia and $1.5 million in income tax revenues in North Carolina. Mountain Valley also estimates that during the peak of construction, the Project would create about 1,020 direct jobs, and an additional 680 indirect and induced jobs (FTI, 2019). Construction of the Project would also generate an aggregate total of $4.1 million in state and local taxes (income, sales, property, and other taxes) in Virginia and $6.3 million in North Carolina.

Operation of the Project would result in long-term ad valorem property tax benefits for the counties crossed by the Project in Virginia and North Carolina. These property taxes would be paid for the life of the Project. Mountain Valley estimates that it would pay a total of up to $1.2 million in property of ad valorem taxes in Virginia annually and a total of up to $1.7 million in property of ad valorem taxes in North Carolina annually.

During operation of the Project, a total of about six direct and indirect jobs would be supported in Virginia, with average annual salaries of about $79,000. In North Carolina, a total of about six direct and indirect jobs would be supported, with average annual salaries of about $71,000 (FTI, 2019).

Based on available economic data and the expected impacts of the Project, we conclude the Project would result in temporary beneficial impacts on the state and local economies by creating a short-term stimulus to the affected areas through payroll expenditures, local purchases of consumables Project-specific materials, room rentals, and sales tax.

4.9.8 Environmental Justice

Executive Order 12898 *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations* requires federal agencies to consider if impacts on human health or the environment (including social and economic aspects) would be disproportionately high and adverse for minority and low-income populations and appreciably exceed impacts on the general population or other comparison group.

Consistent with EO 12898, the EPA's Environmental Justice Policies focus on enhancing opportunities for residents to participate in decision-making. The EPA (2011) states that Environmental Justice involves meaningful involvement so that:

> (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health;
>
> (2) the public's contributions can influence the regulatory agency's decision;
>
> (3) the concerns of all participants involved will be considered in the decision-making process; and
>
> (4) the decision-makers seek out and facilitate the involvement of those potentially affected."

As discussed in sections 1.1 and 1.4 of this EIS, there have been many opportunities for public involvement during the Commission's environmental review process. The FERC has issued multiple notices regarding the Project that were posted on the Commission public dockets, published in the Federal Register, and sent to our environmental mailing list that included local libraries and newspapers. The FERC also held multiple public scoping meetings in the Project area.

All documents that form the administrative record for these proceedings are available to the public electronically through the internet on the FERC's web page (www.ferc.gov). Anyone, at any time, may comment to the FERC about the Project, either in writing or electronically.

We recognize that not everyone has internet access or is comfortable or adept at filing electronic comments. For this reason, each notice and Project Update brochure was physically mailed to all parties on the environmental mailing list. Further, FERC staff has consistently emphasized in meetings with the public that all comments, whether spoken or delivered in person at meetings, mailed in, or submitted electronically, receive equal weight by FERC staff for consideration in the EIS. In addition, Mountain Valley sent copies of its FERC applications in hard copy and/or digital format to the local libraries in the Project area.

4.9.8.1 Minority and Low-income Populations

According to CEQ environmental justice guidance under NEPA (CEQ, 1997) and EPA's Environmental Justice Interagency Working Group's *Promising Practices for Environmental Justice Methodologies in NEPA Reviews* (EPA, 2016), minorities are those groups that include American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. The guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. In this EIS, low-income populations are defined as those individuals with reported income below the poverty level.

To determine if the Project would result in disproportionately high and adverse impacts on minority or low-income populations, we used the following criteria to identify potential environmental justice communities:

a. census block groups that have a minority population of more than 50 percent or a minority population that is 10 percentage points higher than their respective county; and

b. census block groups that have a household poverty rate of more than 20 percent or a household poverty rate that is 10 percentage points higher than their respective county.

Table 4.9-7 provides a summary of the minority or low-income percentage of county populations within 1.0 mile of the proposed compressor station and those crossed by the pipeline. The Project pipeline route would cross 35 census block groups, including 5 that are associated with contractor yards only. Of the 35 block groups, 15 contain environmental justice populations as previously defined. Figure 4.9-1 depicts the Project route, the census block groups assessed, and those block groups that have been identified as containing environmental justice communities.

Two block groups containing environmental justice populations as defined above are located within 1 mile of the Lambert Compressor Station. We received a general comment on the draft EIS regarding siting of compressor stations near environmental justice populations. In general, the siting of compressor stations is based on engineering factors associated with the design of a pipeline system. Compressor stations are anchored by the pipeline corridor and hydraulically bound to a specific segment of the pipeline, with some flexibility within the segment (depending on project-specific conditions). Additionally, the collocation of natural gas pipelines and associated facilities with existing rights-of-way is frequently a consideration to avoid and minimize impacts on the environment. The siting of the Lambert Compressor Station was based on engineering constraints of the pipeline system as well as collocation with existing facilities. Potential impacts from operation of the compressor station on nearby environmental justice communities are further discussed below.

Impacts on the natural and human environment from construction and operation of Project facilities are identified and discussed throughout this document. Factors that could affect environmental justice communities include air and noise impacts from construction and operation (see section 4.11), visual impacts (section 4.8), and socioeconomic impacts such as traffic, loss of tourism, and crop loss (section 4.9). Potentially adverse environmental effects on surrounding communities associated with the Project, including environmental justice communities, would be minimized and/or mitigated, as discussed in those sections.

We received multiple comments regarding air quality related disparate health impacts on more vulnerable environmental justice populations. As discussed in section 4.11, construction and operation of the compressor station would result in long-term impacts that would degrade air quality in the area surrounding the Lambert Compressor Station. During construction, Mountain Valley would use water trucks and road construction entrances to decrease the amount of dust during construction as well as potentially use other optional mitigation measures identified in section 4.11.1.7. For pipeline construction, the emissions should only occur for short periods as the construction progresses. For residents near the Lambert Compressor Station (about 48 people per square mile [U.S. Census Bureau, 2010]), the construction emission impacts would last longer. However, the magnitude of the emissions would not be large and we conclude that construction air quality impacts and air quality-related health impacts would not be significant.

For operation emissions from the Lambert Compressor Station, we recognize that modeled ambient air quality concentrations in the vicinity of the Lambert Compressor Station would not exceed the National Ambient Air Quality Standards (NAAQS) as well as VADEQ limits for ambient formaldehyde concentrations. In addition, the incremental air quality degradation due to emissions from the Lambert Compressor Station would be a relatively small increase in ambient air concentrations in criteria pollutants such as oxides of nitrogen, carbon monoxide, sulfur dioxide, particulate matter, as well as volatile organic compounds and hazardous air pollutants. These results can be seen in the air quality tables 4.11-6 and 4.11-7. Again, we determined that while there would be some degradation of air quality, it would be limited to the immediate area around the compressor station, and not be significant.

Mountain Valley would use water trucks and road construction entrances to decrease the amount of dust during construction. In addition, potential pollution emissions from the Project, when considered with background concentrations, would be below the NAAQS, which are designated to protect public health. Vulnerable populations may exist within the study area and disproportionate impacts on these populations could occur as they would be affected more than the general population due to air quality impacts during construction and operation.[26] However, our analysis determined that the air quality impacts on all populations, including environmental justice communities, would not be significant. Therefore we conclude that there would be no high and adverse impacts to the local environmental justice communities.

As discussed in section 4.11, noise levels resulting from construction would vary over time and would depend upon the number and type of equipment operating, the level of operation, and the distance between sources and receptors. Alternatively, operational noise associated with the new compressor station be persistent; however, Mountain Valley would be required to meet sound level requirements. With Mountain Valley's proposed mitigation measures, the Project would not result in significant noise impacts on local residents and the surrounding communities, including environmental justice populations.

[26] It has been noted that asthma rates in African American populations tend to be higher than in white populations (U.S. Department of Health & Human Services 2020); therefore, due to demographics, populations vulnerable to asthma may exist in proximity to the compressor station.

TABLE 4.9-7

Ethnic and Poverty Statistics in the Counties and Census Block Groups Affected by the Southgate Project (percent)

	White Alone a/	African American a/	Native American/ Alaska Native a/	Asian a/	Native Hawaiian & Other Pacific Islander a/	Some Other Race a/	Two or more races a/	Hispanic/ Latino a/	Total Minority Populations a/	Households in Poverty b/	English-Limited Households c/
Virginia	**62.6**	**18.8**	**0.2**	**6.2**	**0.1**	**0.2**	**2.9**	**9.0**	**37.4**	**NA**	2.6
Pittsylvania County	**74.2**	**21.1**	**0.1**	**0.4**	**0.0**	**0.0**	**1.8**	**2.5**	**25.8**	**14.8**	1.0
Block Group 1, Census Tract 105 d/	77.8	18.1	0.0	0.9	0.0	0.0	0.0	3.1	22.2	**27.4**	3.6
Block Group 3, Census Tract 105	49.8	45.2	0.0	1.3	0.0	0.0	2.4	1.2	**50.2**	7.1	6.5
Block Group 1, Census Tract 107 e/	53.6	37.9	0.0	0.0	0.0	0.0	0.8	7.8	**46.4**	15.0	0.0
Block Group 2, Census Tract 109	86.4	9.0	0.0	0.0	0.0	0.0	1.8	2.8	13.6	9.8	2.5
Block Group 1, Census Tract 110.02	83.4	15.2	0.1	0.3	0.0	0.0	0.8	0.3	16.6	9.5	0.0
Block Group 2, Census Tract 110.02	82.3	11.8	0.0	0.0	0.8	0.0	5.1	0.0	17.7	**26.6**	0.0
Block Group 1, Census Tract 110.01 c/	77.5	18.4	0.0	0.0	0.0	0.0	0.3	3.8	22.5	**45.5**	0.8

TABLE 4.9-7

Ethnic and Poverty Statistics in the Counties and Census Block Groups Affected by the Southgate Project (percent)

	White Alone a/	African American a/	Native American/ Alaska Native a/	Asian a/	Native Hawaiian & Other Pacific Islander a/	Some Other Race a/	Two or more races a/	Hispanic/ Latino a/	Total Minority Populations a/	Households in Poverty b/	English-Limited Households g/
Block Group 2, Census Tract 110.01	92.7	5.9	0.0	0.0	0.0	0.0	1.4	0.0	7.3	10.1	0.0
Block Group 3, Census Tract 110.01	86.2	13.4	0.0	0.0	0.0	0.0	0.4	0.0	13.8	15.2	0.0
Block Group 1, Census Tract 111	80.4	11.9	0.0	0.0	0.0	0.0	0.0	7.7	19.6	19.5	3.2
Block Group 2, Census Tract 111	46.4	41.5	0.0	0.0	0.0	0.0	0.0	12.1	**53.6**	10.7	7.6
Block Group 3, Census Tract 114 c/	79.7	20.3	0.0	0.0	0.0	0.0	0.0	0.0	20.3	14.8	0.0
North Carolina	**63.6**	**21.2**	**1.1**	**2.7**	**0.1**	**0.2**	**2.1**	**9.1**	**36.4**	**NA**	2.4
Rockingham County	***72.6***	***18.5***	***0.5***	***0.5***	***0.1***	***0.2***	***1.7***	***6.0***	***27.4***	***17.5***	***0.5***
Block Group 1, Census Tract 402 f/	88.6	7.2	0.0	0.7	0.0	0.0	1.4	1.4	11.4	5.3	0.0
Block Group 2, Census Tract 402 c/	40.1	22.2	0.9	0.0	0.0	35.4	0.7	36.1	**59.9**	**22.3**	0.0

TABLE 4.9-7

Ethnic and Poverty Statistics in the Counties and Census Block Groups Affected by the Southgate Project (percent)

	White Alone a/	African American a/	Native American/ Alaska Native a/	Asian a/	Native Hawaiian & Other Pacific Islander a/	Some Other Race a/	Two or more races a/	Hispanic/ Latino a/	Total Minority Populations a/	Households in Poverty b/	English-Limited Households g/
Block Group 1, Census Tract 401.01 f/	69.9	29.8	0.0	0.0	0.0	0.0	0.0	0.3	30.1	**24.9**	0.0
Block Group 2, Census Tract 401.01	72.6	24.5	2.3	0.0	0.0	0.0	0.7	0.0	27.4	12.8	0.0
Block Group 3, Census Tract 401.01	61.3	21.8	0.0	0.0	0.0	0.0	1.0	15.8	**38.7**	5.9	0.0
Block Group 2, Census Tract 401.02	52.4	43.2	0.0	0.0	0.0	0.0	0.0	4.4	**47.6**	**23.9**	0.0
Block Group 3, Census Tract 401.02	80.8	8.6	0.0	0.0	0.0	0.0	10.5	0.0	19.2	18.5	0.0
Block Group 1, Census Tract 411	77.2	22.8	0.0	0.0	0.0	0.0	0.0	0.0	22.8	0.0	0.0
Block Group 1, Census Tract 413	82.8	9.9	0.0	0.8	0.0	0.0	3.9	2.6	17.2	**20.2**	0.8
Block Group 2, Census Tract 413	67.4	27.8	4.2	0.0	0.0	0.0	0.0	0.6	32.0	14.4	0.0

TABLE 4.9-7

Ethnic and Poverty Statistics in the Counties and Census Block Groups Affected by the Southgate Project (percent)

	White Alone a/	African American a/	Native American/ Alaska Native a/	Asian a/	Native Hawaiian & Other Pacific Islander a/	Some Other Race a/	Two or more races a/	Hispanic/ Latino a/	Total Minority Populations a/	Households in Poverty b/	English-Limited Households c/
Block Group 4, Census Tract 413	57.0	27.9	0.0	0.0	0.0	0.0	4.0	11.1	32.8	**24.6**	4.6
Block Group 2, Census Tract 414 c/	35.5	40.1	0	0.0	0.0	0.0	0.0	24.4	**64.5**	**32.8**	4.7
Alamance County	***65.0***	***18.9***	***0.3***	***1.5***	***0.0***	***0.1***	***1.9***	**12.3**	**35.0**	***16.3***	***2.9***
Block Group 1, Census Tract 215	82.0	10.9	0.0	0.0	0.0	0.0	0.0	7.1	18.0	5.5	0.0
Block Group 2, Census Tract 215	82.3	11.0	0.0	0.0	0.0	0.0	0.0	6.6	17.7	1.4	0.0
Block Group 3, Census Tract 215	78.4	2.0	0.0	0.0	0.0	0.0	0.0	19.6	21.6	10.3	3.0
Block Group 4, Census Tract 215	88.3	7.0	0.0	0.0	0.0	0.0	1.2	3.6	11.7	18.3	0.0
Block Group 1, Census Tract 214	90.3	1.1	0.0	0.5	0.0	0.0	3.7	4.5	9.7	19.3	0.3
Block Group 5, Census Tract 213	63.2	30.2	0.1	0.0	0.0	0.6	1.1	4.8	35.9	19.5	2.9

TABLE 4.9-7

Ethnic and Poverty Statistics in the Counties and Census Block Groups Affected by the Southgate Project (percent)

	White Alone a/	African American a/	Native American/ Alaska Native a/	Asian a/	Native Hawaiian & Other Pacific Islander a/	Some Other Race a/	Two or more races a/	Hispanic/ Latino a/	Total Minority Populations a/	Households in Poverty b/	English-Limited Households g/
Block Group 2, Census Tract 212.01	62.6	20.2	0.0	0.0	0.2	0.0	3.1	13.9	37.4	16.7	2.1
Block Group 3, Census Tract 212.01	84.1	8.2	0.0	0.0	0.0	0.0	0.5	7.2	15.9	11.0	0.0
Block Group 3, Census Tract 212.04 c/	58.0	20.9	0.0	0.0	0.0	0.0	0.0	21.1	42.0	33.5	0.7
Block Group 1, Census Tract 220.01	75.3	18.3	0.0	2.0	0.0	0.0	0.5	3.9	24.7	5.5	0.0
Caswell County	***61.1***	***33.0***	***0.1***	***0.6***	***0.2***	***0.0***	***1.2***	***3.7***	***38.9***	***22.1***	***0.8***
Block Group 3, Census Tract 9302 c/	46.5	51.6	0.0	1.2	0.0	0.0	0.0	0.0	53.5	60.0	3.0

TABLE 4.9-7

Ethnic and Poverty Statistics in the Counties and Census Block Groups Affected by the Southgate Project (percent)

	White Alone a/	African American a/	Native American/ Alaska Native a/	Asian a/	Native Hawaiian & Other Pacific Islander a/	Some Other Race a/	Two or more races a/	Hispanic/ Latino a/	Total Minority Populations a/	Households in Poverty b/	English-Limited Households g/

Shading denotes exceedances.

a/ U.S. Census Bureau, 2017b

b/ U.S. Census Bureau, 2017c

c/ Contractor Yard is the only Project facility within the block group

d/ Compressor Station site is within the block group.

e/ Compressor Station site is within 1 mile of the block group

f/ Dan River HDD entry and/or exit is within the block group.

g/ U.S. Census Bureau, 2017d

h/ After the draft EIS, Mountain Valley added several new contractor yards, resulting in three new census block groups added to the table.

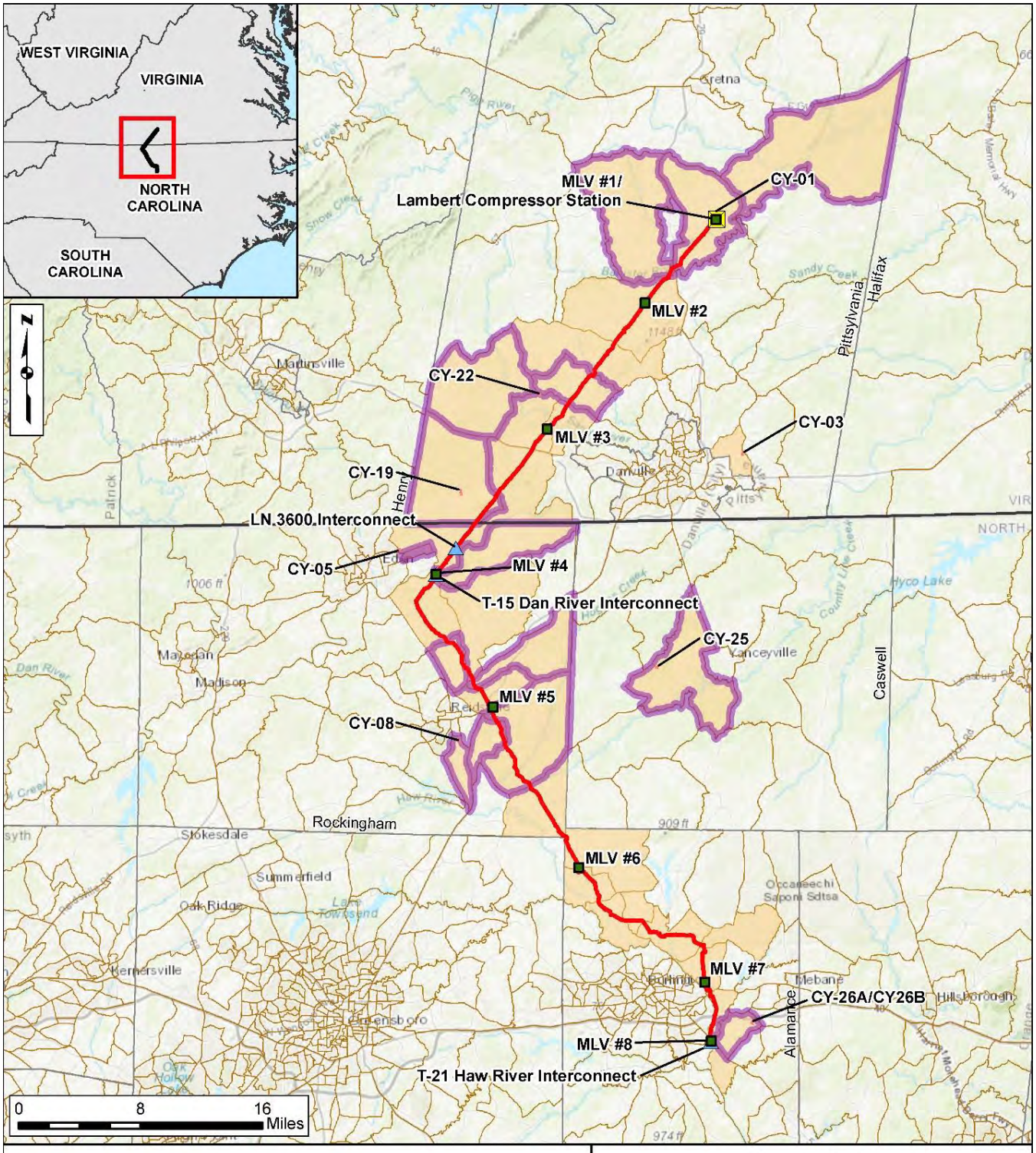

Figure 4.9-1

Southgate Project

Potential Environmental Justice Communities Based on Minority Populations and Poverty

Affects to visual resources (see section 4.8) would be Project wide and would not be concentrated in any single area or community. After construction, all disturbed areas associated with pipeline construction would be restored and areas outside of the permanent right-of-way would be returned to pre-construction conditions. In addition, given that views of the compressor station would be limited and there are no direct views of the site from residences, construction of the compressor station is not expected to result in any significant permanent impacts on visual resources. Therefore, the Project would not have significant visual impacts on environmental justice populations in the Project area.

Socioeconomic impacts that could affect environmental justice communities include traffic, loss of income due to crop loss and decreases in tourism and associated income. Area residents may be affected by traffic delays during construction of the Project. However, mitigation measures would be implemented to alleviate any potential road congestion during construction through the establishment of temporary travel lanes, the use of steel plates, and the use of flagmen and signs, as necessary, to ensure safety of local traffic. After pipeline installation, all roads crossed would be returned to their pre-construction condition and use. Mountain Valley would compensate landowners for any crop loss that occurs during construction of the Project. Mountain Valley would also monitor agricultural areas post-construction to ensure the areas within the right-of-way return to pre-construction yields. Additionally, no significant impacts on tourism are anticipated from the Project.

During the draft EIS comment period, we received a comment concerning access to the Draper Landing boat access site. The comment raised a concern that residents of the community, including nearby environmental justice communities, would be unable to access the Dan River through use of the recently installed Draper Landing due to construction of the pipeline. Potential impacts on accessibility to Draper Landing are discussed in section 4.8. To avoid adverse impacts on public accessibility to the Dan River in this area, Mountain Valley has reduced the ATWS at this location to remove the Draper Landing Boat Ramp access road, and the associated split-rail fence from the Project workspace. Mountain Valley would install temporary signage during construction to alert construction personnel that access to the Draper Landing Boat Ramp must remain open while utilizing access road TA-RO-081. In addition, Mountain Valley would utilize jersey barriers, if needed, to ensure that access to the Draper Landing Boat Ramp is not inhibited during construction.

We also received a comment during the draft EIS comment period concerning potential impacts on English-limited populations. Individuals who lack a fluent knowledge of the English language may have difficulty in understanding the Project and available information provided to the public from Mountain Valley and the FERC. However, the number of English-limited households in the Project area ranges from 0.0 to 7.6 percent (table 4.9-7 and figure 4.9-2). Only two of the census block groups have more than 6 percent of households that are defined as English-limited. Overall, out of the 14,608 households in the census block groups crossed by the Project, 315 households are defined as being English-limited.

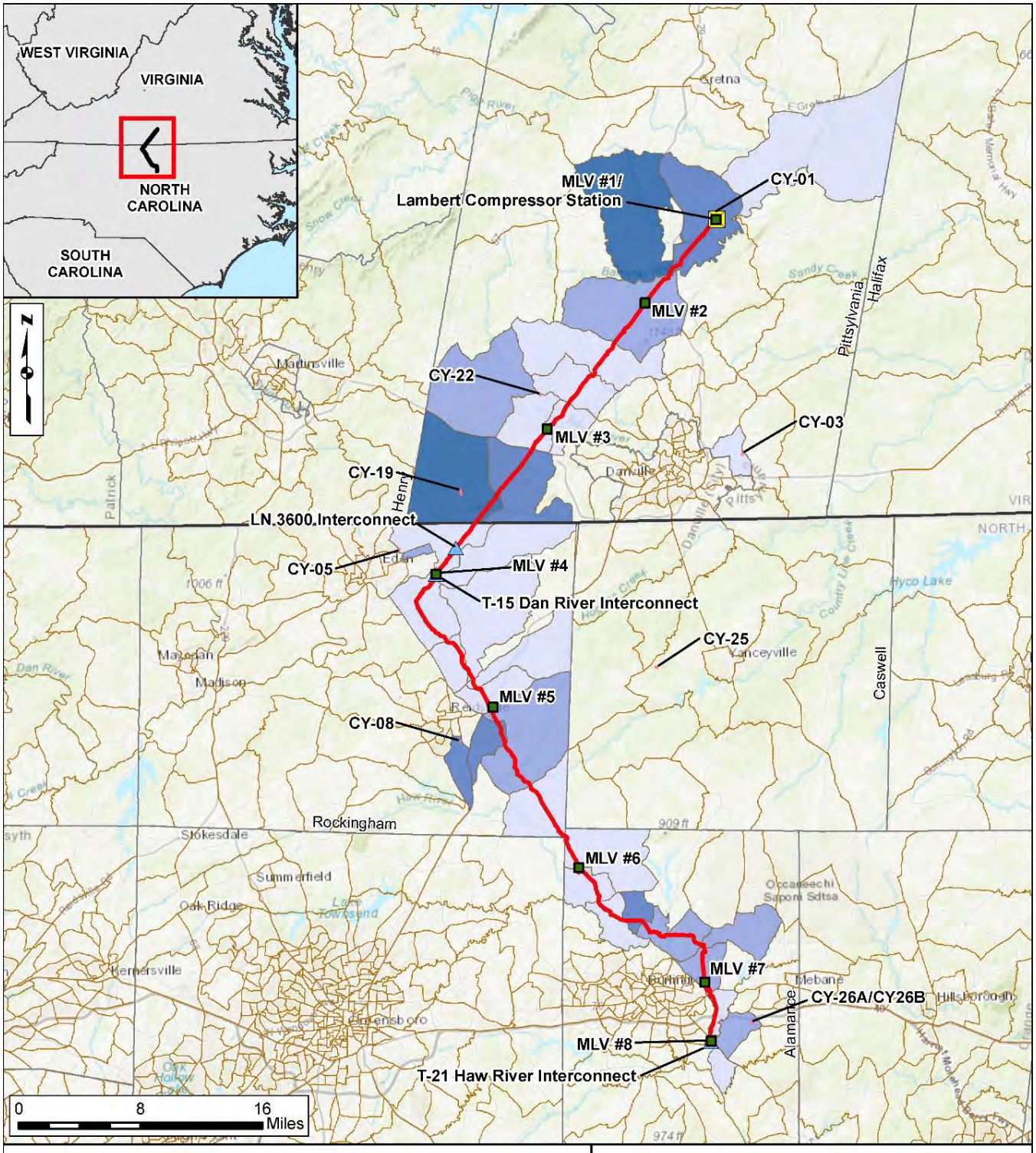

Figure 4.9-2

Southgate Project

Percent of Households that are English Limited

In conclusion, as highlighted in table 4.9-7, 15 block groups containing environmental justice populations would be crossed by the Project pipeline and 2 block groups containing environmental justice populations are located within 1 mile of the Lambert Compressor Station. Potentially adverse environmental effects on surrounding communities, including environmental justice populations, would be minimized and/or mitigated, as applicable, and would not be high and adverse. As previously discussed, vulnerable populations (i.e. groups with high asthma rates) may exist within the study area and disproportionate impacts on these populations could occur as they would be affected more than the general population due to air quality impacts during construction and operation. In consideration of all of these factors, we conclude that the Project would not result in high and adverse impacts on vulnerable populations and would not have a disproportionately high and adverse impact on the remaining environmental justice populations within the study area.

4.9.9 Socioeconomics Conclusions

Impacts on socioeconomic factors associated with construction and operation of the proposed Project are expected to be minor. The limited workforce and short duration of construction would result in a temporary, but minor impact on population, local unemployment levels, and housing available. Since there is plenty of available housing within the Project area, we do not anticipate that the Project would displace any tourists during the construction period. Additionally, no large tourist areas (including state or local parks, fishing areas, piers, etc.) would be crossed or affected by the Project. The communities in the Project area have adequate infrastructure to meet the potential needs of non-local workers who relocate temporarily. Community services would be supported by additional tax revenues generated by the Project. There may be a minor increase in the use of community/public services due to both construction activities (traffic control or medical needs) as well as a result of the increase in general population due to the influx of non-local workers to the area. The increase in traffic due to transportation of equipment and personnel would be mitigation using the measures outlined in Mountain Valley's *Traffic Mitigation Plan*. The Project would not have a significant adverse impact on property values; and would not affect the ability of homeowners to obtain fair market base priced insurance. There may be a potential benefit to the state and local economies by creating a short-term stimulus to the affected areas through payroll expenditures, local purchases of consumables Project-specific materials, room rentals, and sales tax. However, these benefits would generally be temporary and minor. Overall, socioeconomic impacts from the Project on the local communities would be minor.

Although low-income and minority populations exist within the Project area, based on our environmental analysis, the Project would not have a disproportionately high and adverse environmental or human health impact on minority or low-income populations.

4.10 CULTURAL RESOURCES[27]

The NHPA is the cornerstone of the federal government's historic preservation program. Section 101(d)(6) of the NHPA states that properties of traditional religious and cultural importance to Indian tribes[28] may be determined eligible for the NRHP. In carrying out our responsibilities under Section 106 of the NHPA, on behalf of all the federal cooperating agencies, and as the lead federal agency, the FERC conducted government-to-government consultations with Indian tribes that may attach religious and cultural importance to properties in the APE, in accordance with the implementing regulations at Title 36 Code of Federal Regulations (CFR) 800.2(c)(2)(ii). Consultations with Indian tribes are detailed below.

Section 106 of the NHPA requires that the FERC take into account the effect of its undertakings[29] (including authorizations under Section 7 of the NGA) on historic properties,[30] and afford the ACHP an opportunity to comment. Mountain Valley, as a non-federal applicant, is assisting the FERC staff in meeting our obligations under Section 106 by providing data, analyses, and recommendations in accordance with Part 800.2(a)(3) and the FERC's regulations at 18 CFR 380.12(f). Information about cultural resources in the APE was gathered for Mountain Valley by its consultant, TRC Solutions, Inc. (TRC). The FERC remains responsible for all findings and determinations under the NHPA. As the lead federal agency for the Project, the FERC will address compliance with the NHPA on behalf of all the federal cooperating agencies in this EIS.[31]

The regulations for implementing Section 106 of the NHPA, at Part 800.9, encourages the integration of the 106 compliance process with the NEPA process; and we have done that in this section of the EIS below. This section is broken into several subsections that mirrors the Section

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[27] Cultural resources are locations of human activity, occupation, or use. According to the FERC's Office of Energy Projects "Guidelines for Reporting on Cultural Resources Investigations for National Gas Projects" (July 2017), "cultural resources include any prehistoric or historic archaeological site, district, object, cultural feature, building or structure, cultural landscape, or traditional cultural property." Although "cultural resources" are not defined in 36 CFR 800, it is a "term-of-art" in the field of historic preservation and archaeological research. Indian tribes believe that cultural resources could include natural resources, such as plants and animals of traditional importance to tribes, and topographic features and viewsheds that may be sacred.

[28] Indian tribes are defined in Part 800.16(m) as: "an Indian tribe, band, nation, or other organized group or community, including a Native village, Regional Corporation, or Village Corporation, as those terms are defined in Section 3 of the Alaska Native Claims Settlement Act (43 U.S.C. 1602), which is recognized as eligible for the special programs and services provided by the United States to Indians because of their special status as Indians."

[29] "Undertaking means a project activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency," as defined in Part 800.16(y).

[30] Historic properties include any prehistoric or historic district, site, building, structure, or object, and properties of traditional religious or cultural importance to Indian tribes, listed on or eligible for listing on the NRHP, as defined in Part 800.16(l).

[31] Pursuant to Part 800.2(a)(2), the EPAct, and the May 2002 "Interagency Agreement on Early Coordination of Required Environmental and Historic Preservation Reviews Conducted in Conjunction With the Issuance of Authorizations to Construct and Operate Interstate Natural Gas Pipelines Certificated by the Federal Energy Regulatory Commission," signed by the FERC, Advisory Council on Historic Preservation, Council on Environmental Quality, Environmental Protection Agency, Department of the Army, Department of Agriculture, Department of Commerce, Department of Energy, Department of the Interior, and Department of Transportation.

106 compliance process. This process includes consultations; identification of historic properties; assessment of effects; and resolution of adverse effects, if necessary. Then we discuss the *Plan for Unanticipated Discoveries of Historic Properties and Human Remains* (Unanticipated Discovery Plans [UDP]) produced by Mountain Valley for this Project,[32] and reviews by consulting parties.[33] Lastly, we reach conclusions about the status of our compliance with the NHPA.

4.10.1 Consultations

In compliance with Section 106 and its implementing regulations, at 36 CFR 800, the FERC, on behalf of all of the federal cooperating agencies, consulted with other federal agencies; the SHPOs of Virginia and North Carolina;[34] interested Indian tribes; Certified Local Governments (CLG), and local historical societies; and other consulting parties, prior to making our determinations of NRHP eligibility and Project effects for all cultural resources identified in the APE. We also consulted with the SHPOs, interested Indian tribes, and other consulting parties to determine the resolution of adverse effects on historic properties that cannot be avoided. Those consultations are summarized below.

The FERC sent copies of our August 9, 2018, NOI for the Project to a wide range of stakeholders, including other federal agencies such as the ACHP, COE, EPA, DOI Bureau of Indian Affairs (BIA), and NPS; state and local government agencies, such as the SHPOs for Virginia and North Carolina; affected landowners; regional environmental groups and non-governmental organizations; and Indian tribes that may have an interest in the Project area. The NOI contained a paragraph about compliance with Section 106 of the NHPA, which stated that we use the notice to initiate consultations with the SHPOs as well as to solicit their views and those of other government agencies, interested Indian tribes, and the public on the Project's potential effects on historic properties. Comments from the SHPOs, interested Indian tribes, other government agencies, and the public, in response to the NOI, are summarized below.

4.10.1.1 Consultations with the State Historic Preservation Offices

FERC Consultations

Neither the Virginia nor North Carolina SHPOs commented directly to the FERC in response to our August 9, 2018 NOI. FERC staff had a telephone conversation with representatives of the Virginia Department of Historic Resources (VADHR) about the Project on August 7, 2018. A September 11, 2019 letter to the FERC from the VADEQ, commenting on our draft EIS, requested continued coordination with the VADHR. The North Carolina Department of Natural and Cultural Resources (NCDNCR) commented to the FERC about the cultural

[32] Mountain Valley's *Plan for Unanticipated Discoveries of Historic Properties and Human Remains* (UDP) was included as appendix 4-C to Resource Report 4 in its November 6, 2018 application. The UDP can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field.

[33] "Consulting parties" are defied in Part 800.2(c).

[34] The Virginia SHPO is represented by the VADHR; while the North Carolina SHPO is housed within the NCDNCR which also includes the t NCOSA.

resources section (4.10) of our draft EIS in a letter dated September 17, 2019.[35] We address comments on the draft EIS in appendix I.

Communications between Mountain Valley and the SHPOs

Communications between Mountain Valley and the SHPOs are listed in table 4.10-1 located in appendix E.3.

Mountain Valley presented its Project information packages to the Virginia and North Carolina SHPOs on April 27, 2018. On May 17, 2018, Mountain Valley met with VADHR staff, and on May 10, 2018, it met with staff of the NCDNCR. On June 4, 2018, Mountain Valley provided both the Virginia and North Carolina SHPOs with GIS shape files for its proposed facilities, and protocols for the identification and assessment of historic architectural sites. The North Carolina SHPO accepted the protocols on July 6, 2018, but requested additional data about protecting graveyards. Mountain Valley provided the NCDNCR with revised protocols for archaeological survey and testing in North Carolina on August 13, 2018. Mountain Valley's protocols for recording and assessing archaeological sites and a deep testing plan for Virginia, was submitted to the VADHR on July 2, 2018. On August 13, 2018, Mountain Valley submitted copies of a draft Resource Report (RR) 4 (Cultural Resources) and UDP to the Virginia and North Carolina SHPOs. The Virginia SHPO commented on draft RR 4 in a letter to Mountain Valley dated September 14, 2018. The North Carolina SHPO commented on draft RR 4 in a letter to Mountain Valley's cultural resources consultant, TRC, dated September 6, 2018. NCDNCR staff visited the Project area on August 21, 2018; conducted a visit of archaeological field work in Alamance County, North Carolina on January 25, 2019; and visited site 31RK217 on April 24, 2019.

On November 6, 2018, TRC, on behalf of Mountain Valley, provided the Virginia and North Carolina SHPOs with copies of its draft Phase I archaeological survey reports and draft historic architectural survey reports. The North Carolina SHPO commented on those first draft reports in letters dated December 20, 2018. The Virginia SHPO commented on the first draft survey reports on February 13, 2019.

On February 22 and March 25, 2019, TRC submitted to the VADHR copies of draft Phase II testing reports for Virginia. The VADHR provided comments on those reports in letters to TRC dated May 10 and 16, 2019.

On March 13, 2019, TRC submitted to the NCDNCR a copy of its draft Phase II testing report for two sites in North Carolina. The NCDNCR provided comments on that report to TRC in a letter dated April 15, 2019.

On March 28, 2019, TRC submitted to the NCDNCR a copy of its draft Phase I archaeological survey addendum report for North Carolina. The NCDNCR commented on that archaeological addendum report in a May 7, 2019 letter to TRC. On May 13, 2019, TRC provided the NCDNRC with its first draft addendum I report of its historic architectural survey in North

[35] This information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190930-0218 in the "Numbers: Accession Number" field.

Carolina (Karpynec, 2019a). The NCDNRC commented on that structure addendum report in a letter dated July 22, 2019.

On October 2, 2019, TRC, on behalf of Mountain Valley, conveyed to the NCDNCR copies of a draft Treatment Plan for site 31RK259 and draft Avoidance Plans for sites 31RK216, 31RK228, 31RK230, 31RK237, 31RK239, and 31RK261. TRC provided the NCDNCR with copies of Avoidance Plans for sites 31AM441 and 31AM443 on October 14, 2019. The NCDNCR commented on those plans in a letter to TRC dated November 18, 2019.

On October 14, 2019, TRC provided the VADHR with copies of draft Preservation Plans and Avoidance Documentation for multiple sites (44PY281, 44PY358, 44PY375, 44PY445, 44PY447, 44PY449, 44PY451, 44PY452, and 44PY454) and 10 historic period cemeteries (71-5033, 71-5224, 71-5225, 71-5226, 71-5525, 71-5593, 71-5596, 71-5621, 71-5622, and 71-5623).

4.10.1.2 Consultations with Indian Tribes and Other Native Americans

The unique and distinctive political relationship between the U.S. government and Indian tribes is defined by treaties, statutes, executive orders, judicial decisions, and agreements, which differentiates tribes from other entities that deal with, or are affected by, the federal government. This relationship has given rise to a special federal trust responsibility, involving the legal obligations of the U.S. government toward Indian tribes, and the application of fiduciary standards of due care with respect to Indian lands, tribal trust resources, and the exercise of tribal rights.

The FERC acknowledges that it has trust responsibilities to Indian tribes, and so, on July 23, 2003, it issued a "Policy Statement on Consultations with Indian Tribes in Commission Proceedings" in Order 635. That policy statement included the following key objectives:

- The Commission will endeavor to work with Indian tribes on a government-to-government basis, and will seek to address the effects of proposed projects on tribal rights and resources though consultations; and
- The Commission will ensure that Tribal resources and interests are considered whenever the Commission's actions or decisions have the potential to adversely affect Indian tribes or Indian trust resources.

On October 17, 2019, the Commission revised its policy statement.[36] The revision included two new items. In one, the Commission stated that it will set forth in its environmental documents and orders how tribal input resulting from consultations was considered in agency decisions for infrastructure projects. In the other, the Commission stated that it will consider the effect of its actions on treaty rights in its NEPA and decision documents. This EIS discusses treaties, and consultations with interested Indian tribes.

The FERC contacted Indian tribes that may attach religious or cultural significance to sites in the region or may be interested in potential Project impacts on cultural resources. We identified Indian tribes that historically used or occupied the Project area through basic ethno-historical sources such as the Handbook of North American Indians (Trigger, 1978; Fogelson, 2004);

[36] 169 FERC ¶ 61,063, Docket No. PL20-1-000, Order 863, 18 CFR Part 2, *Federal Register* October 24, 2019, vol. 84, no 206: 56940-56943.

communications with the SHPOs and other state agencies such as the North Carolina Commission on Indian Affairs; information provided by Mountain Valley and its cultural resources consultants; and scoping responses to our NOI, including letters from interested Indian tribes.

In a letter to the FERC, dated September 10, 2018, Appalachian Mountain Advocates requested that we consult with the state-recognized Sappony Tribe of North Carolina, and also independently determine if the Project would affect the ancestral lands of any other tribes. As discussed below, Mountain Valley did communicate with the Sappony Tribe. A private citizen of Virginia, Ann Rodgers, suggested that we consult with the Cheyenne River Sioux Tribe and the Rosebud Sioux Tribe of South Dakota about the Project. However, when Mountain Valley reached out to the Cheyenne River Sioux Tribe and the Rosebud Sioux Tribe, these two tribes did not respond to correspondence.

FERC Consultations with Indian Tribes and Other Native Americans

Government-to-government consultations between the FERC and Indian tribes were initiated for this Project when we issued our NOI on August 9, 2018. We sent our NOI to 33 federally-recognized Indian tribes, and 3 other Native American organizations or state-recognized tribes in Virginia and 7 state-recognized tribes in North Carolina. On October 16, 2018, we sent out individual letters to 25 Indian tribes. These consultations are listed in table 4.10-2 located in appendix E.3.

In response to our NOI, we received comments from five federally-recognized tribes, one state-recognized Native American organization in Virginia, and two North Carolina state-recognized Native American organization. In response to our October 16, 2018 individual letters to tribal leaders, we received comments from five federally-recognized tribes. The Absentee Shawnee Tribe of Oklahoma made of finding of no adverse effects on historic properties, and has no objections to the Project. The Cherokee Nation of Oklahoma and Choctaw Nation of Oklahoma indicated that the Project area is outside of the tribes' AOI.

The Monacan Indian Nation, Nansemond Indian Tribe, and Upper Mattaponi Indian Tribe all requested meetings and site visits with FERC staff. FERC staff participated in a meeting with representatives of the Monacan Indian Nation in Richmond, Virginia on January 17, 2019.[37] On February 1, 2019, FERC staff participated in a telephone conference call with representatives of the Nansemond Indian Tribe.[38] FERC staff met with leaders of the Upper Mattaponi Tribe at their tribal office in King William, Virginia on April 24, 2019.[39]

[37] The notes for the Monacan Indian Nation meeting can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190129-3045 in the "Numbers: Accession Number" field.

[38] The notes for the Nansemond Tribe meeting can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190207-3104 in the "Numbers: Accession Number" field.

[39] The notes for the Upper Mattaponi Tribe meeting can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190429-4000 in the "Numbers: Accession Number" field.

In its February 20, 2019, letter to the FERC, the Monacan Indian Nation reiterated previous requests. The Nation asked for copies of cultural resources reports, and GIS shapefiles. Mountain Valley provided representatives of the Monacan Nation with a map of the pipeline centerline on October 18, 2018, and copies of survey reports on February 21, 2019.[40] The Nation questioned the number of cemeteries that may be affected by the Project. FERC staff, in an email to representatives of the Monacan Indian Nation, indicated that there are about 12 cemeteries located along the pipeline route that are documented in the inventory reports, and should be avoided. In October 2019, Mountain Valley filed with the FERC copies of draft Avoidance Plans for historic cemetery sites 71-5224, 71-5225, 71-5226, 71-5593, 71-5596, 71-5621, and 71-5623 in Virginia and cemetery sites 31AM443, 31RK216, 31RK228, and 31RK237 in North Carolina.[41] The Nation requested that Mountain Valley's consultants become familiar with texts that cover Monacan history and culture; and Mountain Valley responded that they had reviewed the recommended texts. Mountain Valley representatives also visited the Monacan Museum. The Nation offered suggestions for revisions to the UDP; and requested the opportunity to further review the plan. As indicated in the notes on the meeting with the Nation, a copy of the UDP was included as part of Mountain Valley's application to the FERC, and is available for public review. Mountain Valley addressed the comments of the Monacan Nation in an October 18, 2019 filing with the FERC.[42]

In a letter to the FERC dated July 1, 2019, the Monacan Nation offered comments on cultural resources reports. The Monacan Nation provided the FERC with its comments on the draft EIS in a letter dated September 16, 2019. We respond to comments on the draft EIS in appendix I.

In letters dated August 2 and November 16, 2018, and February 25, 2019, the North Carolina state-recognized Sappony Tribe requested that FERC staff conduct meetings with the tribe. In a letter to the FERC dated July 1, 2019, the Sappony Tribe provided their comments on cultural resources reports. The Sappony Tribe provided the FERC with its comments on the draft EIS in two letters, dated September 16 and December 12, 2019. We respond to comments on the draft EIS in appendix I.

The North Carolina state-recognized Occaneechi Band of the Saponi Nation, in a letter to FERC, dated October 15, 2018, also requested meetings with FERC staff. In a letter to FERC, dated April 11, 2019, the state-recognized Nottoway Indian Tribe of Virginia expressed interest in the review of the Project.

We believe that the Nottoway Tribe, Sappony Tribe, and Occaneechi Band have a demonstrated interest in the cultural resources of the Project area; and, therefore, they could be consulting parties. We requested that Mountain Valley provide the Nottoway Tribe, Sappony Tribe, and Occaneechi Band with copies of archaeological investigation reports for the Southgate Project. The company provided reports to the Sappony Tribe and Occaneechi Band on February 21, 2019.

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40 See Mountain Valley's March 5, 2019 responses to the FERC staff's February 13, 2019, EIR which can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190305-5214 in the "Numbers: Accession Number" field.

41 Mountain Valley claimed that historic cemetery sites 31RK234 and 31RK236 in North Carolina are far enough away from the LOD they would not be affected by the Project, and do not require site-specific Avoidance Plans. Mountain Valley promised to file avoidance plans for cemetery site 71-5227 in the future.

42 Accession No. 20191018-5168. Response to FERC staff's October 3, 2019 environmental information request question 26.

On April 23, 2019, Mountain Valley contacted the Nottoway Indian Tribe about receiving copies of cultural resources reports relating to the Project. Those Native American organizations can file their comments with the FERC, for consideration by staff.

Communications between Mountain Valley and Indian Tribes and Other Native Americans

Mountain Valley communicated with 26 federally-recognized Indian tribes and 11 state-recognized Native Americans organizations, as listed in table 4.10-3 located in appendix E.3. Six federally-recognized Indian tribes responded back to Mountain Valley. Two North Carolina state-recognized Native American organizations responded to Mountain Valley's contact program. Mountain Valley sent an email dated November 2, 2018 to tribes or Native American organizations informing them about the Project. Mountain Valley provided copies of cultural resources survey reports to Indian tribes and Native American organizations that requested them. Mountain Valley organized a site visit for certain tribes and Native American organizations on March 14, 2019.

4.10.1.3 Communications with Other Agencies, Local Governments, and Historical Organizations

FERC Staff Consultations with Other Agencies, Local Governments, and Historical Organizations

In a filing on October 15, 2018, the NCDEQ provided the FERC with its comments on Mountain Valley's draft RR 4 (Cultural Resources).

We sent our NOI for the Project to nine local governments; three of which are CLGs,[43] listed in table 4.10-4. Only Alamance County, North Carolina and City of Burlington, North Carolina provided the FERC with their comments on cultural resources issues.

TABLE 4.10-4

Local Governments Sent the FERC's August 9, 2018 NOI for the Southgate Project

Local Government/State	Responses to the NOI
Pittsylvania County, Virginia	None filed to date
City of Danville, Virginia (CLG)	None filed to date
Alamance County, North Carolina (CLG)	October 23, 2018 letter to FERC included a Resolution requesting that the EIS discuss the protection of cultural resources and historic structures
Rockingham County, North Carolina	None filed to date
City of Burlington, North Carolina	September 16, 2019 motion to intervene. September 16, 2019 comments on draft EIS and request for a route re-alignment to avoid Stony Creek Reservoir
Town of Eden, North Carolina (CLG)	None filed to date

[43] A local government can work through a certification program, jointly administered by the NPS and SHPOs, to become recognized as a CLG, and thus be eligible for federal and state historic preservation funds and technical assistance.

TABLE 4.10-4

Local Governments Sent the FERC's August 9, 2018 NOI for the Southgate Project

Local Government/State	Responses to the NOI
City of Graham, North Carolina	September 7, 2018 letter to FERC did not raise any cultural resources issues
Town of Haw River, North Carolina	None filed to date
City of Reidsville, North Carolina	None filed to date

Our NOI also went out to nine local historical organizations, listed in table 4.10-5. Preservation Virginia and the Pittsylvania Historical Society responded with concerns.

TABLE 4.10-5

Local Historical Organizations Sent the FERC's August 9, 2018 NOI for the Southgate Project

Local Historical Organization/State	Responses to the NOI
Preservation Virginia	September 6, 2018 letter to FERC raised concerns about potential impacts on Little Cherrystone east of town of Chatham, and the plantations of Bachelors Hall, Oak Ridge, Oak Hill, Windsor, and Berry Hill along the Dan River near Berry Hill Road
Pittsylvania County Historical Society, Virginia	July 21, 2018 email to TRC expressing interest in the project, request for more detailed mapping, and updated contact information
Alamance County Historical Museum, North Carolina	None filed to date
Graham Historical Museum, North Carolina	None filed to date
Haw River Historical Society and Museum, North Carolina	None filed to date
Haw River Heritage, North Carolina	None filed to date
Haw River Historical Development, North Carolina	None filed to date
Mebane Historical Society and Museum, North Carolina	None filed to date
Rockingham County Historical Society, North Carolina	None filed to date
Textile Heritage Museum, North Carolina	None filed to date

Appalachian Mountain Advocates wrote a letter to the FERC, dated September 10, 2018, which requested that our EIS should address "cultural attachment" to land.[44] In addition, it was suggested that the FERC should assess impacts on historic places and structures. Impacts on historic places and structures are addressed in this section of the EIS below. A number of stakeholders also commented about a wide variety of cultural resources issues to the FERC during the scoping period, including at the public scoping meetings, and at the public sessions to take comments on the draft EIS as listed in table 4.10-6 in appendix E.3.

Communications between Mountain Valley and Local Governments and Historical Organizations

Mountain Valley communicated with three CLGs about cultural resources issues related to the Project, together with nine other local historical organizations, listed in table 4.10-7.

TABLE 4.10-7

Communications between Mountain Valley and CLGs and Local Historical Organizations for the Southgate Project

Organization/State	Date of Communication	Type of Communication	Response
City of Danville, Virginia (CLG)	July 6, 2018	Letter	None filed to date
Town of Eden, North Carolina (CLG)	July 6, 2018	Letter	None filed to date
Alamance County Historical Properties Commission (CLG), and Alamance County, North Carolina	July 6, 2018	Letter	July 30, 2018 email request for GIS data
	August 3, 2018	Telephone call and email	Mountain Valley provided shapefile
Danville Historical Society	October 4, 2019	Email to Mark Joyner	Mountain Valley conveyed confidentiality agreement
Danville Historical Society	October 18, 2019	Email to Mark Joyner	Arranged a meeting at Cherrystone Manor
Pittsylvania Historical Society, Virginia	July 6, 2018	Letter	July 21, 2018 email request for additional mapping data
	August 17, 2018	Email	Mountain Valley followed up about mapping review
Preservation Virginia	August 27, 2019	Email to Sonja Ingram	Mountain Valley provided confidentiality agreement
Rockingham County Historical Society, North Carolina	July 6, 2018	Letter	October 2, 2018 telephone request for additional mapping data

[44] Cultural attachment "…is demonstrated in the intimate relationship (developed over generations of experiences) that people of a particular culture share with their landscape – for example, the geographic features, natural phenomena and resources, and traditional sites, etc., that make up their surroundings. This attachment to environment bears direct relationships to the beliefs, practices, cultural evolution, and identify of a people…." (Maly, 1999:27). Appalachian Mountain Advocates did not identify a community or cultural group along the Southgate pipeline route that for generations held specific beliefs and practices tied to any regional landscape features. There are no federal laws or regulations that require that cultural attachment should be addressed by an agency in the analysis of an undertaking. Therefore, we did not conduct a study of cultural attachment in this EIS.

TABLE 4.10-7

Communications between Mountain Valley and CLGs and Local Historical Organizations for the Southgate Project

Organization/State	Date of Communication	Type of Communication	Response
	October 3, 2018	Email	Mountain Valley provided more detailed mapping data
Alamance County Historical Museum, North Carolina	July 6, 2018	Letter	None filed to date
Textile Heritage Museum, North Carolina	July 6, 2018	Letter	None filed to date
Haw River Historical Association Museum, North Carolina	July 6, 2018	Letter	None filed to date
Graham Historical Museum, North Carolina	July 6, 2018	Letter	July 21, 2018 email provided updated contact information
Mebane Historical Society and Museum, North Carolina	July 6, 2018	Letter	None filed to date
Virginia-North Carolina Piedmont Genealogical Society	August 19, 2018	Letter	None filed to date
Afro-American Historical and Genealogical Society of North Carolina	August 21, 2018	Letter	None filed to date

4.10.2 Identification of Historic Properties

4.10.2.1 Area of Potential Effect

As stated in our NOI, we define the direct APE as all areas subject to ground disturbance, including the construction right-of-way, additional temporary extra workspaces, contractor/pipe storage yards, staging areas, disposal areas, aboveground facilities, and new or to-be-improved access roads. As indicated on table 2.3-1 of this EIS, construction of all elements of this Project would impact a total of about more than 1,500 acres. An indirect APE was also established by Mountain Valley based on viewsheds around proposed Project facilities. The indirect APE should include all areas potentially subjected to the introduction of visual, atmospheric, or audible elements from the Project that may diminish the integrity or character of a nearby historic property.

Mountain Valley stated[45] that it provided Project work plans, including its definition of the APE, that were accepted by the North Carolina SHPO in letters dated May 21 and July 5, 2018. On June 4, 2018, Mountain Valley submitted work plans to the Virginia SHPO that included its definition of the APE. On February 2, 2019, the Virginia SHPO commented on draft inventory reports submitted by Mountain Valley that also included its definition of the APE. We agree with the SHPOs that Mountain Valley's definition of the APE is acceptable.

Direct Area of Potential Effect

Mountain Valley defined the direct APE to be a 300-feet-wide corridor where the pipeline would not be collocated with an existing right-of-way, and a 400-feet-wide corridor where it would be collocated. The direct APE also includes a 50-foot-wide corridor centered along the proposed access roads, additional workspaces, staging areas, yards, and the limits of proposed compressor station site and other aboveground facilities.

Indirect Area of Potential Effect

Mountain Valley defined the indirect APE to minimally be a 450-foot-wide corridor centered on the H-605 and H-650 pipeline routes, a 250-foot-wide corridor centered on access roads, and a maximum 0.5-mile area around aboveground facilities. However, in its architectural survey reports, Mountain Valley's consultant (TRC, Karpynec et al., 2018a; Karpynec et al., 2018b) expanded the indirect APE to a maximum 0.5-mile along the pipeline, or where vegetation and/or topography obstructed lines of sight.

4.10.3 Results of Cultural Resources Investigations

Below is a brief summary of cultural resources overviews, inventories, and evaluations that contribute to the identification of historic properties in the APE. Mountain Valley submitted copies of reports of investigation results with the FERC, SHPOs, interested Indian tribes, and other consulting parties.

4.10.3.1 Cultural Context

Native Americans occupied North America for many thousands of years before European exploration and settlement. The archaeological expression of the Late Woodland/Protohistoric period in the Project area is known as the Dan River Phase, characterized by Dan River ceramics (ca. AD 1000 – 1450; Eastman, 1999). In Virginia, the Dan River Phase was found at Belmont (44HR3), Box Plant (44HR2), Dallas Hylton (44HR20), Gravely (44HR29), Koehler (44HR6), Leatherwood Creek (44HR1), Stockton (44HR35), Wells (44HR9), 44FR370, and 44FR372 (Hornum et al., July 2019) archaeological sites. During the surveys for the Project in Virginia, Dan River ceramics were recovered at archaeological sites 44PY270, 44PY447, 44PY449, 44PY479, and isolated find VA-FS-31 (Blood et al., 2019; Millis, November 2019). In North Carolina, Hairston (31SK1) is an example of an archaeological site with a Dan River Phase component. Project surveys and testing found Dan River ceramics at archaeological sites

[45] See November 13, 2019 response by Mountain Valley to FERC staff's November 6 environmental information request Question 8.

31AM428, 31RK97, 31RK217, 31RK222, and 31RK259 in North Carolina (Johnson et al., 2019; Johnson, 2019a).

The permanent European settlement of Virginia was initiated with the establishment of Jamestown by the English in 1607. Pittsylvania County was created in 1767, and the county seat moved to Chatham in 1777.

At the beginning of the contact period, tidewater Virginia was dominated by the Algonquin Powhatten confederacy (Roundtree, 1990). In the piedmont of Virginia, other Indian tribes included the Manahoac, Monacan, Tutelo, Sapponi, and Occaneechi (Demallie, 2004).[46] In 1608, John Smith, one of the original Jamestown leaders, met the Manahoac and Monacan and mapped their village locations (Hantman, 2018). John Lederer, a German explorer, encountered the Monacan, Saponi, and Occaneehee in 1670. The Virginian traders Thomas Batts and Robert Fallon in 1671 reached the Tutero village (Briceland, 1987). Monacan chiefs signed the Treaty of Middle Plantation in 1680. Contact period archaeological sites in Virginia include 44AB416, Hurt Power Plant (44PY144), Philpott (44HR4), and Graham-White (44RN21).[47]

The archaeological expression of the contact period in North Carolina is known as the Saratown Phase (ca. AD 1450 to 1710). Contact period aboriginal archaeological sites in North Carolina are characterized by Oldtown, Jenrette, and Hillsboro ceramics (Millis, 2019a). Archaeological sites along the Dan River which informed this period include Upper Saratown (31SK1a), Lower Saratown (31RK1), Madison (31RK6), and William Kluttz (31SK6) (Eastman, 1999). John Lederer visited the Sara Indians in 1670, and the locations of Upper Saratown and Lower Saratown were illustrated on the Fry and Jefferson map of 1751. Lederer also met with the Shakori. The Jenrette site on the Eno River may represent the Shakori village visited by Lederer.

In the piedmont of northcentral North Carolina during the contact period, the Saxapahaw (or Sissipahaw) were said to be on the Haw River, with the Eno, Shakori, and Shoccoreeon on the Eno River and head of the Neuse River. John Lawson encountered the Eno, Keyauwee, and Sissipahaw Indians in North Carolina during his travels in 1700-1701. The Fredericks site on the Eno River may represent one of the villages visited by Lawson, while the Mitchum site on the Haw River may be the remains of a Sissipahaw village (Millis, 2019a). These groups later amalgamated with the Catawba Indians, who were focused mostly on the Catawba River (Rudes et al., 2004).

The permanent English colonization of North Carolina began with the establishment of the Albemarle District, with settlements on the Chowan and Roanoke Rivers, beginning in 1653. After 1728, William Byrd, who surveyed the Virginia-North Carolina border, enticed settlement of his 20,000 acre grant near Eden. The region's first Euro-American settlers came from the Mid-Atlantic colonies, and were of German, English, Scottish, and Irish descent. Rockingham County was created in 1785, with the county seat established at Wentworth in 1798. Alamance County was

[46] The Saponi and Tutelo probably spoke similar dialects within the Siouan-Catawban language family, The Monacan and Manahoac had no demonstrated linguistic affiliation with the Siouian language family, but did have political and trade associations with the Tutelo, Sapponi, and Occaneechi (Woodard et al., 2017). In a letter to the FERC dated July 1, 2019, the Monacan Indian Nation asserts that the Occaneechi Path trade route connected Monacan villages with Tutelo-Sapponi communities such as Occaneechi Town.

[47] The Monacan Indian Nation asserts that Hantman (2018) believes that the Hurt Power Plant site (44PY144) and the Graham-White site (44RN21) are probably associated with the Monacan.

created out of Orange County in 1849. This area was first settled by religious dominations, with Quakers at Cane Creek, German Reformed and Lutherans near Stinking Quarter Creek, and Presbyterians at Hawfields. A tax revolt by small landowners, known as "regulators," was suppressed by the North Carolina colonial militia under Governor William Tryon in the Battle of Alamance in May 1771.

In the discussion below, we refer to Native American archaeological sites as "prehistoric" or "pre-contact," while non-native colonial and more recent archaeological remains are called "historic," and post-contact buildings and structures are labeled "historic architectural" sites.

4.10.3.2 Overview

Mountain Valley stated that site file searches were conducted by TRC at the VADHR and the NCDNCR and North Carolina Office of State Archaeology (NCOSA) in April and September 2018.

Literature Reviews and Site File Searches in Virginia

In Virginia, Mountain Valley identified 82 previously recorded archaeological sites and 79 previously recorded historic architectural sites within 0.5 mile of Project facilities. Thirty-two of the previously recorded archaeological sites were mapped within 200 feet of facilities (roughly corresponding to the direct APE); however, only 7 of these were relocated during the Project surveys.

Forty of the previously recorded historic architectural sites in Pittsylvania County, Virginia, were determined to be inside the direct APE and 69 were determined to be within 0.5 mile of centerline (roughly corresponding to the indirect APE). Mountain Valley field survey crews revisited 17 of the previously recorded historic architectural sites for the Project in Virginia, of which 16 are within the direct APE and one is within the indirect APE.

Literature Reviews and Site File Searches in North Carolina

Mountain Valley identified 68 previously recorded archaeological sites, and 104 previously recorded historic standing structures within 0.5 mile of the proposed Project facilities in North Carolina. Sixteen of the previously recorded archaeological sites were mapped within 200 feet of facilities (e.g., direct APE); however, only two of these were relocated during the Project surveys (31RK44 and 31RK97).

Twenty-seven of the previously recorded historic architectural sites were identified by Mountain Valley to be within the direct APE and 103 were determined to be within 0.5 mile of centerline (e.g., indirect APE) in North Carolina. Mountain Valley field survey crews revisited 30 previously recorded historic architectural sites, of which 17 are in the direct APE and 13 are in the indirect APE.

4.10.3.3 Inventories

As the end of October 2019, Mountain Valley conducted cultural resources inventories of a total of about 70.5 miles of pipeline route (94 percent); 30.3 acres at aboveground facilities

(100 percent); 119.2 acres at yards (68 percent); 1.1 acres at cathodic protection beds (66 percent); and 29.9 miles of access roads (93 percent). During those inventories, Mountain Valley recorded 81 archaeological sites and 241 historic architectural sites in the direct APE.

North Carolina SHPO made determinations of NRHP eligibility for most of the resources and we agree with those determinations. These findings are discussed below, as documented in letters from the SHPOs filed with the FERC by Mountain Valley. The Project would have no effect on sites found to be not eligible to the NRHP; and those sites require no further work.

Investigations in Virginia

In Virginia, Mountain Valley inventoried about 26.7 miles of the Project pipeline route (99 percent), all proposed aboveground facilities (Lambert Compressor Station, interconnects, and three MLVs), 67.2 acres at four yards (69 percent), 0.5 acre at cathodic protection beds (46 percent), and 11.5 miles of access roads (94 percent) by the end of October 2019. These surveys resulted in the recordation of 30 archaeological sites and 78 historic architectural sites in the direct APE. The individual survey reports filed to date for Project components in Virginia and SHPO reviews are discussed below.

As of September 2018, Mountain Valley conducted archaeological surveys in Virginia that covered about 26 miles of the Southgate pipeline route (98 percent); the Lambert Compressor Station; two MLV sites (MLV-2 and MLV-3); one contractor yard (CY-1); and approximately 22 miles of access roads (Blood et al. February 2019). A total of 17,810 shovel tests were excavated as part of the 2018 archaeological surveys; of which 124 probes produced artifacts. Mountain Valley identified 22 archaeological sites and 19 isolated finds in the direct APE in 2018. The archaeological sites include 14 prehistoric, 5 historic, and 3 multi-component resources. The isolated finds consist of 18 prehistoric artifacts and 1 historic item. After its 2018 surveys, TRC recommended that 15 of the isolated finds and 11 archaeological sites are not eligible for listing on the NRHP. TRC indicated that four isolated finds and 11 archaeological sites in Virginia were unevaluated (Blood et al., 2019).

In a letter dated February 13, 2019, reviewing TRC's first draft Phase I archaeological survey report for Virginia, the VADHR evaluated all the isolated finds but one as not eligible; with additional work required at one resource (VA-FS-30). The VADHR concurred with TRC that 11 archaeological sites are not eligible for the NRHP. The VADHR found nine archaeological sites to be potentially eligible for the NRHP, and two sites as unevaluated.

Between July and September 2018, TRC tested six sites in Virginia. After testing, TRC changed its evaluations, and assessed five sites that were formerly of unknown status (44PY271, 44PY375, 44PY445, 44PY451, and 44PY455) as being not eligible for the NRHP (Millis 2019b, 2019c). Site 44PY449 was reassessed to be eligible and should be avoided.

In letters to TRC dated May 10 and May 16, 2019, the VADHR concurred that site 44PY271 is not eligible for nomination to the NRHP; however, site 44PY449 is eligible for the NRHP. Furthermore, the VADHR deferred their NRHP eligibility determination for sites 44PY375, 44PY445, 44PY451, 44PY455 because the sites extend outside the APE and have not been fully delineated. However, the VADHR determined that the portions of 44PY375, 44PY445,

44PY451, and 44PY455 within the APE are not significant and no further investigations for the portions within the APE are warranted.

Additional cultural resources surveys were conducted by TRC between August 2018 and May 2019 for the Project in Pittsylvania County, Virginia. The additional surveys examined parcels previously inaccessible, as well as proposed route modifications and work space changes located outside of the original study corridor reported by Blood et al. (2019). These areas included 37 pipeline corridor segments, 3 yards, 7 workspaces, and 27 access roads. The additional surveys covered about 6.3 miles of pipeline route; 74.4 acres at yards; 2.6 acres of workspaces; and 2.6 miles of access roads. A total of 2,476 shovel tests were excavated during the additional surveys.

The survey addendum report identified ten new or revisited archaeological resources, including four prehistoric isolated finds, three prehistoric lithic scatters, one multi-component site with a prehistoric lithic scatter and historic artifact scatter, one historic farmstead, and one historic house (Johnson, 2019b). Of these, nine are in the direct APE, all of which are recommended not eligible for listing in the NRHP (table 4.10-8). One site, 44PY477 (historic farmstead), was recommended potentially eligible and should be avoided. The Virginia SHPO reviewed the first addendum archaeological survey report in a letter to TRC dated November 6, 2019, and concurred with its recommendations. An avoidance plan for 44PY477 has not yet been filed.

Mountain Valley filed draft protection or avoidance plans for six archaeological sites (44PY281, 44PY358, 44PY447, 44PY449, 44PY452, and 44PY454). The Virginia SHPO has not yet reviewed those plans. On December 16, 2019, Mountain Valley filed the results of archaeological testing of sites 44PY270 and 44PY479. Both sites were found eligible for the NRHP. No further work at site 44PY270 in the APE was recommended, except fencing to avoid impacts on the eligible portion of the site outside the APE. It was recommended that site 44PY479 should be avoided or mitigated (Millis, 2019h). The Virginia SHPO has not yet commented on the testing report.

Table 4.10-8 in appendix E.3 lists the archaeological sites identified by TRC for Mountain Valley in the direct APE in Virginia and their evaluations.

Based on Mountain Valley's survey reports dated through September 2019, we identified a total of 78 historic architectural sites in the direct APE in Pittsylvania County, Virginia. Twenty-two of those were previously recorded. Thirty-eight historic architectural sites were found by Mountain Valley's contractor along the proposed pipeline route, 16 were found at yards, and 24 were found along proposed access roads. Combined, the historic architectural sites identified for the Project in Virginia include 37 houses, 17 farms with houses, 8 barns and sheds, 9 cemeteries, 2 churches with cemeteries, 2 commercial/industrial buildings, 1 building ruins, and 2 railroad crossings (Karpynec et al., 2018a; 2019c).

TRC evaluated 69 historic architectural sites in the direct APE in Virginia as being not eligible for the NRHP. In a letter dated February 13, 2019, the VADHR disagreed with TRC and found site 71-5212 eligible. The VADHR concurred with the other sites that TRC recommended in 2018 as not eligible for the NRHP.

Two previously recorded historic architectural sites along the pipeline route in Virginia (71-25 and 36) are listed in the NRHP. TRC recommended that seven other historic architectural sites (71-4, 5222, 5227 5598, 5620, 5727, and 5732) should be considered eligible or potentially eligible for listing in the NRHP. The VADHR concurred with the recommendations for sites 71-5222, 5227, 5598, and 5620. Mountain Valley intends to avoid historic architectural sites 71-4, 25, 36, 5212, 5222, 5227, 5598, 5620, 5727, and 5732. In addition, Mountain Valley intends to avoid historic cemetery sites 71-5225, 5226, 5525, 5596, 5621, 5623, and 5735 in the direct APE. Historic period cemetery sites 71-5224 and 5593 are outside the direct APE; however, Mountain Valley produced an avoidance plan for them.

Table 4.10-9 located in appendix E.3 lists the historic architectural sites identified by TRC for Mountain Valley in the direct APE in Virginia and their evaluations.

Investigations in North Carolina

By the end of October 2019, Mountain Valley surveyed about 43.8 miles of pipeline route in North Carolina (90 percent). All of the aboveground facilities proposed for North Carolina were inventoried, including the LN 3600 and T-15 Dan River Interconnections, and two MLVs (4 and 5) in Rockingham County, and the T-21 Haw River Interconnect and three MLVs (6, 7, and 8) in Alamance County. Surveys also covered 52 acres of yards in North Carolina (68 percent). All 0.62 acres of cathodic protect beds in North Carolina were inventoried. About 18.4 miles of access roads were surveyed (92 percent). The survey and testing reports filed to date for Project components in North Carolina and SHPO reviews are discussed below.

In its initial 2018 archaeological surveys in North Carolina, Mountain Valley documented inventories of about 36 miles of proposed pipeline route, the T-15 Dan River Interconnect, five MLVs (4, 5, 6, 7, and 8), one contractor yard (CY-4), and approximately 21 miles of access roads. A total of 7,802 shovel tests were excavated during the original 2018 surveys in North Carolina; with 90 probes producing artifacts (Johnson et al., 2019). The surveys identified 61 archaeological resources (32 archaeological sites and 29 isolated finds), including 42 with prehistoric components only, 13 with historic components only (including five cemeteries), and six multi-component sites consisting of both historic and prehistoric components.

In a letter dated December 20, 2018, reviewing Mountain Valley's first survey report for North Carolina, the NCDNCR found 44 archaeological resources to be not eligible for the NRHP. According to the NCDNCR, two archaeological sites (31AM435 and 31RK244) are not eligible within the direct APE, but are unassessed outside.

Between October 2018 and February 2019, TRC conducted additional surveys in North Carolina, covering a total of 9.4 miles of pipeline route in 53 segments. Also inventoried were a total of about 49 acres at 3 yards; 2 acres at 2 anode beds; 13 acres at 14 workspaces; and 37 access roads totaling about 10 miles. Additionally, 1,392 shovel tests were excavated during the first addendum surveys. The report of the first addendum surveys documented the recordation of seven prehistoric archaeological sites, two historic sites, one multi-component site, and four prehistoric isolated finds. TRC recommended that three prehistoric archaeological sites (31RK97, 31AM441, and 31AM442) and three isolated finds (31RK263, 31AM264, and 31RK265) were unassessed; while the other resources were not eligible for the NRHP within the APE (Johnson, 2019a).

In a letter to TRC, dated May 7, 2019, reviewing the first draft addendum archaeological survey report for North Carolina, the NCDNCR stated that sites 31AM438, 31AM439, and 31AM440, and 31RK262, 31RK266, 31RK267, and 31RK269 are not eligible within the APE. Site 31AM219 was not relocated in the APE. Site 31AM443 is a historic cemetery that is not eligible for the NRHP, but should be avoided. Sites 31RK263 and 31RK265 are outside the APE and should be avoided. Sites 31AM441, 31AM442, 31RK97, and 31RK264 require additional investigations to determine their NRHP eligibility.

Two additional archaeological survey addenda were conducted by TRC between January and May 2019 (Addendum 2; Johnson 2019c) and between May and August 2019 (Addendum 3; Johnson 2019d) for the Project in Alamance, Caswell, and Rockingham Counties, North Carolina. For Addendum 2, the surveyed areas included four pipeline corridor segments, two yards, the T-21 Haw River Interconnect, two workspaces, and two access roads. These surveys examined about 0.76 mile of newly accessible tracts located along the pipeline route, including minor line adjustments; 70.1 acres at yards; 1.56 acres for the T-21 Haw River Interconnect; 0.36 acre for workspaces; and 0.04 miles of access roads extending outside of the original study corridor. A total of 609 shovel tests were excavated for Addendum 2. The surveys identified or revisited five archaeological resources (two prehistoric isolated artifacts, two prehistoric artifact scatters, and a multi-component site with a prehistoric isolated find and historic artifact scatter). Three of these resources (31AM445, 31AM446, and 31CS82) were recommended to be not eligible for the NRHP. Two sites (31AM442 and 31AM447) were considered unassessed during the survey (Johnson 2019c). The North Carolina SHPO reviewed the Addendum 2 report in a letter dated September 19, 2019, and found sites 31AM442 and 31AM447 to be potentially eligible.

For Addendum 3, the surveyed areas included 30 pipeline corridor segments, 11 workspaces, and portions of 30 access roads. These surveys covered about 4.34 miles of pipeline route, including minor line adjustments; 7.01 acres at workspaces; and 9.24 miles of access roads. A total of 755 shovel probes were excavated for Addendum 3 surveys. The study identified eight new archaeological resources including four prehistoric isolated artifacts, three prehistoric artifact scatters of unknown, and one prehistoric lithic scatter. Six resources (31AM449, 31AM450, 31AM453, 31AM454, 31AM455, and 31AM456) was recommended not eligible, and two sites (31AM451 and 31AM452) were unassessed (Johnson 2019d). On November 18, 2019, the North Carolina SHPO provided its review of the Addendum 3 report to TRC. It found sites 31AM451 and 31AM452 potentially eligible for the NRHP, and suggested those sites be avoided.

After archaeological testing at sites 31RK221 and 31RK238, TRC recommended them to be not eligible for the NRHP (Millis 2019d). In a letter to TRC dated April 15, 2019, the NCDNCR agreed that the portions of those sites in the APE are ineligible.

TRC conducted testing at archaeological sites 31RK222, 31RK259, and 21RK261, and additional deep testing along Town Creek in Rockingham County, North Carolina in 2018. Sites 31RK222 and 31RK259 were evaluated to be eligible for the NRHP, and avoidance for 32RK222 and mitigation for 31RK259 was recommended. Site 31RK261 was also evaluated as eligible, but TRC believes the portion of the site within the direct APE does not contribute to its significance. The deep testing at Town Creek identified isolated finds 31RK258 and 31RK260, and a prehistoric component at site 31RK245. Site 31RK245, and isolated finds 31RK258 and 31RK260 were

evaluated as being not eligible for the NRHP (Millis, 2019a). The North Carolina SHPO concurred with these recommendations in its letter dated May 24, 2019.

On October 2, 2019, Mountain Valley submitted a Treatment Plan for site 31RK259, that was accepted by the SHPO on November 18, 2019. An avoidance plan for site 31RK222 has not yet been filed.

Between April and June 2019, TRC conducted testing at archaeological sites 31AM417, 31AM442, and 31AM447, and deep geomorphological testing at five locations along the Haw River floodplain in Alamance County, and testing of archaeological sites 31RK217, 31RK235, and 31RK247 in Rockingham County. Based on this work, TRC indicated that the portions of these sites in the APE do not qualify for the NRHP (Millis, October 2019). The North Carolina SHPO has not yet reviewed this testing report.

On October 22, 2019, Mountain Valley filed draft protection and avoidance plans for four archaeological sites (31AM441, 31RK230, 31RK239, and 31RK261), and avoidance plans for four historic period cemeteries (31AM443, 31RK216, 31RK228, and 31RK237) in North Carolina (Millis 2019f). The SHPO has not yet reviewed these plans.

As of the end of October 2019, Mountain Valley identified 51 archaeological sites in the direct APE in North Carolina. This includes 29 prehistoric sites, 13 historic sites (including six cemeteries), and nine multi-component sites. Future investigations are required at archaeological sites 31AM452, 31RK97, and 31RK229. Table 4.10-10 in appendix E.3 lists the archaeological sites identified in the direct APE in North Carolina and their evaluations.

As of the end of October 2019, Mountain Valley identified a total of 163 historic architectural sites in the direct APE in North Carolina. This includes 42 historic sites along the pipeline route, 12 along access roads, and 8 near yards in Rockingham County; 84 historic sites along the pipeline route, and 10 along access roads in Alamance County; and 7 historic sites near yards in Guilford County. In total, the historic architectural sites in the direct APE in North Carolina include 119 houses, 1 hunting cabin, 1 log cabin, 1 outbuilding, 6 farms with houses, 5 barns or agricultural outbuildings, 3 churches, 20 commercial or industrial structures, 1 culvert, and 4 railroad crossings.

In a letter dated December 20, 2018, reviewing Mountain Valley's first historic architectural survey report for North Carolina, the NCDNCR disagreed with TRC's recommendation of not eligible for two sites (AM2407/2408; and RK1704), believing them to be unevaluated until more information is provided. The NCDNCR concurred that one site (AM1520) was unassessed, and four sites may be potentially eligible for the NRHP (AM203/1516; AM266; AM350; and AM447).

In response to that SHPO letter, Mountain Valley had TRC revise its historic architectural survey report in April 2019. The SHPO reviewed that report, in a letter dated July 18, 2019, and agreed that the T.M. Holt Textile Mill (AM203), J.M. Jordan House (AM1520), Tabardrey Mill (AM2407), and American Tobacco Company Plant (RK1704) are not eligible for the NRHP. The Southgate Project should have no effects on the Jim McClure House (AM266), Robertson House (AM350), and Captain Sam Vest House (AM447). Between September 2018 and April 2019, Mountain Valley had its contractor conduct additional historic architectural surveys covering route

changes, new access roads, and yards. The results of those investigations were filed as an addendum report with the FERC and the SHPO in May 2019. The addendum survey identified 98 historic architectural resources in the indirect APE, and 29 sites in the direct APE. Of the sites in the direct APE, 23 are houses, 3 are commercial structures, 1 is a barn, and 2 are railroads. Nine of the sites in the direct APE are along the pipeline, 11 are along access roads, and 9 are in or near yards. All of the structures identified in the direct APE in the addendum report were evaluated as not eligible for the NRHP; requiring no further work (Karpynec, 2019a). The first addendum historic architectural survey report for North Carolina addendum has not yet been reviewed by the SHPO.

An additional historic architectural survey was completed by TRC in August 2019 for minor modifications to the pipeline route (Karpynec, 2019b). The August 2019 survey recorded two additional historic resources in Alamance County, both of which are recommended not eligible for listing in the NRHP. The North Carolina addendum 2 historic architectural survey report has not yet been reviewed by the SHPO. Table 4.10-11 in appendix E.3 lists the historic architectural sites identified in the direct APE in North Carolina and their evaluations.

4.10.4 Unanticipated Discovery Plan

It is possible that human remains, funerary objects, sacred objects, and objects of cultural patrimony[48] may be discovered during future cultural resources investigations (including data recovery excavations conducted under site-specific treatment plans). It is also possible that during Project construction, there could be unanticipated discoveries of previously unknown and unidentified cultural resources or human remains. To account for these possibilities, and provide for measures that could be implemented to reduce impacts and mitigate effects for those situations, Mountain Valley developed a Project-specific UDP for Virginia and North Carolina (filed as Appendix 4-C of RR 4 in its application to the FERC). The UDP was reviewed and approved by the SHPOs of Virginia and North Carolina (September 6 and 14, 2018, respectively),[49] and the Catawba Indian Tribe. On February 20, 2019, the Monacan Indian Nation filed with the FERC comments on the UDP (accession number 20190221-5108). Mountain Valley addressed the concerns of the Monacan Indian Nation, in filings with the FERC on October 18. 2019 and January 24, 2020.[50]

4.10.5 Compliance with the National Historic Preservation Act

We have not yet completed the process of complying with the NHPA. Additional investigations and/or plans remain outstanding. As of the end of October 2019, about 5 miles of proposed pipeline route, and about 2.5 miles of access roads have still not yet been surveyed. In

[48] "Funerary objects, sacred objects, and objects of cultural patrimony" are defined in the Native American Graves Protection and Repatriation Act (NAGPRA, 25 U.S.C. 3001-3013, 43 CFR Part 10).

[49] The Virginia and North Carolina SHPOs approvals of the UDP were filed by Mountain Valley in its November 6, 2018, application. This information can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20181106-5159 in the "Numbers: Accession Number" field. The NCDNCR reaffirmed its concurrence with the UDP in a letter to FERC dated September 17, 2019 (Accession No. 20190930-0238).

[50] Response to FERC staff's October 3, 2019 Environmental Information Request Question 26. Mountain Valley said it filed revised UDP on January 24, 2020 (Accession No. 20200127-5121).

addition, about 0.6 acres at cathodic protection beds, and 55.6 acres at proposed yards remain to be inventoried.

As of December 2019, we have identified one historic property (archaeological site 31RK259) that cannot be avoided and would likely be adversely affected by the Project. Mountain Valley has filed a Treatment Plan[51] to mitigate impacts on this site. SHPO approved the draft Treatment Plan in a letter dated November 18, 2019. Additional work at this site will be completed under a Programmatic Agreement for the Project (see below).

To outline a process to resolve adverse effects at affected historic properties, the FERC will produce a Programmatic Agreement (PA) for the current undertaking, to be circulated among the consulting parties. A draft PA was circulated among the consulting parties on January 8, 2020.

To ensure that the Commission's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **Mountain Valley should <u>not begin</u> construction of facilities and/or use of all staging, storage, or temporary work areas and new or to-be-improved access roads <u>until</u>:**

  a. Mountain Valley files with the Secretary:

  i. remaining cultural resources survey reports;

  ii. site evaluation reports and avoidance or treatment plans, as required; and

  iii. comments on the cultural resources reports and plans from the Virginia and North Carolina SHPOs and interested Indian tribes.

  b. The ACHP is afforded an opportunity to comment if historic properties would be adversely affected; and

  c. The FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Mountain Valley in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

  All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "<u>CUI//PRIV-DO NOT RELEASE</u>."

[51] TRC. October 2019. Treatment Plan for Archaeological Site 31RK259, Rockingham County, North Carolina, Draft Plan, filed with the FERC by Mountain Valley on October 23, 2019.

4.10.6 Cultural Resources Conclusions

We have not yet completed the process of complying with the NHPA. Additional cultural resources inventories and evaluations need to be completed. Consultations with the SHPOs and interested Indian tribes have also not been concluded. The Project would have adverse effects on some historic properties. Adverse effects on historic properties in the APE would be resolved through a PA, which is currently in draft form. Execution of the agreement document would satisfy compliance with Section 106 of the NHPA.

4.11 AIR QUALITY AND NOISE

4.11.1 Air Quality

This section describes existing air quality; identifies the construction and operating air emissions; summarizes methods that would be used to achieve compliance with regulatory requirements; and outlines projected air quality impacts for the Project.

The Project would include construction and operation of 75.1 miles of natural gas transmission pipeline, one new natural gas-fired compressor station (i.e., the Lambert Compressor Station), and other associated aboveground ancillary facilities (pig launchers/receivers, mainline valves, and meter stations/interconnects) within Pittsylvania County, Virginia and Rockingham and Alamance Counties, North Carolina. Temporary air emissions would be generated during Project construction, which would occur over a 2-year period; long-term air emissions would be generated during Project operation, most of which would be associated with operation of the new compressor station. Construction and operational air emissions as well as proposed mitigation measures are discussed in section 4.11.1.3.

4.11.1.1 Regional Climate

Air quality is substantially influenced by climate and meteorological conditions; therefore, prevalent weather patterns are a major factor in both short- and long-term air quality conditions. The south-central area of Virginia and the northcentral area of North Carolina have a humid subtropical climate. The winters are temperate and the summers long and hot.

Based on 1981 to 2010 climate data from the National Center for Environmental Information (NCEI), temperatures at the Chatham meteorological station in Pittsylvania County range from a monthly minimum average of 22.8 °F in January to a maximum average of 86.3 °F in July. Mean annual precipitation is 45.2 inches, while monthly average precipitation ranges from a minimum of 3.0 inches in February to a maximum of 4.5 inches in July. Mean annual snowfall is 4 inches, and average annual wind speed is 7.4 miles per hour with a prevailing wind direction from the west-southwest. At the Reidsville 2 northwest (NW) meteorological station in Rockingham County, temperatures range from a monthly minimum average of 28.0 °F in January to a maximum average of 87.6 °F in July. Mean annual precipitation is 46.4 inches, while monthly average precipitation ranges from a minimum of 3.3 inches in December to a maximum of 4.8 inches in July. Mean annual snowfall is 9 inches, and average annual wind speed is 7.1 miles per hour with a prevailing wind direction from the southwest (NCEI, 2018).

4.11.1.2 Ambient Air Quality Standards

Ambient air quality is protected by federal and state regulations. With authority granted by the CAA 42 U.S.C. 7401 et seq. as amended in 1977 and 1990, the EPA established NAAQS to protect human health (primary standards) and public welfare (secondary standards). The EPA codified NAAQS in 40 CFR 50 for the following "criteria pollutants:" NO_2, carbon monoxide (CO), ozone (O_3), SO_2, lead (Pb), particulate matter (PM) with an aerodynamic diameter equal to or less than 10 microns (PM_{10}), and PM with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$). These NAAQS reflect the relationship between pollutant concentrations and health and welfare effects. The NAAQS are summarized in table 4.11-1.

TABLE 4.11-1

National Ambient Air Quality Standards

Pollutant	Timeframe	Primary	Secondary	Form
PM_{10}	24-hour	150 µg/m^3	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
$PM_{2.5}$	Annual	12 µg/m^3	15 µg/m^3	Annual mean, averaged over 3 years
	24-hour	35 µg/m^3	35 µg/m^3	98th percentile, averaged over 3 years
SO_2	3-hour	NA	0.5 ppm	Not to be exceeded more than once per year
	1-hour	75 ppb	NA	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
CO	8-hour	9 ppm	NA	Not to be exceeded more than once per year
	1-hour	35 ppm	NA	Not to be exceeded more than once per year
NO_2	Annual	53 ppb	53 ppb	Annual mean
	1-hour	100 ppb	NA	98th percentile of 1-hour daily maximum concentration, averaged over 3 years
O_3	8-hour	0.070 ppm	0.070 ppm	Annual 4th highest daily maximum 8-hour concentration, averaged over 3 years
Pb	3-month rolling	0.15 µg/m^3	0.15 µg/m^3	Not to be exceeded

Source: EPA, 2016

Abbreviations:

NA = not applicable
µg = microgram(s)
ppb = part(s) per billion
ppm = part(s) per million

While states can promulgate more stringent standards than the NAAQS, the VADEQ has adopted the NAAQS in Title 9 of the Virginia Administrative Code (9VAC), Agency 5, Chapter 30; and the NCDEQ has adopted the NAAQS in Title 15A of North Carolina Administrative Code (15A NCAC), Subchapter 02D, Section 0400. Additional pollutants, such as volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) would also be emitted during construction and operation. These pollutants are regulated through various components of the CAA.

GHGs produced by fossil fuel combustion are CO_2, methane (CH_4), and nitrous oxide (N_2O). The status of GHGs as a pollutant is not related to toxicity. GHGs are non-toxic and

nonhazardous at normal ambient concentrations. GHGs are gases that absorb infrared radiation in the atmosphere and anthropogenic sources of GHGs are the primary cause of warming of the global climate system since the 1950s. Emissions of GHGs are typically estimated as CO_2e, where the potential of each gas to increase heating in the atmosphere is expressed as a multiple of the heating potential of CO_2 over a specific timeframe, or its global warming potential (GWP).

4.11.1.3 Air Quality Control Regions and Attainment Status

The EPA has established Air Quality Control Regions (AQCR) in accordance with Section 107 of the CAA. AQCRs are defined as contiguous areas considered to have relatively uniform ambient air quality, and are treated as single geographical units for reducing emissions and determining compliance with the NAAQS. Areas where ambient air pollutant concentrations are below the NAAQS are designated as "attainment," while areas where ambient air concentrations are above the NAAQS are designated as "nonattainment." Areas previously designated as nonattainment that have subsequently demonstrated compliance with the NAAQS are designated as "maintenance" for a period of time (normally 20 years after the effective date of attainment); this time period assumes that the area remains in compliance with the standard. Areas that lack sufficient data to determine their designation are designated "unclassifiable," and are treated as attainment areas for the purpose of stationary source air permitting.

The Project would be constructed in Pittsylvania County, Virginia within the Central Virginia Intrastate AQCR and Rockingham and Alamance Counties, North Carolina within the Northern Piedmont Intrastate AQCR. Areas intersected by the Project are designated as attainment or unclassifiable for the criteria pollutants (EPA, 2018b; EPA, 2018c).

There are three attainment air quality classifications within each of the AQCRs of the United States. Class I areas are designated as pristine natural areas or areas of natural significance and receive special protections under the CAA based on good air quality. Class III areas are heavily-industrialized zones that are established only on request and must meet all requirements outlined in 40 CFR 51.166. The remainder of the United States is designated as Class II. If a new source or major modification of an existing source is subject to the Prevention of Significant Deterioration (PSD) program requirements and is within 62 miles (100 kilometers [km]) of a Class I area, the facility is required to notify the appropriate federal officials and assess the impacts of the proposed project on the Class I area.

The closest designated Class I areas to the Project's Lambert Compressor Station are the James River Face Wilderness Area about 50 miles (81 km) from the proposed site and the Shenandoah National Park about 89 miles (143 km) from the proposed site. However, emissions from the compressor station would not trigger a PSD review (see section 4.11.1.5), and therefore a Class I impact analysis would not be required.

4.11.1.4 Air Quality Monitoring and Existing Air Quality

Along with state and local agencies, the EPA created a network of ambient air quality monitoring stations that collect data on background concentrations of criteria pollutants across the United States. To characterize the existing ambient air quality for the Project, data were gathered from the closest monitoring stations to the Lambert Compressor Station in Pittsylvania County, Virginia:

- For NO_2, CO, $PM_{2.5}$, and SO_2, the closest monitoring site is in Vinton (Roanoke County, Virginia), about 43 miles (69 km) from the site (Site ID 51-161-1004);
- For PM_{10} and O_3, the closest site is in Reidsville (Caswell County, North Carolina) about 37 miles (59 km) from the site (Site ID 37-033-0001); and
- For Pb, the closest monitoring site is in Roanoke City (Roanoke County, Virginia), about 50 miles (80 km) from the site (Site ID 51-161-1004).

Table 4.11-2 shows monitoring data for criteria pollutants for 2016 and 2017 from the monitoring sites, along with the appropriate primary NAAQS standard. All monitored values were below the NAAQS.

TABLE 4.11-2

Baseline Ambient Air Quality

Pollutant	Time Period	Description of Monitored Value	2016	2017	Primary NAAQS
PM_{10}	24-hour	2nd high	38.0 µg/m³	23.0 µg/m³	150 µg/m³
$PM_{2.5}$	Annual	Arithmetic mean	6.7 µg/m³	6.6 µg/m³	12 µg/m³
	24-hour	98th percentile	15.0 µg/m³	14.0 µg/m³	35 µg/m³
SO_2	1-hour	99th percentile	4.0 ppb	3.0 ppb	75 ppb
CO	8-hour	2nd high	0.7 ppm	0.7 ppm	9 ppm
	1-hour	2nd high	1.1 ppm	1.0 ppm	35 ppm
NO_2	Annual	Arithmetic mean	5.7 ppb	5.2 ppb	53 ppb
	1-hour	98th percentile	37.0 ppb	32.0 ppb	100 ppb
O_3	8-hour	4th high	0.064 ppm	0.059 ppm	0.070 ppm
Pb	3-month rolling	1st high	0.01 µg/m³	0.02 µg/m³	0.15 µg/m³

Source: EPA, 2018d

4.11.1.5 Air Quality Regulatory Requirements

New Source Review/Prevention of Significant Deterioration

Federal pre-construction review of certain large proposed projects varies for attainment and nonattainment areas. Federal pre-construction review for sources in nonattainment areas is referred to as Nonattainment New Source Review, while federal pre-construction review for sources in attainment areas is formally referred to as PSD. The review process aids in preventing new sources and modifications to existing systems from causing existing air quality to deteriorate beyond acceptable levels.

A new source in attainment area is classified as PSD major if it has the potential-to-emit (PTE) more than 100 tons per year (tpy) of a pollutant regulated under the CAA and it is listed in one of the 28 named source categories in Section 169 of the CAA, or if it has the PTE more than

250 tpy and is not listed in one of the 28 named source categories in Section 169 of the CAA[52]. For a source that is major for at least one regulated pollutant (i.e., is subject to PSD review), all pollutants that are emitted in amounts equal to or greater than the significant emission rates are also subject to PSD review (i.e., 40 tpy NOx, 100 tpy CO, 40 tpy SO_2, 15 tpy PM_{10}, 10 tpy $PM_{2.5}$, 40 tpy VOCs, or 75,000 tpy GHGs in units of CO_2e).

Table 4.11-3 summarizes the PTE from operation of the Project's Lambert Compressor Station. Potential emissions assume 52 startup/shutdown events per year per combustion turbine (10 minute event duration). Furthermore, both combustion turbine would be equipped with Solar's Advanced SoloNOx combustor technology for NOx emissions control. Potential emissions include fugitives from incidental leaks or releases from valves, connectors, flanges, and seals, as well as emissions from two types of gas blowdown events that could occur at the compressor station: (1) maintenance gas blowdowns that occur when a compressor is stopped and gas between the suction/discharge valves and compressors is vented to the atmosphere; and (2) emergency full station shutdown (ESD) blowdowns that would only occur infrequently at required DOT test intervals or in an emergency situation. Potential emissions assume 16 blowdown events per year, although only 8 are expected for system testing and maintenance.

The natural gas compressor station is a non-listed source category and would be located in an attainment/unclassifiable area for all criteria pollutants. Consequently, because emissions are less than 250 tpy, the Lambert Compressor Station would not be subject to PSD review.

TABLE 4.11-3

Potential-to-Emit for the Lambert Compressor Station

Emission Unit	Annual Pollutant Emissions (tpy)							
	NO_X	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**VOCs**	**HAPs**	**GHGs**
Solar Taurus Turbine (11,792 hp)	13.2	17.3	2.1	4.0	4.0	2.2	1.6	47,063
Solar Mars Turbine (17,123 hp)	19.6	36.3	3.1	6.0	6.0	4.0	2.6	69,982
Capstone Micro-turbines (5 Units; 200 kW each)	1.8	4.8	0.2	0.3	0.3	0.4	0.2	5,847
Fuel Gas Heater (0.77 MMBtu/hr)	0.3	0.3	0.0	0.0	0.0	0.0	0.0	395
Produced Fluids Tanks (2 Units; 10,000 gallon each)	--	--	--	--	--	0.4	0.0	4
Blowdowns	--	--	--	--	--	0.6	0.0	1,411
Fugitives	--	--	--	--	--	0.8	0.0	1,740
TOTAL	**34.9**	**58.6**	**5.4**	**10.4**	**10.4**	**8.4**	**4.5 a/**	**126,442**

a/ The highest individual HAP is formaldehyde with emissions of 3.5 tpy.

Abbreviations:

-- = no associated emission
kW = kilowatts
hp = horsepower
MMBtu/hr = million British thermal units per hour

[52] This summary reflects July 24, 2014 EPA Memorandum indicating that the EPA will no longer treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit (EPA, 2014).

New Source Performance Standards

The New Source Performance Standards (NSPS), codified in 40 CFR 60, regulate emission rates and provide requirements for new or significantly modified sources. NSPS requirements include emission limits, monitoring, reporting, and record keeping. Applicable NSPS for the Project, based on the types of emission units and the expected date of installation, would potentially include, but not be limited to, the subparts listed below.

- 40 CFR 60 Subpart A – General Provisions. Subpart A contains the general requirements applicable to all emission units subject to 40 CFR 60.
- 40 CFR Subpart KKKK – Standards of Performance for Stationary Combustion Turbines. This subpart applies to stationary combustion turbines that commenced construction, modification, or reconstruction after February 18, 2005 and have a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 MMBtu/hr [million British thermal units per hour]). The proposed Solar turbines at the Lambert Compressor Station would be subject to NSPS Subpart KKKK as their fuel heat input ratings would exceed 10 MMBtu/hr, and their manufacturing date would be after February 18, 2005. Subpart KKKK regulates emissions of NOx and SO_2. The turbines would be subject to a NOx emission limit of 25 ppm at 15 percent oxygen. The SO_2 requirement would be met through exclusive use of natural gas fuel with sulfur content at or below 0.060 pound of SO_2 per MMBtu. Mountain Valley would comply with all applicable Subpart KKKK standards and requirements for monitoring, recordkeeping, and reporting.
- 40 CFR 60 Subpart OOOOa – Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution. This subpart establishes standards for GHGs (in the form of limitations on CH_4), VOCs, and SO_2 from affected facilities that commenced construction, modification, or reconstruction after September 18, 2015. Affected facilities include centrifugal compressors, reciprocating compressors, pneumatic controllers, pneumatic pumps, storage vessels, and equipment leaks and sweetening units within the crude oil and natural gas sector. Fugitive emissions components at the Lambert Compressor Station would be subject to Subpart OOOOa. Mountain Valley would comply with all applicable leak detection and repair requirements of Subpart OOOOa, including the use of optical gas imaging (OGI) technology during its periodic surveys.

National Emissions Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs), codified in 40 CFR 61 and 63, regulate the emissions of HAPs from new and existing sources. Part 61, promulgated before the 1990 CAA Amendments, regulates eight hazardous substances: asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. The 1990 CAA Amendments established a list of 189 HAPs, resulting in the promulgation of Part 63, also known as the Maximum Achievable Control Technology (MACT) standards. Part 63 regulates HAPs from major sources of HAPs and specific source categories emitting HAPs. Some NESHAPs may apply to non-major sources (area sources) of HAPs. Major source thresholds for NESHAPs are 10 tpy of any single HAP or 25 tpy of total HAPs.

Potential HAP emissions from the Lambert Compressor Station would be below the major source thresholds. Consequently, it would be considered an area source of HAP emissions. However, there would be no applicable NESHAPs based on the types of emission units and the expected date of installation.

Title V Operating Permit

The required elements of Title V operating permit programs are outlined in 40 CFR 70 and 40 CFR 71. Title V operating permits may be referred to as "Part 70" or "Part 71" permits, or as Title V permits. A Title V permit should list all air pollution requirements that apply to the source, including emissions limits and monitoring, record keeping, and reporting requirements. Regulations also require that the permittee annually report the compliance status of its source with respect to permit conditions to the corresponding regulatory agency.

A Title V major source, as defined in 40 CFR 70.2, is a source or group of stationary sources (including new and existing sources) within a contiguous area and under common control, emitting or with the PTE of regulated pollutants or HAPs above threshold values. The Title V major source threshold is 100 tpy of CO, NOx, SO_2, VOC, PM_{10}, or $PM_{2.5}$; 10 tpy for any single HAP, and 25 tpy for any combination of HAPs.

Potential emissions from the Lambert Compressor Station would be below the Title V major source thresholds (see table 4.11-3). Consequently, a Title V operating permit would not be required.

General Conformity

The General Conformity Rule was designed to require federal agencies to ensure that federally-funded or federally-approved projects conform to the applicable State Implementation Plan (SIP). Section 176(c) of the CAA prohibits federal actions in nonattainment or PSD maintenance areas that do not conform to the SIP for the attainment and maintenance of NAAQS. General Conformity regulations apply to project-wide direct and indirect emissions of pollutants (and all precursors) for which the project areas are designated as nonattainment or maintenance that are not subject to New Source Review (NSR) and that are greater than the significance thresholds established in the General Conformity regulations or 10 percent of the total emissions budget for the entire nonattainment or maintenance area. Federal agencies are able to make a positive conformity determination for a proposed project if any of several criteria in the General Conformity Rule are met. These criteria include:

- emissions from the project that are specifically identified and accounted for in the SIP attainment or maintenance demonstration; or
- emissions from the action that are fully offset within the same area through a revision to the SIP, or a similarly enforceable measure that creates emissions reductions so there is no net increase in emissions of that pollutant.

The Project would be entirely within an attainment/unclassifiable area; consequently, it is not subject to General Conformity.

GHG Reporting Rule

The Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG emissions from suppliers of fossil fuels and facilities that emit greater than or equal to 25,000 metric tpy of GHGs (reported as CO_2e), which equates to 27,558 tpy. Onshore natural gas transmission compression facilities are considered part of the source category regulated by 40 CFR Part 98, Subpart W.

Potential GHG emissions from the Lambert Compressor Station would be greater than 25,000 metric tpy (see table 4.11-3). However, the rule establishes reporting requirements based on actual emissions. Mountain Valley would monitor emissions in accordance with the reporting rule. If actual emissions exceed the 25,000 metric tpy threshold, GHG emissions would be reported to the EPA as required.

Chemical Accident Prevention Provisions

The chemical accident prevention provisions, codified in 40 CFR 68, are federal regulations designed to prevent the release of hazardous materials in the event of an accident and minimize potential impacts if a release does occur. The regulations contain a list of substances and threshold quantities for determining applicability to stationary sources, including CH_4, propane, and ethylene in amounts greater than 10,000 pounds. If a stationary source stores, handles, or processes one or more substances on this list in a quantity equal to or greater than that specified in the regulation, the facility must prepare and submit a risk management plan (RMP). An RMP is not required to be submitted to the EPA until the chemicals are stored on-site at the facility.

If a facility does not have a listed substance on-site, or the quantity of a listed substance is below the applicability threshold, the facility is not required to prepare a RMP. In the latter case, the facility still must comply with the requirements of the general duty provisions in Section 112(r)(1) of the 1990 CAA Amendments if there is any regulated substance or other extremely hazardous substance on-site. The general duty provision is as follows: "The owners and operators of stationary sources producing, processing, handling and storing such substances have a general duty to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility, taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."

Chemicals regulated by this rule, including CH_4 and ethane, would be produced, processed, handled, or stored at the new compressor station. However, natural gas transmission facilities are not subject to the RMP regulations if they are subject to DOT requirements or to a state natural gas program certified by the DOT. As such, the Project would not be subject to the RMP regulations.

4.11.1.6 State Air Quality Regulations

Project activities undertaken within the state of Virginia would involve temporary construction, installation of pipelines, and operation of the Lambert Compressor Station. The applicable state air quality regulations, codified in 9VAC5, are listed below:

- 9VAC5-20 – General Provisions
- 9VAC5-30 – Ambient Air Quality Standards
- 9VAC5-50 – New and Modified Stationary Sources
- 9VAC5-50-80 – Standard for Visible Emissions
- 9VAC5-50-90 – Standard for Fugitive Dust/Emissions
- 9VAC5-50-260 – Best Available Control Technology (BACT)
- 9VAC5-60 – Hazardous Air Pollutant Sources
- 9VAC5-80 – Permits for Stationary Sources
- 9VAC5-80-1100 – Permits for New and Modified Stationary Sources
- 9VAC5-130 – Open Burning

Project activities undertaken within the state of North Carolina would involve temporary construction and installation of pipelines. The applicable state air quality regulations, codified in 15A NCAC 02D, would include 15A NCAC 02D.1900 to control air pollution resulting from the open burning. Mountain Valley has committed to comply with all applicable state requirements.

4.11.1.7 Air Emission Impacts and Mitigation

Construction Air Impacts and Mitigation

Air quality impacts associated with construction of the Project would include emissions from fossil fuel-fired construction equipment, deliveries, and worker commutes; fugitive dust from ground disturbance and transportation; and emissions associated with burning wood debris in construction work areas.

Fossil fuel-fired construction equipment, trucks, and delivery vehicles are a source of combustion emissions, including NOx, CO, VOC, SO_2, PM_{10}, $PM_{2.5}$, and small amounts of HAPs. Construction equipment, trucks, and delivery vehicles would also emit GHGs. Gasoline and diesel engines must comply with the EPA mobile source regulations in Title 40 CFR Part 85 for on-road engines and Title 40 CFR Part 89 for non-road engines. These regulations are designed to minimize emissions and require a maximum sulfur content in diesel fuel of 15 ppm. Mountain Valley has identified additional mitigation measures to minimize construction combustion emissions, including using newer model equipment that are equipped with the latest emissions reduction technologies when practical; following manufacturer's operating recommendations regarding good combustion practices; strict enforcement of idling limits for construction equipment; use of electric equipment where possible; and the use of clean diesel through add-on control technologies such as diesel particulate filters and diesel oxidation catalysts. However, this is not a commitment for use of these technologies and the use would be a voluntary option for Mountain Valley.

Fugitive dust is a source of respirable airborne PM, including PM_{10} and $PM_{2.5}$, which could result from land clearing, grading, excavation, and mobile source traffic on paved and unpaved roads. The amount of dust generated is a function of construction activity, silt and moisture content

of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. During construction of the Lambert Compressor Station, Mountain Valley would comply with Virginia regulations requiring measures to prevent fugitive dust from becoming airborne and leaving the property boundary of an affected facility (9VAC5-50-90).

During construction, Mountain Valley would implement the following mitigation measures to minimize the generation of dust: minimizing disturbed areas as much as possible through construction sequencing; using wet suppression to control dust from motorized equipment and vehicle traffic; utilizing water trucks, power washers, sweepers, and/or vacuums on paved roads to control dust; and placing rock construction entrances on access roads that begin at a junction with paved roads to reduce track out of loose materials. Mountain Valley would also conduct daily inspections of dust control measures when environmental conditions are dry.

Ground-level open burning emissions are affected by many variables, including wind, ambient temperature, composition and moisture content of the debris burned, and compactness of the pile. In general, the relatively low temperatures associated with open burning increase emissions of NOx, CO, VOCs, PM_{10}, and $PM_{2.5}$. Mountain Valley may utilize open burning as a means of disposing of land clearing waste during construction of the Project. Any open burning would be conducted on a site-specific basis, and in accordance Mountain Valley's *Fire Prevention and Suppression Plan* and Virginia and North Carolina regulations (9VAC5-130; 15A NCAC 02D.1900). This would include burning only in approved burn areas and during appropriate weather conditions to avoid any impacts on nearby residences, and complying with the open burning prohibition in Virginia from May 1 through September 30.

Estimated construction emissions for the Project for years 2020 and 2021 are shown in table 4.11-4. Emissions would not typically be concentrated in any one location, but would occur incrementally along the pipeline route. Construction of the compressor station and aboveground ancillary facilities may occur at a single location for a longer duration.. Once the Project's construction phase is completed, fugitive dust and construction emissions would subside; thus, the length of time the area would be exposed to dust and emissions from construction activities would be limited. Consequently, air emissions from construction would result in localized, intermittent, and temporary impacts and would not be expected to impact regional air quality or result in any violation of applicable ambient air quality standards. As a result, we conclude the impacts on local air quality during construction of the Project would not be significant.

TABLE 4.11-4

Estimated Construction Emissions for the Southgate Project

Emission Source a/	Annual Pollutant Emissions (tons), by Year							
	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$	VOCs	HAPs	GHGs b/ (CO_2e)
Year 2020 Construction Emissions								
Lambert Compressor Station/Interconnect								
Commuter transit	4.33	9.6	0.1	21.3	3.0	0.6	0.2	2,236
Construction equipment	22.1	15.3	0.0	1.6	1.6	3.1	0.2	7,664
Open burning	0.1	3.1	0.0	0.4	0.4	0.5	0.0	70
Fugitive dust	--	--	--	14.4	1.5	--	--	--
Subtotal	**26.6**	**27.9**	**0.1**	**37.8**	**6.5**	**4.3**	**0.4**	**9.970**
Meter Stations								
Commuter transit	4.6	5.8	0.0	18.0	2.5	0.6	0.1	2,005
Construction equipment	13.0	7.6	0.0	1.0	1.0	1.7	0.1	4,411
Open burning	0.0	0.2	0.0	0.0	0.0	0.0	0.0	4.0
Fugitive dust	--	--	--	3.5	0.4	--	--	--
Subtotal	**17.6**	**13.6**	**0.0**	**22.4**	**3.8**	**2.3**	**0.2**	**6,420**
Pipeline								
Commuter transit	4.9	31.7	0.0	29.2	4.8	1.2	0.4	4,286
Construction equipment	196.6	72.0	0.4	11.2	11.2	25.0	1.9	83,586
Open burning	10.8	378.4	0.0	46.0	46.0	65.0	0.0	8,595
Fugitive dust	--	--	--	1,084.0	115.2	--	--	--
Subtotal	**212.3**	**482.1**	**0.5**	**1,170.3**	**177.2**	**90.1**	**2.3**	**96,467**
Year 2020 Total	**256.5**	**523.5**	**0.6**	**1,230.5**	**187.4**	**96.7**	**2.9**	**112,857**
Year 2021 Construction Emissions								
Lambert Compressor Station/Interconnect								
Commuter transit	0.6	1.5	0.0	3.1	0.4	0.1	0.0	328
Construction equipment	4.5	2.1	0.0	0.3	0.3	0.7	0.0	1,929
Open burning	--	--	--	--	--	--	--	--
Fugitive dust	--	--	--	7.2	0.8	--	--	--
Subtotal	**5.1**	**3.6**	**0.0**	**10.6**	**1.5**	**0.8**	**0.1**	**2,257**
Pipeline								
Commuter transit	0.7	2.4	0.0	2.5	0.4	0.1	0.0	423
Construction equipment	5.9	2.2	0.0	0.3	0.3	1.1	0.1	4,417

TABLE 4.11-4

Estimated Construction Emissions for the Southgate Project

Emission Source a/	Annual Pollutant Emissions (tons), by Year							
	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$	VOCs	HAPs	GHGs b/ (CO_2e)
Open burning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Fugitive dust	0.0	0.0	0.0	632.3	67.2	0.0	0.0	0
Subtotal	**6.6**	**4.6**	**0.0**	**635.1**	**67.9**	**1.2**	**0.1**	**4,840**
Year 2021 Total	**11.7**	**8.2**	**0.0**	**645.8**	**69.5**	**2.0**	**0.2**	**7,097**

a/ Emission sources for each Project component are sorted by type of construction activity, as follows: Commuter transit includes tailpipe emissions from on-road and off-road vehicle travel; Construction equipment include tailpipe emissions from heavy equipment; Open burning includes fugitives from burning of brush and slash from clearing; and Fugitive dust includes dust from earthmoving fugitives and wind erosion.

b/ GHGs include CO_2 emissions only.

-- Indicates that the specific pollutant emissions are not expected from that source.

Operations Air Impacts and Mitigation

Operation of the Project would result in emissions from the Lambert Compressor Station, as well as emissions from maintenance and testing blowdowns and incidental leaks from the pipeline and four interconnects. Estimated operational emissions are shown in table 4.11-5.

TABLE 4.11-5

Estimated Operational Emissions for the Southgate Project

Emission Source	Annual Pollutant Emissions (tons per year)							
	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$	VOCs	HAPs	GHGs (CO_2e)
Lambert Compressor Station a/	34.9	58.6	5.4	10.4	10.4	8.4	4.5	126,442
Blowdowns	--	--	--	--	--	4.2	0.2	4,229
Fugitives	--	--	--	--	--	0.2	0.0	156
Total	**34.9**	**58.6**	**5.4**	**10.4**	**10.4**	**12.8**	**4.7**	**130,827**

a/ See table 4.11-3 for detailed information on emissions from each type of emission source for the compressor station.

Minor NSR permits are required for facilities that emit less than 100 tpy of any criteria pollutant (PM, PM_{10}, $PM_{2.5}$, CO, NOx, SO_2, and VOC) but more than the criteria pollutant exemption levels listed in 9VAC5-80-1105C (i.e., 40 tpy NOx, 100 tpy CO, 40 tpy SO_2, 15 tpy PM_{10}, 10 tpy $PM_{2.5}$, or 25 tpy VOCs). Minor NSR permits are also required for facilities that emit HAPs more than state toxic exemption levels listed in 9VAC5-60-300C and 9VAC5-80-1105E but less than 10 tpy of one HAPs or 25 tpy of a combination of HAPs. Operation of the Lambert Compressor Station would trigger air permitting as a minor source of air emissions, specifically as a result of emissions of $PM_{2.5}$ and formaldehyde. NOx emissions would not trigger minor

permitting due to installation of Solar's Advanced SoloNOx combustor technology on both combustion turbines. Mountain Valley submitted an air permit application to VADEQ in November 2018 with a revision in April 2019, which is pending review and issuance. Compliance with the applicable federal and state air quality standards and regulations would be addressed accordingly in the air quality permit. As a result, air quality impacts during operation of the compressor station would be minor.

Pursuant to 9VAC5-50-260B, minor sources in Virginia are required to undergo a BACT review for each pollutant greater than the levels in 9VAC5-80-1105C. For the proposed Lambert Compressor Station, BACT would be required for $PM_{2.5}$. The air permit application included a BACT assessment and Mountain Valley proposed the following:

- **$PM_{2.5}$ BACT for Solar Turbines.** For controlling emissions of $PM_{2.5}$, Mountain Valley proposed the use of clean-burning fuels and good combustion practices as BACT. The turbines would be equipped with self-cleaning inlet air filters to reduce the entrainment of PM into the turbine and to reduce the PM exhaust emissions. Mountain Valley would develop and implement an *Operation and Maintenance Plan* to ensure good combustion practices.

Furthermore, based on review of EPA's voluntary Natural Gas Star program, Mountain Valley identified several feasible mitigation measures for potential emission reduction. These measures include:

- replace gas starters with air or nitrogen;
- reduce natural gas venting with fewer compressor engine startups and improved engine ignition;
- test and repair pressure safety valves;
- eliminate unnecessary equipment and/or systems;
- install automated air/fuel ratio controls;
- install electric motor starters; and
- reduce emissions when taking compressors off-line.

The incorporation of these emission reduction measures would be voluntary; however, Mountain Valley has incorporated measures to control air/fuel ratios and use electric motor starters into the design of the Lambert Compressor Station.

Mountain Valley conducted air dispersion modeling of the Lambert Compressor Station to demonstrate compliance with the NAAQS using EPA's model atmospheric dispersion modeling system (AERMOD, version 18081). The modeling was conducted using emission rates from a range of combustion turbine operating scenarios for the Lambert Compressor Station including startup and shutdown, as well as three load and seven ambient temperature scenarios. A summary of the maximum (worst-case emissions from the various parameter combinations) modeling results of the Lambert Compressor Station alone are provided in table 4.11-6. Details of the operating scenarios, along with methodologies and results, can be found in the modeling protocol and

modeling results reports[53]. Results indicate that the maximum modeled concentrations would be less than the applicable NAAQS for all criteria pollutants modeled. The NO_2 results for the Lambert Compressor Station are predicted to be 15 percent of the annual standard and 9.5 percent of the one-hour standard. Mountain Valley submitted revised modeling results to VADEQ on January 31, 2020 to support updates in the April 2019 revised application.

TABLE 4.11-6

Criteria Pollutant Modeling Results for Lambert Compressor Station

Pollutant	Timeframe	Maximum Modeled Concentration (µg/m³)	Background Concentration (µg/m³)	Total Concentration (µg/m³) a/	NAAQS (µg/m³)
PM_{10}	24-hour	1.3	31.0	32.3	150
$PM_{2.5}$	Annual	0.2 b/	7.2	7.4	12
	24-hour	0.8 bc/	17.0	17.8	35
SO_2	3-hour	3.7 d/	10.5 d/	14.2	1,300
	1-hour	4.1 d/	10.5 d/	14.6	196
CO	8-hour	105.1	1,380	1,485.1	10,000
	1-hour	498.2	2,300	2,798.2	40,000
NO_2	Annual	1.8 e/	13.2	15.0	100
	1-hour	17.9 e/	Variable f/	17.9	188

a/ Total concentration is the sum of the modeled and background concentration; this value is compared with the NAAQS.

b/ Value includes secondary impacts ($PM_{2.5}$ emissions formed in the atmosphere from precursor emissions [NO_X and SO_2]) from the Lambert Compressor Station.

c/ Based on maximum 98th percentile daily maximum modeled concentrations.

d/ Values from prior draft EIS.

e/ Based on EPA's Ambient Ratio Method 2 (ARM2) modeling guidance.

f/ Background varies by season and hour-of-day. The EPA guidance suggests the season and hour-of-day combination be based on the 3rd highest values to represent the 98th percentile. The resultant matrix of ninety-six (96) season and hour-of-day 1-hour NO_2 monitor values were used in the 1-hour NO_2 modeling analyses.

Because emissions of formaldehyde at the compressor station would be greater than the Virginia exemption threshold in 9VAC5-60-300C, Mountain Valley also conducted air dispersion modeling of formaldehyde emissions, which were included in the January 31, 2020 submission to VADEQ. Results were compared with the VADEQ's Significant Ambient Air Concentration (SAAC) for formaldehyde, which is the concentration of the pollutant in ambient air that, if exceeded, may have an adverse effect to human health. We note that there are no federal ambient

[53] Mountain Valley's Air Quality Dispersion Modeling Protocol was filed on January 28, 2020 (accession number 20200128-5024). Mountain Valley's Air Quality Dispersion Modeling Report was filed on February 3, 2020 (accession number 20200203-5194). These files can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter the accession number in the "Numbers: Accession Number" field.

air quality standards for formaldehyde. As shown in table 4.11-7, results indicate that the maximum modeled concentrations would be less than the Virginia formaldehyde SAAC.

TABLE 4.11-7

Formaldehyde Modeling Results for Lambert Compressor Station

Pollutant	Timeframe	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Ambient Air Concentration ($\mu g/m^3$)
Formaldehyde	Annual	0.1	2.4
	1-hour	24.8	62.5

4.11.1.8 Conclusions Regarding Air Quality

Because pipeline construction moves through an area relatively quickly, air emissions are typically localized, intermittent, and temporary. Once construction activities in an area are completed, fugitive dust and construction equipment emissions would subside and the impact on air quality would diminish. Further, construction emissions would be minimized by mitigation measures described above. As a result, we conclude that the Project's construction-related impacts are not expected to result in a significant impact on local or regional air quality, although residents near the pipeline right-of-way, compressor station, and other associated aboveground ancillary facilities may experience intermittent elevated levels of fugitive dust and smoke-dust from nearby open burning.

Operational emissions would be a result of emissions from the Lambert Compressor Station, as well as minimal emissions from maintenance blowdowns and incidental leaks from the pipeline and four interconnects. The Lambert Compressor Station would be considered a minor source of criteria and HAP air pollutants according to Virginia regulations. Using advanced low NOx turbine combustors, clean-burning fuels, and self-cleaning turbine inlet air filters, low emission levels would be achieved with normal engine operation and good maintenance practices. Air quality dispersion modeling confirmed that emissions due to the compressor station's operations would not exceed the NAAQS or the Virginia formaldehyde SAAC. Therefore, although ambient air quality in the area near the compressor station would degrade, we conclude that criteria pollutant and formaldehyde emissions from operations would not result insignificant impacts on local or regional air quality.

4.11.2 Noise

The existing noise environment would be affected by construction and operation of the Project. Temporary noise would be generated during Project construction, and long-term noise would be generated during operation. Construction and operational noise impacts as well as proposed mitigation measures are discussed in section 4.11.2.3.

4.11.2.1 Noise Levels and Terminology

Sound is mechanical energy transmitted by pressure waves in media such as air or water (FTA, 2006). When sound becomes excessive, annoying, or unwanted, it is referred to as noise.

Noise levels are quantified using decibels (dB), which are units of sound pressure. Noise may be continuous (constant noise with a steady decibel level), steady (constant noise with a fluctuating decibel level), impulsive (having a high peak of short duration), stationary (occurring from a fixed source), intermittent (at intervals of high and low sound levels), or transient (occurring at different rates).

The A-weighted sound level, expressed as dBA, is an expression of the relative loudness of sounds in air as perceived by the human ear. Therefore, A-weighted sound levels are usually used to quantify audible sound and its effect on people (EPA, 1978). On the dBA scale, normal conversation falls at about 60 to 65 dBA, and sleep disturbance occurs at about 40 to 45 dBA. Table 4.11-8 contains examples of common activities and their associated noise levels in dBA.

TABLE 4.11-8

Typical Noise Levels for Common Activities

Activity	Noise Level (dBA)
Rock band	110
Gas lawnmower at 3 feet	95
Diesel truck at 50 feet at 50 miles per hour	85
Vacuum cleaner at 10 feet	70
Normal speech at 3 feet	65
Heavy traffic at 300 feet	60
Dishwasher in next room	50
Large conference room (background)	40
Bedroom at night	25
Broadcast/recording studio	15

Source: Caltrans, 2013

Existing ambient noise levels, or background noise levels, are the current sounds from natural and artificial sources at the receptors. The magnitude and frequency of background noise at any given location may vary considerably over the course of a day or night and throughout the year. The variations are caused in part by weather conditions, seasonal vegetative cover, and human activity. Two common measures used to relate the time-varying quality of environmental noise levels to known effects on people are the 24-hour equivalent sound level ($L_{eq(24)}$) and the day-night sound level (L_{dn}). The $L_{eq(24)}$ is the level of steady sound with the same total energy as the time-varying sound, averaged over a 24-hour period. The L_{dn} is the $L_{eq(24)}$ with 10 dBA added to the nighttime sound levels between the hours of 10:00 p.m. and 7:00 a.m. to account for people's tendency to be more sensitive to sound during nighttime hours.

The potential for noise impacts are assessed by evaluating noise levels at the nearest noise sensitive areas (NSAs) such as residences, schools and day-care facilities, hospitals, long-term care facilities, places of worship, and libraries. Where the nature of a new sound is similar to the ambient noise level, an increase of 3 dBA is barely detectable by the human ear and an increase of 5 dBA is considered clearly noticeable. Increases of 10 dBA are perceived as a doubling of noise (i.e., twice as loud). Furthermore, noise levels typically decrease by approximately 6 dBA every

time the distance between the source and receptor is doubled, depending on the characteristics of the source and the conditions over the path that the noise travels. The reduction in noise levels can be increased if a solid barrier or natural topography blocks the line of sight between the source and receptor.

Existing Sound Levels and Noise Sensitive Areas

Mountain Valley conducted baseline noise surveys at the nearest NSAs to the proposed Lambert Compressor Station and meter stations (referred to as interconnects) in July 2018. Figures 4.11-1 through 4.11-4 show the proximity and direction of the NSAs to the respective facility. Noise survey results are summarized in table 4.11-9, and indicate that existing ambient background noise levels range from 44.8 to 65.0 dBA L_{dn}. The existing land uses on and adjacent to these locations include upland forest/woodland, agricultural land, upland open land, and commercial/industrial land.

TABLE 4.11-9

Summary of Existing Ambient Noise Levels at the Southgate Project Aboveground Facilities

Facility/ NSA	NSA Land Use	NSA Distance and Direction from Facility	Ambient Noise Levels (dBA) a/ b/		Ambient Noise Level, L_{dn} (dBA)
			Daytime, L_d	Nightime, L_n	
Lambert Compressor Station/Interconnect (MP 0.0)					
NSA 1	Residential	3,480 feet WSW	36.8	40.8	46.8
NSA 2	Residential	3,500 feet SW	36.8	40.8	46.8
NSA 3	Residential	3,290 feet SE	60.4	55.1	62.8
NSA 4	Residential	3,800 feet N	38.6	38.4	44.8
LN 3600 Interconnect (MP 28.2)					
NSA 1	Residential	1,700 feet NNW	47.2	42.1	49.7
T-15 Dan River Interconnect (MP 30.4)					
NSA 1	Residential	750 feet S	63.1	57.1	65.0
T-21 Haw River Interconnect (MP 73.1)					
NSA 1	Residential	550 feet N	62.8	57.2	65.0

a/ Ambient noise surveys were conducted at each location for 24-hours.

b/ Insect noise was removed by omitting sound energy in the whole octave bands above 1,000 hertz.

Abbreviations:

L_d = daytime equivalent sound level L_n = nighttime equivalent sound level

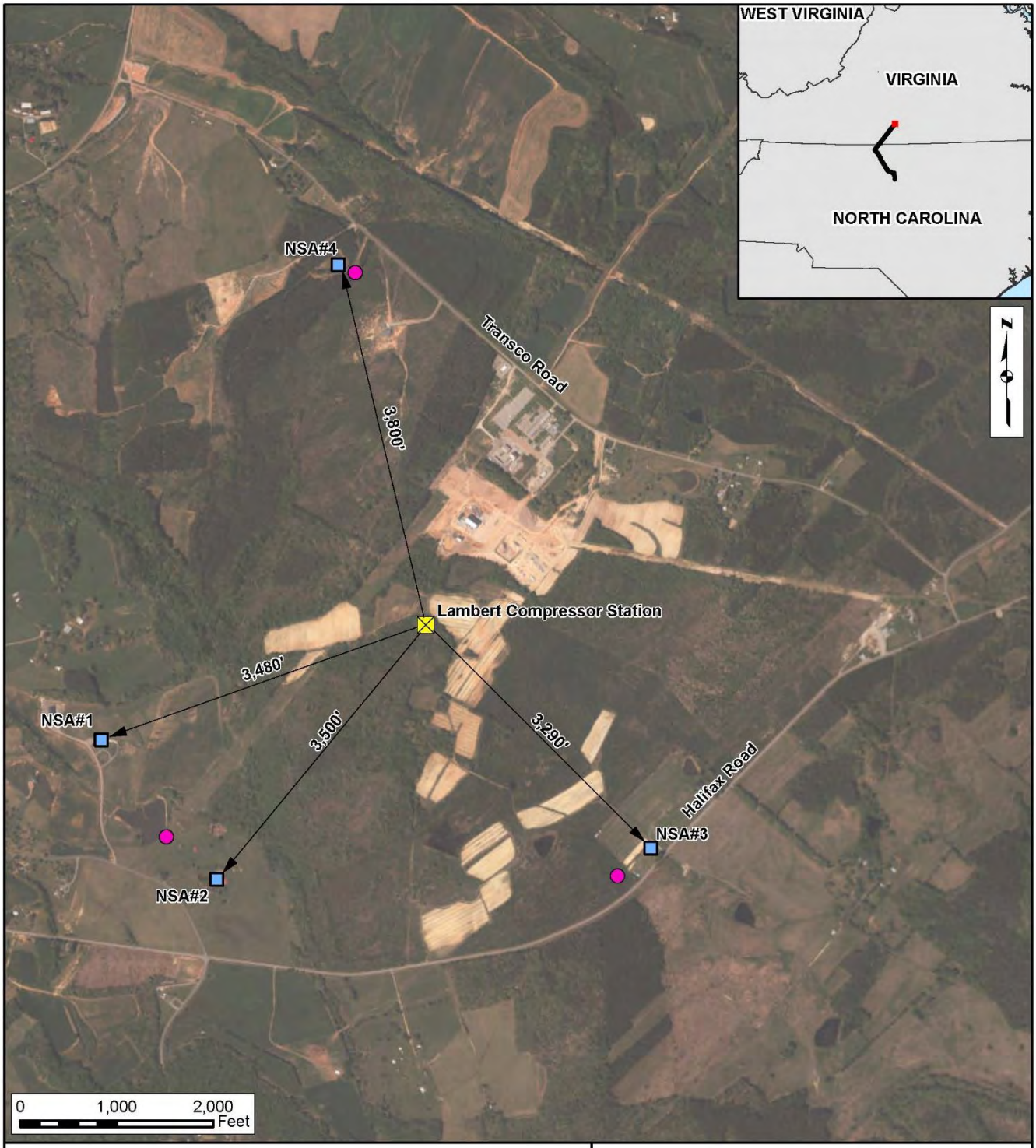
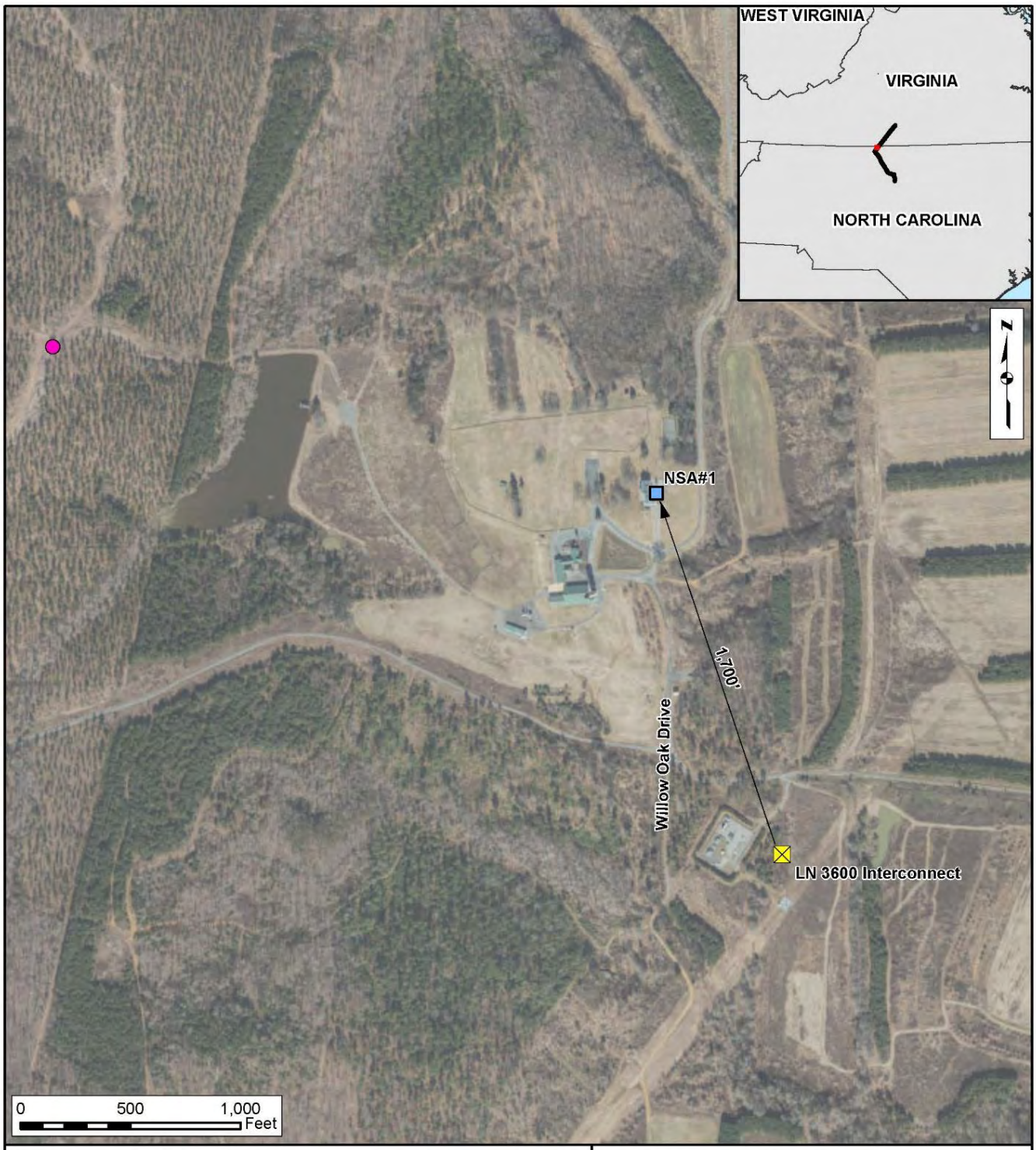


Figure 4.11-1

Southgate Project

Lambert Compressor Station/Interconnect: Noise Sensitive Areas and Measurement Locations



Interconnect Location
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-2

Southgate Project

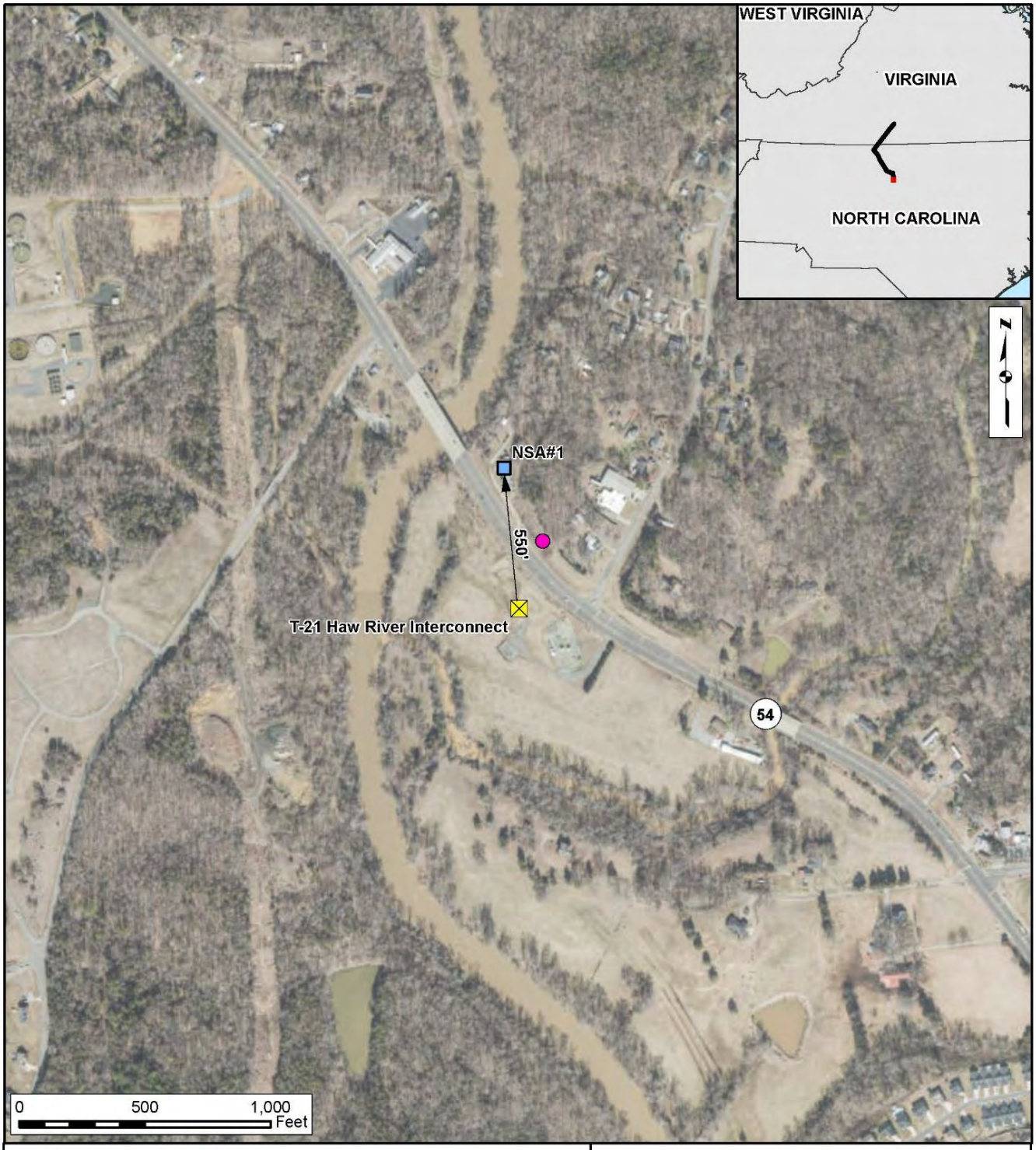
LN 3600 Interconnect:
Noise Sensitive Areas and
Measurement Locations

Interconnect Location
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-3

Southgate Project

T-15 Dan River Interconnect: Noise Sensitive Areas and Measurement Locations



Interconnect Location
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-4

Southgate Project

T-21 Haw River Interconnect: Noise Sensitive Areas and Measurement Locations

Mountain Valley also conducted baseline noise surveys of potential HDD and conventional bore (railroad crossing) sites in July 2018. Figures 4.11-5 through 4.11-10 show the proximity and the direction of the NSAs to the respective activity. Noise survey results are summarized in table 4.11-10, and indicate that existing ambient background noise levels range from 39.7 to 58.9 dBA L_{dn}.

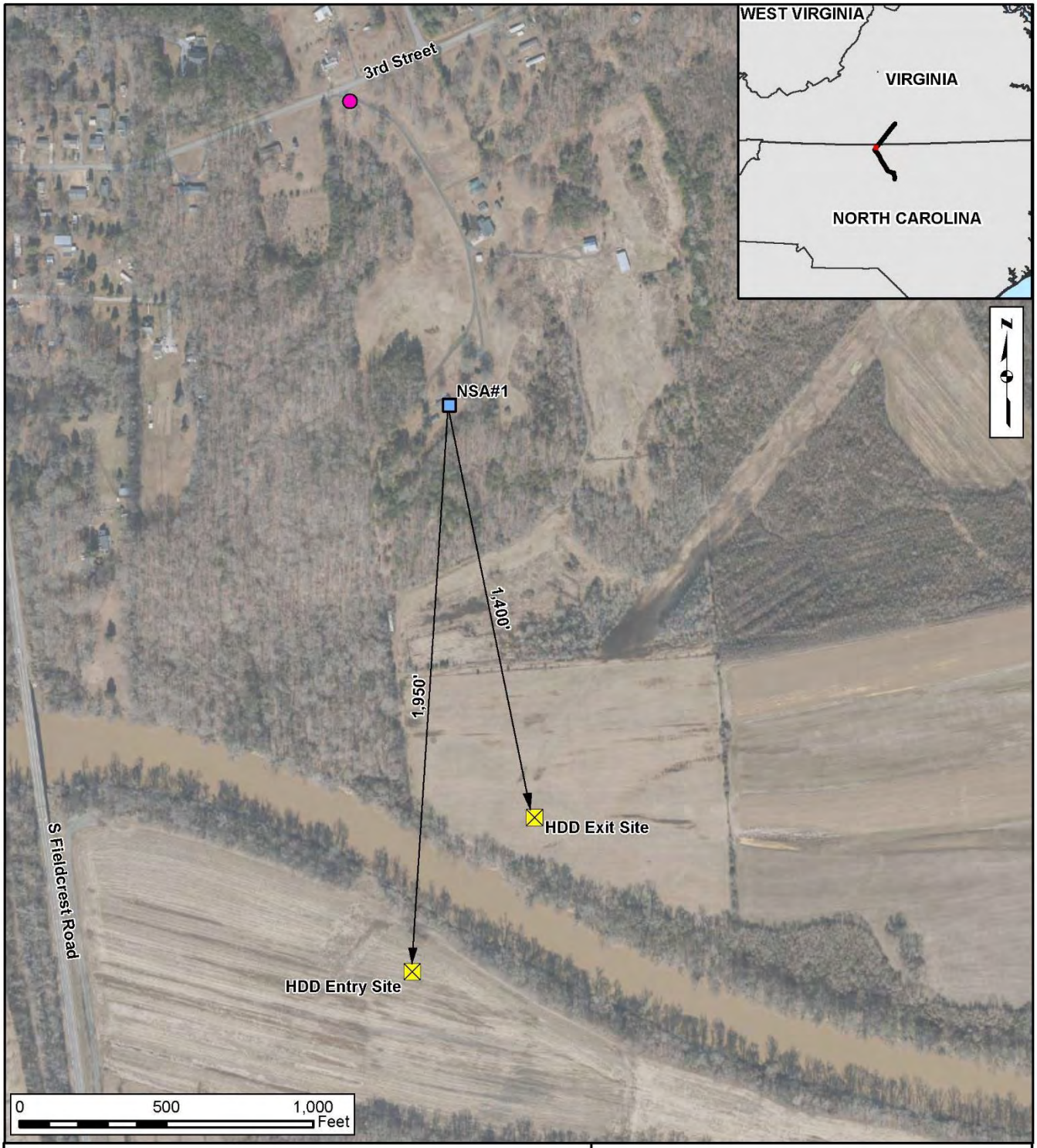
TABLE 4.11-10

Summary of Existing Ambient Noise Levels at HDD and Railroad Crossings for the Southgate Project

Activity/ NSA	NSA Land Use	Distance and Direction from Activity	Ambient Noise Levels (dBA) a/ b/		Ambient Noise Level, L_{dn} (dBA)
			Daytime, L_d	Nighttime, L_n	
Dan River HDD (MP 30.4)					
NSA 1	Residential	1,950 feet NW of HDD Entry 1,400 feet N of HDD Exit	40.5	35.0	42.8
Stony Creek Reservoir HDD (MP 63.8)					
NSA 1	Residential	1,400 feet NW of HDD Entry 300 feet NW of HDD Exit	37.1	32.1	39.7
Railroad Crossing 1 (MP 5.3)					
NSA 1	Residential	3,550 feet E	56.6	51.1	58.9
Railroad Crossing 2 (MP 25.0)					
NSA 1	Residential	3,000 feet S	38.8	33.3	41.1
Railroad Crossing 3 (MP 39.7)					
NSA 1	Residential	250 feet NW	43.2	37.7	45.5
Railroad Crossing 4 (MP 69.8)					
NSA 1	Residential	500 feet N	46.3	41.3	48.9

a/ Ambient noise surveys were conducted at each location for 10 minutes during the nighttime; daytime levels were estimated by applying the average day-night sound level difference from a nearby 24-hour measurement location (see table 4.11-9).

b/ Insect noise was removed by omitting sound energy in the whole octave bands above 1,000 hertz.

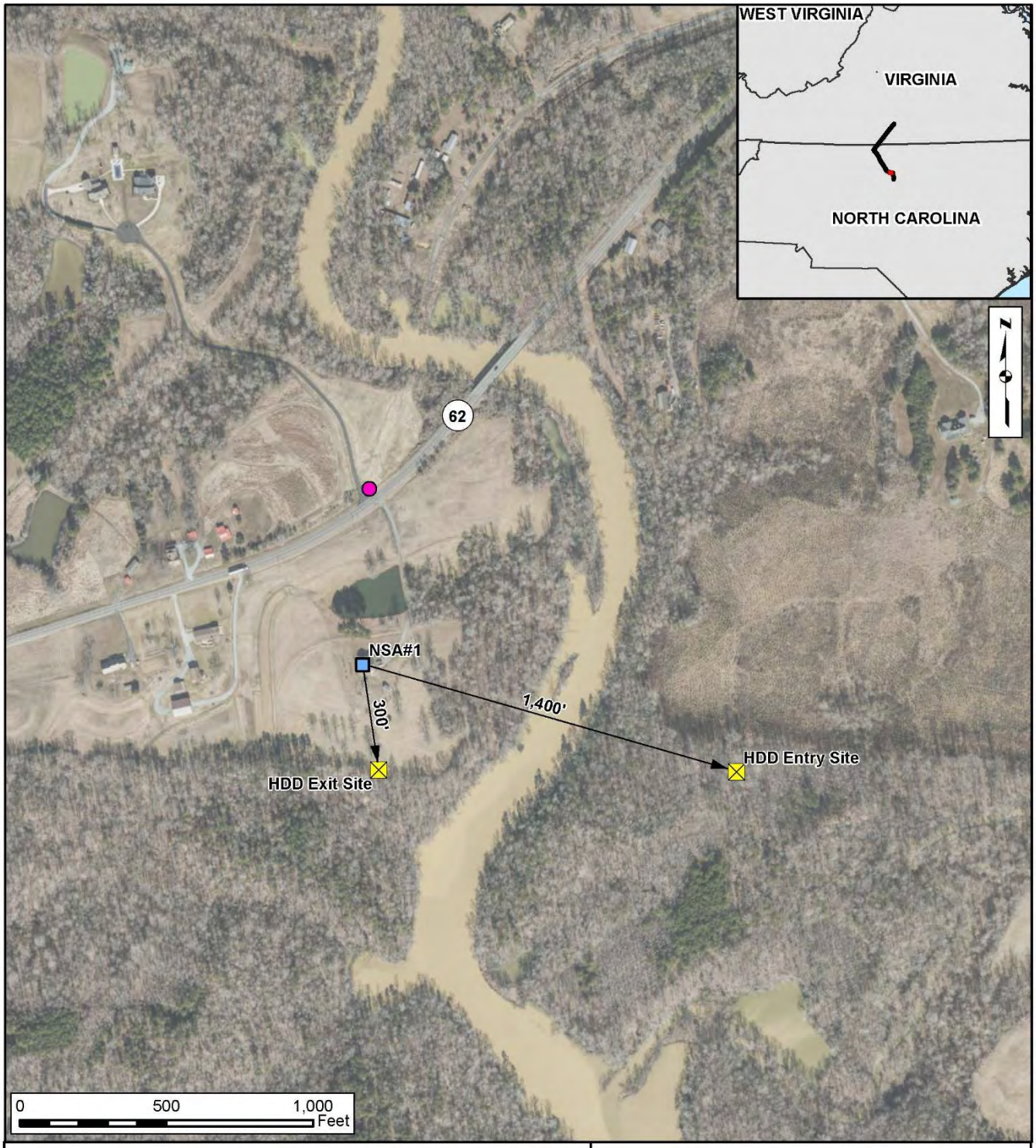


HDD Entry/Exit
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-5

Southgate Project

Dan River HDD:
Noise Sensitive Areas and
Measurement Locations

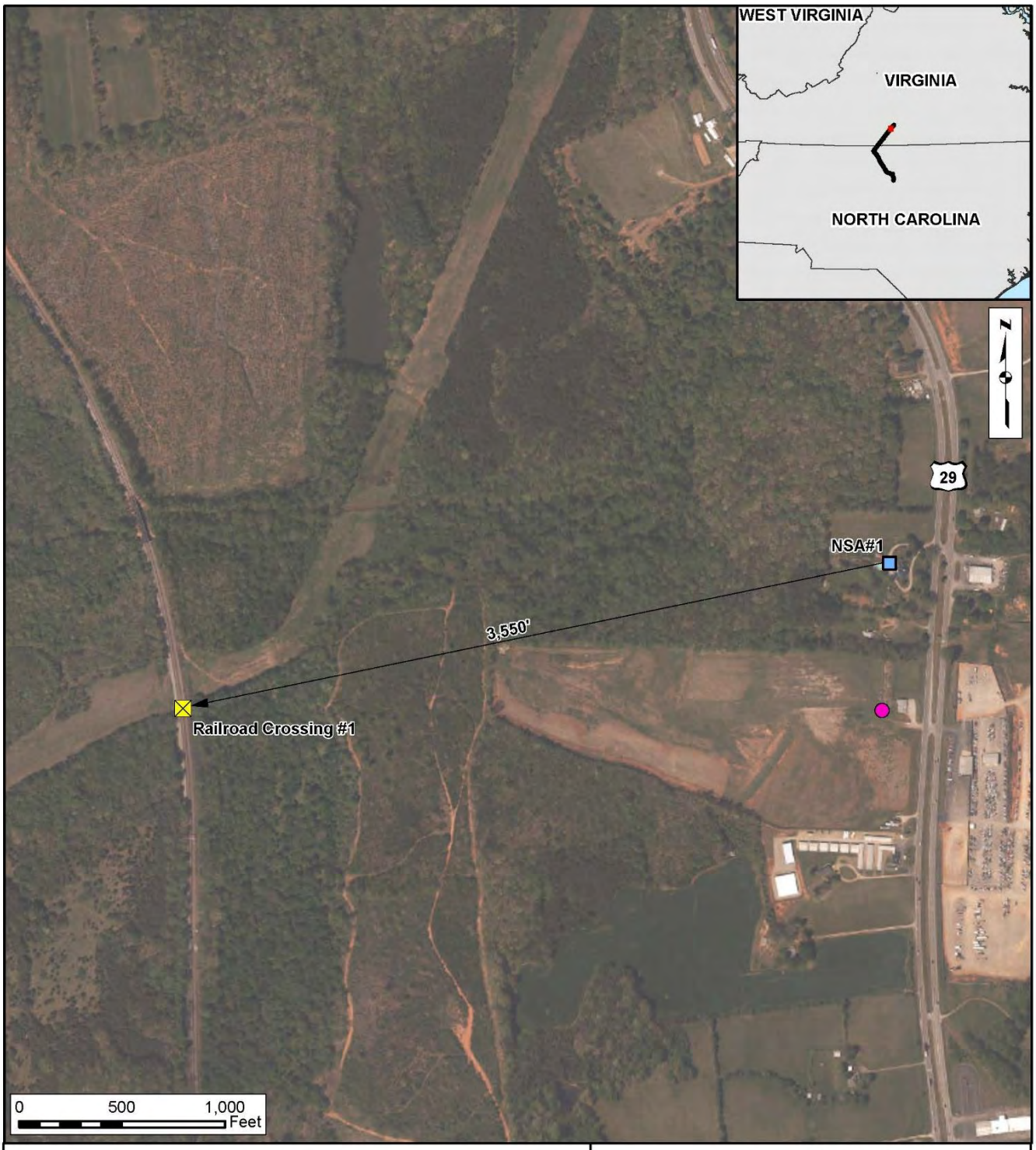


HDD Entry/Exit
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-6

Southgate Project

Stony Creek Reservoir HDD:
Noise Sensitive Areas and
Measurement Locations



Crossing Location
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-7

Southgate Project

Railroad Crossing 1:
Noise Sensitive Areas and
Measurement Locations

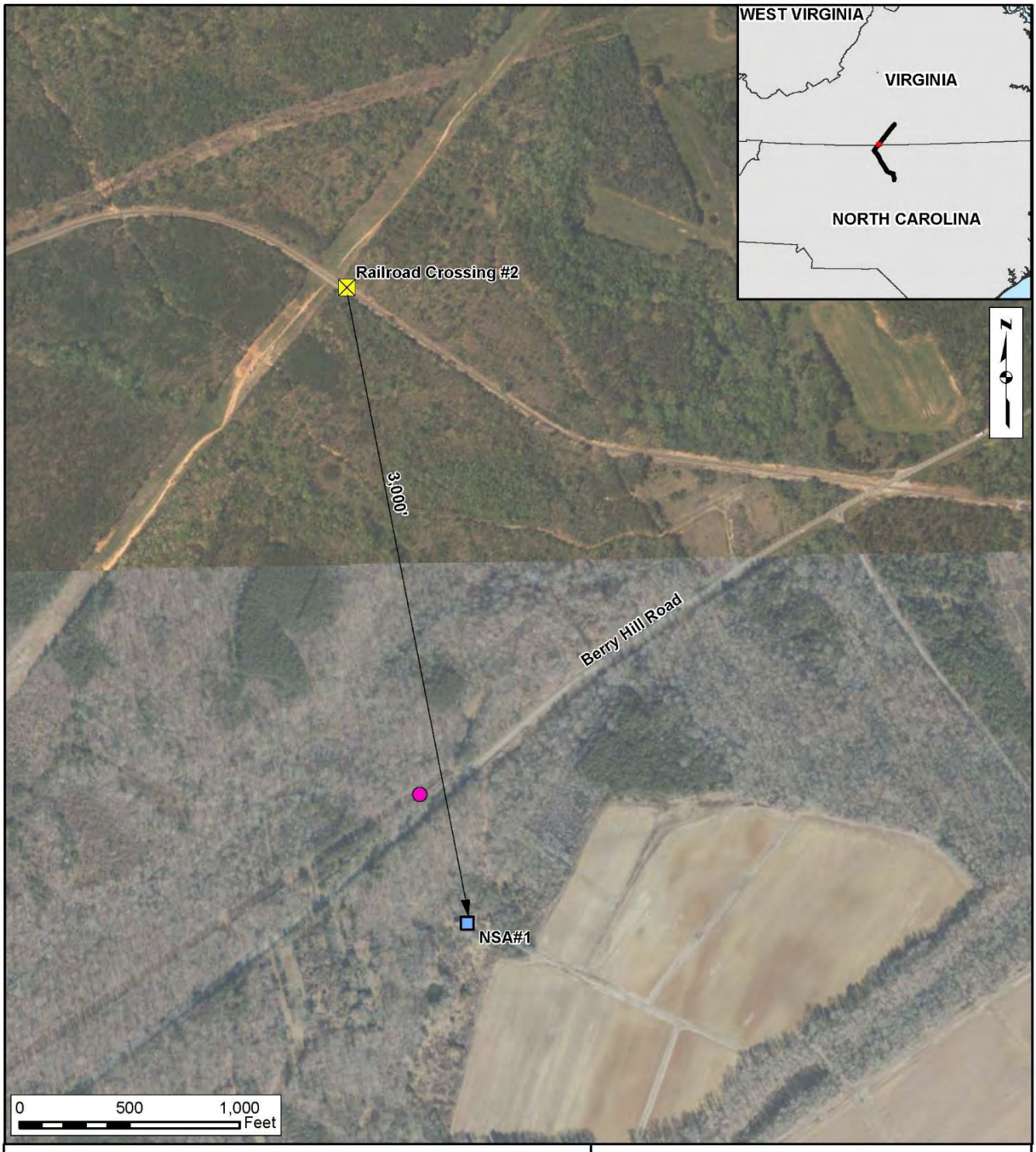


Figure 4.11-8

Southgate Project

Railroad Crossing 2:
Noise Sensitive Areas and
Measurement Locations

Figure 4.11-9

Southgate Project

Railroad Crossing 3:
Noise Sensitive Areas and
Measurement Locations

Crossing Location
Measurement Location (ML)
Noise Sensitive Area (NSA)

Figure 4.11-10

Southgate Project

Railroad Crossing 4:
Noise Sensitive Areas and
Measurement Locations

4.11.2.2 Noise Regulatory Requirements

The states of Virginia and North Carolina do not have regulations that would limit noise from construction or operation of the Project. While Rockingham and Alamance Counties have only nuisance-based regulations; Pittsylvania County has a numerical-based noise ordinance. The ordinance contains an exemption for sound generated by the Project construction provided such sound is limited between the hours of 7:00 a.m. and 10:00 p.m. Mountain Valley continues to coordinate with Pittsylvania County regarding the Pittsylvania County Noise Ordinance noise limits at the Lambert Compressor Station.

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has indicated that an Ldn of 55 dBA protects the public from indoor and outdoor activity interference (EPA, 1974). We have adopted this criterion and have used it to evaluate the potential noise impacts from construction and operation of the Project. The potential for noise impacts are assessed by comparing the proposed Project's noise levels with the 55 dBA noise level criterion at the nearest NSA. For nighttime noise where the background ambient noise levels are already above the 55 dBA noise level criterion, all efforts should be made to restrict noise level increases to less than 10 dBA over background.

With regards to compressor stations, the FERC regulations at 18 CFR 380.12(k)(4)(v)(A) state that the noise attributed to any new compressor station must not exceed an L_{dn} of 55 dBA at any pre-existing NSA such as schools, hospitals, and residences. Due to the 10 dBA nighttime penalty added prior to calculation of the L_{dn}, for a facility to meet the L_{dn} 55 dBA limit, the facility must be designed such that a constant noise level on a 24-hour basis does not exceed 48.6 dBA L_{eq} at any NSA.

4.11.2.3 Noise Impacts and Mitigation

Construction Noise Impacts and Mitigation

Construction noise levels are rarely steady; instead, they fluctuate depending on the number and type of equipment in use at any given time. There would be times when no large equipment is operating and noise would be at or near existing ambient levels. In addition, construction-related sound levels experienced by a noise sensitive receptor in the vicinity of construction activity would be a function of distance, other noise sources, and the presence and extent of vegetation and intervening topography between the noise source and the sensitive receptor.

Noise level increases during construction would be intermittent and would generally occur during daylight hours, with the possible exception of HDD and conventional bore activities. Construction of the compressor station and other associated aboveground ancillary facilities would represent more localized noise sources and are discussed in conjunction with each component of the Project below.

Pipeline

Pipeline construction would result in noise along the entire length of the Project; however, noise impacts would be transient as construction progresses from one location to the next along the pipeline corridor. It is expected that construction-related noise would last for only a few days to weeks at any one location. Prevalent noise sources would come from internal combustion engines used by construction equipment (e.g., trucks, backhoes, excavators, loaders, cranes).

Construction equipment noise levels would typically be about 85 dBA at 50 feet when the equipment is operating at full load. There are about 45 occupied residences within 50 feet of the Project construction work areas. For the worst-case scenario (i.e., assuming no noise shield or barrier between the noise source and sensitive receptor), the nearest distance at which a sound level of 85 dBA attenuates to the 55 dBA noise criterion would be about 1,600 feet. Therefore, sensitive receptors within 1,600 feet of the construction equipment could be affected by the noise. However, construction noise would be intermittent and temporary, and no NSA would be expected to be exposed to significant noise levels for an extended period of time. Mountain Valley would mitigate pipeline construction-related noise by limiting most pipeline construction in residential areas to daytime hours (7:00 a.m. to 7:00 p.m) when ambient noise levels are often higher and most individuals are less sensitive to noise. In non-residential areas, Mountain Valley proposes to conduct construction activities from 7:00 a.m. to 7:00 p.m., or sunrise to sunset whichever is longer. In addition, certain construction activities may extend typical workhours, such as tie-ins, operation of pumps at waterbody crossings, and hydrostatic testing, as these activities require extended and continuous operation until the activity is complete. Low noise generating activities (e.g., x-rays, inspections, drying, etc.) may occur during limited nighttime hours. Mountain Valley would also notify local residents in advance of construction activities.

Compressor Station and Meter Stations

Construction activities for aboveground facilities would be primarily limited to daytime hours; however, specific situations related to safety, permit compliance, or other non-typical circumstances may necessitate limited nighttime work. The expected duration of construction is 18 months for the Lambert Compressor Station and 5 months for the meter stations. Mountain Valley used the FHWA Roadway Construction Noise Model (RCNM) (version 1.1) to calculate noise generated from construction of the Lambert Compressor Station and meter stations. The noisiest construction stage was determined to occur during the early earthmoving phase. Daytime work would include the use of up to three excavators, three bulldozers, three dump trucks, one generator, three drill rigs, two pile augers, and one roller (i.e., total sound power level of 129.9 dBA). Mountain Valley has indicated that they would conduct night time (24-hour) construction at certain locations, as indicated further below. Mountain Valley's noise assessment assumed the use of up to two excavators, two bulldozers, two dump trucks, three light plants, and one roller (i.e., total sound power level of 120.2 dBA).

Table 4.11-11 shows the predicted noise impacts on the worst-case NSAs from construction of the new compressor station and meter stations during the typical 12-hour daytime shift (7:00 a.m. to 7:00 p.m.). As shown in the table, noise levels due to daytime construction of the Lambert Compressor Station and LN 3600 Interconnect would be below the FERC 55 dBA L_{dn} criterion at the nearest NSAs. As a result, noise impacts from daytime construction of the

Lambert Compressor Station and LN 3600 Interconnect would be localized, temporary, and less than significant. Mountain Valley has indicated that construction at the Lambert Compressor Station may occur at night. The nighttime and 24-hour L_{dn} impacts are identified in table 4.11-12. The noise impacts are estimated to be below 55 L_{dn}; however, considering the length construction at the Lambert Compressor Station, nighttime noise may be disruptive to nearby residents due to the equipment usage and vehicle back-up alarms.

TABLE 4.11-11

Estimated Noise Levels at Nearby Noise Sensitive Areas from Construction of Aboveground Facilities (12-Hour Daytime Shift)

Station / NSA	Ambient Noise Levels (dBA)		Construction Noise (dBA)		Construction + Ambient (dBA)		Increase over Ambient (dBA)	
	L_d	L_{dn}	L_d a/	L_{dn}	L_d	L_{dn}	L_d	L_{dn}
Lambert Compressor Station/Interconnect								
NSA 1	36.8	46.8	48.7	46.6	49.0	49.7	12.2	2.9
NSA 2	36.8	46.8	46.5	44.4	46.9	48.8	10.2	2.0
NSA 3	60.4	62.8	43.8	41.7	60.5	62.8	0.1	0.0
NSA 4	38.6	44.8	42.7	40.7	44.1	46.3	5.5	1.4
LN 3600 Interconnect								
NSA 1	47.2	49.7	51.2	49.1	52.7	52.4	5.4	2.7
T-15 Dan River Interconnect								
NSA 1	63.1	65.0	64.7	**62.7**	67.0	67.0	3.9	2.0
T-21 Haw River Interconnect								
NSA 1	62.8	65.0	67.1	**65.1**	68.5	68.1	5.6	3.1

Noise levels due to daytime construction of the T-15 Dan River and T-21 Haw River Interconnects would be above the FERC criterion of 55 dBA L_{dn} at the nearest NSAs. At these sites, the existing ambient noise levels are already above the 55 dBA noise level criterion. At the T-15 Dan River Interconnect, the noise increase above the existing day ambient noise level would be 3.9 dBA. While local residents may notice a new noise source, the overall noise increase would be barely detectable to the human ear. At the T-21 Haw River Interconnect, the noise increase above the existing day ambient noise level would be 5.6 dBA and clearly noticeable to local residents.. Although these increases would be noticeable, the noise impacts would be localized, temporary, and occurring during daytime only.

Nighttime work would be conducted for specific situations. Table 4.11-12 shows the predicted noise impacts on the worst-case NSAs from construction of the new compressor station and meter stations during a 24-hour shift.

TABLE 4.11-12

Estimated Noise Levels at Nearby Noise Sensitive Areas from Construction of Aboveground Facilities (24-Hour Shift)

Station / NSA	Ambient Noise Levels (dBA)		Construction Noise (dBA)		Construction + Ambient (dBA)		Increase over Ambient (dBA)	
	L_n	L_{dn}	L_n a/	L_{dn}	L_n	L_{dn}	L_n	L_{dn}
Lambert Compressor Station/Interconnect								
NSA 1	40.8	46.8	45.9	**53.1**	47.1	54.0	6.3	7.2
NSA 2	40.8	46.8	43.7	50.9	45.5	52.3	4.7	5.5
NSA 3	55.1	62.8	41.0	48.2	55.3	63.0	0.2	0.1
NSA 4	38.4	44.8	40.0	47.1	42.3	49.1	3.9	4.3
LN 3600 Interconnect								
NSA 1	42.1	49.7	48.5	**55.4**	49.4	56.4	7.3	6.7
T-15 Dan River Interconnect								
NSA 1	57.1	65.0	62.0	**69.2**	63.2	70.6	6.2	5.6
T-21 Haw River Interconnect								
NSA 1	57.2	65.0	64.4	**71.5**	65.2	72.4	8.0	7.4

Mountain Valley has indicated that construction at the LN 3600, T-15 Dan River, and T-21 Haw River Interconnects may occur at night. Noise levels due to 24-hour construction of the LN 3600, T-15 Dan River, and T-21 Haw River Interconnects would all be above the FERC criterion of 55 dBA L_{dn} at the nearest NSAs. The noise increases above the existing day-night ambient noise levels would be 5.5 to 7.4 dBA and clearly noticeable to the human ear. Although these increases would be noticeable, the noise impacts would be intermittent and temporary. Furthermore, because of the uncertainty of the equipment operating during night construction, Mountain Valley has committed to develop a *Nighttime Construction Noise Management Plan.* Mountain Valley stated that it would include specific noise mitigation, such as noise barriers, quieter equipment, or partial equipment enclosures to ensure that sound levels at the NSAs do not exceed 48.6 dBA at night or 55 dBA L_{dn} overall, or 10 dBA over the ambient for the T-15 Dan River and T-21 Haw River Interconnects with ambient levels that exceed 55 dBA L_{dn}. We agree that the plan should list the noise levels from the selected nighttime equipment at the nearest NSAs as well as site-specific mitigation measures such as noise walls, notification of residents, and indicate the resulting impacts on the NSAs.

Nighttime construction has the potential to disrupt local residents. To ensure that residents and sensitive receptors near the Lambert Compressor Station, LN 3600, T-15 Dan River, and T-21 Haw River Interconnects would not be significantly affected by the noise levels from 24-hour/nighttime construction, **we recommend that:**

- **Prior to construction, Mountain Valley should file its *Nighttime Construction Noise Management Plan* with the Secretary, for review and written approval by the Director of OEP, that demonstrates noise levels would be reduced below 48.6 dBA at night and 55 dBA L_{dn} overall at the nearest NSA, or not exceed 10 dBA over the ambient at the nearest NSA where ambient noise levels are already above 55 dBA. This plan should indicate site-specific mitigation measures and indicate resulting noise impacts on NSAs.**

Blasting

Mountain Valley would conduct blasting to excavate where shallow bedrock is encountered. Noise and vibration impacts produced during blasting would be instantaneous and would vary based on a number of factors, such as the type and amount of explosives used, distance of the receptor to the blast site, below-ground depth of explosives, and minimization measures applied. At a distance of 50 feet, typical construction blasting noise levels have been documented at about 94 dBA and vibration at about 100 vibration decibels (VdB). If the vibration level at a structure reaches 90 to 102 VdB depending on the building type, there may be damage effects (FHWA, 2006b; FTA, 2006). Mountain Valley would conduct a noise and vibration assessment for nearby structures once blasting locations are identified.

Mountain Valley would conduct blasting operations in accordance with its *General Blasting Plan* and applicable regulations. Furthermore, before any blasting occurs, Mountain Valley's contractor would complete a Project/site-specific blasting plan for approval. If blasting is necessary within 150 feet of an occupied building, store, residence, business, farm, or other occupied area, Mountain Valley would perform pre- and post-blast inspections, and provide at least a 24-hour notice prior to initiating blasting operations. Mountain Valley would control vibration by limiting the size of charges and by using charge delays, which stagger each charge in a series of explosions. In the event of a landowner complaint regarding damage from blasting, Mountain Valley would negotiate a settlement with the landowner that may include repair or replacement. With implementation of these mitigation measures, significant noise and vibration impacts from blasting are not anticipated.

Horizontal Direction Drilling

Mountain Valley would use the HDD method to install the pipeline beneath the Dan River in Rockingham County, North Carolina and the Stony Creek Reservoir, in Alamance County, North Carolina. The expected drilling duration is 8 to 12 weeks for each crossing, under normal circumstances. Noise impacts at the nearest NSAs due to 24-hour HDD activities were calculated using the computer aided noise abatement (CadnaA) noise model (version 2018, build 161.4801). The model assumed slight shielding and screening effects from the tanks and trailers on-site. Noise would be generated by HDD equipment at the entry point and at the exit point, and assumed equipment would operate simultaneously at both locations. Since Mountain Valley has yet to

decide the drilling direction, two models were constructed for each HDD (i.e., each side modeled as both entry and exit) in order to identify the work-case scenario.

HDD equipment at the entry point includes a drill rig and engine-driven hydraulic power unit, engine-driven mud pump(s) and other engine-driven generator set(s); mud mixing/cleaning equipment and associated fluid systems shale shakers; crane(s), forklift(s), front-end loader(s), and/or truck(s); and engine-driven light plants (i.e., total sound power level of 115 dBA). HDD equipment at the exit point includes a backhoe or bulldozer; engine-driven generator set and small engine-driven pump; and engine-driven light plant (i.e., total sound power level of 103 dBA).

As shown in table 4.11-13, the worst-case noise level from the Dan River HDD would be below the FERC criterion of 55 dBA L_{dn} at the nearest NSA. HDD activities at the Stony Creek Reservoir would generate noise above the 55 dBA L_{dn} criterion. At this site, Mountain Valley would implement noise mitigation as follows: (1) use residential-grade exhaust mufflers on exhaust of all engines; and (2) use of a series of 12 to 14 foot tall noise barriers located 20 feet from the primary noise source. Based on modeling conducted by Mountain Valley, the use of the proposed mitigation would reduce the estimated noise level from Stony Creek Reservoir HDD below the 55 dBA L_{dn} criterion for the nearest NSA. As such, noise impacts associated with HDD activities would be localized,temporary, and mitigated where necessary.

TABLE 4.11-13

Estimated Worst-Case Noise Levels at Nearby Noise Sensitive Areas Due to Horizontal Directional Drilling (24-Hour Shift)

HDD	Closest NSA Distance and Direction from HDD	Sound Levels (dBA)			Increase over Ambient (dBA)
		Ambient Noise Level (L_{dn})	HDD Noise (L_{dn})	HDD + Ambient (L_{dn})	
Without Mitigation					
Dan River HDD	1,400 feet N	42.8	52.9	53.3	10.5
Stony Creek Reservoir HDD	300 feet NW	39.7	**60.6**	**60.6**	20.9
With Mitigation					
Stony Creek Reservoir HDD	300 feet NW	39.7	48.6	49.2	9.5

Conventional Bore

Pipeline would be installed beneath railroad at four locations utilizing the conventional bore construction method with the following equipment: an auger boring machine, six light plants, and two backhoes. Mountain Valley expects that each railroad crossings would require 24-hour construction activities for 2 to 3 days. If problems are encountered, construction could be extended for up to 14 days.

Mountain Valley used the CadnaA noise model (version 2018 build 161.4801) to estimate noise impacts at the nearest NSAs to the railroad crossings. The model assumed slight shielding and screening effects from the tanks and trailers on-site. Table 4.11-14 shows the predicted noise impacts on the worst-case NSAs due to construction from railroad crossings during a 24-hour shift.

As shown in the table, noise levels would be below the FERC criterion of 55 dBA L_{dn} at the nearest NSAs to Railroad Crossings 1 and 2.

Noise levels from Railroad Crossings 3 and 4 would be above the FERC criterion of 55 dBA L_{dn} at the nearest NSAs. At these two locations, Mountain Valley would implement the following noise mitigation: (1) use residential-grade exhaust mufflers on exhaust of all engines; and (2) use of a series of 12 to 14 foot tall noise barriers located 20 feet from the primary noise source. As an alternative to the noise mitigation at Railroad Crossing 3 and/or 4, Mountain Valley may consider offering the residents compensation or temporary housing as a means of reducing the temporary construction noise impact. If all affected residents choose to accept compensation or temporary housing for the duration of the work (2 to 3 days), then the mufflers and barriers would not be necessary.

As shown in table 4.11-14, with mufflers and barriers as mitigation, noise levels from Railroad Crossing 3 remain above the FERC criterion of 55 dBA L_{dn} at the nearest NSA. In the event that sensitive receptors near Railroad Crossing 3 find the noise levels to be disruptive after proposed mitigation, Mountain Valley would also offer compensation or temporary housing (e.g., hotel or motel) accommodations as warranted, until the noise levels are remedied. As such, noise impacts associated with railroad crossings activities would be localized, temporary, and mitigated where necessary.

TABLE 4.11-14

Estimated Noise Levels at Nearby Noise Sensitive Areas Due to Railroad Crossings (24-Hour Shift)

Railroad Crossing	NSA Distance and Direction from Crossing	Sound Levels (dBA)			Increase over Ambient (dBA)
		Ambient Noise Level (L_{dn})	Crossing Noise (L_{dn})	Crossing + Ambient (L_{dn})	
Without Mitigation					
Railroad Crossing 1	3,550 feet E	58.9	45.1	59.0	0.2
Railroad Crossing 2	3,000 feet S	41.1	38.3	42.9	1.8
Railroad Crossing 3	250 feet NW	45.5	**69.5**	69.5	24.0
Railroad Crossing 4	500 feet N	48.9	**65.2**	65.3	16.4
With Mitigation					
Railroad Crossing 3	250 feet NW	45.5	**57.5**	57.8	12.3
Railroad Crossing 4	500 feet N	48.9	**53.2**	54.6	5.7

Operational Noise Impacts and Mitigation

Normal operations noise from the pipeline would be negligible. The only potential sound level increases associated with operation would be noise from vehicle and equipment use during maintenance and inspection activities. However, these activities would be transient, temporary, and not significantly more audible than normal vehicle traffic at the nearest NSAs along the pipeline right-of-way.

Noise from the Lambert Compressor Station would be generated from continuous operation of the equipment listed in table 4.11-3. The increase in noise would be sustained for the life of the Project. The CadnaA noise model (version 2018 build 161.4801) was used to estimate noise impacts at the nearest NSAs to the compressor station.

The data used for modeling included available data from equipment manufacturers and noise level measurements from other similar compressor stations. The models assumed an exhaust height of 45.5 feet per the planned turbine installations and vendor proposal. Certain noise mitigation measures, such as compressor building walls, roof, doors, and ventilation; turbine exhaust silencers and breakout (capable of meeting 45 dBA at 200 feet); turbine intake silencers and breakout (capable of meeting 73 dBA at 50 feet); underground suction and discharge piping; and acoustically lagged aboveground main gas piping were included as part of the noise modeling. Further, the compressor station would be located in an area with foliage ranging from grass and crops to areas of dense woods. For a conservative assumption, no foliage shield factor was applied.

Table 4.11-15 summarizes modeled noise levels on worst-case NSAs due to typical operation of the Lambert Compressor Station. As shown in the table, noise levels at each NSA due to typical compressor station operation would be below the FERC noise limit of 55 dBA. Noise increases over the existing ambient noise levels of 0.0 dBA to 3.7 dBA would range from not detectible to barely detectible to the human ear.

TABLE 4.11-15

Estimated Noise Levels at Nearby Noise Sensitive Areas Due to Operation of the Lambert Compressor Station

NSA	NSA Distance and Direction from Station	Sound Levels (dBA)			Increase over Ambient (dBA)
		Ambient Noise Level (L_{dn})	Compressor Noise (L_{dn})	Compressor + Ambient (L_{dn})	
NSA 1	3,480 feet WSW	46.8	48.0	50.5	3.7
NSA 2	3,500 feet SW	46.8	41.6	47.9	1.1
NSA 3	3,290 feet SE	62.8	40.7	62.8	0.0
NSA 4	3,800 feet N	44.8	39.4	45.9	1.1

Once the compressor station design is finalized, Mountain Valley would finalize and modify as needed the noise mitigation to ensure compliance with the FERC requirements.. To verify that the actual noise levels resulting from operation of the Lambert Compressor Station would comply with these noise limits and would not result in significant noise impacts, **we recommend that:**

- **No later than 60 days after placing the Lambert Compressor Station (including the Interconnect) into service, Mountain Valley should file a noise survey with the Secretary. If a full load condition noise survey is not possible, Mountain Valley should provide an interim survey at the maximum possible load within 60 days of placing the station into service and provide the full load survey within 6 months. If the noise attributable to the operation of the**

equipment at the station under interim or full load conditions exceeds an L_{dn} of 55 dBA at the nearest NSA, Mountain Valley should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. Mountain Valley should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.

Compressor Station Maintenance Blowdowns/Venting

A maintenance blowdown would occur at the Lambert Compressor Station when a unit is shut down for an extended period. It entails releasing of high pressure gas in the system in a controlled fashion (through a blowdown silencer capable of meeting 85 dBA at 3 feet) causing a temporary increase of noise level lasting approximately 5 minutes.

During a maintenance blowdown event, the worst-case predicted noise level (i.e., during nighttime) at the worst-case NSA would be below the FERC 55 dBA limit as shown in table 4.11-16. The noise increase above the existing nighttime ambient noise level would be 0.6 dBA and likely not detectible to the human ear. As a result, noise impacts from maintenance blowdowns would be negligible.

TABLE 4.11-16

Estimated Noise Levels at Nearby Noise Sensitive Areas Due to Maintenance Blowdown at the Lambert Compressor Station

NSA	NSA Distance and Direction from Station	Sound Levels (dBA)			Increase over Ambient (dBA)
		Ambient Noise Level (L_n)	Blowdown Noise (L_n)	Blowdown + Ambient (L_n)	
NSA 1	3,480 feet WSW	44.5	36.8	45.1	0.6

Compressor Station Emergency Shutdown

An ESD blowdown event would occur at the Lambert Compression Station when the ESD system senses irregularity in operation and automatically shuts down the whole station. This would cause elevated noise due to the release of gas from all of the station's piping through a series of silencers. The estimated noise from the discharge, suction, and fuel gas vents are 138, 133, and 120 dBA, respectively, which would be high enough to be audible within a 1-mile radius. However, these noise levels would occur only during the first few seconds of ESD venting, during the period with the highest upstream pressure. Thereafter, the noise levels would drop quickly over the 10-minute venting period as the upstream pressure decreases.

Table 4.11-17 shows the estimated maximum noise level (L_{max}) and 10-minute average noise level (L_{eq}) on worst-case NSAs from an emergency shutdown of the Lambert Compressor Station. As shown in the table, the noise levels would be below the FERC noise limit of 55 dBA for all NSAs during a 24-hour average period. Because ESD blowdown events are extremely rare and would take place only in the event of an emergency or when the system is tested once every

year, impacts on NSAs would not be considered significant. Mountain Valley is in discussion with Pittsylvania County to assess applicability of the Pittsylvania County Noise Ordinance with regards to ESD blowdown events. Information will be updated in the final EIS.

TABLE 4.11-17

Estimated Noise Levels at Nearby Noise Sensitive Areas Due to Emergency Shutdown of the Lambert Compressor Station

NSA	NSA Distance and Direction from Station	Sound Levels (dBA)					
		Ambient Noise Level (L_{dn})	Maximum ESD Noise (L_{max})	10-Minute Average ESD Noise (L_{eq})	24-Hour Average ESD Noise (L_{dn})	ESD + Ambient (L_{dn})	Increase over Ambient (dBA)
NSA 1	3,480 feet WSW	46.8	63.9	58.9	47.3	50.1	3.3
NSA 2	3,500 feet SW	46.8	63.4	58.4	46.8	49.8	3.0
NSA 3	3,290 feet SE	62.8	56.1	51.1	39.5	62.8	0.0
NSA 4	3,800 feet N	44.8	55.5	50.5	38.9	45.8	1.0

Compressor Station Vibration

Mountain Valley conducted an analysis of the impacts of low-frequency[54] noise at Lambert Compressor Stations to assess the potential for vibration at nearby NSAs. Pursuant to ANSI 12.2-2008 Criteria for Evaluating Room Noise, low-frequency noise can result in acoustically induced vibrations if the sound pressure level (SPL) is above 65 dB in the 31.5 Hertz (Hz) octave band or above 70 dB in the 63 Hz octave band. The Lambert Compressor Station would generate approximately 50 dB at 31.5 Hz and 50 dB at 63 Hz at the closest NSA. Consequently, we conclude there would be no adverse low-frequency noise induced vibration at any NSA from operation of compressor station.

Meter Stations

Noise from the associated meter stations would be generated mainly by flow control valves installed at each interconnect. The increase in sound would be for the life of the Project. Table 4.11-18 shows the predicted operational worst-case noise levels at the nearest NSAs. As shown in the table, the noise levels contributed by operations of the interconnects would not exceed the FERC noise criterion of 55 dBA. Noise level increases over the existing ambient at NSAs would be 0.0 to 0.1 dBA, which is likely not detectible to the human ear. As a result, noise impacts from meter stations would be negligible.

[54] Frequency is the number of times sound fluctuation occurs measured in cycles per second called Hertz (Hz). Human hearing covers the frequency range of 20 Hz to 20,000 Hz (FTA, 2006).

TABLE 4.11-18

Estimated Noise Levels at Nearby Noise Sensitive Areas Due to Operation of the Meter Stations

Meter Station a/	NSA Distance and Direction from Station	Sound Levels (dBA)			Increase over Ambient (dBA)
		Ambient Noise Level (L_{dn})	Station Noise (L_{dn})	Station + Ambient (L_{dn})	
LN 3600 Interconnect	1,700 feet NNW	49.7	27.7	49.7	0.0
T-15 Dan River Interconnect	750 feet S	65.0	46.8	65.1	0.1
T-21 Haw River Interconnect	550 feet N	65.0	41.8	65.0	0.0

a/ Noise levels for the Lambert Interconnect are included with the Lambert Compressor Station; see table 4.11-15.

4.11.2.4 Conclusions Regarding Noise Impacts and Mitigation

Noise generated during the construction phase would cause noise levels above the FERC noise criterion at certain NSAs. Construction noise would be heard by members of the public and residents near to the construction areas. However, construction noise is typically temporary and localized. With implementation of the measures proposed by the Mountain Valley and recommended by FERC, construction noise impacts would be minimized or mitigated to the extent practicable. Similarly, operational noise impacts would be limited to areas near the aboveground facilities. Considering Mountain Valley's proposed mitigation measures and our recommendations, all aboveground facilities would comply with our noise criteria of 55 dBA L_{dn} and they should cause no adverse noise vibration. Therefore, we conclude that the noise associated with construction and operation of the Project would not result in a significant impact on the local noise environment and residents.

4.12 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for an accidental release of natural gas. In the unlikely event of a leak, natural gas, which is lighter than air, should dissipate into the atmosphere. However, a spark or ignition at the point of the release could result in a fire or explosion following a major pipeline rupture. Those risks are ameliorated by pipeline design and safety regulations mandated by the DOT, and measures that would be implemented by Mountain Valley as part of its *Emergency Response Plans*[55]. Below we discuss historic incidents, in order to quantify risks.

The primary component of natural gas, CH_4, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. To reduce the hazards release of natural gas compressor station's pneumatic control systems are designed to use

[55] Mountain Valley's Emergency Response Plan was included as Attachment 1d-1 to Mountain Valley's March 5, 2019 response to the February 13, 2019 FERC EIR. The Emergency Response Plan can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20190305-5214 in the "Numbers: Accession Number" field.

compressed air rather than natural gas, which minimizes any venting or leaking at stations. Further, the use of turbine compressors instead of reciprocating compressors and micro-turbines for on-site power instead of reciprocating compressor generators act to prevent or minimize leakage.

Natural gas is buoyant at atmospheric temperatures and disperses rapidly in air. An unconfined mixture of CH_4 and air is not explosive; however, it may ignite if there is an ignition source. Methane has an auto-ignition temperature of 1,000°F and is flammable at concentrations between 5.0 percent and 15.0 percent in air. A flammable concentration of natural gas within an enclosed space in the presence of an ignition source can explode.

4.12.1 Safety Standards

The DOT is mandated to regulate pipeline safety under 49 U.S.C. 601. The DOT's PHMSA administers the national regulatory pipeline safety program for the nation's interstate and intrastate pipelines and requires that pipeline operators design, construct, test, operate, and maintain their pipeline facilities in compliance with the federal pipeline safety regulations. Many of the regulations are written as performance standards, which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety.

PHMSA works closely with state pipeline safety programs. The DOT provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing, at a minimum, the federal standards. A state may also act as the DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement actions.

The DOT pipeline standards are published in 49 CFR 190-199. Part 192 specifically addresses the minimum federal safety standards for transportation of natural gas by pipeline.

Under a *Memorandum of Understanding on Natural Gas Transportation Facilities* dated January 15, 1993, between the DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection, or certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with Section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert the DOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable. The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT's *Minimum Federal Safety Standards* in 49 CFR 192. The regulations are intended to ensure adequate protection for the

public and to prevent natural gas facility accidents and failures. The DOT regulations specify material requirements and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

The federal pipeline safety regulations also define area classifications, based on population density near pipeline facilities, and specify more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline.

The four area classifications are defined below:

- Class 1 – Location with 10 or fewer buildings intended for human occupancy;
- Class 2 – Location with more than 10 but less than 46 buildings intended for human occupancy;
- Class 3 – Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period; and
- Class 4 – Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. For example, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (i.e., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4 locations). Pipe wall thickness and pipeline design pressures; hydrostatic test pressures; MAOP; inspection and testing of welds; and frequency of pipeline patrols and leak surveys must conform to higher standards in more populated areas. Class locations for the Project have been determined based on the relationship of the pipeline centerline to other nearby structures and manmade features. Table 4.12-1 summarizes the class locations for the Project. The majority of the pipeline routes would be in Class 1 areas.

TABLE 4.12-1

Lengths of Area Classifications Crossed by the Southgate Project

State/County	Class 1 (miles)	Class 2 (miles)	Class 3 (miles)
Virginia			
Pittsylvania	19.60	6.75	0.22
Virginia Total	*19.60*	*6.75*	*0.22*
North Carolina			
Alamance	9.82	12.19	1.56
Rockingham	22.07	6.47	0
North Carolina Total	*31.89*	*18.66*	*1.56*
Mountain Valley Southgate Project Total	**51.49**	**25.41**	**1.78**

Mountain Valley has procedures in place to monitor for changes in population density. If a subsequent increase in population density adjacent to the right-of-way results in a change in class location for the pipeline, Mountain Valley would revise the MAOP to conform to the new class. This would be achieved by reducing the MAOP or replacing the segment with pipe of sufficient grade and wall thickness, if required to comply with DOT requirements for the new class location. Mountain Valley has stated that it would also increase pipeline patrol frequency and pressure testing, or would decrease the percent specified minimum yield strength (pipeline stress) of a pipe segment in areas where population densities change.

The DOT Pipeline Safety Regulations require operators to develop and follow a written Integrity Management Program (IMP) that contain all the elements described in 49 CFR 192.911 and address the risks on each transmission pipeline segment. Specifically, the rule establishes an IMP that applies to all High Consequence Areas (HCA).

We received comments about the potential effects of a pipeline rupture and natural gas ignition. It should be noted that if a pipeline rupture does occur, the natural gas does not necessarily ignite. However, the DOT has published rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an IMP to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for the DOT to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method, an HCA includes:

- current Class 3 and 4 locations;
- any area in Class 1 or 2 where the potential impact radius is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[56]; or

[56] The potential impact circle is a circle of radius equal to the potential impact radius.

- any area in Class 1 or 2 where the potential impact circle includes an identified site.

An "identified site" is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

The PIR for the 16- and 24-inch-diameter Project with a MAOP of 1,440 psig is 419 feet and 628 feet, respectively.

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

Once a pipeline operator has determined the HCAs along its pipeline, it must apply the elements of its IMP to those sections of the pipeline within HCAs. The DOT regulations specify the requirements for the integrity management plan in Subpart O of Part 192, Gas Transmission Pipeline Integrity Management. Table 4.12-2 lists the HCAs for the Project, which have been determined based on the relationship of the pipeline centerline to nearby structures.

TABLE 4.12-2

Location of High Consequence Areas for the Southgate Project

County	Start MP	End MP	Length (miles)	Class Location
Virginia				
Pittsylvania	2.89	2.91	0.02	Class 1
	2.91	3.34	0.43	Class 2
	4.04	4.24	0.20	Class 2
	4.24	4.31	0.07	Class 3
	4.31	4.39	0.08	Class 2
	4.39	4.51	0.12	Class 1
	19.19	19.43	0.24	Class 2
	19.43	19.53	0.10	Class 3
	19.53	19.92	0.39	Class 2
	19.92	19.97	0.05	Class 3
	19.97	20.17	0.20	Class 2
North Carolina				
Rockingham	40.41	40.60	0.19	Class 2
Alamance	56.69	56.73	0.04	Class 1
	56.73	56.81	0.08	Class 2
	56.81	56.94	0.13	Class 3
	56.94	57.06	0.12	Class 2

TABLE 4.12-2

Location of High Consequence Areas for the Southgate Project

County	Start MP	End MP	Length (miles)	Class Location
	64.79	65.05	0.26	Class 2
	69.19	70.02	0.83	Class 3
	72.70	72.99	0.29	Class 1

The pipeline and aboveground facilities for the Project would be designed, constructed, operated, and maintained in accordance with the DOT's *Minimum Federal Safety Standards* in 49 CFR 192. The general construction methods that Mountain Valley would implement to ensure the safety of the Project are described in section 2.0, including welding, inspection, and integrity testing procedures.

The DOT prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Each pipeline operator is required to establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency system shutdown and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

In addition to adhering to the requirements described above, the integrity of completed welds would be visually inspected and tested using non-destructive methods such as x-ray radiography or ultrasound. Any unacceptable welds would be repaired and re-welded. Mountain Valley has also stated that it would meet or exceed pipeline safety regulations including installing remote controlled vales, which are not currently required by PHMSA.

The DOT requires pipeline operators to place pipeline markers at frequent intervals along the pipeline rights-of-way, such as where a pipeline intersects a street, highway, railway, or waterway, and at other prominent points along the route. Pipeline right-of-way markers can help prevent encroachment and excavation-related damage to pipelines. Because the pipeline right-of-way is much wider than the pipeline itself, and a pipeline can be anywhere within the right-of-way, state laws require excavators to call their state One Call center well in advance of digging to locate underground utilities and ensure it is safe for the contractor to dig in that location. Pipeline markers identifying the owner of the pipe and a 24-hour telephone number would be placed for

"line of sight" visibility along the entire pipeline length, except in active agricultural crop locations and in waterbodies in accordance with the DOT's requirements.

In accordance with DOT regulations, the proposed facilities would be regularly inspected for leakage and potential pipeline hazards such as construction activity, encroachments, and evidence of recent unmonitored excavations as part of scheduled operations and maintenance, including:

- physically walking and inspecting the pipeline corridor periodically;
- conducting fly-over inspections of the right-of-way as required;
- inspecting and maintaining MLVs and meter stations; and
- conducting leak surveys at least once every calendar year or as required by regulations.

Cathodic protection would be installed along the entire length of the new pipelines to prevent corrosion. Mountain Valley personnel would check the voltage and amperage at regular intervals as well as the pipe-to-soil potentials and rectifiers. In addition, annual surveys are completed, as described above.

The DOT regulations specified in Part 192 require that the applicant establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. Mountain Valley would utilize the emergency procedures contained in the Project *Emergency Response Plan*, which require communication with emergency responders on an annual basis. Local contact phone numbers, external contact information, equipment or resources available for mobilization, and any specific procedures to be followed for Mountain Valley would be incorporated into the *Emergency Response Plan* prior to commencement of pipeline operations. The fire departments of the states of Virginia and North Carolina have specific requirements for staffing, training, and equipment that allow them to fight pipeline related fires. The locations of fire stations in proximity to the Project are provided in section 4.9.3.

Mountain Valley would also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials.

Mountain Valley would establish and maintain liaison with appropriate fire, police, and public officials in a variety of ways. Mountain Valley's annual communications would include the following information:

- the potential hazards associated with Project facilities located in their service area and prevention measures undertaken;
- the types of emergencies that may occur on or near the Mountain Valley's facilities;
- the purpose of pipeline markers and the information contained on them;

- pipeline location information and the availability of the National Pipeline Mapping System;
- recognition of and response to pipeline emergencies; and
- procedures to contact Mountain Valley for more information.

Mountain Valley's communications with local emergency responders may involve individual meetings, group meetings, or direct mailings to build and maintain a relationship with the appropriate emergency personnel and ensure their knowledge and familiarity with ESD and isolation systems and protocol. In addition, Mountain Valley would perform and financially support periodic emergency exercises and mock emergency drills with local government, law enforcement, and emergency response agencies, subject to agency availability and willingness to participate. Additional training materials, including the PHMSA – Emergency Response Guidebook, National Association of State Fire Marshals – Pipeline Emergencies textbook, would also be made available to emergency personnel.

On October 1, 2019 the PHMSA issued new regulations modifying and expanding the standard pipeline safety standards under 49 CFR Parts 191 and 192. These regulations, in part, established: new standards for in-line inspections; requirements for newly established moderate consequence areas (MCA); explicitly requires consideration of seismicity and geotechnical risks in its integrity management plan for the pipeline; new regulations on pipeline patrol frequency HCAs, MCAs and grandfathered pipelines; a policy to reconfirm MAOP for certain pipelines; installation of pressure relief for pig launcher/receivers, and report exceedances of MAOP to PHMSA. These regulations go into effect on July 1, 2020.

4.12.2 Pipeline Accident Data

The DOT requires all operators of natural gas transmission pipelines to notify the National Response Center at the earliest practicable moment following the discovery of an incident and to submit a report within 30 days to PHMSA. On January 19, 2017, PHMSA issued a final rule entitled, "Operator Qualification, Cost Recovery, Accident and Incident Notification, and Other Pipeline Safety Changes." The rulemaking lays out a specific timeframe requirement for telephonic or electronic notifications of accidents and incidents. The rule also amends drug and alcohol testing requirements, and incorporates consensus standards by reference for inline inspection and Stress Corrosion Cracking Direct Assessment. The rule addresses mandates included in the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011. Incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization; or
- involve property damage, including cost of gas lost, of more than $50,000, in 1984 dollars (approximately $115,499.04 in 2016 [Bureau of Labor and Statistics, 2016]).

During the period from 1999 through 2018, 2,119 significant incidents were reported on the more than 301,000 total miles of natural gas transmission pipelines nationwide (PHMSA, 2017).

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.12-3 provides a distribution of the causal factors as well as the number of each incident by cause from 1999 to 2018.

TABLE 4.12-3

Natural Gas Transmission Dominant Incident Causes, 1999 – 2018

Incident	Number of Incidents	Percentage
Corrosion	410	19.3
Excavation **a/**	340	16.0
Pipeline material, weld, or equipment failure	704	33.2
Natural force damage	229	10.8
Outside force **b/**	148	7.0
Incorrect operation	85	4.0
All other causes **c/**	203	9.6
Total	**2,119**	**100**

a/ Includes third-party damage
b/ Fire, explosion, vehicle damage, previous damage, and unintentional damage
c/ Miscellaneous causes or other unknown causes
Source: PHMSA, 2019

The dominant causes of pipeline incidents from 1999 to 2018 were corrosion and pipeline material, weld, or equipment failure, constituting 33.2 percent of all significant incidents. The pipelines included in the data set in table 4.12-3 vary widely in terms of age, diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of significant incidents is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents because corrosion is a time-dependent process. Jones et al. (1986) compared reported incidents with the presence or absence of cathodic protection and protective coatings. The results of that study, summarized in table 4.12-4, indicated that corrosion control was effective in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe. The data also indicate that cathodically protected pipe without a protective coating actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

TABLE 4.12-4

Incidents Caused by External Corrosion and Level of Protection (1970 – June 1984)

Corrosion Control	Incidents per 100 Miles per Year
None – bare pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11

Source: Jones et al., 1986

Older pipelines also have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller-diameter pipelines, which are more easily crushed or broken by mechanical equipment or earth movements (Jones et al., 1986).

Outside force, excavation, and natural forces were the cause in 33.8 percent of significant pipeline incidents from 1999 to 2018. These result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geological hazards; and weather effects such as winds, storms, and thermal strains; and willful damage. Table 4.12-5 provides a breakdown of outside force incidents by cause.

Since 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The One Call program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide pre-construction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts.

TABLE 4.12-5

Outside Forces Incidents by Cause (1999 – 2018) a/

Cause	Number of Incidents	Percent of All Incidents
Operator excavation damage	48	2.3
Previous excavation damage	14	0.7
Third-party excavation damage	275	13.0
Unspecified excavation damage	3	0.1
Earth movement	38	1.8
Heavy rains/floods	103	4.9
High winds	15	0.7
Lightning	26	1.2
Temperature	31	1.5
Natural force damage (unspecified/other)	16	0.7

TABLE 4.12-5

Outside Forces Incidents by Cause (1999 – 2018) a/

Cause	Number of Incidents	Percent of All Incidents
Electrical arcing from other equipment/facility	4	0.2
Fire/explosion	16	0.8
Fishing or maritime activity	8	0.4
Intentional damage	5	0.2
Maritime equipment or vessel adrift	2	0.1
Other outside force	15	0.7
Previous mechanical damage	9	0.4
Unspecified outside force	1	0.0
Vehicle (not engaged with excavation)	88	4.2
Total	**717**	**33.8**

a/ Excavation, Outside Force, and Natural Force from table 4.12-3
Source: PHMSA, 2019

4.12.3 Impacts on Public Safety

The service incident data summarized in table 4.12-3 include pipeline failures of all magnitudes with widely varying consequences. Table 4.12-6 presents the average annual fatalities that occurred on natural gas transmission lines between 2010 and 2018. The data have been separated into employees and nonemployees to better identify a fatality rate experienced by the general public. Fatalities among the public averaged three per year over the 20-year period from 1999 to 2018.

TABLE 4.12-6

Injuries and Fatalities – Natural Gas Transmission Pipelines

	Injuries		Fatalities	
Year	Employees	Public	Employees	Public
2010 a/	3	58	0	10
2011	1	0	0	0
2012	1	6	0	0
2013	0	2	0	0
2014	1	0	1	0
2015	1	13	4	2
2016	2	1	2	1
2017	1	2	1	2
2018	2	5	0	1

a/ All of the public injuries and fatalities in 2010 were due to the Pacific Gas and Electric pipeline rupture and fire in San Bruno, California on September 9, 2010.
Source: PHMSA, 2019a

The majority of fatalities from natural gas pipelines are associated with local distribution pipelines. These pipelines are not regulated by the FERC; they distribute natural gas to homes and businesses after transportation through interstate transmission pipelines. In general, these distribution lines are smaller-diameter pipes and/or plastic pipes that are more susceptible to damage. In addition, local distribution systems do not have large rights-of-way and pipeline markers common to the FERC-regulated interstate natural gas transmission pipelines. Therefore, incident statistics inclusive of distribution pipelines are inappropriate to use when considering natural gas transmission projects.

The nationwide totals of accidental fatalities from various anthropogenic and natural hazards are listed in table 4.12-7 in order to provide a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between accident categories should be made cautiously because individual exposures to hazards are not uniform among all categories. As indicated in table 4.12-7, the number of fatalities associated with natural gas facilities is much lower than the fatalities from natural hazards such as lightning, tornados, floods, earthquakes, etc.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 1999 to 2018, there were an average of 106 significant incidents and 3 fatalities per year. The number of significant incidents distributed over the more than 300,000 miles of natural gas transmission pipelines indicates the risk is low for an incident at any given location. The rate of total fatalities for the nationwide natural gas transmission lines in-service is approximately 0.01 per year per 1,000 miles of pipeline. Thus, operation of the Project would represent only a slight increase in risk to the nearby public.

TABLE 4.12-7

Nationwide Accidental Deaths a/

Type of Accident	Annual Number of Deaths
All accidents	169,936
Motor vehicle	40,231
Poisoning	64,795
Falls	36,338
Drowning	3,709
Fire, smoke inhalation, burns	2,812
Floods **b/**	80
Lightning **b/**	20
Tornado **b/**	10
Natural gas distribution lines **c/**	10
Natural gas transmission lines **c/**	3

a/ All data, unless otherwise noted, reflect 2017 statistics from CDC, 2019.
b/ Reflects 2018 data from NWS, 2019.
c/ 20-year average (1999-2018) from PHMSA, 2019b; c.

4.12.4 Terrorism and Security Issues

Safety and security concerns have changed the way pipeline operators as well as regulators must consider terrorism, both in approving new projects and in operating existing facilities. The U.S. Department of Homeland Security is tasked with the mission of coordinating the efforts of all executive departments and agencies to detect, prepare for, prevent, protect against, respond to, and recover from terrorist attacks within the United States. Among its responsibilities, the U.S. Department of Homeland Security oversees the Homeland Infrastructure Threat and Risk Analysis Center, which analyzes and implements the National Critical Infrastructure Prioritization Program that identifies and lists Tier 1 and Tier 2 assets. The Tier 1 and Tier 2 lists are key components of infrastructure protection programs and are used to prioritize infrastructure protection, response, and recovery activities. The Commission, in cooperation with other federal agencies, industry trade groups, and interstate natural gas companies, is working to improve pipeline security practices, strengthen communications within the industry, and extend public outreach in an ongoing effort to secure pipeline infrastructure.

The Commission, like other federal agencies, is faced with a dilemma in how much information can be offered to the public while still providing a significant level of protection to the facility. Consequently, the Commission has taken measures to limit the distribution of information to the public regarding facility design to minimize the risk of sabotage. Facility design and location information has been removed from the FERC's website to ensure that sensitive information filed as Critical Energy Infrastructure Information is not readily available to the public (Docket No. RM06-23-000, issued October 30, 2007 and effective as of December 14, 2007).

The likelihood of future acts of terrorism or sabotage occurring along the Project or at any of the myriad natural gas pipeline or energy facilities throughout the United States is unpredictable given the disparate motives and abilities of terrorist groups. Further, the Commission, in cooperation with other federal agencies, industry trade groups, and interstate natural gas companies, is working to improve pipeline security practices, strengthen communications within the industry, and extend public outreach in an ongoing effort to secure pipeline infrastructure.

In accordance with the DOT surveillance requirements, Mountain Valley would incorporate air and ground inspection of its proposed facilities into its inspection and maintenance program. Security measures at the new aboveground facilities would include secure fencing.

Despite the ongoing potential for terrorist acts along any of the nation's natural gas infrastructure, the continuing need for the construction of these facilities is not eliminated. Given the continued need for natural gas conveyance and the unpredictable nature of terrorist attacks, the efforts of the Commission, the DOT, and the U.S. Department of Homeland Security to continually improve pipeline safety would minimize the risk of terrorist sabotage of the projects to the maximum extent practical, while still meeting the nation's natural gas needs. Moreover, the unpredictable possibility of such acts does not support a finding that these particular projects should not be constructed.

4.12.5 Reliability and Safety Conclusion

The pipeline and aboveground facilities associated with the Project will be designed, constructed, operated, and maintained to meet the DOT *Minimum Federal Safety Standards* in 49 CFR 192 and other applicable federal and state regulations. These regulations include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. The DOT rules require regular inspection and maintenance, including repairs as necessary, to ensure the pipeline has adequate strength to transport natural gas safely.

We received several comments about the potential effects of a pipeline rupture and natural gas ignition (the area of potential effect is sometimes referred to as the potential impact radius). While a pipeline rupture does not necessarily ignite, the DOT does publish rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an IMP to minimize the potential for an accident. Mountain Valley would follow federal safety standards for pipeline class locations based on population density. The DOT regulations are designed to ensure adequate safety measures are implemented to protect all populations. We conclude that Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety.

4.13 CUMULATIVE IMPACTS

Cumulative impacts are those that result from adding a project's impacts on a specific resource to the impacts of other past, present, and reasonably foreseeable projects' impacts on that same resource. We identified other projects near the Southgate Project to determine whether the Southgate Project's impacts would result in a cumulative impact on the environment when combined with other projects' impacts. Although the individual impact of each separate project may be minor, the additive effects of multiple projects could be significant.

The environment that would be affected by the Southgate Project, as it exists today reflects the impacts of natural processes, human influences, and other innumerable activities occurring over thousands of years. Beginning with the original settlement of North America by Native Americans, the Southgate Project area has been affected by human activities for over 15,000 years. European settlers arriving in the 17th Century further affected the environment through increased agricultural and timbering activities. As the human population grew, resources such as wetlands and forests were modified or converted to satisfy growing demand for land and timber. Since 1977, the annual loss of forested land in Virginia is estimated to be 16,000 acres per year (VADOF, 2018). The majority of this loss has been attributed to urban development, followed by agriculture (VADOF, 2019). Similarly, it is estimated that at least half of the wetlands in North Carolina have been lost since pre-Colonial times (Dahl, 1990); however, it is difficult to determine an exact figure given the lack of reliable historical data. Wetland loss is attributed to changes in land use practices such as farming and residential development (USGS, 1996). Forested land in North Carolina has declined by approximately 1.6 million acres since the mid-1960's (NCFS, 2017b). Today approximately 19 million people reside in Virginia and North Carolina combined.

Although the region has been substantially affected by human activity, natural resources remain throughout the landscape. Based on USGS data, Virginia and North Carolina currently have a total of approximately 1.0 and 5.7 million acres of wetlands, respectively. In 2018, the

VADOF estimated more than 62 percent of the state, approximately 16 million acres, qualified as forestland (VADOF, 2018). North Carolina's forests were estimated to cover 18.8 million acres as of 2017, or 60 percent of the land area in the state (NCFS, 2017b).

As described in the previous sections, the existing environment is representative of the impacts of past projects and actions. In this analysis, we consider the impacts of past projects to have become part of the affected environment (environmental baseline), which is described and evaluated in the preceding environmental analyses; however, ongoing effects of past actions that are relevant to the analysis are also considered. Furthermore, the CEQ in a memorandum regarding analysis of past actions issued on June 24, 2005, stated: "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." (CEQ, 2005). "Present" projects are those currently ongoing (either being constructed or are in operation) and affecting the environment in such a manner that could contribute to a cumulative impact. "Reasonably foreseeable" projects are proposed projects or developments that have applied for a permit from a local, state, or federal authority or planned projects, which have been publicly announced.

For a cumulative impact to occur, another project(s) must impact the same resource(s) as the Southgate Project. Impacts often vary in extent and duration. For example, a project's impact on cultural resource sites is localized in nature, with some exceptions, and typically not affecting other sites. Whereas, a project's impact on air quality could be measured over a relatively large distance. We account for this variation by considering resource-specific geographic scopes. Within each geographic scope, other projects' impacts when combined with those of the Southgate Project could result in a cumulative impact. Continuing the use of cultural resources and air quality as examples, the geographic scope for cultural resources is limited to the area within which sites could be directly or indirectly affected by another project(s) and would be significantly smaller than the geographic scope for air quality. Projects located outside a geographic scope are not evaluated because their potential to contribute to a cumulative impact diminishes with increasing distance from the Southgate Project. Table 4.13-1 describes the resource-specific geographic scopes for this cumulative impact analysis.

When determining the significance of a cumulative impact, we consider the duration of the impact; the geographic, biological, and/or social context in which the impact would occur; and the magnitude and intensity of the impact. For the purposes of this analysis, we are including the following resources: soils, groundwater, surface water, and wetlands; vegetation; wildlife; fisheries and aquatic resources; land use, recreation, special interest areas, and visual resources; socioeconomics and environmental justice; cultural resources; and air quality and noise. Most of the impacts resulting from construction and operation of the Southgate Project would be temporary and localized, would be contained within the right-of-way and extra workspaces, and when added to the impacts of other projects are not expected to result in significant cumulative impacts. Exceptions to the limited nature of cumulative impacts exist where the impacts may migrate outside of designated work areas, such as turbidity and sedimentation, air emissions, and noise. Impacts geological resources are localized, temporary, and limited to the immediate Southgate Project workspace, and therefore, we determined that cumulative impacts would not occur on geological resources. For each environmental resource, the potential direct and indirect impacts associated with the Southgate Project are discussed in relation to the cumulative effects that may occur when they are added to other past, present, or reasonably foreseeable projects within the geographic scope of analysis, as described below.

TABLE 4.13-1

Geographic Scope for Cumulative Impact Analysis

Resource(s)	Cumulative Impact Geographic Scope	Justification for Geographic Scope
Soils	Construction workspaces	Impacts on soils would be highly localized and primarily limited to the Southgate Project footprint during active construction. Cumulative impacts would only occur if other geographically overlapping or abutting projects were constructed at the same time as the Southgate Project.
Groundwater, Wetlands, Vegetation, Wildlife	Hydrologic Unit Code (HUC) 12 Watershed	A HUC-12 watershed is a natural boundary to appropriately assess impacts on most biological resources including wetlands, vegetation, and wildlife. The HUC-12 sub-basin also accounts for the potential of inadvertent spills that could affect groundwater. Cumulative effects on biological resources typically are assessed within watershed boundaries due to the connectivity between biotic and abiotic resources that occurs within a drainage system. We chose the HUC-12 sub-level watershed for these resources because of the small scale of the Southgate Project's ground disturbance in relation to the area encompassing surrounding watersheds.
Surface Water Resources, Fish, and Aquatic Life	HUC-10 Watershed. Includes potential overlapping impacts from sedimentation, turbidity, and water quality for direct in-water work.	Based on our findings throughout the previous sections of this EIS and given the anticipated scale of impacts the Southgate Project would have on surface water resources, fish, and aquatic life, the natural, ecological boundaries of a HUC-10 watershed is the appropriate geographic scope for this analysis.
Cultural Resources	Overlapping impacts within the APE	The APE for direct effects (physical) includes areas subject to ground disturbance, while the APE for indirect effects (visual or audible) includes aboveground ancillary facilities or other Southgate Project elements that are visible from historic properties in which the setting contributes to their NRHP eligibility.

TABLE 4.13-1

Geographic Scope for Cumulative Impact Analysis

Resource(s)	Cumulative Impact Geographic Scope	Justification for Geographic Scope
Land Use	1-mile radius	Impacts on general land uses would be restricted to the construction workspaces and the immediate surrounding vicinity; therefore, the geographic scope for land use and recreation is a 1.0-mile radius from the centerline of the Southgate Project pipeline and aboveground facility sites.
Visual	Viewshed: Includes distance that the tallest feature at the planned facility would be visible from neighboring communities for aboveground facilities. For pipelines, a distance of 0.25 mile and existing visual access points (e.g., road crossings).	Assessing the impact based on the viewshed allows for the impact to be considered with any other feature that could have an effect on aesthetic quality.
Noise - Operations	NSAs located within 1 mile of the Southgate Project's noise-emitting permanent aboveground facilities.	Noise from the Southgate Project's permanent facilities is not anticipated to have an impact beyond 1.0 mile.
Noise - Construction	0.25 mile from pipeline or aboveground facilities. 0.5 mile from HDD installation	Areas in the immediate proximity of pipeline or aboveground facility construction activities (within 0.25 mile) would have the potential to be affected by construction noise. NSAs within 0.5 mile of an HDD installation could be cumulatively affected if other projects had a concurrent impact on the NSA.
Air Quality - Operations	50 km (about 31.1 miles) from compressor station	The geographic scope adopted the distance used by the EPA for cumulative modeling of large PSD sources during permitting and following 40 CFR 51, appendix W, section 4.1. We consider 50 km a conservative geographic scope for the purpose of identifying other projects which could contribute to a cumulative impact on air quality.
Air Quality - Construction	0.25 mile from pipeline or aboveground facilities	Air emissions during construction would be limited to vehicle and construction equipment emissions and dust, and would be localized to the Southgate Project construction sites. About 0.25 mile conservatively captures the distance these emissions would travel before becoming negligible and unlikely to contribute to a cumulative impact.

TABLE 4.13-1

Geographic Scope for Cumulative Impact Analysis

Resource(s)	Cumulative Impact Geographic Scope	Justification for Geographic Scope
Socioeconomics	Affected counties and municipalities	Affected counties would experience the greatest impacts associated with employment, housing, public services, transportation, traffic, property values, economy, and taxes.
Environmental Justice	Census tracts that contain or are adjacent to Southgate Project facilities	Projects within the census tracts directly affected by and adjacent to the proposed Southgate Project facilities could contribute to cumulative impacts on environmental justice communities.

The Southgate Project would affect 9 HUC-10 watersheds and 22 HUC-12 watersheds during construction. These watersheds vary in size depending on topography. The average size of the affected HUC-10 watersheds is about 130,000 acres, while the average size of the HUC-12 watersheds is approximately 19,000 acres. The total area included in our consideration of cumulative impacts on these resources covers more than 1 million acres. Tables 4.13-2 and 4.13-3 list all the HUC-10 and HUC-12 watersheds affected during construction and operation of the Southgate Project, their size in acres, the acres affected by other projects considered in this analysis within each watershed, and the acres affected by the Southgate Project within each watershed.

TABLE 4.13-2

HUC-10 Watersheds Affected by the Southgate Project and Other Projects

Activity	Construction (Acres) b/	Percent of Watershed c/
Virginia (HUC-10 Watershed Acres)		
Watershed: Cherrystone Creek-Banister River (88,668 acres)		
Other Identified Projects a/	246.9	0.3
Southgate pipeline and Associated Facilities	227.0	0.3
Watershed: Wolf Island Creek-Dan River (97,896 acres)		
Other Identified Projects a/	11.7	<0.1
Southgate pipeline and Associated Facilities	174.9	0.2
Watershed: Stinking River-Banister River (148,877 acres)		
Other Identified Projects a/	877.2	5.9
Southgate pipeline and Associated Facilities	3.5	0
Virginia/North Carolina (HUC-10 Watershed Acres)		
Watershed: Cascade Creek – Dan River (133,602 acres)		
Other Identified Projects a/	284.0	0.2
Southgate pipeline and Associated Facilities	397.2	0.3
Watershed: Hogans Creek-Dan River (128,257 acres)		
Other Identified Projects a/	297.0	0.2
Southgate pipeline and Associated Facilities	194	0.1
North Carolina (HUC-10 Watershed Acres)		
Watershed: Headwaters Haw River (120,672 acres)		
Other Identified Projects a/	787.0	0.7
Southgate pipeline and Associated Facilities	141.3	0.1
Watershed: Back Creek-Haw River (160,351 acres)		
Other Identified Projects a/	493.0	0.3
Southgate pipeline and Associated Facilities	322.8	0.2
Watershed: Big Alamance Creek (167,770 acres)		
Other Identified Projects a/	47.0	<0.1
Southgate pipeline and Associated Facilities	0	0

TABLE 4.13-2

HUC-10 Watersheds Affected by the Southgate Project and Other Projects

Activity	Construction (Acres) b/	Percent of Watershed c/
Watershed: Lower Smith River (148,578 acres)		
Other Identified Projects a/	0	0
Southgate pipeline and Associated Facilities	4.7	<0.1
Other Identified Projects Total	**3,043.8**	**0.3**
Southgate pipeline and Associated Facilities Total	**1,465.4**	**0.1**

a/ Includes estimated values.

b/ Construction acres includes the area affected by construction (i.e., temporary and additional temporary workspace, contractor yards, and access roads) and the area affected by operation of the Southgate Project.

c/ Percent of watershed affected is based on the acres of the HUC-10 watershed in the applicable state, and the construction acres for the Southgate Project and the other relevant projects within the applicable HUC-10 watershed.

TABLE 4.13-3

HUC-12 Watersheds Affected by the Southgate Project and Other Projects

Activity	Construction (Acres) b/	Percent of Watershed c/
Virginia (HUC-12 Watershed Acres)		
Watershed: Cane Creek-Dan River (14,462 acres)		
Other Identified Projects a/	185.0	1.2
Southgate pipeline and Associated Facilities	16.9	0.1
Watershed: Cherrystone Creek (29,132 acres)		
Other Identified Projects a/	246.9	0.8
Southgate pipeline and Associated Facilities	93.3	0.3
Watershed: Lower Sandy River (34,709 acres)		
Other Identified Projects a/	10.0	0.0
Southgate pipeline and Associated Facilities	105.5	0.3
Watershed: Sandy Creek (West)-Dan River (20,670 acres)		
Other Identified Projects a/	1.7	0.0
Southgate pipeline and Associated Facilities	69.4	0.3
Watershed: Shockoe Creek-Banister River (18,805 acres)		
Other Identified Projects a/	138.2	0.7
Southgate pipeline and Associated Facilities	3.5	<0.1
Watershed: White Oak Creek-Banister River (23,128 acres)		
Other Identified Projects a/	0.0	0.0

TABLE 4.13-3

HUC-12 Watersheds Affected by the Southgate Project and Other Projects

Activity	Construction (Acres) b/	Percent of Watershed c/
Southgate pipeline and Associated Facilities	133.6	0.6
Virginia/North Carolina (HUC-12 Watershed Acres)		
Watershed: Trotters Creek-Dan River (27,788 acres)		
Other Identified Projects a/	133.0	0.5
Southgate pipeline and Associated Facilities	106.1	0.4
Watershed: Cascade Creek (27,000 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	89.0	0.3
North Carolina (HUC-12 Watershed Acres)		
Watershed: Boyds Creek-Haw River (19,153 acres)		
Other Identified Projects a/	256.0	1.3
Southgate pipeline and Associated Facilities	137.4	0.7
Watershed: Fall Creek-Smith River (6,739 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	4.7	0.1
Watershed: Giles Creek – Haw River (10,520 acres)		
Other Identified Projects a/	176.0	1.7
Southgate pipeline and Associated Facilities	16.8	0.2
Watershed: Lick Fork (12,923 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	47.2	0.4
Watershed: Little Troublesome Creek (8,324 acres)		
Other Identified Projects a/	30.0	0.4
Southgate pipeline and Associated Facilities	11.6	0.1
Watershed: Lower Back Creek (21,358 acres)		
Other Identified Projects a/	155.0	0.7
Southgate pipeline and Associated Facilities	28.4	0.1
Watershed: Lower Little Alamance Creek (19,490 acres)		
Other Identified Projects a/	38.0	0.2
Southgate pipeline and Associated Facilities	0	0
Watershed: Stony Creek-Stony Creek Reservoir (20,308 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	54.7	0.3

TABLE 4.13-3

HUC-12 Watersheds Affected by the Southgate Project and Other Projects

Activity	Construction (Acres) b/	Percent of Watershed c/
Watershed: Town Creek-Dan River (22,520 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	148.2	0.7
Watershed: Town of Altamahaw-Haw River (13,013 acres)		
Other Identified Projects a/	252.0	1.9
Southgate pipeline and Associated Facilities	112.8	0.9
Watershed: Travis Creek-Haw River (22,306 acres)		
Other Identified Projects a/	40.0	0.2
Southgate pipeline and Associated Facilities	102.3	0.5
Watershed: Upper Hogans Creek (29,144 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	103.7	0.4
Watershed: Upper Moon Creek (20,227 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	26.1	0.1
Watershed: Upper Wolf Island Creek (18,148 acres)		
Other Identified Projects a/	0.0	0.0
Southgate pipeline and Associated Facilities	54.5	0.3
Other Identified Projects Total	1,660.8	0.4
Southgate pipeline and Associated Facilities Total	1,465.4	0.3

a/ Includes estimated values.

b/ Construction acres includes the area affected by construction (i.e., temporary and additional temporary workspace, contractor yards, and access roads) and the area affected by operation of the Southgate Project.

c/ Percent of watershed affected is based on the acres of the HUC-12 watershed in the applicable state, and the construction acres for the Southgate Project and the other relevant projects within the applicable HUC-12 watershed.

4.13.1 Other Projects within the Geographic Scope of Analysis

In accordance with the CEQ regulations, we identified other projects (and actions) located in the resource-specific geographic scope of the Southgate Project and evaluated the potential for a cumulative impact on the environment. These projects are described in the following sections and are depicted on maps and summarized in appendix F. Actions were identified by reviewing a variety of publicly available information, including but not limited to pending or approved permit information from federal, state, and local agencies; various organizations' websites; commercial company websites; news outlets; and desktop and field review. We have identified five types of projects that could contribute to a cumulative impact. These are:

- FERC-jurisdictional natural gas interstate transportation projects;
- non-jurisdictional Southgate Project-related facilities;
- other energy projects;
- mining operations;
- transportation or road projects; and
- commercial/residential/industrial and other development projects.

Development of other projects would likely result in permanent impacts on vegetation and associated wildlife habitat; displacement of wildlife; loss of soil and land use; alteration of surface and groundwater flow, and visual resources; as well as temporarily and/or permanently increase dust, and impact noise levels and air quality. Approximate locations of the other projects in relation to the Southgate Project are shown in figures 1 through 4 in appendix F.1. Additional details on each project are also described in appendix F.2.

Due to concerns raised during public scoping, the ACP Project (CP15-554) was considered but not included because the closest ACP Project facility is located approximately 100 miles from the Southgate Project and is outside of the defined geographic scopes considered in this analysis. As previously described, projects located outside a geographic scope are not evaluated because their potential to contribute to a cumulative impact diminishes with increasing distance from the Project.

4.13.1.1 FERC-jurisdictional Natural Gas Interstate Transportation Projects

There are three FERC-regulated natural gas transmission pipeline projects within proximity to the Southgate Project: Virginia Southside Expansion (CP13-30-000), Virginia Southside Expansion II (CP15-118), Southeastern Trail (CP18-186-000), and Mountain Valley Pipeline (CP16-10-000).

Virginia Southside Expansion

Transco's Virginia Southside Expansion went into service in September 2015. The project extended the Transco pipeline system from Transco Station 165 in Pittsylvania County, Virginia 98 miles to Brunswick County, Virginia through the counties of Halifax, Charlotte, and Mecklenburg. Upgrades in New Jersey, North Carolina, Maryland, and Pennsylvania were also included as part of the project. A new compressor station, Transco Station 166, was constructed in Pittsylvania County, Virginia, approximately 600 feet northeast from the boundaries of proposed Lambert Compressor Station site. The project affected a total of 1,454.3 acres during construction of which 199 acres is being maintained for operation. Approximately 51 acres of wetlands and 63.4 acres of prime farmland were affected during construction and 4.8 acres of wetlands and 10 acres of prime farmland were permanently affected by operation of the project. Construction of the Virginia Southside Expansion project disturbed approximately 160 acres of silviculture forest and 322 acres of non-silviculture forest. However, only a fraction of these total acreages occurred in the geographic scopes of the Southgate Project. As shown in appendix F.2, this project is within the geographic scopes for all resources. The project affected about 18 acres within the Cherrystone Creek-Banister River HUC-10 watershed and 63.2 acres within the

Stinking River-Banister River HUC-10 watershed (watersheds affected by the Southgate Project shown in table 4.13-2 above). The only ongoing impacts from this project within the Southgate Project geographic scopes are forest regeneration, air emissions and noise, socioeconomics, and visual impacts.

Virginia Southside Expansion Project II

In December 2017 Transco's Virginia Southside Expansion Project II went into service. This project included the following construction and upgrade activities:

- new 4.19-mile-long 24-inch-diameter lateral pipeline in Brunswick and Greensville Counties, Virginia, referred to as the Greensville Lateral;
- new building containing a pig launcher and a new block valve assembly at the Greensville Lateral's connection to the existing Brunswick Lateral in Brunswick County, Virginia;
- new building containing the proposed Greensville Meter and Regulator (M&R) Station, a pig receiver, heaters, and a block valve assembly at the end of the Greensville Lateral in Greensville County, Virginia;
- new 25,000 horsepower electric-driven compressor unit at compressor station (CS) 185 in Prince William County, Virginia;
- addition of 21,830 horsepower of gas-driven compression at CS 166 (including piping, valve modification, gas cooling, and the re-wheeling of two existing compressor units) and a 1,208 brake-horsepower emergency generator in Pittsylvania County, Virginia; and
- modifications to 19 existing facilities on Transco's existing pipeline (mainlines and the Tryon Lateral) in North Carolina and South Carolina.

The Virginia Southside Expansion Project II affected 180.1 acres of land during construction and 29.3 acres during operation. The project crossed 1.3 miles of prime farmland during construction and returned these areas to agricultural land use following construction. Approximately 0.8 acre of wetlands and 30.0 acres of forest was affected for construction; the project's operation permanently affected 0.4 acres of wetlands and 12.4 acres of forest. However, only a fraction of these total acreages occurred in the geographic scopes of the Southgate Project. This project falls within the geographic scopes for all resources as shown in appendix F.2. Approximately 27.4 acres of the Cherrystone Creek-Banister River HUC-10 watershed and 1.8 acres of the Stinking River – Banister River HUC-10 watershed were affected by construction of the Virginia Southside Expansion II Project. Impacts associated with operation of this project within the Southgate Project geographic scopes include forest regeneration, air emissions and noise, socioeconomics, and visual impacts.

Southeastern Trail

Transco filed its application for the Southeastern Trail Project (CP18-186-000) with the FERC on April 11, 2018. This project would include construction of approximately 8 miles of pipeline along the existing Transco mainline in Fauquier and Prince William Counties, Virginia between Station 180 and 185. Compressor station horsepower additions were also proposed at Stations 165, 175, and 185 in Virginia. Compressor Station 165 is located in Pittsylvania County,

Virginia, less than 5 miles from the Southgate Project, and falls within the geographic scope for cumulative impacts on air quality. Only a portion of the total impacts of this project falls within the geographic scopes of the Southgate Project. This project falls within the geographic scopes for all resources as shown in appendix F.2 and could contribute to cumulative impacts on all resources. Approximately 19.2 acres of the Cherrystone Creek-Banister River HUC-10 watershed and 62.9 acres of the Stinking River – Banister River HUC-10 watershed would be affected by the Southeastern Trail Project. Transco projected an in-service date of November 1, 2020, with construction to begin August 2019.

Mountain Valley Pipeline Project

Mountain Valley filed an application with the FERC on October 23, 2015 for the Mountain Valley Pipeline Project in Docket No. CP16-10. Approximately 303 miles of 42-inch pipeline, 3 new compressor stations, and associated facilities were proposed for construction in West Virginia and Virginia. Construction for the Mountain Valley Pipeline Project began in the first quarter of 2018. The project's total construction disturbance footprint is about 6,362.5 acres, and it would affect about 2,116.5 acres when operational. Construction of the Mountain Valley Pipeline Project would affect 31 acres of wetlands and 4,453.1 acres of upland forest. Operation of the project would affect 7.9 acres of wetlands and 1,596.9 acres of upland forest. Construction and operation of the project would affect 23.5 acres of prime farmland within the Southgate Project workspace. The Mountain Valley Pipeline Project is within the geographic scopes for all resources, but only a small portion at the southern end of the project falls within Southgate Project's resource-specific geographic scopes.

There would be 182.3 acres constructed for the Mountain Valley Pipeline Project in the Cherrystone Creek-Banister River HUC-10 watershed and 49.3 acres constructed in the Stinking Rover–Banister River HUC-10 watershed. The Mountain Valley Pipeline Project and Southgate Project would cross two of the same perennial streams and one intermittent stream within the Cherrystone Creek-Banister River HUC-10 watershed. These stream crossings for each project are located at least 3.5 miles from one another and would not occur on the same timeline.

4.13.1.2 Non-jurisdictional Southgate Project-related Facilities

Non-jurisdictional facilities associated with the Southgate Project would include installation of aboveground and underground powerlines and telecommunications from existing nearby power poles to the interconnects, cathodic protection sites, and MLVs. All of the MLVs associated with the Southgate Project would require the local electric distributor to extend aboveground power and telecommunications from an existing power pole to the MLV site. These extensions would range from 50 feet to 1,684 feet in length. Impacts from these non-jurisdictional facilities are included in appendix F.2. Although these facilities fall within several of Southgate's resource-specific geographic scopes, impacts associated with these non-jurisdictional facilities are expected to be minimal due to the limited footprint of these projects and potential mitigation measures required by permitting agencies.

4.13.1.3 Other Energy Projects

Reidsville Energy Center Project

In January of 2017, NTE Energy received siting authority from the North Carolina Utilities Commission for the Reidsville Energy Center proposed to be constructed in Rockingham County starting mid- to late-2019 with a commercial operation date of October 1, 2021 with an expected final completion date of January 1, 2022. The 500 MW natural gas-fired combined cycle generating facility would be interconnected with the Duke Energy Carolinas, LLC transmission system and is proposed to be located approximately 12 miles from the Southgate Project. Approximately 20 acres of forest land would be disturbed for construction and operation of the project. As shown in appendix F.2, this project is within the geographic scope for socioeconomics.

Solar Energy Generation Projects

We identified 15 solar generation facilities in various stages of development in Rockingham and Alamance Counties, affecting approximately 1,808 acres of land. Details on the solar generation facilities can be found in appendix F.2. As shown in appendix F.2, these projects are within the geographic scopes for the following resources: groundwater, surface waters, wetlands, vegetation, wildlife, air quality (operation), and socioeconomics. An estimated 1,782 acres are located within HUC-10 watersheds and 708 acres are located within HUC-12 watersheds affected by the Southgate Project. Development of all 15 solar facilities is likely to affect a total of approximately 385 acres of forest land within HUC-12 watersheds. The solar facilities would affect 0.9 acres of mapped Prime Farmland within the Southgate Project workspace. The Bakatsias Solar Farm, Green Level – Charles Drew Solar Farm, Husky Solar Farm, and Cypress Creek Renewables Solar Farm are located less than 1 mile from the Southgate Project and are within the geographic scopes for the following resources, in addition to the resources previously mentioned: cultural resources, land use, recreation, visual resources, noise (construction and operation), and air quality (construction). The Old Road Solar Farm, Kimery Road Solar Farm, and Necal Solar Farm are located within the geographic scope for environmental justice communities, described in section 4.13.2.7.

Both the Cypress Creek Renewables Solar Farm and the Husky Solar Farm are located directly adjacent to the existing Transco right-of-way between MP 48.7 to 51. Construction on the Cypress Creek Renewables Solar Farm is anticipated to begin in the summer or fall of 2019 with project operation commencing in 2020. The project would include construction of an 80 MW facility between MP 49 and 51 on 341 acres of land shared with the Headwaters Haw River HUC-10 watershed. An estimated total of 229 acres of upland forest would be affected by this project. About 0.4 acres of prime farmland within the Southgate Project workspace would be affected by construction and operation of the Cypress Creek Renewables Solar Farm. The 7 MW Husky Solar Farm is located between MP 48.7 and 49.0, occupying space on both sides of NC Highway 87, and is currently in operation. This facility occupies 29 acres of land within the Headwaters Haw River HUC-10 watershed and affects 0.5 acres of prime farmland within the Southgate Project workspace.

The Husky Solar Farm and Bakatsias Solar Farm are both in operation. Ongoing impacts from these projects within the Southgate Project geographic scopes include forest regeneration, prime farmlands soils (Husky Solar Farm only), socioeconomics, and visual impacts.

4.13.1.4 Mining Operations

We identified 22 facilities, including quarries, mines, pits, and a brick plant, through the USGS Mineral Resources Data System located within 7 shared HUC-10 watersheds. The East Alamance Quarry is the only active mining operation located within 0.25 miles of the Southgate Project as listed in appendix F.2 and described in section 4.1.2.

Ongoing activities at these facilities could affect an estimated 6,540 acres within the geographic scopes of the Southgate Project. Operating these facilities requires surface clearing, excavation, mineral extraction, and reclamation in accordance with state or local permit requirements. Activities at these facilities are presently ongoing and affect different sites and acreages as resource-extraction activities change over time. Resource-extraction operations requires land to be disturbed, which could result in impacts on water resources, vegetation, air quality, and noise. Depending on the facility operator (and the resources present), we expect future activities to occur incrementally. No significant cumulative impacts are anticipated from these facilities as operational activities would be subject to state and local permit requirements, such as erosion and sediment control plans.

4.13.1.5 Transportation and Road Improvement Projects

The Virginia Department of Transportation (VADOT) and North Carolina Department of Transportation (NCDOT) are overseeing nine infrastructure projects in the range of geographic scopes for the proposed Southgate Project. These include widening of local routes, bridge replacement, and other road improvements and treatment projects.

According to available information, the size of many of the transportation and road improvement projects identified is less than 20 acres. All of the projects were considered minor, as they were generally localized road improvements rather than larger road projects encompassing many miles. Construction timeframes for eight of the transportation and road improvement projects are currently unknown.

Of the remaining transportation and road improvement projects in the Southgate Project geographic scope, U.S. Route 29 South over Norfolk Southern Railroad, was completed in 2017 and construction for the Route 311 Connector Road project is expected to be constructed between September 2022 and May 2025. The U.S. Route 29 South over Norfolk Southern Railroad project is located approximately 4.4 miles from the Southgate Project. It affected approximately 0.4 acres within the Cherrystone Creek HUC-12 watershed. The Route 311 Connector Road project would be located approximately 3.5 miles from the Southgate Project within the Trotters Creek-Dan River HUC-12 watershed. As the Route 311 Connector Road project is still in the planning stages, the area of impact is unknown at this time. Both of these transportation projects are within the geographic scope for all resources except cultural, noise, and land use/visual. Construction for the Southgate Project is anticipated to begin at least 3 years after the U.S. 29 South over Norfolk Southern Railroad was completed. Short-term impacts on surface water resources, such as

increased turbidity, would have returned to baseline levels over a period of days or weeks following construction the U.S. 29 South over Norfolk Southern Railroad and disturbed areas were likely stabilized through revegetation. The Route 311 Connector Road project is planned to begin construction over 2.5 years after the Southgate Project in-service date (currently projected as December 2021). Any impacts from the Southgate Project that could potentially create cumulative impacts within the geographic scope for the Route 311 Connector Road project would be under restoration before September 2022. Construction activities associated with both transportation projects were, and would be, conducted in accordance with all applicable state, federal, and local permit requirements. Cumulative impacts could result on resources such as forest that take a longer time to restore. Additionally, the projects would result in several acres of permanent land conversion to industrial use within the geographic scope. Given the relatively small footprint of each project, these projects in combination could have minor cumulative impacts on forest habitat as well as permanent conversion of land to industrial use.

4.13.1.6 Commercial, Industrial, and Residential Projects

There are seven commercial, industrial, and residential development projects that have been identified within the watersheds used in our analysis. From the available data we gathered, these projects may impact 421 acres of land within HUC-10 watersheds and 309 acres within HUC-12 watersheds affected by the Southgate Project, including 38.5 acres of upland forest. Each of these developments, with the exception of the Berry Hill Industrial Park and Granite Mill Project, would likely be completed by the time the Southgate Project would be under construction. Mixed-use portions of the Granite Mill Project may be constructed in 2021 and 2022 and while sites are available for development at the Berry Hill Industrial Park site, no construction is scheduled at this time Mountain Valley would coordinate with developers of the Granite Mill Project and Berry Hill Industrial Park if construction schedules were to coincide with the Southgate Project.

Due to the speculative nature of the housing and development markets and funding mechanisms for other projects listed in appendix F.2, it is difficult to determine the amount of land that would ultimately be affected by these projects and, therefore, contribute to a cumulative impact with the Southgate Project. Based on the largely temporary impacts associated with the Southgate Project, we have determined that impacts associated with the Southgate Project when assessed with the other commercial, industrial, and residential projects would not result in a significant cumulative impact.

4.13.2 Cumulative Impacts on Specific Environmental Resources

Data for specific environmental resources were identified by reviewing a variety of publicly available information, as discussed in the introduction. In some instances, resource-specific impact data in the geographic scopes of analysis were lacking for projects, including for FERC-regulated projects. For these circumstances we either used Project-specific data to estimate quantitative resource impacts using scaling and assumptions, or have noted where information is unavailable where appropriate. Therefore, conclusions regarding cumulative impacts on specific environmental resources are limited only to available data on other projects and the contribution of the Southgate Project to potential resource impacts.

4.13.2.1 Soils

With the exception of prime farmland soils, we determined that the Southgate Project when considered with other projects would not have cumulative impacts on all other types of soils because of the site-specific nature of the soils crossed and the fact that implementation of FERC's Plan would keep soils within the construction right-of-way. As previously mentioned, three projects would overlap with the Southgate Project's workspace: the Mountain Valley Pipeline Project, Cypress Creek Renewables Solar Farm, and the Husky Solar Farm. The Husky Solar Farm is in operation, therefore no construction activities would occur within the same timeframe as the Southgate Project. Construction activities for both the Mountain Valley Pipeline Project and Cypress Creek Renewables Solar Farm are planned for 2019. It is unknown whether construction activities for these two projects would extend into 2020 or coincide with the Southgate Project. FERC requires the project proponents to follow the FERC Plan to keep soils in the construction right-of-way and fully restore soils to pre-construction condition immediately after construction. We assume other non-FERC-regulated projects would follow similar requirements set by the permitting agencies. Therefore, although soils would be temporarily disturbed from the combination of these projects occurring within similar timeframes and adjacent workspaces, ultimately, after project completion and restoration there would not be any discernable cumulative impact on soils.

Construction and operation of projects within the geographic scope for soils (Southgate Project construction workspace) would cumulatively affect 24.4 acres of prime farmland soils. Approximately 23.5 acres of prime farmland soils would be affected by the Mountain Valley Pipeline Project, 0.4 acres would be affected by the Cypress Creek Renewables Solar Farm, and 0.5 acres are affected by the Husky Solar Farm.

As a FERC-regulated project, the Mountain Valley Pipeline Project would be required to return soils and agricultural land in temporary workspaces and the pipeline right-of-way to pre-construction conditions. These areas would be able to be farmed after restoration is complete. We assume that the 0.9 acres of prime farmland affected by the Cypress Creek Renewables Solar Farm, and Husky Solar Farm would also be required to return these areas to pre-construction conditions, unless there is a permanent aboveground facility or access road located in the area. Due to impacts being temporary on prime farmland soils for most projects in the area, we conclude that a small but not significant cumulative impact on these resources would occur.

4.13.2.2 Water Resources

The cumulative impact geographic scope for water resources varies according to the water source. As stated in table 4.13-1, we consider the HUC-12 watershed as the geographic scope for groundwater. Projects could contribute to impacts on groundwater quality within a HUC-12 sub-basin due to the fact that shallow groundwater features generally follow natural drainage boundaries. We determined that the larger HUC-10 watershed was appropriate to analyze cumulative impacts on surface water resources based on our findings throughout the previous sections of this EIS and given the anticipated scale of impacts the Southgate Project would have on surface water resources.

Other projects within the affected HUC-10 watersheds include 4 FERC-jurisdictional natural gas projects, 4 non-jurisdictional facilities associated with the Southgate Project, 15 non-natural gas energy projects, 1 resource-extraction projects, 10 transportation projects, 2 commercial/industrial projects, and 5 residential projects. Other projects within the affected HUC-12 watersheds include the same FERC-jurisdictional and non-jurisdictional facilities and residential projects. A smaller number (8) non-natural gas energy projects, 8 transportation projects, 1 commercial/industrial projects, and 1 resource-extraction projects fall within the HUC-12 watersheds.

Groundwater

Water wells and springs in the vicinity of the Southgate Project are described in section 4.3.1.3. We were unable to quantitatively determine the number of these features on a HUC-12 watershed basis. Given the relatively shallow (typically less than about 8 feet) nature of pipeline trenching and the often deep depths at which water wells are drilled to reach aquifers, in general it is unlikely that pipeline activities would negatively affect groundwater supplies from wells. Springs may be more subject to disruption as there is greater connectivity at the ground surface.

The 31 other projects listed in appendix F.2 located in the affected HUC-12 watersheds would disturb surface conditions and could result in minor effects on groundwater resources. There could be a cumulative impact if multiple projects affected the same groundwater source (aquifer, well, or spring) through spills of hazardous substances or temporary increased turbidity from trench dewatering; however, it is unlikely that impacts would be significant because most projects would involve shallow ground disturbance and proponents would be required to implement spill prevention and immediate remediation plans if a spill of hazardous substances were to occur. There are no known wells or springs near the areas where there are overlapping impacts from multiple projects within the Southgate Project workspace (Mountain Valley Pipeline Project, Cypress Creek Renewables Solar Farm, and the Husky Solar Farm).

Surface Water

The Southgate Project would cross 123 perennially flowing waterbodies in Virginia and North Carolina. Details on the Southgate Project's crossing procedures and impacts on waterbodies are discussed in section 2.4.1.10. Table 4.13-4 provides details on the number of waterbodies crossed by the Southgate Project and other projects within affected HUC-10 watersheds.

TABLE 4.13-4

Waterbodies Crossed in HUC-10 Watersheds for the Southgate Project and Other Projects

	Number of Waterbodies Crossed by the Southgate Project a/				Number of Waterbodies Crossed by the Other Projects b/			
Watershed	**Ephem**	**Interm**	**Peren**	**Pond**	**Ephem**	**Interm**	**Peren**	**Pond**
Stinking River - Banister River	0	0	0	0	0	5	2	0
Cherrystone Creek-Banister River	0	13	10	1	0	11	5	0
Wolf Island Creek – Dan River	1	2	18	0	0	0	0	0
Cascade Creek – Dan River	7	21	42	0	0	0	0	0
Hogans Creek – Dan River	3	9	19	0	0	0	0	0
Headwaters Haw River	1	6	13	0	0	0	0	0
Back Creek – Haw River	6	28	21	2	0	4	1	0
Total Streams Crossed	**18**	**79**	**123**	**3**	**0**	**20**	**8**	**0**

a/ Field delineated streams through August 24, 2019, and approximated streams on no survey parcels, crossed by the Southgate Project pipelines.

b/ Mapping included in the FERC eLibrary, available aerial imagery, and the USGS National Hydrography Dataset, were used to determine number of stream crossings for other projects in HUC-10 watersheds within the geographic scope of the Southgate Project

Abbreviations:

Ephem = Ephemeral

Interm = Intermittent

Peren = Perennial

Minor cumulative impacts on surface waters are possible when considering the total contributions of all 41 projects located within the affected HUC-10 watersheds. In-stream activities, such as dredging, open-cut pipeline crossing techniques, and other in-stream activities have the greatest potential to contribute to cumulative impacts on surface water resources through increased turbidity. These impacts are typically minor due to the short duration of in-water activities. Turbidity plumes may travel downstream for a few miles, but typically the plume would disperse and become diluted to background levels within several days. Projects involving in-water work would have to occur within similar timeframes within close distance to have a cumulative effect on turbidity within the waterbody or watershed. Clearing, grading, or other earthwork within the watershed may also increase the potential for cumulative impacts on water quality from increased stormwater runoff and sedimentation. Because FERC projects and most other projects would be required (by permit) to install erosion and stormwater control devices to minimize runoff,

any cumulative impacts from upland construction of multiple projects occurring with a watershed would not likely be significant.

The Mountain Valley Pipeline Project would cross two of the same waterbodies as the Southgate Project; however, the crossing locations are different, at least 3.5 miles apart and there would be no overlapping workspace between the projects. In addition, the stream crossings would not occur within the same time frame due to the construction schedules for both projects. Therefore, it is unlikely that cumulative impacts would be significant because the geographic and temporal separation of the crossings would limit the potential additive impacts from turbidity. Sedimentation impacts could be additive, if turbidity plumes settled within common stream segments. Given the spatial separation of the projects, this is unlikely.

The Southgate Project would contribute little to the long-term cumulative impacts on waterbodies because the majority of the potential impacts are short-term. Each of the 41 projects within the HUC-10 watershed, such as FERC-jurisdictional, solar energy, and transportation projects, would likely have similar impacts on surface waters due to increased turbidity and sedimentation during construction. These projects would likely be required to install and maintain BMPs similar to those proposed for the Southgate Project as required by federal, state, and local permitting requirements so as to minimize impacts on waterbodies. In addition, any projects crossing Waters of the United States would have to obtain permits from the COE. Therefore, the cumulative effect on surface waterbody resources would be minor.

4.13.2.3 Wetlands

As stated in table 4.13-1, potential cumulative impacts on wetlands are evaluated within the HUC-12 watershed as projects could contribute to impacts on wetlands within the natural boundaries of a drainage basin. As described section 4.13.2.2, the Southgate Project would affect 22 HUC-12 watersheds during project construction. Of the projects listed in appendix F.2, 31 would occur within the affected HUC-12 watersheds.

Construction of the Southgate Project would affect approximately 25.7 acres of wetlands during construction and about 5.6 acres of wetlands during operation. About 4.2 acres of PFO wetlands and 0.2 acres of PSS wetlands would be affected over the long-term. About 4.2 acres of forested wetland would be converted to emergent and scrub-shrub conditions.

The Mountain Valley Pipeline Project would affect 0.7 acres of PFO wetlands and 0.1 acres of PEM wetlands within HUC-12 watersheds. None of the other FERC-jurisdictional projects would affect wetlands within HUC-12 watersheds shared with the Southgate Project. For other projects located in the geographic scope of the Southgate Project we found no wetlands would be affected or have been affected within HUC-12 watersheds or data was unavailable. For most projects where data was unavailable, only a portion of these impacts would occur in the watersheds affected by the Southgate Project.

All FERC-jurisdictional projects would comply with COE 404 permit requirements regarding potential wetland impacts and mitigation. Given the relatively small total of wetland acres affected by the Southgate Project, and information available on other projects listed in

appendix F.2, we conclude that cumulative impacts on wetlands within the HUC-12 watersheds when considered with the projects identified in this analysis would not likely be significant.

4.13.2.4 Vegetation

Similar to wetlands, the geographic scope for vegetation is the HUC-12 watershed. There are 31 projects located within the HUC-12 watersheds affected by the Southgate Project, which could contribute to impacts on vegetation. Constructing the Southgate Project would impact 1,392.6 acres of vegetated lands. Details about specific vegetation types affected by the Southgate Project are provided in section 4.5.4.

Although we do not have exact data on vegetation impacts for the other projects within the geographic scope, the overall impact (disturbance footprint) data for the 31 other projects located within the affected watersheds may be used as a proxy for vegetation impacts. The other 31 projects account for 1,660.8 acres, or 0.4 percent of the HUC-12 watersheds affected by the Southgate Project as shown in table 4.13-5. Projects with permanent aboveground facilities (such as industrial developments), solar energy projects, and roads would have greater impacts on vegetation than buried utilities, which allow for restoration of vegetation following construction. However, these projects would also likely be required to implement measures designed to minimize the potential for long-term erosion and resource loss, increase the stability of site conditions, and revegetate disturbed soils, thereby minimizing the degree and duration of the impacts of these projects.

With the exception of forest clearing, most impacts on vegetation from construction of the Southgate Project would be short-term. In general, we do not anticipate long-term cumulative impacts on upland herbaceous/scrub-shrub areas as most vegetative cover would regenerate within 1 to 3 years. Therefore, we focused our analysis more on the potential for cumulative forest impacts.

Approximately 50 percent of the Southgate Project is collocated with existing right-of-way; however, construction of the Southgate Project would result in the clearing of about 48.6 acres of interior forest and 569 acres of forested edge. In general, from the data we were able to obtain, about 447.7 acres of forest has been affected or would be affected by the projects in the geographic scope of the Southgate Project.

Constructing the Southgate Project, would create a new, cleared corridor in areas of interior forest where the rights-of-way would not be collocated with existing linear corridors. These activities, in conjunction with other projects that have permanent maintained areas within the geographic scope, would create permanent, long-term cumulative impacts on interior forest areas. Forested areas within the other project facility footprints would remain cleared for the lifetime of the facility, while other areas cleared for temporary workspaces would take 20 to 50 years or more to recover. Clearing and fragmentation of interior forests creates more edge habitat and smaller forested tracts.

TABLE 4.13-5

Upland Forest/Woodland Within HUC-12 Watersheds Affected by the Southgate Project and Other Projects

Project	Acres a/
Virginia Southside Expansion	20
Virginia Southside Expansion Project II	0.6
Southeastern Trail	7
Mountain Valley Pipeline	88.7
Woodgriff Solar Farm	10
Cypress Creek Renewables Solar Farm	229
Husky Solar Farm	0
Green Level-Charles Drew Solar Energy Farm	5
Osceola Solar Project	16
Bakatsais Solar Farm	8.4
Norris Solar Farm	21.5
Danville Farm Solar	0
Route 311 Connector Road	0
Route 58 over Route 311	0
Stony Mill Road	0
Mount Cross Road	0
Berry Hill Industrial Park	0
Carter Ridge Residential	3.5
LGI Homes Bedford Hills Residential	28
Forest Creek Residential	5
Brassfield Meadows Residential	5
Granite Mill Residential	0
East Alamance Quarry	0
Other Identified Projects Total a/	447.7
Southgate pipeline and Associated Facilities Total	618.4

a/ Includes estimated acreages of upload forest/woodland area within shared HUC-12 watersheds where data is available.

Cumulative impacts on vegetation resulting from nearby projects considered along with the Southgate Project are expected to be minor, considering the limited area affected within the geographic scope, as compared to the large amount of similar communities remaining in each watershed (see table 4.13-5). The Southgate Project would restore areas of temporary impact in accordance with the FERC Plan and minimize the potential introduction of non-native invasive species through their Invasive Species Plan. Some of the other 31 projects located within HUC-12 watersheds could be required to develop similar plans to restore areas and minimize the spread of invasive plant species. For these reasons and based on the available data in our analysis, we conclude that the cumulative effect on vegetation would not likely be significant.

4.13.2.5 Wildlife, Fisheries, and Federally Listed Threatened or Endangered Species

Similar to vegetation, the HUC-12 watershed is the geographic scope of analysis for cumulative impacts on wildlife and federally listed threatened or endangered species where we determined that natural drainage basins are appropriate biological boundaries to assess potential cumulative impacts. Cumulative impacts on fisheries were assessed within the larger HUC-10 watershed for reasons described for surface water sources in section 4.13.2.2.

Wildlife

Constructing and operating the Southgate Project, as well as any of the 31 projects located in the affected HUC-12 watersheds, would temporarily increase the rates of stress, injury, and mortality experienced by wildlife. Wildlife would avoid construction activities by using adjacent habitats, but are expected to resume use of affected lands following construction and restoration. The construction of Southgate Project aboveground facilities as described in appendix F.2 would result in the permanent loss of habitat. However, this is not a large impact, as the Southgate Project would affect 13.3 acres total of vegetated habitat occupied operationally for aboveground facilities.

As discussed previously, constructing the Southgate Project would result in habitat fragmentation and "edge" effects. However we conclude that impacts on most non-special status wildlife species would not result in long-term or significant population-level effects, given the stability of local populations and the abundance of available adjacent habitat.

The construction of 31 other projects located in HUC-12 watersheds within the geographic scope of the Southgate Project would result in similar cumulative fragmentation and removal of habitat. While exact schedules are not known, we anticipate some of the other projects construction activities would occur within the same time frame as the Southgate Project. These include Southeastern Trail and the Granite Mill residential project. Operations at the East Alamance Quarry are expected to continue to operate during construction of the Southgate Project.

Cumulative impacts on wildlife as a result of increased noise, lighting, road traffic, and general human activity, would be greatest during concurrent construction of the Southgate Project and other projects. Quantitative cumulative noise impacts are further discussed in section 4.13.2.9. While noise contributions from the Southgate Project would not directly affect wildlife beyond the geographic scope for cumulative noise impacts, an overall increase in noise associated with projects located throughout the HUC-12 watershed could limit the available habitat not affected by noise to which disturbed wildlife can relocate. Wildlife that cannot relocate away from noise-emitting sources could be adversely affected by increasing stress levels and masking auditory cues necessary to avoid predation or hunt prey and find mates.

The overall footprint of the other identified projects within the defined geographic scope when combined with the Southgate Project would result in the disturbance of wildlife habitat that would either be converted to industrial use or revegetate over time. However, there are just under 400,000 acres of land area, much of which provides habitat for wildlife, within the HUC-12 watersheds comprising our geographic scope, and only about 0.3 percent of that area would be disturbed by the Southgate Project**.** Herbaceous vegetation and adjacent edge areas provide habitat

for numerous wildlife species more suited to human-caused modifications. This suite of species would utilize the habitats converted from forested areas that formerly may have been inhabited by certain forest-dwelling migratory bird species. In general, most of the wildlife inhabiting the affected watersheds are human commensal species or individuals that have otherwise become acclimated to human activity.

Overall, cumulative impacts on wildlife would be greatest during the concurrent construction of the other projects considered, and would continue to a lesser extent during operation. Given the large amount of wildlife habitat that would remain undisturbed within the geographic scope, we conclude that any resulting cumulative impacts on wildlife from the combined projects occurring in the common HUC-12 watersheds would not be significant.

Fisheries and Aquatic Resources

Cumulative impacts on aquatic life was assessed using HUC-10 watersheds for the same reasons we stated for surface water resources. Potential cumulative impacts on fisheries and aquatic resources resulting from the Southgate Project and the projects in the affected HUC-10 watersheds identified in appendix F.2 include aquatic habitat alteration, spills and releases of hazardous materials into waterways, water depletions, and entrainment or entrapment of aquatic wildlife due to water withdrawals or construction crossing operations. As described in section 4.3.2.2, constructing, and operating the Southgate Project would require 224 waterbody crossings, many of which provide aquatic habitat and support fisheries. In addition, the Southgate Project would cross 21 perennial waterbodies containing fisheries of special concern; 8 in Virginia, and 13 in North Carolina. The 41 other projects in the affected HUC-10 watersheds would cross multiple waterbodies as shown in table 4.13-4. We assume that these waterbodies contain fisheries and aquatic resources. As discussed in section 4.13.2.2, only the Mountain Valley Pipeline Project would cross two of the same waterbodies as the Southgate Project; however the crossing locations are different and there would be no overlapping workspace between the Mountain Valley Pipeline Project and the Southgate Project.

Cumulative impacts on fisheries and aquatic resources could occur if other projects occur within the same segment of a waterbody and/or have similar construction time frames as the proposed Southgate Project. Additionally, cumulative impacts could occur could result where permanent or long-term impact on the same or similar habitat types occurs. We expect that most of the projects in the geographic scope that are subject to permitting approval would be designed to minimize impacts on fisheries and aquatic resources and that the VADEQ and NCDEQ would require any other projects to adhere to state-mandated or recommended timing windows for construction within waterbodies containing sensitive fish species. However, until permits and authorizations are finalized, the extent of avoidance, minimization, and mitigation is speculative and we have not used this information to determine significance.

Impacts on fisheries and aquatic resources would be temporary and mostly limited to construction activities associated with the other 41 projects located within HUC-10 watersheds. As such, none of these impacts are expected to be cumulatively significant because of their limited scope and temporary nature.

Federally Listed Threatened and Endangered Species

Effects on federally listed wildlife and aquatic species could occur where other projects would result in permanent or long-term loss of habitat types important to wildlife. These include transportation projects, residential development projects, and solar projects located in HUC-12 watersheds as listed in appendix F.2.

Section 7 of the ESA specifically requires "major federal actions" to have separate ESA consultations, so the impacts on all federally listed and proposed species within the geographic scope of the identified projects would be assessed. Further, because protection of threatened, endangered, and other special status species is part of the various state permitting processes or resource reviews, cumulative impacts on such species would be specifically considered and reduced or eliminated through conservation and mitigation measures identified during those relevant processes and consultations. Other companies who have constructed, are constructing, or are proposing other projects are required to consult with the appropriate federal, state, and local agencies to evaluate plant and animal species that may be found in the area. Additionally, they are required to identify potential impacts from construction and operation of the projects to any special status species identified, and implement measures to avoid, minimize, or mitigate impacts on those species.

Consultation with the FWS, pursuant to section 7 of the ESA, is ongoing. We expect all other activities (federal, state, and private) would comply with the ESA, thereby also preventing or appropriately minimizing or mitigating for impacts. Consequently, we conclude that projects in the geographic scope in combination with the Southgate Project could have minor cumulative effects on special status species, including federally listed threatened and endangered species.

4.13.2.6 Land Use, Recreation, Special Interest Areas, and Aesthetic Quality

Impacts on general land uses would be restricted to the construction workspaces and the immediate surrounding vicinity; therefore, the geographic scope for land use and recreation is a 1-mile radius from the centerline of the Southgate Project pipeline and aboveground facility sites. The cumulative impact geographic scope for aesthetics includes the viewshed or distance that the tallest feature at the planned facility would be visible from neighboring communities for aboveground facilities. For pipelines, this is typically a distance of 0.25 mile and existing visual access points.

Construction of the Southgate Project would disturb about 1,466 acres of land affecting a variety of land uses as discussed in section 4.8. Approximately 450 acres would remain in use for Southgate Project operations. The projects listed in appendix F.2 would disturb a total of approximately 10,956 acres of land affecting a variety of land uses, but only 873.03 acres is within the 1-mile geographic scope of analysis for land use impacts. All of the projects within a 1-mile radius of the Southgate Project have the potential to contribute to cumulative impacts on land use. This includes all 4 FERC-jurisdictional projects, 4 non-jurisdictional facilities, 1 resource-extraction operations, 2 transportation projects, 1 industrial project, 1 residential/commercial project, and 4 solar projects. Projects with permanent aboveground components (e.g., buildings), solar energy projects, transportation projects, and industrial/commercial projects would generally

have greater impacts on land use than the operational impacts of a pipeline, which would be buried and thus allow for most uses of the land following construction.

Some lands near the Southgate Project site are largely undeveloped, providing a variety of recreational activities. Special interest and other recreation areas crossed by the Southgate Project are discussed in section 4.8.4. None of the projects listed in appendix F.2 are located within a 1-mile radius of these areas; therefore, no cumulative impacts on special interest and recreational areas are anticipated.

Visual Setting

Aboveground facilities associated with the Southgate Project, including the Lambert Compressor Station and meter stations, would have the most impact on a visual setting. Other projects located within 0.25 mile of the Southgate Project include the Virginia Southside Expansion, Virginia Southside Expansion II, Mountain Valley Pipeline Project, Berry Hill Road project, Cypress Creek Renewables Solar Farm, Husky Solar Farm, the Granite Mill Project, East Alamance Quarry, and all 4 non-jurisdictional facilities associated with the Southgate Project. Within this context, the two solar projects would have the greatest cumulative impact on visual resources. Whereas visual impacts may be locally noticed, generally they would not be inconsistent with the existing visual character of the area. In many cases, views of the facilities and pipeline right-of-way against the landscape background are from highways, with viewers located in moving vehicles, reducing the time of the view. Those views may also be shielded by topography, perspective (angled crossings would typically be less visible than perpendicular crossings), and vegetation. The Lambert Compressor Station has been sited adjacent to an existing industrial area and would be screened from view from the nearest public roadway through graded terrain and existing wooded vegetation.

Transco Compressor Station 165 is located approximately 0.62 mile (1 km) from the Lambert Compressor Station in an adjacent industrial area. Transco Compressor Station 166 is located in the same industrial area as Transco Compressor Station 165 and is situated approximately 600 feet northeast of the Lambert Compressor Station. There are trees and vegetation in place along adjacent roadways that buffer the views from both compressor stations from passersby. The addition of the Lambert Compressor Station to the existing industrial area would not result in significant changes to the visual landscape of the area. Revegetation as required by federal and state agencies would reduce visual impacts for most projects located within 0.25 mile of the Southgate Project.

Given the reasons described above, we conclude that the Southgate Project's contribution to cumulative impacts on these land use, recreation and visual resources, when considered with the other projects included in our analysis, would not be significant.

4.13.2.7 Socioeconomics

The socioeconomic cumulative impact geographic scope for the Southgate Project includes all 3 affected counties and municipalities. A county-wide geographic scope for socioeconomics was selected because the primary economic and fiscal effects of projects are generally discernable or measurable at the county level, and the affected counties would experience the greatest impacts

associated with employment, housing, public services, transportation, traffic, property values, economy, and taxes.

The projects considered in this section would have cumulative effects on employment during construction if more than one project is built at the same time. Most of the projects listed in appendix F.2 occur within the 3 counties crossed by the Southgate Project. Transco Southeastern Trail and several solar and transportation projects listed in appendix F.2 may be under construction concurrently with the Southgate Project or in the foreseeable future. Cumulative impacts on population, employment, public services, transportation and traffic would be limited to the Southgate Project construction time frame. State, county, and local economies would experience cumulative impacts from the Southgate Project and other projects during both construction and operational time frames.

It is assumed that the future projects listed in appendix F.2 would employ workers from the same labor pool in the Southgate Project counties and surrounding areas, with the exception of specialized construction crafts or trades. Given the available labor pool, we conclude that there is likely to be sufficient available labor in these counties to meet cumulative, construction and operational requirements. If construction occurs concurrently with other projects, particularly during peak tourist periods, temporary housing would still be available but may be slightly more difficult to find and/or more expensive to secure in the short-term. These effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative impact on housing.

The incremental demands of several projects taking place at the same time could strain the ability of some police, fire, and emergency service departments, particularly in rural areas. The impact would be temporary, occurring only for the duration of cumulative construction activities, and could be mitigated by the various project sponsors providing their own personnel to augment the local capacity or by providing additional funds or training for local personnel.

Construction of the Southgate Project could result in temporary impacts on road traffic in some areas and could contribute to cumulative traffic, parking, and transit impacts if other projects, such as the Cypress Creek Renewables Solar Farm and Granite Mill Project are scheduled to take place at the same time and in the same area. Increased use of local roadways from multiple projects could accelerate degradation of roadways and require early replacement of road surfaces. However, Mountain Valley, and the other project sponsors in the geographic scope of influence would be required to adhere to local road permit requirements (which may have provisions for road damage repairs or compensation) and road weight restrictions.

As detailed in section 4.9.7, the Southgate Project would provide an increase in tax revenue for the states, counties, and other local economies through the payment of payroll tax, sales tax, property tax, and other taxes and fees. Other present and foreseeable future projects would also be expected to contribute to a net increase in payroll and tax revenues. Therefore, we conclude that the Southgate Project, in combination with the projects listed in appendix F.2, would have both short- and long-term beneficial cumulative impacts on state, county, and local economies.

Environmental Justice

Census block groups that contain or are adjacent to Southgate Project facilities were determined to be the geographic scope for potential cumulative impacts on environmental justice communities. Figure 4.13-1 shows the locations of potential environmental justice communities within census block groups located within 1 mile of the Lambert Compressor Station, crossed by the project, and census block groups containing other relevant projects as listed in appendix F.2.

As discussed in section 4.9.8 the Southgate Project crosses two census block groups in Pittsylvania County and one census block in Rockingham County where minority populations exceed 50 percent. Additionally, low-income communities exist along the Southgate Project route within two census blocks in Pittsylvania County and six census blocks in Rockingham County. The primary impacts associated with the construction of the Southgate Project would include temporary noise, fugitive dust, and traffic during construction. Long-term effects include visual, air quality, and noise impacts from the operation of aboveground facilities. As discussed throughout this draft EIS, Mountain Valley would implement various measures to minimize impacts and, as detailed in section 4.9.8, we conclude that the Southgate Project would not have a disproportionately high and adverse environmental or socioeconomic impact on environmental justice populations

The projects listed in appendix F.2 were evaluated for potential impacts on environmental justice communities within the census tract block groups shared by and adjacent to the Southgate Project. Of the projects identified in appendix F.2, the following are located within census block groups where minority populations exceed 50 percent (or a minority population that is 10 percentage points higher than their respective county) and/or the household poverty rate is more than 20 percent (or a household poverty rate that is 10 percentage points higher than their respective county):

- **Pittsylvania County, Virginia and the city of Danville, Virginia**: Virginia Southside Expansion, Virginia Southside Expansion II, Southeastern Trail, U.S. 29 Bridge Replacement, Mount Cross Road Widening, Lambert Interconnect, Stony Mill and Tunstall High transportation project;
- **Rockingham County, North Carolina**: Old Road Solar, Carter Ridge Homes, and the T-15 Dan River Interconnect;
- **Alamance County, North Carolina**: LGI Homes Bedford Hills, Necal Solar Farm, Brassfield Meadows, and Kimery Road Solar Farm.

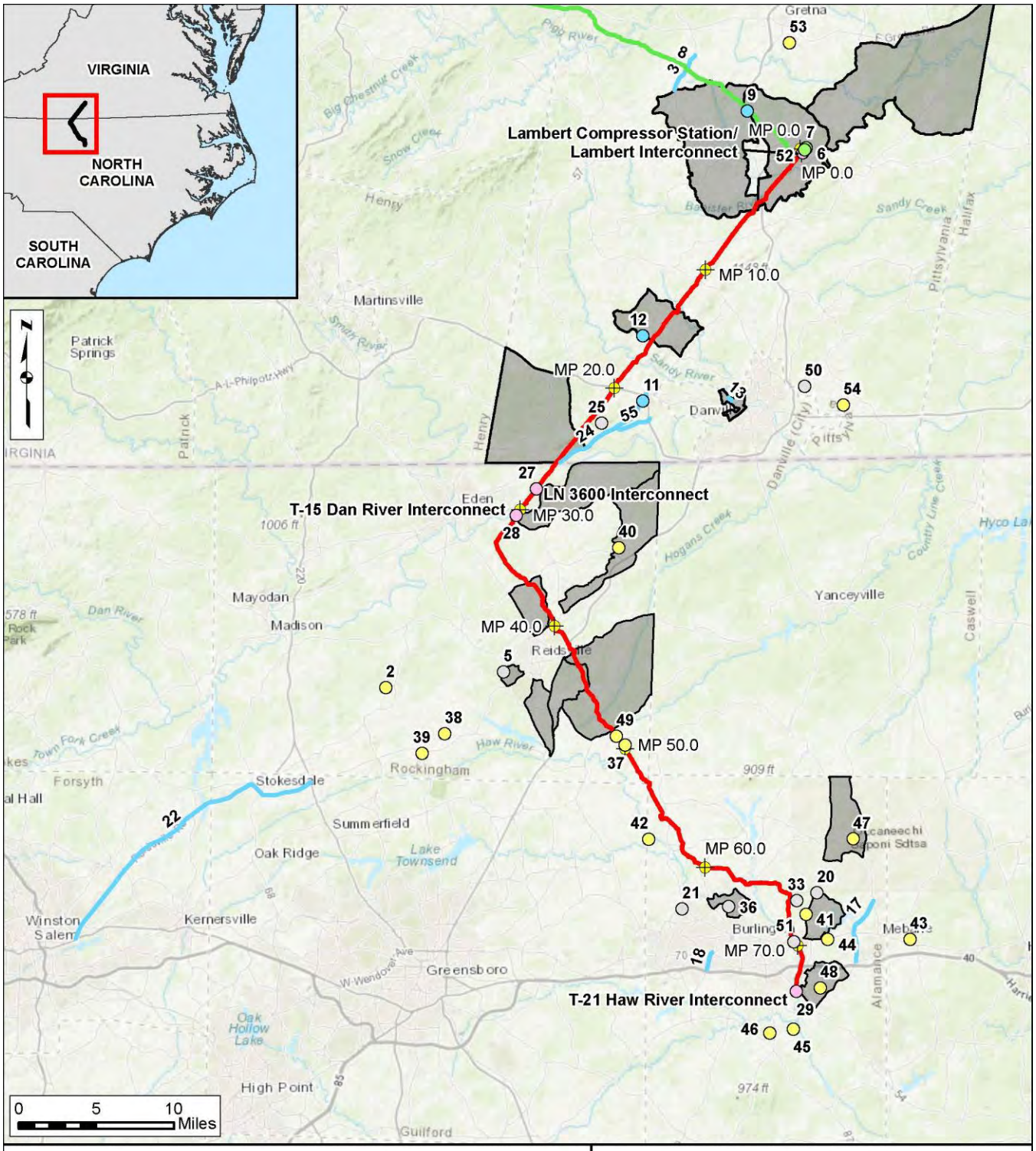


Figure 4.13-1

Southgate Project

Potential Environmental Justice Areas near Other Relevant Projects

Developers of the FERC-regulated projects listed above would be required to implement various measures to minimize impacts similar to the Southgate Project and would not have a disproportionately high and adverse environmental or socioeconomic impact on environmental justice populations. The Southeastern Trail Project would include horsepower additions to Transco Compressor Station 165, located approximately 0.62 miles from the Lambert Compressor Station. Similarly, the Virginia Southside Expansion Project II included horsepower additions to Transco Compressor Station 166, which is located approximately 600 feet northeast of the Lambert Compressor Station in the same industrial area as Transco Compressor Station 165. Both compressor stations were constructed more than 3 years ago and annual emissions from each facility are discussed in section 4.13.2.9.

As discussed below in section 4.13.2.9, no significant cumulative impacts are anticipated to surrounding communities, including environmental justice populations, based on the modeled air quality impacts associated with operation of the Southgate Project and Transco's Compressor Station 165 (CS 165) and Transco's Compressor Station 166 (CS 166). Upgrades to Transco CS 165 as part of the Southeastern Trail Project would be in compliance with NAAQS and required air quality permits. Additionally, we looked at the latest modeling from the VADEQ permit modification to CS 165 which showed that the cumulative impacts of all three stations would be limited to the area near the fence line and directly north-northeast of Transco's facilities. These incremental impacts, all below the NAAQS, would not be large, nor would they affect any clusters of homes in the wider rural EJ community. In addition, as indicated in section 4.13.2.9, as a condition of the VADEQ permit for Transco CS 165, Transco is required to install an ambient NO_2 air monitor to ensure impacts would not exceed the NAAQS.

Similarly, construction of the proposed Lambert Compressor Station and pipeline would generate a minor impact to air quality from the additional dust and fossil-fueled equipment emissions during construction. Although we acknowledge that air quality in the area would degrade slightly. We conclude that construction and operation of the Project would not result in disproportionate cumulative impacts on air quality and environmental justice populations.

Potential traffic impacts associated with the transportation projects and solar projects listed above could occur during construction. The transportation projects consist of improvements to existing transportation infrastructure and are anticipated to be temporary and minor. As construction timelines for the transportation and solar projects are unknown, schedules would likely not coincide with the Southgate Project and would not contribute to cumulative traffic impacts on environmental justice populations.

Continued development of the Carter Ridge, Brassfield Meadows, and LGI Homes Bedford Hills residential projects would create temporary noise, fugitive dust, and traffic during construction; however, these impacts would be minor and temporary and would not disproportionately impact environmental justice populations.

Minor cumulative impacts on air quality and noise would likely affect environmental justice communities within the geographic scope, but these cumulative impacts on environmental justice communities would not be disproportionately adverse given the modeling analysis and air monitoring required by the VADEQ for the Transco Compressor Station 165.

4.13.2.8 Cultural Resources

The geographic scope for potential cumulative impacts on cultural resources was limited to overlapping impacts within the APE. The direct APE for the Southgate Project was defined as a 400-foot-wide corridor centered on the pipeline; while the indirect APE would extend out 0.5-mile from the centerline.

Mountain Valley has surveyed about 941 percent of the Southgate Project pipeline routes for cultural resources by October 2019. This resulted in the identification of 86 archaeological resources and 186 historic architectural sites in the direct APE. Of the archaeological resources, 66 were evaluated as not eligible for listing in the NRHP, 10 of which extend beyond the APE and are considered unevaluated for the portions outside the APE. Additionally, there are 16 potentially eligible or unassessed sites, and 4 are eligible for listing in the NRHP in the direct APE. Of the historic architectural sites, 172 were evaluated as not eligible for the NRHP, 10 are potentially eligible or unevaluated, 1 is eligible, and 3 are listed in the NRHP in the direct APE.

No further work was recommended for the not eligible sites. The Southgate Project would have no effect on the ineligible resources. Avoidance or additional evaluation investigations were recommended for the potentially eligible or unevaluated sites. Avoidance or mitigation was recommended for the listed or eligible sites.

We identified 4 FERC-regulated projects, 3 non-natural gas projects, one commercial/residential project, 1 transportation project, and one mineral extraction operation within the geographic scope for cultural resources. The currently proposed projects listed in appendix F.2 that are defined as federal actions would have to comply with Section 106 of the NHPA. The federal agencies that would manage those projects would have to follow the regulatory requirements of 36 CFR 800. Under those regulations, the lead federal agency, in consultation with the SHPO, would have to identify historic properties in the APE, assess potential impacts, and resolve adverse effects through an agreement document that outlines a treatment plan. Non-federal actions would need to comply with any mitigation measures required by the SHPOs of the affected states. We can conclude that given the state and federal laws and regulations that protect cultural resources, mentioned above, it is not likely that there would be significant cumulative impacts on historic properties, resulting from the Southgate Project in addition to other projects that may occur within the defined geographic scope.

4.13.2.9 Air Quality and Noise

Air Quality

Cumulative impacts on air quality associated with Southgate Project construction activities were evaluated within a geographic scope of 0.25 mile from the pipeline or aboveground facilities. Air emissions during construction would be limited to vehicle and construction equipment emissions and dust and would be localized to the Southgate Project construction sites. A range of approximately 0.25 mile conservatively captures the distance these emissions would travel before becoming negligible and unlikely to contribute to a cumulative impact. Traditional air pollutants such as criteria pollutants, VOCs, and HAPs were listed for chronic and acute health impacts due to inhalation, as well as secondary environmental effects. For these pollutants, we can consider a

geographic scope for cumulative impacts up to 31.1 miles (50 km). GHGs were identified by the EPA as pollutants in the context of climate change. GHG emission do not cause local impacts, it is the combined concentration in the atmosphere that causes global climate (see Climate Change below) and these are fundamentally global impacts that feedback to localized climate change impacts. Thus, the geographic scope for cumulative analysis of GHG emissions is global rather than local or regional. For example, a project 1 mile away emitting 1 ton of GHGs would contribute to climate change in a similar manner as a project 2,000 miles distant also emitting 1 ton of GHGs. Cumulative impacts on air quality as a result of Southgate Project operation were evaluated from a radius of 31.1 miles (50 km) from the Lambert Compressor Station.

The Southgate Project would be located in counties in Virginia and North Carolina that are in attainment/unclassifiable for all criteria pollutants. Mountain Valley would minimize potential impacts on air quality caused by construction and operation of the Project by adhering to applicable federal and state regulations to minimize emissions as described in section 4.11.

Construction

Other projects/actions within the 0.25 mile geographic scope for cumulative impacts on air quality during Southgate Project construction would involve the use of heavy equipment that would produce dust and increase traffic and resultant air emissions. Other projects within this geographic scope include Virginia Southside Expansion, Virginia Southside Expansion II, Mountain Valley Pipeline Project, Berry Hill Road Project, the 4 non-jurisdictional facilities associated with the Southgate Project, the Granite Mill Project, the Cypress Creek Renewables Solar Farm, and the Husky Solar Farm. Additionally, when completed, certain projects in the geographic scope would increase air emissions by varying amounts through increased traffic and operation of any fossil-fueled industrial equipment. The combination of these effects would cumulatively add to the air impacts in the area.

Emissions from construction equipment would be primarily restricted to daylight hours and would be minimized through applicable equipment emission standards and by mitigation measures such as using properly maintained vehicles and commercial gasoline and diesel fuel products with specifications to control pollutants. Because the construction emissions would be short-term, intermittent, and highly localized (essentially limited to within 0.25 mile of the activity), cumulative impacts would depend on the type and location of construction activities occurring at the same time. Pipeline construction moves and would not spend long amounts of time at any one location thus the possibility of any two (or more) projects overlapping construction emissions are reduced. Emissions during construction of the Lambert Compressor Station, which would be stationary (in contrast to pipeline construction which proceeds as a moving assembly line), would take place for many months but would be minimized by mitigation measures described in section 4.11.1.5. Ongoing activities of other projects in the area, such as non-jurisdictional Southgate Project-related facilities (see appendix F.2), also would involve the use of heavy equipment that would generate tailpipe emissions of air contaminants and fugitive dust during construction.

The combined effect of multiple construction projects occurring in the same time frame as the Southgate Project could temporarily add to the ongoing air quality effects of existing activities. However, we conclude that construction of the Southgate Project combination with other projects would not result in significant cumulative impacts on air quality.

Operation

We attempted to identify any other projects that may be located within 31.1 miles of the compressor station proposed by Mountain Valley to ensure that other nearfield facilities relevant to air quality were adequately considered. This resulted in the identification of two projects, the proposed upgrade to Transco Compressor Station 165 (20,500 hp) as part of the Southeastern Trail Project and the upgrade to Transco Compressor Station 166 (21,830 hp) as part of the Virginia Southside Expansion Project II.

Operation of the Southgate Project and other nearby projects would contribute cumulatively to existing air emissions. Each of the projects would need to comply with federal, state, and local air regulations, which may require controls to limit the emission of certain criteria pollutants or HAPs.

Operation of both CS 165 and CS 166 would result in long-term, stationary sources of criteria pollutant air emissions. Operation of these facilities would generate primarily NO_x, CO, and PM emissions, with lesser amounts of SO_2 and VOCs. However, none of the major source thresholds would be exceeded, and the facilities would continue to operate in compliance with all permitting requirements, including the CAA. In addition, while both facilities were constructed over three years ago, recent modifications to the VADEQ air permit for CS 165 were approved on January 28, 2020 under Registration no. 30864. CS 165 and CS 166 emissions are considered part of the ambient air quality within the Southgate Project geographic scope and are accounted for in existing facility permits. Dispersion modeling for the Lambert Compressor Station was submitted to VADEQ on January 31, 2020. The modeling included the Transco Compressor Stations 165/166 as nearby sources along with 24 additional facilities located within a 50 km radius of the proposed Lambert Compressor Station (see table 4.13-6). Details of the methodologies used can be found in the modeling protocol report (see section 4.11.1.7). Cumulative results from the dispersion modeling were reviewed and determined to be in compliance with NAAQS.

While the NO_2 levels for the combined facilities were within the NAAQS, the VADEQ is requiring Transco install ambient air quality monitoring for NO_2 at a location to be approved by the VADEQ. This ambient monitoring should ensure that if NO_2 impacts exceed the NAAQS, mitigation measures would be taken. We also received air quality modeling data that shows the estimated impacts of the combined facilities. As the modeled pollutant closest to the NAAQS, we are including an isopleth (figure 4.13-2) showing the location of the highest impacts for NO_2. Figure 4.13-2 shows that the highest impacts are limited to the area very close to the CS 165 fence line with elevated levels decreasing to the north-northeast and do not extend into denser communities. In addition, a cause and contribute (aka culpability analysis) submitted to the VADEQ demonstrated that the Lambert Compressor Station does not significantly contribute to the higher impacts. This is also demonstrated in figure 4.13-2 where you can see the impacts immediately around the Lambert Compressor Station are substantially below the NAAQS for NO_2.

For these reasons, we conclude that operation of the Southgate Project in combination with other projects would not result in significant cumulative impacts on air local or regional air quality.

TABLE 4.13-6

Cumulative Criteria Pollutant Modeling Results

Pollutant	Timeframe	Maximum Modeled Concentration (µg/m³) a/	Background Concentration (µg/m³)	Total Concentration (µg/m³) b/	NAAQS (µg/m³)
PM_{10}	24-hour	7.9	31.0	38.9	150
$PM_{2.5}$	Annual	1.0 **c/**	7.2	8.2	12
	24-hour	6.0 **cd/**	17.0	23.0	35
CO	8-hour	1,106	1,380	2,486	10,000
	1-hour	2,151	2,300	4,451	40,000
NO_2	Annual	22.0 **e/**	13.2	35.2	100
	1-hour	117.94	60.86	178.8e/	188

a/ Includes Lambert Compressor Station and nearby sources (Transco Stations 165/166 and 24 other facilities were included as nearby sources).

b/ Total concentration is the sum of the modeled and background concentration; this value is compared with the NAAQS.

c/ Value includes secondary impacts ($PM_{2.5}$ emissions formed in the atmosphere from precursor emissions [NO_X and SO_2]) from Lambert Compressor Station and Transco Stations 165/166.

d/ Based on maximum 98th percentile daily maximum modeled concentrations.

e/ Based on EPA's Ambient Ratio Method 2 (ARM2) modeling guidance.

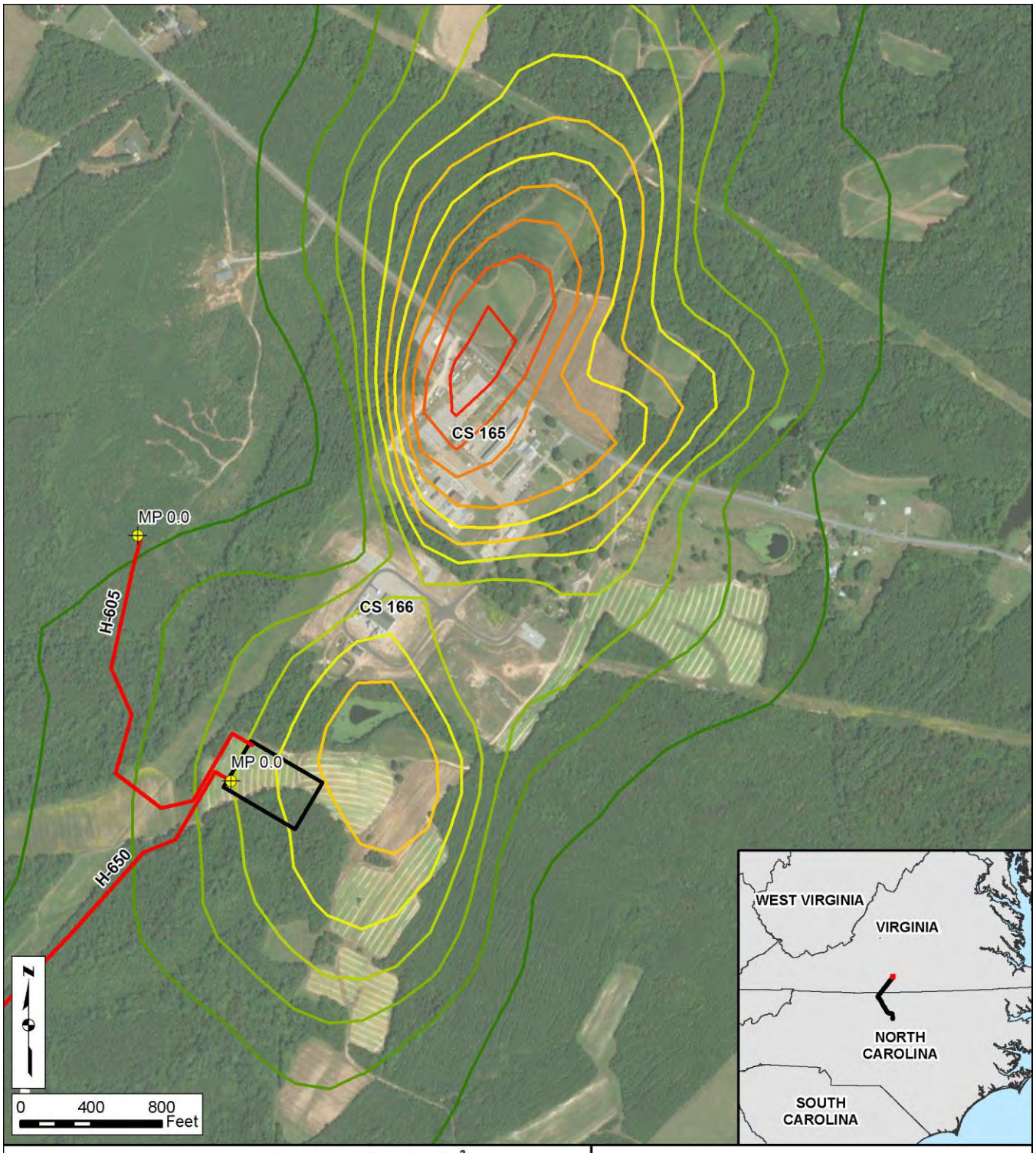


Figure 4.13-2

Southgate Project

Air Quality Modeling Results
for 1 Hour NO_2

Noise

Construction activities associated with the Southgate Project would result in perceptible noise within 0.25 mile from pipeline or aboveground facility construction activities during daylight hours, and at nearby NSAs within 0.5 mile of an HDD location. Noise from HDD operations would be temporary but might occur around the clock at certain points in the HDD process. Noise associated with pipeline and aboveground facility construction would also be temporary and would be mostly limited to daytime hours. This, along with our recommendation for a nighttime noise mitigation plan, would minimize the impact on nearby NSAs. The geographic scope for cumulative impacts from noise associated with project operation is limited to any facilities that could impact NSAs located within 1 mile of the Southgate Project's noise-emitting permanent aboveground facilities.

The impact of noise is highly localized and attenuates quickly as the distance from the noise source increases. Other projects located within 0.25 mile from the Southgate Project include Virginia Southside Expansion, Virginia Southside Expansion II, Mountain Valley Pipeline Project, Berry Hill Road Project, the 4 non-jurisdictional facilities associated with the Southgate Project, the Granite Mill Project, the Cypress Creek Renewables Solar Farm, and the Husky Solar Farm. The T-15 Dan River Interconnect is the only project located within 0.5 mile of an HDD location, the Stoney Creek Reservoir HDD. The nearest NSA to the T-15 Dan River Interconnect is a residence located 750 feet south from the site. Based on the schedule and proximity of the other projects to the pipeline route, there could be some cumulative noise impacts. However, the majority of noise impacts associated with the projects would be limited to the period of construction. The majority of Southgate Project construction activities would occur during daytime hours and be intermittent rather than continuous; therefore, the proposed contribution from the Southgate Project to cumulative noise impacts would primarily be for only short periods of time when the construction activities are occurring at a given location.

Operation of the Southgate Project would have a long-term effect on noise levels in proximity to the proposed Lambert Compressor Station and meter stations. Operation of the Lambert Compressor Station would not exceed our noise thresholds, nor would any of the other FERC-regulated projects. We did not identify any other stationary sources of long-term noise impacts within the geographic scope for the Lambert Compressor Station that would affect their associated NSAs. The Mountain Valley Pipeline Project would be located within 1 mile of the Lambert Compressor Station; however, no noise-emitting facilities associated with the Mountain Valley Pipeline Project would be located within one mile of the Lambert Compressor Station.

A cumulative assessment of noise to include the Lambert Compressor Station, CS 165, and CS 166 was developed to address the combined noise from all three facilities because of their proximity to NSAs and each other. Table 4.13-7 summarizes the results of this assessment.

Table 4.13-7

Cumulative Noise Assessment for Lambert Compressor Station and Transco Compressor Stations 165 and 166

Southgate Project NSA	CS 165 NSA	Distance/ Direction from CS 165 to NSA, feet	Current Sound Level (including CS165 remaining equipment & CS166), dBA L_{dn}	Estimated Sound Level of New CS165 Compressor Units, dBA L_{dn}	Estimated Sound Level of Lambert CS Equipment, dBA L_{dn}	Combined Sound Level Lambert, CS165, & CS166, dBA L_{dn}	Potential Cumulative Increase Over Existing Level dBA L_{dn}
N/A	1	1150, SE	48.8 a/	40.4	40.2	49.9	1.1
4	2	2500, NW	44.8 b/	45.4 c/	39.4 d/	48.7	3.9

a/ As provided in Mountain Valley's Southgate Project Application

b/ As measured for the Southgate Project

c/ Calculated from the previously reported CS165 contribution at location of NSA 2 using a hemispherical spreading factor of 20*(1800/2500) or -2.9 dB. The residence designated as NSA 2 in the CS 165 noise analysis has been purchased by Mountain Valley as part of the Southgate Project and is no longer an NSA.

d/ Calculated from the noise model for the Southgate Project

The cumulative analysis indicates that modest increases in the cumulative noise levels, as compared to the existing levels, could occur. These increases are well below FERC's standard for all receiving land use levels (see section 4.11.2.2). Therefore, noise impacts from all three compressor stations would not be significant.

Noise from blowdown events, would be audible NSAs, but are typically infrequent, of short duration, and occur during daytime hours. Based on the analyses conducted and mitigation measures proposed, we conclude that the Southgate Project along with other projects in the geographic scope would not result in significant cumulative noise impacts on residents or the surrounding communities.

Climate Change

Climate change is the variation in climate (including temperature, precipitation, humidity, wind, and other meteorological variables) over time, whether due to natural variability, human activities, or a combination of both, and cannot be characterized by an individual event or anomalous weather pattern. For example, a severe drought or abnormally hot summer in a particular region is not a certain indication of climate change. However, a series of severe droughts or hot summers that statistically alter the trend in average precipitation or temperature over decades may indicate climate change. Recent research attributes certain extreme weather events to climate change (U.S. Global Change Research Program [USGCRP], 2017 and 2018).

The leading U.S. scientific body on climate change is the U.S. Global Change Research Program (USGCRP), composed of representatives from 13 federal departments and agencies.[57] The Global Change Research Act of 1990 requires the USGCRP to submit a report to the President and Congress no less than every 4 years that "1) integrates, evaluates, and interprets the findings of the Program; 2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and 3) analyzes current trends in global change, both human induced and natural, and projects major trends for the subsequent 25 to 100 years." These reports describe the state of the science relating to climate change and the effects of climate change on different regions of the U.S. and on various societal and environmental sectors, such as water resources, agriculture, energy use, and human health. In 2017 and 2018, the USGCRP issued its Climate Science Special Report: Fourth National Climate Assessment, Volumes I and II (Fourth Assessment Report) (USGCRP, 2017; and USGCRP, 2018, respectively). The Fourth Assessment Report states that climate change has resulted in a wide range of impacts across every region of the country. Those impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, and human health. The U.S. and the world are warming; global sea level is rising and acidifying; and certain weather events are becoming more frequent and more severe. These changes are driven by accumulation of GHG in the atmosphere through combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture, clearing of forests, and other natural sources. These impacts have accelerated throughout the end 20th and into the 21st century (USGCRP 2018).

Climate change is a global phenomenon; however, for this analysis, we will focus on the existing and potential cumulative climate change impacts in the Southgate Project area. The USGCRP's Fourth Assessment Report notes the following observations of environmental impacts are attributed to climate change in the Southeast region of the United States (USGCRP, 2017; USGCRP, 2018):

- The region has experienced an increase in annual average temperature of 0.46 degrees Fahrenheit (°F) since the early 20th century, with the greatest warming during the winter months;
- The region has experienced more frequent and longer heat waves and a greater number of days with nighttime temperatures above 75 °F;
- Over the past 50 years, there has been an overall increase in extreme rainfall events in the region, except in some areas near the Appalachian Mountains and Florida where there has been a downward trend;
- The number of strong (Category 4 and 5) hurricanes has increased since the early 1980s;

[57] The USGCRP member agencies are: Department of Agriculture, Department of Commerce, Department of Defense, Department of Energy, Department of Health and Human Services, Department of the Interior, Department of State, Department of Transportation, Environmental Protection Agency, National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, and U.S. Agency for International Development.

- As average global sea level rise over the past century averaged approximately 8 to 9 inches; in some low lying areas of the Southeast region, the combination of vertical land motion and changing currents has resulted in as much as 1 to 3 feet of local relative sea level rise. This recent rise in local relative sea level has caused normal high tides to reach critical levels that result in flooding in many coastal areas in the region.

The USGCRP's Fourth Assessment Report notes the following projections of climate change impacts in the project region with a high or very high level of confidence[58] (USGCRP, 2018):

- The frequency and severity of extreme precipitation events are projected to increase, with up to double the number of heavy rainfall events by the end of the century.
- The Southeast region's coastal plain and inland low lying areas are projected to experience daily high tide flooding by the end of the century due to sea level rise and extreme rainfall events.
- Rising temperatures and increases in the duration and intensity of droughts are expected to increase wildfire occurrence and also reduce the effectiveness of prescribed fire.
- The region is projected to experience an increase in economic vulnerabilities in the agricultural, timber, and manufacturing sector as well as exposure-linked health impacts due to changing seasonal climates and more frequent extreme heat episodes.
- Tropical storms are projected to be fewer in number globally, but stronger in force, exacerbating the loss of barrier islands and coastal habitats.

It should be noted that while the impacts described above taken individually may be manageable for certain communities, the impacts of compound extreme events (such as simultaneous heat and drought, wildfires associated with hot and dry conditions, or flooding associated with high precipitation on top of saturated soils) can be greater than the sum of the parts (USGCRP 2018).

The GHG emissions associated with construction and operation of the Southgate Project are discussed in section 4.11.1. The construction and operation of the Southgate Project would increase the atmospheric concentration of GHGs, in combination with past, current, and future emissions from all other sources globally and contribute incrementally to future climate change impacts.

[58] The report authors assessed current scientific understanding of climate change based on available scientific literature. Each "Key Finding" listed in the report is accompanied by a confidence statement indicating the consistency of evidence or the consistency of model projections. A high level of confidence results from "moderate evidence (several sources, some consistency, methods vary and/or documentation limited, etc.), medium consensus." A very high level of confidence results from "strong evidence (established theory, multiple sources, consistent results, well documented and accepted methods, etc.), high consensus" (https://science2017.globalchange.gov/chapter/front-matter-guide/).

We have not been able to find any GHG emission reduction goals established at the federal level.[59] At the state level, Virginia established the "Governor's Commission on Climate Change" (GCCC) in 2007 (The Center for Climate Strategies, undated). Governor Terry McAuliffe issued Executive Order 19 on July 1, 2014 convening the Governor's Climate Change and Resiliency Update Commission. The Commission provided a report dated December 21, 2015. The Report built upon previous work and included an inventory of contributors of GHG, evaluation of impacts, approaches used by other federal or non-federal governmental agencies, needed adaptation and resilience preparations, and recommended a renewable electric portfolio percentage and actions to mitigate climate change impacts. The plan called for a reduction of GHG emissions 30% below a "business as usual scenario" by 2025. We do not have the data that identified the "business as usual" scenario. In April 2019, the VADEQ issued a final carbon trading regulation that would commence trading in 2020; however, this would only apply to electric generation units in excess of 25 MW. As the Southgate Project is intended to serve end users in North Carolina, we cannot determine Southgate Project effects, if any, on Virginia's GHG goals.

On October 29, 2018, North Carolina Governor Roy Coopers signed EO No. 80 "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy". The EO mandated a statewide reduction of greenhouse gas emissions by 2025 to 40 percent below 2005 levels. Mountain Valley has indicated that the currently subscribed volume of natural gas, 300 MMcf/d, would be used in North Carolina, primarily by residential and small and medium-sized commercial customers for heating, cooking, and other end-uses. The remaining 75 MMcf/d could be utilized in either North Carolina or Virginia. The end use of this gas is not known. For both the subscribed and unsubscribed volumes, we cannot determine Southgate Project effects on the states' goals.

Currently, there is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Southgate Project's incremental contribution to GHGs. We have looked at atmospheric modeling used by the EPA, National Aeronautics and Space Administration, the Intergovernmental Panel on Climate Change, and others and we found that these models are not reasonable for project-level analysis for a number of reasons. For example, these global models are not suited to determine the incremental impact of individual projects, due to both scale and overwhelming complexity. We also reviewed simpler models and mathematical techniques to determine global physical effects caused by GHG emissions, such as increases in global atmospheric CO_2 concentrations, atmospheric forcing, or ocean CO_2 absorption. We could not identify a reliable, less complex model for this task and we are not aware of a tool to meaningfully attribute specific increases in global CO_2 concentrations, heat forcing, or similar global impacts on Southgate Project-specific GHG emissions. Similarly, it is not currently possible to determine localized or regional impacts from GHG emissions from the Southgate Project. Absent such a method for relating GHG emissions to specific resource impacts, we are not able to assess potential GHG-related impacts attributable to the Southgate Project. Without

[59] The national emissions reduction targets expressed in the EPA's Clean Power Plan were repealed, Greenhouse Gas Emissions From Existing Electric Utility Generating Units; Revisions to Emissions Guidelines Implementing Regulations, 84 Fed. Reg. 32,250, 32,522-32, 532 (July 8, 2019). In November 2019, formal notification was sent to the United Nations of the U.S.'s withdrawal from the Paris climate accord.

the ability to determine discrete resource impacts, we are unable to determine the significance of the Southgate Project's contribution to climate change.

4.13.3 Conclusion

Construction of the Southgate Project, in addition to other projects within geographic scopes of analysis, could have minor cumulative impacts on a range of environmental resources, as discussed above. The majority of the cumulative impacts associated with the Southgate Project and with the projects listed in appendix F.2 would be minor and temporary during construction. However, some long-term cumulative impacts would occur in forested wetlands and forested uplands regarding vegetative communities and associated wildlife habitats. Some cumulative long-term benefits include new jobs and wages, purchases of goods and materials, and tax revenues. For the federal projects listed in appendix F.2, there are laws and regulations in place that protect waterbodies and wetlands, threatened and endangered species, and historic properties, and limit impacts from air and noise pollution. We only have limited information about potential or foreseeable private projects in the region. For some resources, there are also state laws and regulations that apply to private projects as listed in appendix F.2. Given the Southgate Project BMPs, design features, and mitigation measures that would be implemented; and the federal and state laws and regulations protecting resources, and permitting requirements that would apply to the other projects listed in appendix F.2, we conclude that when added to other past, present, and reasonably foreseeable future actions, cumulative impacts on environmental resources within the geographic scopes affected by the Southgate Project would not be significant.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF THE ENVIRONMENTAL ANALYSIS

The conclusions and recommendations presented in this section are those of the FERC environmental staff. Our conclusions and recommendations are based on input from the COE and the FWS, as cooperating agencies in the preparation of this EIS. The federal cooperating agencies may adopt this EIS per 40 CFR 1501.3 if, after an independent review of the document, they conclude that their requirements and/or regulatory responsibilities have been satisfied. However, the cooperating agencies will issue subsequent decisions, determinations, permits, or authorizations for the Project in accordance with each individual agency's regulatory requirements..

We conclude that construction and operation of the Southgate Project would result in limited adverse environmental impacts. Most adverse environmental impacts would be temporary or short-term during construction, but some long-term and permanent environmental impacts would occur on forest and wetlands. This determination is based on a review of the information provided by Mountain Valley and further developed from data requests; field investigations; scoping; literature research; alternatives analysis; and contacts with federal, state, and local agencies as well as individual members of the public. As part of our analysis, we developed specific mitigation measures that we determined would appropriately and reasonably reduce the environmental impacts resulting from construction and operation of the Project. We are, therefore, recommending that these mitigation measures be attached as conditions to any authorization issued by the Commission. If the Project is constructed and operated in accordance with the mitigating measures discussed in this EIS, and our recommendations, adverse environmental impacts would be reduced to less than significant levels. A summary of the Project impacts and our conclusions regarding impacts are provided below by resource area.

5.1.1 Geologic Resources

The overall effects of Project construction and operation on topography and existing geologic conditions would be minor. Primary impacts would be limited to construction activities and would include temporary disturbance resulting from grading and trenching operations. After completion of construction activities, topography and associated drainages in areas of temporary disturbance would be returned to pre-construction contours and elevations to the extent practicable.

The Project permanent easement would be an average of 100 feet from parcels owned by the East Alamance Quarry, and approximately 28.5 feet away at nearest distance. Based on a review of the East Alamance Quarry mining permit revision (dated April 2019), Mountain Valley understands there to be a 25-foot buffer inside of the property line of Martin Marietta Materials, Inc.-owned parcels that includes all aspects of activity related to mining (e.g. berms, drains, basins, erosion devices etc.). This permit also depicts active mining as occurring another 200 feet inside of the property line, thus increasing the distance between the pipeline and mining activity. Therefore, we conclude that the Project would not significantly impact or be impacted by the East Alamance Quarry.

We received comments regarding the presence of uranium deposits in the Project vicinity in Pittsylvania County. The nearest commercially viable uranium deposit is 3.5 miles north of the Lambert Compressor Station and concentrations of uranium in sediment, soils, shallow bedrock, and groundwater near the Project workspace are comparable to concentrations in the conterminous U.S. Further, uranium is generally not highly mobile in the environment, and Mountain Valley would implement its E&SC Plan to address fugitive dust mitigation, stormwater control, and erosion and sediment control measures.

The removal of bedrock, by blasting or other means, may be required if bedrock is encountered within the pipeline trench or at aboveground facility sites. Blasting events would be designed to break up only the amount of bedrock needed for construction, and impacts on bedrock would be minor and limited to the immediate area of construction. Mountain Valley would comply with all federal, state, and local blasting regulations and has developed a *General Blasting Plan* that describes measures that would be implemented to minimize potential blasting-related impacts. We have included a recommendation in section 4.1.4.6 that Mountain Valley should file a revised *General Blasting Plan* that clarifies it will not bury excess rock fragments generated during trenching or blasting in any location other than where the rock originated.

The Project would cross about 2.0 miles of slopes over 30 percent. Mountain Valley completed additional field assessment and assigned site-specific control measures to these areas in their *Landslide Mitigation Report*. Although not currently identified, construction could cross karst sensitive areas. Mountain Valley would implement the measures outlined in its *Karst Hazard Assessment* to reduce the potential for subsidence if karst terrain is encountered.

Mountain Valley has proposed the use of the HDD method to cross sensitive resources at two separate locations (Dan River and Stony Creek Reservoir). Mountain Valley's *HDD Contingency Plan* would ensure that drill operations are monitored and adjusted to avoid potential IRs, and if one should occur, that the release would be contained and remediated. We have reviewed Mountain Valley's *HDD Contingency Plan* and find it acceptable. Mountain Valley's geotechnical boring and hydrofracture analysis for the Dan River and Stony Creek Reservoir HDD crossings have been completed and we conclude that subsurface conditions identified would not render the HDD's infeasible.

With the implementation of the measures outlined in Mountain Valley's *Landslide Mitigation Report*, *General Blasting Plan*, *HDD Contingency Plan,* E&SC Plan*,* and *Karst Hazard Assessment*, we conclude that impacts on geological resources would be adequately minimized.

5.1.2 Soils

Construction of the Project facilities would temporarily and permanently disturb soils, resulting in increased potential for erosion, compaction, and reduced revegetation following construction. Mountain Valley indicates that the potential for soil erosion would be minimized through the use of erosion controls and revegetation measures described in Mountain Valley's Plan.

Permanent impacts on prime farmland and farmland of statewide importance would be limited to soils within the footprint of new aboveground facilities (about 10.8 acres total) and new

permanent access roads (5.6 acres total), where soils would be permanently converted to industrial use. Agricultural activities would not be precluded within the permanent pipeline right-of-way; therefore, impacts on prime farmland and farmland of statewide importance within temporary work areas would be limited to the construction phase. Within these areas, impacts on prime farmland would be minimized by implementing BMPs included in Mountain Valley's Plan.

A total of 30 sites of potential contamination concern within 0.25 mile of the Project area were identified. The nearest site with an active or unresolved status, Midway Auto Sales, is approximately 100 feet from the proposed Project workspace near MP 43.6. This site is down-gradient of the Project alignment, and available information describes groundwater contamination only. Mountain Valley has prepared an *Unanticipated Discovery of Contamination Plan*, which would be used in the event that unknown areas of contaminated soils are encountered during construction of the Project. The Project is not anticipated to be affected by any identified sites based on distance from the construction work area and regulatory status (i.e., closed status, no violations found), and/or media impacted (i.e., groundwater only).

We conclude that Mountain Valley's implementation of the its Plan and Procedures, E&SC Plan, SPCC Plan, and *Unanticipated Discovery of Contamination Plan*, during construction and restoration, in combination with our recommendations, would adequately minimize impacts on soils, and no significant impacts on soils as a result of the Project would occur.

5.1.3 Water Resources

Groundwater

The Project would not cross any sole source aquifers or principal source aquifer areas. No wellhead protection areas were identified within the Project area. Landowner surveys by Mountain Valley to identify any private wells and springs that are used for potable water are not complete. Therefore, we are recommending that, prior to construction, Mountain Valley file the locations of all private water wells and springs identified within 150 feet of the Project work areas, including the well's or springs' status, use, direction, and distance from construction workspace, and any proposed mitigating actions to minimize or avoid impacts on the private water wells or springs. As described in the Project's *Water Resources Identification and Testing Plan*, Mountain Valley would offer to conduct pre-construction and post-construction water quality testing for all water supply wells located within 150 feet of Project workspaces.

One site of potential concern for groundwater contamination was identified about 100 feet from the Project work areas. Additional existing contaminated groundwater resources may be encountered during construction of the Project. If contaminated groundwater is encountered during construction, Mountain Valley would implement the measures outlined in its *Unanticipated Discovery of Contamination Plan*. The Project's SPCC Plan addresses the prevention and mitigation measures that would be implemented to avoid or minimize the potential impacts of a spill during construction.

We conclude that the groundwater mitigation measures proposed by Mountain Valley would adequately avoid or minimize potential impacts on groundwater resources. Therefore, we

do not anticipate long-term or significant impacts on groundwater resources as a result of construction or operation of the Project.

Surface Water

In general, the watersheds crossed by the Project contain development consistent with a rural environment. We expect that the water quality and biota within the Project area streams is largely reflective of the degree of upstream development. One public water supply intake is located within 3 miles downstream of the Project. This intake is located in the Stony Creek Reservoir 1.8 river miles downstream from an HDD crossing and serves the City of Burlington. Based on the use of an HDD and the distance to the intake, we conclude that the Project would not affect the intake.

The Project would require 223 crossings of waterbodies, 4 of which are major waterbodies. The Project crossings would follow Mountain Valley's Procedures and E&SC Plan. Mountain Valley would use HDD crossings at the Dan River and the Stony Creek Reservoir. Conventional bore crossings are proposed at Cascade Creek/Dry Creek, Wolf Island Creek, and Deep Creek due to the potential presence of federal or state listed aquatic species in these systems. All other crossing would be completed using dry-ditch crossing methods (dam-and-pump or flume method) to minimize in-stream construction and surface water impacts. Mountain Valley stated they would use enhanced erosion control to protect waterbodies where the pipeline would parallel within 15 feet; and where workspaces would be within 50 feet of a waterbody or wetland. We are recommending that Mountain Valley provide specific details about these enhanced erosion control measures for our review and approval, prior to construction.

Mountain Valley would cross impaired waters using a dry-ditch crossing technique (e.g. flume or dam-and-pump) if there is flowing water at the time of construction. Mountain Valley would use BMPs and measures outlined in its Plan and Procedures, as well as the project-specific E&SC Plan to maintain stream conditions and minimize further impairment. We do not anticipate that a pipeline installed underneath waterbodies would contribute to the impairment of streams for *E. coli* and therefore would not contribute to the further impairment of Little Cherrystone Creek, White Oak Creek, and Sandy Creek in Virginia. VADEQ commented that hydroseeding could be a contributing factor to PCB concentrations in the Dan River (VADEQ 2018e). The Project would avoid hydroseeding within 100 feet of direct tributaries to the Dan River.

The segment of the Dan River crossed by the Project is included in the NRI list, but not designated as a National Wild and Scenic River. The NPS consultation indicated that an HDD crossing of the Dan River and implementation of appropriate BMPs would reduce potential impacts on the river and the surrounding landscape. Mountain Valley would install applicable BMPs outlined in the E&SC Plan and would implement the *HDD Contingency Plan.*

The Sandy River is a major waterbody crossed by the Project and qualifies for a potential designation in the Virginia Scenic River Program that may result in a scenic river designation in the future. The segment of the Banister River crossed by the Project at MP 4.9 is listed as a future Blueway (a designated recreational water trail). The Sandy and Banister Rivers would be crossed using a dry-ditch method (e.g. dam-and-pump or flume). While there would be minor impacts on the rivers during construction, these impacts would be short-term with the implementation of

Mountain Valley's Procedures for the stream crossing. Boaters would be temporarily restricted from traversing sections of the Sandy River during construction. Mountain Valley would notify users of any closings through websites, at upstream access areas, and/or using other methods based on recommendations from the VADCR. The river crossing would take 5 to 10 days to complete. It is not anticipated that the river crossing would affect a significant number of boaters.

All waterbodies crossed by the Project are designated warmwater fisheries. The FERC requires all in-stream work, except the installation and removal of equipment bridges, to be completed in warmwater fisheries between June 1 and November 30 unless expressly permitted or further restricted by an appropriate federal or state agency in writing. Based on results of fish and mussel surveys and correspondence with VADGIF, Mountain Valley has adopted a construction window of July 16 through April 14 for surface waterbody crossings in Virginia. NCWRC has agreed that no construction window would be needed for waterbody crossings in North Carolina.

Mountain Valley would use a total of 5.9 million gallons of water withdrawn from the Dan River for hydrostatic test water, HDD process water, and dust suppression. Mountain Valley states that municipal water sources would be used if conditions in the Dan River were not suitable for water withdrawal. Mountain Valley would screen the intake hose to present entrainment of aquatic species and maintain intake rates appropriate to local conditions. Because Mountain Valley has yet to get permission from the FWS for use of the Dan River, we are recommending that, prior to construction, Mountain Valley file its final list of water sources to be used for the Project (dust control, hydrostatic testing, and HDD operations), for our review and approval, and provide written concurrence from the FWS for any water withdrawals from the Dan River.

Temporary and localized impacts on surface waters could result from in-stream construction activities and potential erosion and runoff from upland construction. Mountain Valley would implement its Plan, Procedures, and E&SC Plan to protect surface water resources, including restoring stream habitat and restoring riparian strips along streams. We conclude that the surface water mitigation measures proposed by Mountain Valley would adequately avoid or minimize potential impacts on surface water resources. Therefore, we do not anticipate long-term or significant impacts on surface water resources because of construction or operation of the Project.

5.1.4 Wetlands

Mountain Valley made numerous modifications to its proposed route to avoid and reduce wetland crossings and impacts; however, construction of the Project would affect 25.7 acres of wetlands. Most of these impacts would be temporary and short-term. The Project's 50-foot-wide operational right-of-way would affect about 5.6 acres of wetlands, including the conversion of 0.2 acre of PSS wetland to PEM wetland, and 4.2 acres of PFO wetlands to PSS and PEM wetlands. Permanent impacts on wetlands would include the conversion of forested wetlands to scrub-shrub or emergent wetlands within the pipeline permanent easement. The majority of wetland impacts would be from temporary construction work areas (21 acres) which would be allowed to revegetate following construction.

Construction and operation-related impacts on wetlands would be mitigated by Mountain Valley's proposed construction methods and restoration measures outlined in Mountain Valley'

Procedures; and compliance with the COE section 404 requirements. Mountain Valley would conduct annual post-construction monitoring of wetlands affected by construction to assess the condition of revegetation and the success of restoration until revegetation is successful. Mountain Valley identified site-specific conditions that do not allow for a 50-foot setback of ATWS from wetlands and requested approval to implement alternative measures. Based on our review, we conclude that those requests are justified. Based on Mountain Valley's efforts to route the pipeline facilities and site aboveground facilities to avoid and minimize impacts on wetlands, and by Mountain Valley's implementation of proposed construction and restoration plans, we conclude that impacts on wetland resources would be effectively minimized and mitigated. In addition, the COE could require Mountain Valley to offset unavoidable impacts on wetlands through implementation of an agency-approved *Compensatory Mitigation Plan*.

5.1.5 Vegetation

The Project is located wholly within the Piedmont Region and areas that have been heavily used as cropland; however, many of these areas have regrown into successional forests. Managed or developed land classes include agricultural land, commercial, industrial, and residential areas. These land classes represent about 21 percent of the proposed land that would be required for the Project. Of the about 94 percent of vegetated areas within the Project footprint, the majority (about 44 percent) consists of forested upland, followed by herbaceous/scrub-shrub upland (about 39 percent); less than 2 percent of the pipeline Project area is within wetland vegetation communities.

The primary effect of pipeline construction would be cutting, clearing, and/or removal of existing vegetation. Secondary impacts associated with disturbances to vegetation could include increased soil compaction and erosion, increased soil temperature and dryness, increased potential for the introduction and establishment of non-native and invasive species, and physical damage to nearby trees. Mountain Valley documented noxious weeds on accessible tracts during field surveys conducted in 2018 and 2019. To control the spread of noxious weed species within the Project area, Mountain Valley developed an *Exotic and Invasive Plant Species Control Plan* in coordination with state agencies. Once construction is complete, Mountain Valley would monitor and address occurrences of noxious and invasive weed species throughout restoration and for two years post-construction.

The majority of vegetation affected by construction of the Project would be upland forested land, which would result in long-term impacts. A total of 18.5 acres of interior forest would be permanently converted to an herbaceous state as part of the permanent right-of-way (1.3 acres in Virginia and 17.2 acres in North Carolina). The remaining acreage cleared during construction would revegetate as edge habitat. To minimize forest fragmentation and edge effects, Mountain Valley has collocated about 49 percent (37 miles) of the pipeline route with existing linear corridors.

The permanent footprint at the Lambert Compressor Station, and other aboveground facilities would be converted to developed land. Areas used for temporary and additional workspace at each facility would be restored and maintained as open land or allowed to revert to pre-construction land use cover.

Mountain Valley states that merchantable timber would be cut to useable lengths and stacked on the edge of the right-of-way to a maximum height of 4 feet with openings every 200 feet to allow the safe passage of wildlife. Mountain Valley further states that brush cleared from the construction corridor would be open burned, windrowed, chipped/mulched on the right-of-way, or hauled off for disposal at an approved location. Mountain Valley would determine methods and locations for the collection, containment, and disposal of brush and timber during construction in coordination with the landowner. Open burning would not be conducted without landowner approval. Disposal of brush and timber for beneficial reuse would be subject to landowner approval, and compliance with permit requirements and local regulations. To ensure that Mountain Valley's proposed timber and brush disposal methods comply with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan*, section III.E. and do not result in adverse environmental impact, we are recommending that any timber that remains on or adjacent to the right-of-way, as agreed to by the landowner, is located at access points where the landowner can reasonably retrieve timber without any inadvertent impacts on the restored right-of-way.

Following construction, Mountain Valley would seed the construction workspace and allow natural succession to revegetate workspaces disturbed by construction in accordance with the Mountain Valley's Plan and Procedures. Mountain Valley would use and apply a seed mix that incorporates recommendations from the local soil conservation authority, the landowner, or land management agency. Mountain Valley would mow or clear vegetation within the operational right-of-way every 3 years. However, Mountain Valley proposes to maintain an herbaceous corridor up to 10 feet wide centered on the pipeline to facilitate periodic corrosion/leak surveys.

Impacts on forested and non-forested vegetation types, as well as the potential introduction or spread of noxious weeds or invasive plant species, would be minimized through adherence to the measures outlined in Mountain Valley's Plan and Procedures, and other mitigation measures. Therefore, given the amount of collocation with existing, maintained rights-of-way and the presence of similar vegetation communities in Virginia and North Carolina, we conclude that impacts on vegetation, including forested areas, would not be significant.

5.1.6 Wildlife and Aquatic Resources

Constructing the Project would disturb about 1,300 acres of wildlife habitat, including agricultural lands. The temporary and permanent loss and/or conversion of habitat and the general disturbance created by the use of construction equipment would impact wildlife. This impact would vary depending on the type and quantity of habitat affected and the ability of species to leave Project work areas and successfully use adjacent habitats. Constructing the Project may result in limited mortality of less mobile animals, such as small rodents, reptiles, amphibians, and invertebrates, which may not be able to relocate from the immediate construction area.

To increase the speed and success of restoration of wildlife habitat, Mountain Valley would implement right-of-way restoration measures contained in the its Plan and Procedures and solicit guidance from the NRCS, VADCR, and NCWRC to restore the pipeline corridor using native seed mixes specific to the Project locations. Additionally, Mountain Valley would allow the right-of-way adjacent to a 10-foot-wide strip over the pipeline to grow as scrub-shrub habitat, which would provide a more gradual transition between the pipeline corridor and surrounding forested habitat.

The Project would not cross any National Wildlife Refuges, Wildlife Management Areas, or other federally protected lands. The Project would not come within 3 miles of any state Wildlife Management or Game Lands in North Carolina, but would pass within a mile of the White Oak Mountain Wildlife Management Area in Virginia between approximate MPs 0.0 and 1.3. The Project would also cross multiple state-managed or private conservation areas, including three North Carolina Forest Legacy Areas (MPs 26.1 to 36.3, MPs 42.2 to 48.4, and contractor yard CY25) and a Piedmont Land Conservancy Easement. The Project would also pass through about 3 miles of the Virginia Piedmont Forest Block Complex IBA between MPs 22.7 and 25.7.

Mountain Valley would attempt to minimize Project impacts on migratory birds by conducting construction-related vegetation clearing outside of the peak migratory bird nesting season within each state (March 15 through August 15 in Virginia and April 1 through August 31 in North Carolina). Conducting vegetation clearing outside of the peak migratory bird nesting season would minimize incidental take of nesting migratory birds. If avoiding the migratory bird nesting season during construction-related clearing becomes infeasible, Mountain Valley would consult with the FWS to identify measures to implement to minimize impacts on migratory birds.

Mountain Valley coordinated with the VADGIF, NCWRC, and local conservation districts to develop right-of-way mowing schedules and conservation practices beneficial to bird species (and other wildlife) that may use the Project right-of-way as nesting or foraging habitat. Based on recommendations from VADCR and NCWRC, Mountain Valley has proposed to not conduct maintenance clearing or mowing of the right-of-way between April 1 and October 15 of any year.

Mountain Valley has also minimized the impact on migratory bird habitat by collocating the Project route with existing rights-of-way or previously disturbed habitat. Given the steps Mountain Valley would take to attempt to minimize Project impacts on migratory birds, and the relatively low percentage of forested habitat generally and interior forest habitat specifically that would be affected in comparison with available forested habitat in the vicinity of the Project, we conclude Project impacts on migratory birds would be avoided or minimized to the extent practicable.

To account for the possibility of bald eagles building a nest in the vicinity of the Project, Mountain Valley would conduct bald eagle nest surveys during the winter prior to the beginning of construction within 0.5 mile of the Project. Mountain Valley also received a recommendation from the NCWRC in August of 2018 (NCWRC, 2018b) to avoid construction activities within 0.5 mile of any active colonial nesting bird rookeries. The NCWRC further recommended that Mountain Valley conduct surveys for rookeries within 0.5 mile of the Project rights-of-way during the winter months prior to construction. Mountain Valley has accordingly committed to conducting the rookery surveys concurrently with the bald eagle nest surveys. Additionally, Mountain Valley would maintain established landscape buffers between Project-related activities and active rookeries and would refrain from construction activities within 0.5 mile of any rookery between February 15 and July 31. Based on Mountain Valley's intent to conduct rookery and bald eagle surveys, and implement the noted protective measures, we conclude Project impacts on colonial nesting birds and bald eagles would be avoided or minimized to the extent practicable; however, to confirm whether Mountain Valley would need to implement the above-noted measures protective of nesting bald eagles and/or colonial rookeries, we are recommending that Mountain Valley should file the results of the pre-construction bald eagle nest and colonial rookery surveys.

The Project would cross 21 perennial waterbodies containing fisheries of special concern; 8 in Virginia, and 13 in North Carolina. Constructing and operating the Project could temporarily impact fisheries and aquatic resources. Sedimentation and turbidity, alteration or removal of in-stream and stream bank cover, stream bank erosion, introduction of water pollutants, water depletions, and entrainment of small fishes and fry during water withdrawals could increase the rates of stress, injury, and mortality experienced by fish and other aquatic life. In general, fish would migrate away from these activities.

Mountain Valley would implement erosion and sediment control BMPs described in its E&SC Plan at all crossings of waterbodies. The majority of waterbody crossings for the Project would be dry-ditch crossings (flume, dam-and-pump, or cofferdam). The Dan River and Stony Creek Reservoir are proposed to be crossed via an HDD; and three locations are proposed to be crossed via conventional bore including Cascade Creek/Dry Creek, Wolf Island Creek, and Deep Creek. Mountain Valley also would adhere to all federal and state permit conditions, including those regarding the minimization of impacts on fisheries of special concern adhering to the recommended work window for in-water construction in Virginia (North Carolina agencies have stated no work windows would be required for in-water construction in North Carolina). Mountain Valley would also attempt to minimize impacts on fisheries by relocating all aquatic species, including fishes, freshwater mussels, crayfish, reptiles, and amphibians, from the construction areas. All fish and freshwater mussel relocations would be supervised by qualified, professional biologists in possession of applicable federal and/or state permits

Based on our review of the potential impacts and mitigation measures, we conclude that constructing and operating the Project would not significantly impact wildlife, terrestrial habitats, migratory birds, or fisheries and aquatic resources.

5.1.7 Special Status Species

Federal agencies are required by the ESA Section 7(a)(2) to ensure that any action authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed threatened or endangered species or species proposed for listing, or result in the destruction or adverse modification of designated critical habitat. As the lead federal agency, the FERC is responsible for determining whether any federally listed endangered or threatened species or any of their designated critical habitats are near the proposed action, and to determine the proposed action's potential effects on those species or critical habitats. There are five federally listed threatened or endangered species, two species of concern, and one species that is proposed as threatened that could potentially be affected by the Project. We have determined that the Project is *not likely to adversely affect* these species, and we are asking the FWS to consider this EIS as our final Biological Assessment for the Project. We have included a recommendation that restricts construction until our ESA consultation with the FWS is completed.

5.1.8 Land Use, Recreation, and Visual Resources

The primary land uses affected by construction would be forested/woodland and open land. Agricultural, silviculture, industrial/commercial, and residential would make up the remaining land types affected during construction. Operating the Project would permanently impact about 450 acres. The permanent operational easement would account for 431.6 acres. The remaining

18.4 acres of permanent impact would be associated with aboveground facilities, cathodic protection beds, and permanent access roads.

Mountain Valley considered existing developed residential areas and planned residential developments, including short segments of the route at road crossings with homes near the route alignment, as residential land use. As currently designed, 18.1 acres of residential land would be affected by construction of the pipeline (8.9 acres) and access roads (9.2 acres). Mountain Valley prepared and would adhere to site-specific *Residential Construction Plans* for 24 residential structures currently identified within 25 feet of construction work areas or where a plan was requested by FERC. Mountain Valley would work with landowners to either protect, purchase or relocate structures within the proposed construction right-of-way. One residence at MP 67.3 would be within 10 feet of a new temporary access road due to the construction constraints along this portion of the Project route, and Mountain Valley provided documentation that the landowner has concurred with the site-specific construction plan in this area.

Mountain Valley contacted local planning agencies and identified one planned residential and commercial development within 0.25 mile of the Project. The Granite Mill Project includes the redevelopment of an abandoned mill to include new apartments and commercial space. Mountain Valley proposed to use access road TA-AL-187, an existing road through the redevelopment site. However, after the issuance of the draft EIS, Mountain Valley determined that there were other available access points to the right-of-way and therefore determined that the access road was no longer needed. Therefore, no direct impacts on the Granite Mill Project site are expected.

We received comments regarding potential impacts on the Draper Landing River Access Site, a recently built boat ramp site in the City of Eden near the Dan River HDD site. As this is the only major boat and recreational access to the Dan River in this area, access to the boat ramp could be hindered during Project construction. Mountain Valley has agreed to reduce workspace at this location and ensure public access is not inhibited.

5.1.9 Socioeconomics

The Project may affect the socioeconomic character of communities near the proposed facilities. These potential impacts include temporary population increases, new employment opportunities, increased demand for housing and public services, impacts on tourism and local businesses, transportation impacts, environmental justice, and revenues associated with sales and payroll taxes.

The Project construction workers would be spread out along two separate pipeline spreads within three counties over a short construction timeframe. Non-local construction workers could easily be absorbed within the populations of the affected counties. The Project would not have a significant effect on any one counties' population, nor would it have significant adverse impacts on housing. Also, any increase in local employment rates from construction of the Project in these counties or the surrounding areas would be temporary and minor, and the Project is unlikely to noticeably affect local unemployment rates.

Each county within the Project area has numerous fire and police departments. Mountain Valley would work with local fire departments, police departments, and emergency first responders to discuss any Project needs, including traffic assistance and emergency response preparedness. The communities in the Project area have adequate public service infrastructure to meet the potential needs of non-local workers who relocate temporarily. Therefore, we conclude that the Project would not significantly impact public services.

Mountain Valley would inspect roads periodically and, if damages occur as a direct result of Project-related activities, would repair them as appropriate and in accordance with the applicable permit. Following construction, roads would be restored to their original conditions unless otherwise directed by the landowner, county, or state agency. Construction activities would result in temporary to short-term impacts on transportation infrastructure.

The Project would not have a significant adverse impact on property values. Additionally, we conclude that homeowners' insurance rates are unlikely to change, and the Project would not affect the ability of homeowners to obtain fair market base priced insurance.

The Project would result in some beneficial impacts on the state and local economies by creating a short-term stimulus to the affected areas through payroll expenditures, local purchases of consumables Project-specific materials, room rentals, and sales tax. Operation of the Project would result in long-term ad valorem property tax benefits for the counties crossed by the Project.

Although low-income and minority populations exist within the Project area, the Project would not have a disproportionately high and adverse environmental or human health impact on minority or low-income populations.

5.1.10 Cultural Resources

Mountain Valley conducted cultural resources surveys through November 2019 and identified a total of 81 archaeological sites and 241 historic architectural sites within the direct APE. Of the archaeological sites, 55 were evaluated as not eligible for the NRHP, 23 were assessed as potentially eligible or unevaluated, and 3 were determined eligible. Of the historic architectural sites, 201 were evaluated as not eligible, 34 are potentially eligible or unevaluated, 2 should be treated as eligible, 1 is eligible, and 3 are listed in the NRHP. No further work was recommended for the sites not eligible for the NRHP. Avoidance or additional evaluation investigations were recommended for the potentially eligible or unevaluated sites, and avoidance or mitigation was recommended for the listed or eligible sites. The Project would have adverse effects on some historic properties. To outline a process to resolve adverse effects at affected historic properties, the FERC will produce a PA for the current undertaking, to be circulated among the consulting parties. A draft PA was circulated among the consulting parties on January 8, 2020. Execution of the PA document would satisfy compliance with Section 106 of the NHPA.

Because compliance with Section 106 of the NHPA is not complete, we recommend that Mountain Valley not begin construction until all outstanding archaeological and architectural surveys are complete; survey and evaluation reports and treatment or avoidance plans, if required, have been prepared and reviewed by the SHPOs; the ACHP is provided an opportunity to comment if historic properties would be adversely affected; and we provide written notice to proceed.

5.1.11 Air Quality and Noise

Air quality impacts associated with construction of the Project would include emissions from construction equipment and fugitive dust. Such air quality impacts would generally be temporary and localized and are not expected to cause or contribute to a violation of applicable air quality standards. Mountain Valley would implement mitigation measures to minimize the generation of dust and reduce construction impacts on air quality. Once construction activities in an area are completed, fugitive dust and construction equipment emissions would subside, and the impact on air quality due to construction would cease. As a result, we conclude that the Project's construction-related impacts would not result in a significant impact on local or regional air quality.

Operational emissions would be generated by the Lambert Compressor Station, as well as minimal emissions from maintenance blowdowns and incidental leaks from the pipeline and four interconnects. Mountain Valley submitted a minor NSR permit application for operation of the compressor station in accordance with Virginia regulations, including an assessment of BACT for $PM_{2.5}$ emissions. Minimization of operational air pollutant emissions would be achieved by using advanced low NOx turbine combustors, clean-burning fuels, and self-cleaning turbine inlet air filters. Air quality dispersion modeling, confirmed that the station's operational emissions would not exceed the air quality standards for all criteria pollutants modeled. As a result, we conclude that the Project's operational emissions would not result in a significant impact on local or regional air quality.

Residences near the construction areas may experience an increase in perceptible noise, but the effect would be temporary and localized. Noise mitigation would be implemented during construction as necessary including the use of residential-grade exhaust mufflers on engines and barriers between construction activity and NSAs, as well as, limiting some construction to daytime hours. For construction of the Project's proposed aboveground facilities, nighttime work would be conducted for specific situations related to safety, permit compliance, or other non-typical circumstances. Noise levels due to 24-hour construction of the Lambert Compressor Station would be below the FERC criterion of 55 dBA L_{dn} at the nearest NSAs. However, noise levels due to 24-hour construction of the LN 3600, T-15 Dan River, and T-21 Haw River Interconnects would all be above the FERC criterion of 55 dBA L_{dn} at the nearest NSAs. Based on proposed nighttime construction activities at the aboveground facilities, we have recommended that prior to construction Mountain Valley file a *Nighttime Construction Noise Management Plan*, for our review and approval. If the resulting noise level is above 48.6 dBA at night and 55 dBA L_{dn} overall at the nearest NSA; or above 10 dBA over the ambient at the nearest NSA where ambient noise levels are already above 55 dBA L_{dn}, the plan would identify specific noise mitigation, such as noise barriers, quieter equipment, or partial equipment enclosures that would reduce noise levels. As a result, we conclude that construction of the Project would not result in significant noise impacts on residents and the surrounding communities.

Operational noise impacts would be limited to areas near the aboveground facilities, primarily the Lambert Compressor Station. Noise impacts on NSAs due to operation of the pipeline, meter stations, and compressor station would be negligible to barely perceptible. However, we have included a recommendation for Mountain Valley to verify the actual noise levels from operation of the compressor station at full load. Noise from planned or unplanned

blowdown events would be loud, but infrequent and of short duration. Based on the analyses conducted, mitigation measures proposed, and our recommendations, we conclude that operation of the Project would not result in significant noise impacts on residents and the surrounding communities.

5.1.12 Safety

The Project would be designed, constructed, operated, and maintained to meet the DOT *Minimum Federal Safety Standards* in 49 CFR 192 and other applicable federal regulations. These regulations include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. The DOT rules require regular inspection and maintenance, including repairs as necessary, to ensure the pipeline has adequate strength to transport natural gas safely.

The proposed facilities would be regularly inspected for leakage and potential pipeline hazards such as construction activity, encroachments, and evidence of recent unmonitored excavations as part of scheduled operations and maintenance, including: physically walking and inspecting the pipeline corridor periodically; conducting fly-over inspections of the right-of-way as required; inspecting and maintaining MLVs and meter stations; and conducting leak surveys at least once every calendar year or as required by regulations.

Mountain Valley has prepared an *Emergency Plan* that provides procedures to be followed in the event of an emergency that would meet the requirements of 49 CFR 192.615. The plan includes procedures to protect the safety of the public and employees; to prevent or minimize facility and property damage; to maintain continuity of service or re-establish service should an interruption occur; and to assure immediate reporting and investigation of emergencies.

Mountain Valley would follow federal safety standards for pipeline class locations based on population density. The DOT regulations are designed to ensure adequate safety measures are implemented to protect all populations. We conclude that Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety.

5.1.13 Cumulative Impacts

We analyzed cumulative impacts of the Southgate Project, in addition to other projects that may impact resources within the same geographic scope and timeframe. The other projects we examined include FERC-jurisdictional natural gas transportation projects; non-jurisdictional project-related facilities; other energy projects; mining operations; transportation or road projects; and commercial/residential/industrial and other development projects.

Most of the impacts resulting from construction and operation of the Southgate Project would be temporary and localized, contained within the right-of-way and extra workspaces, and when added to the impacts of other projects are not expected to result in significant cumulative impacts. However, some long-term cumulative impacts would occur in forested wetlands and forested uplands. Given the Southgate Project BMPs, design features, and mitigation measures that would be implemented; and the federal and state laws and regulations protecting resources,

and permitting requirements for the other projects evaluated, we conclude that when added to other past, present, and reasonably foreseeable future actions, cumulative impacts on environmental resources within the geographic scopes affected by the Southgate Project would not be significant.

5.1.14 Alternatives

As required by NEPA and Commission policy, we identified and evaluated reasonable alternatives to the Project to determine whether the implementation of an alternative would be environmentally preferable to the proposed action. The No Action Alternative was considered for the Project. While the No Action Alternative would eliminate the environmental impacts identified in the EIS, the stated objectives of Mountain Valley's proposal would not be met. Further, the natural gas shippers could seek alternative transportation infrastructure that would impact similar resources as the Project.

Our analysis of system alternatives included an evaluation of whether existing or proposed natural gas pipeline systems could meet the Project's objectives. We could not identify any existing and approved interstate natural gas transmission systems that have available individual capacity, combined available capacity, nor direct physical connection to transport the required volumes of natural gas to the delivery points proposed for the Project. Furthermore, modifications of existing and approved systems would result in environmental impacts similar to those that would occur as proposed by the Project.

During the pre-filing and environmental scoping process, Mountain Valley incorporated over 100 route variations into the Southgate route to avoid and/or minimize impacts on specific resources at the request of landowners and stakeholders. We evaluated three major route alternatives, including the Berry Hill Alternative, Lake Cammack East Alternative, and the North-South Alternative. We also evaluated six minor route alternatives and seven minor route variations. However, when considering all affected resources, theses route alternatives/variations do not offer a significant environmental advantage when compared to the proposed route.

We evaluated the feasibility of using electric motor-driven compressors at the proposed Lambert Compressor Station as an alternative to the proposed natural gas-fired reciprocating engines and natural gas-fired turbines. However, the use of electric-driven compressors was not considered environmentally superior to natural gas compressors in terms of reducing regional emissions. Although local air emissions from electric-driven compressors would be lower than those from natural gas driven compressors, use of electric-driven compressors would result in a higher load on the electric power grid and higher regional emissions from the electric power generating stations.

Based on our findings, we conclude that the proposed Project is the preferred alternative that can meet the Project purpose.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission authorizes the Project, we recommend that the following measures be included as specific conditions in the Commission's Order. We have determined that these

measures would further mitigate the environmental impacts associated with Project construction and operation as proposed.

We included recommendations that required Mountain Valley to provide updated information and/or documents prior to the end of the draft EIS comment period. As a result of Mountain Valley's supplemental filings, we removed recommended conditions where the information provided by Mountain Valley was adequate, and retained or modified recommendations where appropriate. The section number in parentheses at the end of a condition corresponds to the section number in which the measure and related resource impact analysis appears in the EIS.

1. Mountain Valley shall follow the construction procedures and mitigation measures described in its application, supplemental filings (including responses to staff data requests), and as identified in the EIS, unless modified by the Order. Mountain Valley must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of OEP **before using that modification**.

2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the Project. This authority shall allow:

    a. the modification of conditions of the Order;

    b. stop-work authority; and

    c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction,** Mountain Valley shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Mountain Valley shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities

approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

Mountain Valley's exercise of eminent domain authority granted under Natural Gas Act Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Mountain Valley's right of eminent domain granted under Natural Gas Act Section 7(h) does not authorize it to increase the size of its natural gas facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Mountain Valley shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all facility relocations, and staging areas, construction support areas, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally-sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. All areas must be approved in writing by the Director of OEP **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the Commission's *Upland Erosion Control, Revegetation, & Maintenance Plan* and/or minor field realignments per landowner needs and requirements that do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

   b. implementation of endangered, threatened, or special concern species mitigation measures;

   c. recommendations by state regulatory authorities; and

   d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the Certificate and before construction begins**, Mountain Valley shall file its Implementation Plan with the Secretary, for review and written approval by the Director of OEP. Mountain Valley must file revisions to its plans as schedules change. The plans shall identify:

   a. how Mountain Valley will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;

b. how Mountain Valley will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to on-site construction and inspection personnel;

c. the number of EIs assigned per spread and/or facility, and how Mountain Valley will ensure that sufficient personnel are available to implement the environmental mitigation;

d. company personnel, including EIs and contractors, who will receive copies of the appropriate materials;

e. the location and dates of the environmental compliance training and instructions Mountain Valley will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s);

f. the company personnel (if known) and specific portion of Mountain Valley's organization having responsibility for compliance;

g. the procedures (including use of contract penalties) Mountain Valley will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or Program Evaluation Review Technique (PERT) chart (or similar Project scheduling diagram), and dates for:

the completion of all required surveys and reports;

the environmental compliance training of on-site personnel;

the start of construction; and

the start and completion of restoration.

7. Mountain Valley shall employ a team of EIs (i.e., two or more or as may be established by the Director of OEP) per construction spread. The EIs shall be:

a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or authorizing documents;

b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

d. a full-time position separate from all other activity inspectors;

e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Mountain Valley shall file updated status reports with the Secretary on a **weekly** basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include the following:

    a. an update on Mountain Valley's efforts to obtain the necessary federal authorizations;

    b. the construction status of each spread, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally-sensitive areas;

    c. a listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

    d. a description of the corrective actions implemented in response to all instances of noncompliance;

    e. the effectiveness of all corrective and remedial actions implemented;

    f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

    g. copies of any correspondence received by Mountain Valley from other federal, state, or local permitting agencies concerning instances of noncompliance, and Mountain Valley's response.

9. Mountain Valley shall implement its environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. **Prior to construction**, Mountain Valley shall mail the complaint procedures to each landowner whose property will be crossed by the Project.

    a. In its letter to affected landowners, Mountain Valley shall:

        i. provide a local contact that the landowners should call first with their concerns; the letter shall indicate how soon a landowner should expect a response;

        ii. instruct the landowners that if they are not satisfied with the response, they should call Mountain Valley's Hotline; the letter shall indicate how soon to expect a response; and

        iii. instruct the landowners that if they are still not satisfied with the response from Mountain Valley's Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

b. In addition, Mountain Valley shall include in its **weekly** status report a copy of a table that contains the following information for each problem/concern:

i. the identity of the caller and date of the call;

ii. the location by milepost and identification number from the authorized alignment sheet(s) of the affected property;

iii. a description of the problem/concern; and

iv. an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

10. Mountain Valley must receive written authorization from the Director of OEP **before commencing construction of any Project facilities**. To obtain such authorization, Mountain Valley must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

11. Mountain Valley must receive written authorization from the Director of OEP **before placing the Project facilities into service**. Such authorization would only be granted following a determination that rehabilitation and restoration of the areas affected by the Project are proceeding satisfactorily.

12. **Within 30 days of placing the authorized facilities in-service**, Mountain Valley shall file an affirmative statement with the Secretary, certified by a senior company official:

a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

b. identifying which of the conditions of the Order Mountain Valley has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

13. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, a revised *General Blasting Plan* that clarifies it will not bury excess rock fragments generated during trenching or blasting in any location other than where the rock originated. Excess rock fragments not suitable for reburial at the point of origin should be considered construction debris and should be disposed of consistent with our Plan at sections III.E and V.A.3. (*section* 4.1.4.6)

14. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, the locations of all private water wells and springs identified within 150 feet of the Project work areas, including the well's or springs' status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts on the private water wells or springs. (*section* 4.3.1.2)

15. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, site-specific plans detailing the enhanced erosion

control measures and maintenance requirements for each location where the Project would parallel and remove vegetation within 15 feet of a waterbody. (*section* 4.3.2.2)

16. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, its final list of water sources to be used for the Project (dust control, hydrostatic testing, and HDD operations), including intake location, waterbody name, withdrawal rate and method, and measures to minimize entrainment of aquatic species. Mountain Valley shall also provide written concurrence from the FWS for any water withdrawals from the Dan River. (*section* 4.3.2.6)

17. **During construction and prior to any Project in-service approval,** Mountain Valley shall remove and dispose of timber and debris from the right-of-way. Mountain Valley must ensure that any beneficial reuse of timber that is not removed and remains on or adjacent to the right-of-way, as agreed to by the landowner, is located at access points where the landowner can reasonably retrieve timber without any inadvertent impacts on the restored right-of-way, in accordance with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan,* section III.E. (*section* 4.5.4.1)

18. In order to identify locations where additional protection measures will be needed, and to inform compliance monitoring, Mountain Valley shall file with the Secretary, the results of the pre-construction bald eagle nest and colonial rookery surveys **prior to construction.** (*section* 4.6.3.6)

19. Mountain Valley shall **not begin** construction activities **until**:

    a. Mountain Valley files with the Secretary the results of all outstanding biological surveys;

    b. the staff completes ESA consultation with the FWS; and

    c. Mountain Valley has received written notification from the Director of OEP that construction or use of mitigation may begin. (*section* 4.7.6)

20. Mountain Valley shall **not begin** construction of facilities and/or use of all staging, storage, or temporary work areas and new or to-be-improved access roads **until**:

    a. Mountain Valley files with the Secretary:

        i. remaining cultural resources survey reports;

        ii. site evaluation reports and avoidance or treatment plans, as required; and

        iii. comments on the cultural resources reports and plans from the Virginia and North Carolina SHPOs and interested Indian tribes.

    b. The ACHP is afforded an opportunity to comment if historic properties would be adversely affected; and

    c. The FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Mountain Valley in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "**CUI//PRIV- DO NOT RELEASE**." (*section* 4.10.5)

21. **Prior to construction**, Mountain Valley shall file its *Nighttime Construction Noise Management Plan* with the Secretary, for review and written approval by the Director of OEP, that demonstrates noise levels will be reduced below 48.6 dBA at night and 55 dBA L_{dn} overall at the nearest NSA, or not exceed 10 dBA over the ambient at the nearest NSA where ambient noise levels are already above 55 dBA. This plan should indicate site-specific mitigation measures and indicate resulting noise impacts on NSAs (*section* 4.11.2.3).

22. **No later than 60 days after placing the Lambert Compressor Station (including the Interconnect) into service**, Mountain Valley shall file a noise survey with the Secretary. If a full load condition noise survey is not possible, Mountain Valley shall provide an interim survey at the maximum possible load **within 60 days** of placing the station into service and provide the full load survey **within 6 months**. If the noise attributable to the operation of the equipment at the station under interim or full load conditions exceeds an L_{dn} of 55 dBA at the nearest NSA, Mountain Valley shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. Mountain Valley shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls (*section* 4.11.2.3).

APPENDIX A

Southgate Project Distribution List for the Final Environmental Impact Statement

APPENDIX A: DISTRIBUTION LIST FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT

Table of Contents

Federal Agencies

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Edward Boling, Associate Director for NEPA Oversight, Council on Environmental Quality

Federal Regulatory Commission

Amanda Mardiney, Environmental Biologist

John Peconom, General Natural Resources Management and Biological Sciences

Kimberly D. Bose, Secretary

Nancy Fox-Fernandez, Environmental Biologist and Project Manager

Cardno

Allen Jacks, Senior Project Scientist

Office of Federal Agency Programs

John Eddins, Advisory Council on Historic Preservation

Office of U.S. Representative Mark Walker

Janine Osborne, Director if Constituent Services

Ryan Walker, Legislative Assistant

Office of U.S Representative Thomas Garrett

Tripp Grant, Legislative Assistant

Office of U.S .Senator Mark Warner

Kenneth S. Johnson, Jr., Senior Policy Advisor

Office of U.S. Senator Richard Burr

Ben Khouri, Press Secretary

Betty Jo Shepheard

Office of U.S. Senator Thom Tillis

Torie Ness, Legislative Assistant

Office of U.S. Senator Tim Kaine

Nick Barbash, Legislative Assistant

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U.S. Army Corps of Engineers

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Jennifer Frye, Western Section Chief, Norfolk District
Steven Vanderploeg, Environmental Scientist, Norfolk District
Todd Miller, Southern Section Chief, Norfolk District
Tom Walker, Regulatory Chief, Norfolk District
Jean Gibby, North Carolina
Robert Clark, Commander, Wilmington District
David Bailey, Project Manager, Wilmington District

U.S. Department of Agriculture

Conservation and Environmental Program Division

Nell Fuller, National Environmental Compliance Manager

Forest Service

Ken Arney, Acting Regional Forester Southern Region 8
Timothy Abing, Energy Program Manager

Joe Carbone, Assistant Director, NEPA, Forest Service-Ecosystem Management Coordination

Natural Resources Conservation Service

Burling Service Center
Brian Loadholt, Supervisory Soil Conservationist

Chatham Service Center
Trenton Howell, District Conservationist

North Carolina
Andree DuVarney, National Environmental Coordinator
Milton Cortes, Assistant State Soil Scientist
Steve Troxler, Secretary of Agriculture – Commissioner
Tim Beard, State Conservationist

Virginia State Office
David Harper, State Soil Scientist
Jack Bricker, State Conservationist

U.S. Department of Commerce

National Oceanic and Atmospheric Administration
NOAA NEPA Coordinator

U.S. Department of Energy

Office of Environmental Management
Mark Whitney, Principal Deputy Assistant Secretary

Office of NEPA Policy and Compliance
Brian Costner, Acting Director, OGC

Office of Oil and Natural Gas
Brian Lavoie'

Division of Natural Gas Regulatory Activities
Amy Sweeney, Director

U.S. Department of Health and Human Services

Edward Bole, Chief Environmental Officer

Center for Disease Control, National Center for Environmental Health
Division of Emergency and Environmental Health Services
Sharunda Buchanan, Director

U.S. Department of Homeland Security

Customs and Border Protection
Christopher Oh, Branch Chief

U.S. Department of Housing and Urban Development

Office of Environment and Energy
Danielle Schopp, Community Planner

U.S. Department of the Interior

Bureau of Indian Affairs
Pamela Snyder-Osmum, EMS/ EMAP Program Manager
Terry McClung, NEPA Coordinator
B.J. Howerton
Bruce Maytubby, Regional Director

Bureau of Safety and Environmental Enforcement

Division of Environmental Assessment
Dr. Jill Lewandowski, Chief
Office of Pipeline Safety
Sentho White, Director, Engineering and Research Division
Environmental Compliance Division
David Fish, Chief

U.S. Department of Transportation

Pipeline and Hazardous Materials Safety Administration
Karen Lynch, Community Liaison Services Program Manager

Office of Pipeline Safety
Ahuva Battams, Attorney Advisor
William Schoonover, Associate Administrator for Hazardous Materials Safety
Melanie Stevens, Attorney Advisor

Office of Safety, Energy, and the Environment
Camille Mittelholtz, Environmental Policy Team Coordinator

Surface Transportation Board
Victoria Rutson, Chief, Section of Environmental Analysis

U.S. Environmental Protection Agency

Aaron Blair, NEPA Reviewer
Barbara Rudnick, NEPA Program Manager
Matthew Lee, Project Office
Todd Bowers, NC Regulatory and NCDOT

Region 3
Cosmo Servidio, Regional Administrator

Region 4

Maria R. Clark, NEPA Program Manager
Trey Glenn, Regional Administrator

NEPA Program Office
Ntale Kajumba, Acting Chief

Office of Enforcement and Compliance Assurance
Lawrence Starfield, Assistant Administrator

Office of Federal Activities
Susan E. Bromm, Director

U.S. Fish and Wildlife Service

North Carolina
Dale Suiter, Biologist
Pete Benjamin, Field Supervisor
John Ellis, Biologist
Kathy Matthews, Biologist
Sarah McRae, Biologist

Virginia
Bryan Tompkins, Conservation Biologist
Cindy Schulz, Field Supervisor
Emily Argo, Biologist

Jennifer Stanhope, Biologist
Troy Anderson, Supervisory Fish & Wildlife Biologist
Sumalee Hoskin, Biologist

U.S. Geological Survey

Environmental Management Branch
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U.S. House of Representative

Denver Riggleman
Mark Walker, Representative
Thomas Garrett, Representative

U.S. National Park Service

Sarah Craighead, Acting Regional Director

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Northeast Region
Gay Vietzke, Regional Director

Resource Planning and Compliance
Mary Krueger, Energy Specialist

Southeast Region
Bryan Faehner, Energy and Environmental Protection Specialist

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Sue White, Engineer
Zachary Lentz, Regional Engineering Associate

Air Quality

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Michael Abraczinskas, Director

Division of Energy, Mineral and Land Resources

Annette Lucas, PE Stormwater Program Supervisor
Corey Anen, Environmental Engineer
Toby Vinson, Director

Environmental Assistance Outreach

David Lee, Environmental Assistance Coordinator

Land Quality

Tamera Eplin, Regional Engineer

Land Resources

Julie Coco, State Sediment Specialist
Matt Gantt, Regional Environmental Engineer
Shannon Leonard, Regional Engineering Associate

Waste Management

Sarah Rice, North Carolina DEQ Title VI and EJ Coordinator

Water Quality Permitting

Jeffrey Poupart

Water Resources

Jim Gregson, Regional Supervisor
Linda Culpepper, Director
Sean McGuire, GIS Specialist

Sue Homewood, Sr. Environmental Scientist
Daniel Mark Durway, Water Resource Specialist

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Blake Thomas, General Counsel
Lynne Weaver, Special Deputy Attorney General

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Courtney Page, Collections Manager
Kimberly Urban, Staff Archaeologist
Renee Shearin, Environmental Review Technician, State Historic Preservation Office
Susi Hamilton, Secretary

Department of Transportation

James Trogdon, Transportation Secretary

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Justin Williamson, Environmental Review Coordinator

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Hal Weatherman, Chief of Staff

Office of State Archaeology

Cassandra Pardo, Project Registrar
David Cranford, Assistant State Archaeologist

State Bureau of Investigations

Mike Harper
Steven Holmes
Angel Gray

State Historic Preservation Office

Beth King, Architectural Survey Specialist
Hannah Beckman, National Register / Survey Specialist
Jennifer Brosz, National Register Coordinator
John Mintz, North Carolina State Archeologist
Katie Harville, Environmental Review Specialist
Lindsay Ferrante, Deputy State Archaeologist - Land
Renee Gledhill-Earley, Environmental Review Coordinator

Rosie Blewitt-Golsch, Staff Archaeologist
Susan Myers, Assistant State Archaeologist and Site Registrar
Kevin Cherry, State Historic Preservation Officer
Ramona Bartos, Deputy State Historic Preservation Officer

State of North Carolina

Dan Forest, Lt. Governor
Roy Cooper, Governor

Wildlife Resources Commission

Brena Jones, Central Aquatic Wildlife Diversity Coordinator
Jeffery Hall, Partners in Amphibian & Reptile Conservation Biologist
John Isenhour, Technical Assitance Biologist
Olivia Munzer, Western Piedmont Habitat Conservation Coordinator
Shannon Deaton, Chief, Habitat Conservation Division
Tyler Black, Eastern Region Aquatic Wildlife Diversity Research Coordinator
Vann Stancil, Special Project Coordinator
David Cox, Habitat Conservation Program Supervisor
Gordon Myers, Executive Director
Kyle Briggs, Chief Deputy Director

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Chamber of Commerce

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Ryan Dunn

Commonwealth of Virginia

Justin Fairfax, Lt. Governor
Kelly Thomasson, Secretary of the Commonwealth
Ralph Northam, Governor
Todd Haymore, Secretary of Commerce

Department of Agriculture and Consumer Services

Charles Green, Deputy Commissioner
Jewel H. Bronaugh, Commissioner

Department of Conservation and Recreation

Clyde Cristman, Director
Craig Seaver, Division Director
Jeffrey Steers
Joseph Weber, Natural Heritage Information Manager
Timothy Hatton, Office Manager, Natural Heritage Contact
Jason Bullock, Environmental Manager II
Tyler Meader, Environmental Specialist I
Beth Reed, Administrative and Office Specialist
Theresa Duffey, Natural and Cultural Resource Manager
Rene Hypes, Environmental Manager I
Robbie Rhur, Environmental Planner II

Department of Environmental Quality

Receipts Control

Benjamin Leach, Erosion & Sediment Control & Stormwater Management
Brad White, Groundwater Specialist, Piedmont Region
Dave Davis, Director
David Paylor, Director
Greg Bilyeu, Director of Communications
Hannah Zegler, Erosion & Sediment Control & Stormwater Management
Jaime Robb, Office of Stormwater Management
James Golden, Director of Operations
Jerome Brooks, Office of Water Compliance
Joel P. Maynard, GIS
Julia Wellman, Environmental Impact Review Coordinator
Jutta Schneider, Water Planning Division Director
Michael Dowd, Director
Patrick Corbett, Air Toxics Coordinator
Sandra Mueller, Water Monitoring and Assessment Program Manager
Scott Kudlas, Director
Stan Faggert, Minor New Source Review Coordinator
Tamera Thompson, Manager, Office of Air Permitting
Trieste Lockwood, Senior Policy Advisor

Office of Air Quality Assessments
Michael Kiss, Manager

Blue Ridge Regional Office
Paul Jenkins, Regional Air Permitting Manager
Anita Walthall, Air Permit Writer Senior

Office of Environmental Impact Review
Bettina Rayfield, Manager

Water Division
Anthony Cario, Water Withdrawal Permit Writer
Melanie Davenport, Director

Department of Forestry
Drew Arnn, Senior Area Forester
Mike Santucci, Forestland Conservation Program Manager

Department of Game and Inland Fisheries
Amy Ewing, Environmental Services Biologist
Brian Watson, Aquatic Resources Biologist/Malacologist
David Whitehurst, Director
Ernie Aschenbach, Environmental Services Biologist
Michael Pinder, Aquatic Biologist
Ray Fernald, Environmental Services Section Manager
Rick Reynolds, T&E Bat Survey Contact
Robert Duncan
Sergio Harding, Nongame Bird Conservation Biologist

Department of Health, Office of Drinking Water
Aaron Moses, Source Water Program Manager
Mary Mahoney, Source Water Protection Program Assistant

Department of Historical Resources
Mark Holma, Project Review Architectural Historian

Department of Mines, Minerals and Energy
Rick Cooper, Director

Department of Transportation
Stephen C. Brich, Commissioner

Division of Geology and Mineral Resources
Lorrie Coiner, Geologist

Economic Development Partnership
Vince Barnett, Vice President, Business Investment

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Matthew Strickler
Clark Mercer, Chief of Staff

Marine Resources Commission
Mike Johnson, Habitat Management
Randy Owen, Project Manager

State Historic Preservation Office
Julie Langan, State Historic Preservation Officer
Roger Kirchen, Director
Stephanie Williams, Deputy State Historic Preservation Officer

Native American Tribes

Absentee-Shawna Tribe of Oklahoma
Devon Frazier, Tribal Historic Preservation Officer
Edwina Butler-Wolfe, Governor
Erin Thompson, Tribal Historic Preservation Officer

Catawba Indian Nation
Caitlin Haire, Tribal Historic Preservation Office
Caitlin Totherow, Tribal Historic Preservation Officer
Darin Steen, Environmental Services Director
Evie Stewart, Tribal Administrator
Wenonah G. Haire, Tribal Historic Preservation Officer
William Harris, Chief

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Clint Halftown, National Representative

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Ellis Wright, Vice Chief
Walt Brown, Chief

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Bill John Baker, Principal Chief
Elizabeth Toombs, Tribal Historic Preservation Officer

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Steve Vance, Tribal Historic Preservation Officer

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Stephen Adkins, Chief

Chickahominy Tribe Eastern Division
Gene Pathfollower Adkins, Chief

Gerald Stewart, Chief

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Bill Anoatubby, Governor
Kirk Perry

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Gary Batton, Chief
Ian Thompson, Tribal Historic Preservation Officer

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Gene Jacobs, Chief
Greg Jacobs, Executive Director

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Darren Hill, Director of Cultural Preservation Program
Deborah Dotson, President
Kim Penrod, Director of Cultural Resources
Nekole Alligood, Director of Cultural Resources

Delaware Tribe Historic Preservation
Susan Bachor, Historic Preservation Representative

Delaware Tribe of Indians
Brice Obermeyer, Historic Preservation Director
Chester Brooks, Chief

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Holly Austin, Tribal Historic Preservation Officer
Richard Sneed, Principal Chief
Russell Townsend, Tribal Historic Preservation Officer

Eastern Shawnee Tribe of Oklahoma
Brett Barnes, Tribal Historic Preservation Officer
Glenna Wallace, Chief

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Ogletree Richardson, Chief

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Muscogee (Creek) Nation
Corain Lowe-Zepeda, Tribal Historic Preservation Officer
James Floyd, Principal
Raelynn Butler, Manager, Historic and Cultural Preservation

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William Tarrant, Tribal Historic Preservation Officer

Shawnee Tribe
Tonya Tipton, Historic Preservation Officer

Shawnee Tribe of Oklahoma
Kim Jumper, Preservation Office
Ron Sparkman, Chief

St. Regis Mohawk Tribe
Arnold Printup, Tribal Historic Preservation Officer
Beverly Cook, Chief

Stockbridge-Munsee Community of Wisconsin
Shannon Holsey, President
Bonney Hartley, Tribal Historic Preservation Officer

Tonawanda Band of Seneca Indians of New York
Kevin Jonathan, NAGPRA Contact
Roger Hill, Chief

Tuscarora Nation
Neil Patterson, Director of the Chiefs Council, Tuscarora Environmental Program
Bryan Printup, Representative
Leo Henry, Chief

United Keetoowah Band of Cherokee Indians in Oklahoma
Joe Bunch, Chief
Lisa Stopp, Tribal Historic Preservation Officer
Karen Prichett, TCNS Coordinator

Upper Mattaponi Tribe
Frank Adams, Chief
Kenneth Adams, Chief

Waccamaw Sioux Tribe
Brenda Moore, Housing Coordinator
Lacy Wayne Freeman, Chief
Matthew Blanks, Tribal Council Chair

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David Lewis, District 53 Representative
Dennis Riddell, District 64 Representative
John R. Bell, IV, District 10 House Majority Leader
Kirk Osteen, Policy Director for Rep. Stephen Ross
Kyle Hall, District 91 Representative
Phil Shepard
Polly Riddell, Legislative Aide for Representative Dennis Riddell
Stephen Ross, District 63 Representative
Theresa Lopez, Legislative Aide for Rep. Jerry Carter
Tim Moore, Speaker of the House

North Carolina Senate
Bill Rabon, District 8 Senator
Dan Blue, District 14 Senate Minority Leader
Harry Brown, Senate Majority Leader
Jon Hardister, State Representative
Karen Johns, Legislative Aide for Sen. Rick Gunn
Kathryn Currie Carter, Legislative Intern for Sen. Rick Gunn
Kirk DeViere
Michael Garrett, Senator
Rick Gunn, District 24 Senator
Phil Berger, District 26 Senator

Virginia Senate
David Suetterlein
Frank Ruff
Jerry Carter, District 65 House Representative
Steve Newman
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William Stanley, Jr.

Virginia House of Delegates
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Daniel Marshall, III, 14th District Delegate
Kirk Cox, 66th District, Speaker of the House
Leslie Adams, 16th District Delegate
Terry Kilgore, 1st District Delegate

Virginia 9th District

Morgan Griffith, 9th Congressional District Congressman

City Agencies

Alamance County

Brian Baker, Director of Parks and Recreation
Bruce Waller, Assistant County Manager
Bryan Hagood, County Manager
Clyde Albright, Attorney
Craig Honeycutt
Marlena Isley, GIS Director
Robert Key, Director of Inspections
Sherry Hook, Human Resources Director

Alamance County Board of Commissioners

Amy Scott Galey, Board Chair
Bill Lashley, Vice Chair, County Commission
Bob Byrd, Commissioner
Eddie Boswell, Commissioner
Steve Carter, Commissioner
Tim Sutton, Commissioner

Alamance County Emergency Management Office

Debbie Hatfield, Emergency Management Coordinator

Alamance County Emergency Medical Service

Teresa Harvey

Alamance County Fire Marshall's Office

John Payne, Fire Marshall

Alamance County GIS

Katherine Liles, Interim Planning Director

Alamance County Historic Properties Commission

Jessica Dockery, Planner

Alamance County Planning Department

Rodney Cheek, Chair
Tonya Caddle, County Planner

Alamance County Sheriff's Office

Terry Johnson, Sheriff
Cliff parker, Chief Deputy

Chatham Town Council

William Pace, Mayor

City of Burlington

Hardin Atkins, City Manager
Robert Patterson, Jr., Water Resources Director
Todd Lambert, P.E., City Engineer

City of Danville

Joni House, Preservation Coordinator
Kenneth C. Gillie, Jr., Director of Community Development

Telly Tucker, Director of Intergovernmental Affairs

City of Eden

Angela Hampton, Council Member
Bernie Moore, City Council Member
Darryl Carter, City Council Member
Debra Galloway, Planner
Jerry Ellis, City Council Member
Jerry Epps, City Council Member
Jim Burnette, Council Member and Mayor Pro-Team
Kelly Stultz, Planning Director
Michael Dougherty, Director of Economic Development
Neville Hall, Mayor
Paul Dishmon, Director of Municipal Services
Stephen (Brad) Corcoran, City Manager
Sylvia Grogan, Council Member

Chamber of Commerce

Angela Fowler, President

City of Graham

Chip Turner, Council Member
Frankie Maness, City Manager
Griffin McClure, Council Member
Jerry Peterman, Mayor
Lee Kimrey, Mayor Pro Tem
Melody Wiggins, Council Member
Nathan Page, Planning Director

City of Reidsville

Donald L. Gorham, Council Member
Donna Setliff, Community Development Manager
Harry L. Brown, Council Member
Haywood Cloud Jr, Assistant City Manager
James K. Festerman, Council Member
Jay Donecker, Council Member
Jeff Garstka, Economic Development Director
Preston W. Mitchell, City Manager
Rev. William Hairston, Council Member
Sherri G. Walker, Council Member
Steve Moran, City Engineer
Terresia Scoble, Council Member

Chamber of Commerce

Denise Brady, Membership Director
Diane Sawyer, President

Human Relations Commission

Maricarmen Garduno

Reidsville Police Department
Robert Hassell, Chief

Danville-Pittsylvania County Chamber of Commerce
Alexis Ehrhardt, Interim President & CEO

Eden Chamber of Commerce
Heather Castle

Graham Police Department
Tony Velez, Lieutenant

Haw River Police Department
Scott Thomas, Assistant Chief

Haw River Sheriff Department
Toby Harrison, Chief

Haw River Town
Charlie Davis, Attorney

Mebane City
David S. Cheek, Manager

Orange County
Amanda Garner, Business Recruitment Economic Developer
Steve Brantley, Director

Pittsylvania County
Ben L. Farmer, Board of Supervisors Callands-Gretna District
Charles Miller, Supervisor
David M. Smitherman, County Administrator
Elton W. Blackstock, Board of Supervisors Staunton River District
Gregory Sides, Assistant County Administrator for Planning and Development
J. Vaden Hunt, County Attorney
Joe Davis, Supervisor
Karen Hayes, Deputy Director
Matt Rowe, Economic Development Director
Robert "Bob" Warren, Chair, Board of Supervisors
Ronald Scearce, Vice Chair, Board of Supervisors
Tim Barber, Supervisor

Planning Commission
Richard Motley, Planning Commission Chairman

Rockingham County
Carrie Spencer, Planning and Inspections Director
John Morris, Attorney
Lance Metzler, County Manager
Lynn Cochran, Planner
Tina Massey, Executive Assistant – County Manager's Office

Board of Commissioners
A. Reece Pyrtle Jr., Vice-Chairman
Charlie Hall, Commissioner

Kevin Berger, Chairman
Mark F. Richardson, Commissioner
T. Craig Travis, Commissioner
W. Keith Mabe, Commissioner

County Center
Kerry Taylor- Pinnix, Economic Development

Center for Business and Economic Development
Ken Allen, Assistant Director
Jan Critz Yokeley

Education Foundation
Dawn Charaba, Executive Director

County Government
Rodney Cates, Director of Emergency

Planning Department
Tonya Caddle, County Planner

Sheriff Department
Grey Smith, Captain
Samuel Page, Sheriff

Stoneville Government
Chuck Hundley, Town Council
Jerry Smith, Town Council
Johnny Farmer, Town Council
Kenneth Gamble, Town Manager
Ricky Craddock , Mayor

Town of Green Level
Michael Trollinger, Interim Town Manger
Rodney Gunn, Public Works

Town of Haw River
Buddy E. Boggs, Mayor
Charlie Davis, Attorney
H. Lee Lovette, Mayor Pro Tem
Jeff Fogleman, Council Member
Kelly Allen, Council Member
Melanie Eveker, Assistant Finance Officer/Town Clerk
Patty Wilson, Council Member
Sean Tencer, Town Manager
Steve Lineberry, Council Member

Yanceyville Volunteer Fire Department
John Worley, Chief

Companies and Organizations

1804-1814 Greenstreet Associates

329 Partners, LLC
Robert H. Kluttz, Registered Agent
801 Brooks Rd. Land Trust
Afro-American Historical and Genealogical Society of North Carolina, Inc.
Lamar E. DeLoatch, President
Alamance Chamber of Commerce
Reagan Chandler Gural, Vice President
Alamance Community College
Algie Gatewood, President
Cindy Day Collie, Vice President of Administrative and Fiscal Services
Thomas Hartman, Director of Administrative Services
Alamance County Area Chamber of Commerce
Mac Williams, President
Alamance County Historical Museum
William Murray Vincent, Director
Alltech, Inc.
Andrews Memorial Baptist Church
Appalachian Mountain Advocates
Benjamin A. Luckett
Apex Economic Development
Joanna Helms, Economic Development Director
AQ Contracting, Inc.
Ronald Adams and Cynthia Adams
Archy Grove United Christian Church
AWCK Engineering
Josh Johnson, Principal Engineer/Project Manager
Baggerly Irrevocable Trust
Bakatsias Solar Land Hldgs, LLC
Belle Grove Church
Willie Thomas Fitzgerald and Curtis Wayne Galloway, Trustees for Belle Gove Church a/k/a Belle Grove Primitive Baptist Church, Trustees
Belview Baptist Church
Berger & Thornhill
Dennis Scott Harris and Robin A. Harris, Attorney
Blue Ridge Environmental Defense League (BREDL)
Mark Barker
Bluebird Trail Farms, LLC
Border Lake Farm
Howard Kicks, Jr.
Bryant Properties & Holdings, LLC
Shiloh Daum, Attorney
Burlington GIS
Patricia “Trish” Patterson
Burnt Shops, Inc., R. Henderson Scott, Jr. Family Limited Partnership
R. Henderson Scott, Jr., President
Cape Fear Workforce Development Board
Jan Critz Yokeley, Business Engagement Manager
Capital Results
Shawn Day, Director of Public Affairs
Cardinal Pipeline Company, LLC
Cascade Meadows, LLC

Centro La Comunidad
Lucy Rubiano, Family Support Specialist
Church of God of Prophecy
Circle Bar D Ranch, LLC
Circle Bar D Ranch, LLC, Willow Oaks Plantation, LLC
Charles Dick Arthur, Registered Agent
Citizens Economic Dev. Inc.
Civitas Institute
Donald Bryson, President
Leah Byers, Policy Analyst
Clarence Hale Auto Sales Inc.
Clarence Hale and Lenora Hale, Jason Todd Hale
Commonwealth Forest Investments, Inc.
Copland Fabrics
Jason Copland, President and CEO
Cora Holdings, LLC
Cox Properties, LLC
Carolyn Deloras Cox Browning, Manager
Jerry C. Browning, Manager
Cultural Heritage Partners
Ellen Chapman
Kelli Peterson, Attorney at Law
Marion Werkheiser
D3 Development, Inc.
Cora Holdings, LLC, c/o Michael D. Hill, President
D & W Investment Properties, LLC
Deborah J. Hines
Danville Historical Society
Mark Joyner, President
Dan River Basin Association
Jenny Edwards, Rockingham County Project Manager
Tiffany Haworth, Executive Director
Robin Light, Office & Finance Manager
Danville & Western Railroad
Danville Utilities
Jason Grey, Director
Danville-Pittsylvania Regional Industrial Facility Authority
Clement and Wheatley, Attorney
Michael Guanzon, Attorney
Deep Creek Baptist Church
Delta Contracting, Inc.
Duke Energy Carolinas, Inc.
Duke Power Company
Duke Power Company
E S T Enterprises, LLC
Scott Thompson, CEO
Economic Development Partnership of North Carolina
Chris Chung, CEO
Eden Custom Processing, LLC
Eden Public Library
Michael Roche, Library Director

Eden Rotary Club
Vonda Higgs, Program Chair
Eden Water Department
Environmental Solutions and Innovations, Inc.
Casey Swecker, Vice President
Stephanie Frazier, Senior Project Manager
Taina Pankiewicz, President, COO
EQT Energy LLC
Megan D. Stahl, Permitting Supervisor
EST Enterprises, LLC
Scott Thompson, CEO
Fieldcrest Road Properties, LLC
First Baptist Church of Draper
FLMR Properties, LLC
Foss Rentals, LLC
G&I Properties
Glen Raven Mills, Inc.
GNE Properties, LLC
Bradley C. Friesen
Faye Diachenko
Graham Historical Museum Advisory Board
Elaine Murrin, Chair
Jeannette Beaudry, Chair
Greenbrier Pipeline Co., LLC
Beverly Lowe
Greenwood Presbyterian Church
James Pruitt, Elder
H. S. Nolen General Contractors
Haw River 413 Boundary Street
Haw River Assembly
Elaine Chiosso, Executive Director
Emily Sutton, Haw River Watch Coordinator
Haw River Baptist Church
Haw River Business Center, LLC
Pam Stone
Haw River HDC I, LLC, Haw River HDC II, LLC, Haw River HDC III, LLC
Haw River Heritage, LLC
Haw River Historical Society Museum
Gail Knauff, Director
Haw River Partners, LLC
Haw River Sanitary District
Haworth & Reese, PLLC
Daniel Lee Bates and Emily Talbott Bates, Attorney
High Country Holdings, LLC
Hirschler Fleischer
Joseph Lee Stiles, Esq
Igloo Series II Reo, LLC
Independent Timber, Inc.
Emmett Martin
Innotex Holding USA, LLC
Interstate Investments of Alamance, LLC

Irvine River Company
Mark Bishopric, President
JDC Manufacturing, LLC
Hagan Barrett
John Robert Kernodle Senior Center
Judy Whitfield, Senior Center Director
Johns & Counsel PLLC
Daniel A Hughes and Margaret M. Hughes, Attorney
K Farms, Inc.
Keystone Foods, LLC
Knowles Road Trust
Lenox Castle Farms
William Jarrell Young
Lewis Brothers Farms, LLC
M. Kendall Lumber Company, Inc.
Vanna Connor, Secretary
Martin Marietta Materials, Inc.
Brian North
Josh Turner
Maxey Properties, LLC
May Memorial Library
Lisa Kodin, Reference Department
Deanna Cunningham, Branch Manager
MBEE Properties, LLC a NC limited liability company
Bryan M. Wagoner and Michele F. Wagoner
McCandles Performance, LLC
McLeansville Corp.
Melinda H. Coleman, President
Mebane Historical Society and Museum
Traci Davenport, Executive Director
Millercoors LLC
Morningside, LLC
Mountain Valley Pipeline, LLC
Travis Garrett
Moving North Carolina Forward
Tom Hendrickson, President
NC Manufacturer Extension Partnership
Phil Mintz, Executive Director- Industry Expansion Solutions
NextEra Energy, Inc.
Alex Miller, MVP Southgate Permitting Lead
Christina Akly, Senior Environmental Specialist
Matt Raffenburg, Director, Environmental Services
Norfolk Southern Railway Co., Property Tax Department
Property Tax Department
Norfolk Southern, Southern Railroad
Herbert Wilson, Real Estate Manager
Normandy Mtg Loan Trust 2016-1
North Carolina Chamber of Commerce
Angela Sutton, Event Sponsorship Manager
Gary Salamido, Vice President, Governmental Affairs
Kate Payne, Vice President, Communications

Kara Carter, Communications Manager
Michael Hill, Executive Director of Economic Development
Susan Fleetwood, Executive Director of Economic Development
North Carolina Economic Development Association
Lawrence Bivins, Managing Director
North Carolina Economic Development Association
Liz Dobbins-Smith, Managing Director – Membership Engagement and Programs
North Carolina Future Farmers of America
Alycia Thornton, Director of Development
Jason Davis, Coordinator
North Carolina Natural Heritage Program
Laura Robinson, Botanist
Misty Buchanan, Director
North Carolina Petroleum Council
David McGowan, Executive Director
North Carolina Museum of Natural Sciences
Patricia (Trish) Weaver, Collections Manager, Geology and Paleontology
Lisa Herzog, Operations Manager, Paleontology
North Carolina Railroad Company
PFJ Southeast, LLC
Piedmont Triad Partnership
Jed McMillan, Vice President, Government Affairs
Penny Whiteheart, Executive Vice President
Stan Kelly, President & CEO
Pittman and Steele
Tom Steele, Attorney – Cantelmo Family Irrevocable Trust c/o John R Cantelmo
Pittsylvania County Public Library
Jennifer Arthur, Branch Manager
Pittsylvania Historical Society
Larry Aaron, President
Pittsylvania Historical Society
Mary Plaster, President
Preservation Virginia
Sonja Ingram, Preservation Field Services Manager
Protect Our Water Heritage Rights (POWHR)
Russell Chisholm
Public Service Company of North Carolina
David Knott
Ranch Properties, LLC
Peter F. Osborne, Registered Agent
Reidsville Public Library
Michael Roche, Library Director
Reidsville Rotary Club
John Kolessar, President
Remnants and Textiles, Inc.
Revolution Properties Holdings, LLC
Rosemarie Williams
Rock Solid Hardscapes, LLC
Rockingham Community College
Mark Kinlaw, President
Rockingham County Center

Adam Mark, Economic Development
Rockingham County Center for Economic Development
Leigh Cockram, Director of Economic Development and Tourism
Rockingham Historical Society
Jordan Rossi, Executive Director
Rolesville Economic Development
Mical McFarland, Economic Development Director
Sandy Oaks Farms, LLC
Brian Lavinder, Registered Agent
Sanford Area Growth Alliance
Bob Joyce, Economic Development Director
Jimmy Randolph, Existing Industry Development Manager
Scott Associates
Mike White
Second Partners, LLC
Sierra Club
Caroline Hansley, Organizer, working with the Beyond Dirty Fuels campaign
Smith Family Irrevocable Trust
Jennings Smith
Sonim, LLC
South Rock Farm, LLC
M. Denise Booth
South Rock Farm, LLC
Tina Pinnix-Broome
Southern Environmental Law Center
Geoff Gisler, Staff Attorney
Southern Railway Co.
Southwestern Virginia Gas Company SCC
Hershel Michaels
Spencers, Inc. of Mount Airy NC
Stone Street Development, LLC
Tall Timber Holdings, LLC
Textile Heritage Museum
Jerrie Nall
The Eminent Domain Litigation Group
David C. Dalton and Nancy C. Dalton, Attorney
Thomas Weaver Construction Company, Inc.
Transcontinental Gas Pipeline Company, LLC
Jim Hutchins
Transcontinental Gas Pipeline SCC
TRC Companies, Inc.
Paul Webb, Cultural Resources Program Leader
Tracy Millis, Senior Archaeologist/Senior Project Manager
Truby Drive Realty, LLC
United States Cellular Corporation, A Delaware Corporation
Virginia Chamber of Commerce
Barry DuVal, President & CEO
Virginia Economic Development Partnership
Christy Morton, Vice President, External Affairs
Jason El Koubi, Executive Vice President
Stephen Moret, President & CEO

Vince Barnett, Vice President, Business Investment
Virginia Free
Chris Saxman, Executive Director
Virginia Oil and Gas Association
Ian Landon
Virginia Outdoor Foundation
Martha Little, Deputy Director of Stewardship
Virginia Petroleum Council
Miles Morin, Executive Director
Virginia Speleological Survey
Mike Futrell, GIS/DB Manager
Virginia-North Carolina Piedmont Genealogical Society
Diane Barbour, Publicity Chair/Immediate Past President
Watts for Congress
Willow Oaks Plantation, LLC
Wolf Island Forestry, LLC
Kenan C. Wright
Z Trans Property, LLC
Igor Nikolovski

Landowners and Individuals

Adam J. Harper
Aimee Smith Tilley and Stephen Edward Smith, II
Alan Dale Toler and Sharon B. Toler
Alan Hall
Alan Lewis
Alan Lynn Pike and Debra Lovelady Pike
Albert Billie Troxler and Barbara Troxler
Albert Johnson, Sr.
Albert L. Keatts and Ocie Adams Keatts
Alfred O. Smith
Alice Doraine B. Shropshire
Allen R. Gardner, Nancy F. Gardner, and Gladys M. Frazier
Allen Scott Mitchell
Allen Scott Mitchell and Cynthia C. Mitchell
Alvin Herbin and Virginia B. Herbin
Alyssa Hamilton and Penny Jones
Amanda M. Roach
Anderson M. Jones and Elizabeth Jones
Andrea Brown
Andrea D. Boothe
Andrew N. Johnson and Wilma Anne Johnson
Andy Salomon Chavez Sandoval c/o Freddy Chavez
Angela Marie Hinton
Angela Parham
Angelica Covarrubias
Anglia Gail Reavis
Ann Hilton-Huffsmith
Anna H. Wingate
Anne Lane
Anthony Ray Mull
Anthony Settle, Alphony Settle, Carol J. Cummings and Maxine Settle
Anthony W. Jones and Kellie R. Jones
April Marie Stanfield and Ronald Stanfield
Ardell Harrison
Arnie Thomas Roberts and Martha Roberts
Arthur Brunner and Ann Wegmann
Arvin Van Lemons and Joyce M. Lemons
Asure Grisales and Ellen E. Grisales
Avet Anderson
B. F. Blanchard and Debra D. Blanchard
B. W. Walker and James R. Walker
Baltazar Cruz and Bonnie R. Cruz
Bambi Farris Hutchinson
Barbara B. Perkins
Barbara Booth Hand
Barbara Linville Rebb
Barry Giles Hyler and Katherine Shelton Hyler
Barry Justin Cochran and Deborah Vernon Cochran
Barry S. Frank
Bart Allen West and Rene Lee West
Beatrice B. Hornaday
Beatrice Evelyn Cochran
Belinda Beeson

Belwood L. Hyler
Ben Edwards
Benjamin Joel Andrews and Kimberly Russell Andrews
Bennie L. Anderson
Betty Williams
General O. Totten Estate c/o Betty Williams
Beulah Kay Danieley and Jesse Steven Gwynn
Beverly S. White and William S. White
Bill Hunt
Bob Costa
Bobby Cox
Bobby Daniel Chambers and Wendy Carol Cain Chambers
Bobby Franklin Wall and Lavalon C. Wall
Bobby G. Brown and Peggy W. Brown
Bobby W. King and Linda C. King
Bonnie Apple Robertson
Bonnie Jean Quanah Colon
Bradford I. Evans, Jr.
Brandon A. Collins and Kari T. Collins
Brenda Clark c/o Michael Harrison
Brenda N. Searcy
Brenda S. Strickland and Glenn C. Strickland
Bret L. Stevens, Jennifer M. Stevens and Timothy G. Stevens
Brian Edward Workman and Misty Renee Workman
Brian N. Kelly and Amy M. Kelly
Brooks Miller
Bruce D. Taylor and Susan A. Taylor
Bruce E. Smith
Bruce W. Forbes and Nancy A. Forbes
Bryan M. Wagoner and Michele F. Wagoner
Bula Fay Conner
Byron Lee Moose
Calvin C. Montgomery and Fran T. Moore
Calvin Timothy Collie
Camden Whitehead and Betty W. Whitehead
Betty W. Whitehead Revocable Trust
Cantelmo Family Irrevocable Trust c/o John R. Cantelmo
Carelton Bass
Carlton Dillard Estes and Janice Estes
Carlton Vaden Morton and Betty Brown Morton
Carol A. Giuliani
Carol Christopher Oliver
Carol H. Emerson
Carol Jean Metcalf
Carol Jean Presnell
Carol Miles Headen and Dan Headen
Carol Williamson Oakes
Caroline Franklin Holliday
Carolyn Harrison
Carolyn Harrison c/o Michael Harrison
Carrie Brown Massey
Carrie Louise G. Smith c/o Scott (Colt) Puryear, Attorney
Catherine R Wilkerson and Brock M. Wilkerson
Catherine R. Norville et al
Cathy L. Wilson
Cecil Wayne Corum and Brenda D. Corum
Chad E. Rhodes and Shannon A. Simpson
Chad Everett Soyars and Chandra Lynn Soyars
Chad Matthew Randleman
Charissa L. Evans
Charles A. Jones and Deborah A. Jones
Charles B. Mann and Rayanne S. Mann
Charles C. Hylton and Sandra W. Hylton
Charles Danny Lynn
Charles E. Clemmons and Pamela H. Clemmons
Charles Kevin Harris and Angela C. Harris
Charles S. Bumbarner and Elizabeth Bumgarner
Charles S. Clarke and Melissa H. Clarke
Charlie Thomas Crane
Charlie Worth Lee, Jr. and Brenda Worth
Chelsea H. Corum and Betty J. Carter
Cheryl K. Smith
Cheryl Turner
Chris Edmund Yates and Patricia Anne Donoghue
Christen Scott Wood and James Craig Wood
The Scott Family Irrevocable Trust Agreement
Christie Oliver Oakley
Christine Apple Turner and Thomas Barry Turner, Jr.
Christopher A. Rogers
Christopher Cochran and Frances Cochran
Christopher E. Caddis and Marlo R. Caddis
Christopher G. Powell, Trustee for the Samuel C. Powell Irrevocable Trust & Karen Powell
Christopher P. Johnson
Christopher P. Maltby

Christopher R. Blair and Anna F. Blair
Christopher T. Benkosky and Jennifer L. Benkosky
Christy Barefoot
Cindy Lou Smith Clark and Elizabeth Ann Bailey
Clara H. Jennings
Clarence E. Piper
Clarence Haymore, Jr.
Claude S. Whitehead
Claudia Belfield
Clayton C. Murphy
Connie R. Mullis
Constance Dickerson and Randy Steven
Cornelius Howlett and Linda Lou Y Howlett
Coy B. Frith, Jr.
Craig Drye
Cruciger
Curtis S. Millner
Cynthia C Cobb
Cynthia King Smith Mance
Cynthia Mae Caudill Cobb, Kenneth W. Cobb and Teresa Cobb Massey c/o Teresa Cobb Massey
D. Dale Page and Sue Brooks Page
D. L. Motley
Dale Frank Tate
Dale L. Proffit and Linda C. Proffit
Dale Ray Combs and Jean W. Combs
Dana H. Sparks, Billy Anne Harmon Living Trust
Daniel Garrett, Janice Garrett and David Hutson
Daniel Lee Bates and Emily Talbott Bates
Daniel Lee Madren and Loretta B. Madren
Daniel R. Falk and Anita C. Kuchera
Daniel T. Deutermann and Kelly A. Deutermann
Danny M. Barber
Darrell Hugh Davis
Darrell R. Turner
Darryl D. Pennington and Leigh A. Pennington
Daryl M. Powell and Tina A. Powell and Danny Lee Powell
David and Rene Neff
David and Sharon Middendorf
David Allen Lewis and Vonda Lewis ichey, Trustees
David C. Dalton and Nancy C. Dalton
David C. Johnson and Karen R. Johnson
David Eugene Fonville
David H. Crane and Joyce J. Crane
David K. Naylor
David Lee Adams and Teressa H. Adams
David Lee Harbour and Nancy Ann Denny
David M. Edwards and Linda L. Edwards
David M. Hughes
David N. Smith and Pamela C. Smith
David Nelson Cox and Sue Nash Cox
David P. Hensley
David R. Mehalko
David Travis
David W. Stowe and Nancy C. Stowe
Dawn Louise Ratliff
Deanna Pinnix Thompson and Stanley Thompson
Debbie Smith
Debra Dayle Driver Blanchard
Deborah Amaral
Deborah L. Bohannon and Betty G. Bohannon
Deborah S. Boothe
Deborah Whittington
DeLane King, Robert King, Sr., and Robert King, Jr.
Delmus S. Broadnax, Bill R. Broadnax & Others
Delores A. Odell
Deloris Poser
Demetria Williamson c/o Michael Harrison
Dena A. Lawson
Denise Shotwell
Dennis Lee Hughes and Nancy Hughes
Dennis W. Loye and Arlene W. Loye
Dennis Wayne McCollum
Dewey Alton Brown
Dianne E. Adkerson and Boyd W. Adkerson
Donald Clyde Iseley and Phyllis B. Iseley
Donald Deboe and Kim G. Deboe
Donald Eugene Radsick, Jr. and Caron Claudia Radsick
Donald Glenn and Melissa H. Walker
Donald L. Brown and Wilma S. Brown
Donna Buttry Cochran
Donna G. Moser and Brian T. Hamilton
Donnie W. Haymore
Dora Ann Atha and Frank Dehart
Doris C. Flinchum
Doris C. Gilliam Irrevocable Trust
Dorothy Hamlet
Douglas Settle, Jr.
Duane W. Neal
Dustin and Haley Saul

Dwaine R. Strader, Albert G. Strader et al
Earl B. Horner, Jr. and Ann H. Harris
Earl Melvin Worsham and Joan A. Worsham
Eddie L. Roland and Andy W. Moore
Eddy A. Irving and Jennifer Irving
Edith Kernodle Khateeb
Edna Mae Young
Edward D. Purcell and Norma Jean Purcell
Edward Jay Frisbee and Krystal Siegel Inman Frisbee
Edward Lee Lewis
Efren Salinas and Maria Socorro Guerrero
Elaine Chiosso
Elizabeth Ann McKinney Talley
Elizabeth Ore and Peter Cowan
Elizabeth S. Daley c/o John N. Hester
Elizabeth Y. Wilkins
    Otis Edward Young Estate & Orak Young Estate
Ella West Bason
    Ella West Bason Life Estate
Ellen S. Roberts c/o William T. Strickland and Ellen S. Roberts
Ellen Willets Turlington and James Anthony Turlington
Elmo Franklin Bridges and Judith Sandridge Bridges
Eloise R. Richardson
Elva Teeters c/o Robert Teeters and Elva Teeters
Emigdio Castro and Humberto Castro
Emily Louise Turner and Christopher Perry Turner
Emma H. McGinnis
Eric Kass and Brittney Kass
Erika Cassell c/o Vince Cassell and Erika Cassell
Ervin Junior King
Estate of Furman E. Coggins and Teresa Ann C. Freeman
Estate of Jeanette G. Hicks
Estate of Mattie N. Harrison c/o Ardell Harrison
Estate of W. H. Matkins c/o Phillip H. Brown
Estate of Walter Sanford Harrison c/o Anna H. Wingate
Esther P. Blanchard
Eunice Kenodle
Evelyn S. Strader, Henry E. Strader, Jr., Sandra K. Strader and Garry D. Strader
Everett Nesbitt Jarrett, Jr.
Faedra Schleif
Fay B. Woods and Sandy E. Woods
Faye Barber-Cook
Faye L. Lowe and Glenn Anthony Lowe
Felix Reymundo Felix
Floyd Dishmon and Ramona Dishmon
Fran T. Moore
Frances Anne Kistler-Gervasio
Frances Gwendolyn Page Post
Frances M. Crews and Gail M. Held
Frances S. Gammon
Frances U. Pruitt and Thomas M. Pruitt
Francis D. Grooms and Mary Grooms
Francis M. Martin, Thomas O. Martin and Anna Martin Day
Frank C. Hall and Verlie J. Hall, Trustees
Frank E. Bell and Julian Boyd Bell
Frank Junior Emerson and Mildred W. Emerson
Franklin I. Bass
Fred Allen Vaughn, Jr.
Fred Lehman and Carol Lehman
Fred Preston, III and Fred Preston, IV
Fred Vaughn
Freddie S. Evans and Shirley C. Evans
Freddy Chavez
Furman E. Coggins and Bobby Davis Coggins
G.N. Cochran
Gail A. Brewer and George L. Brewer
Garland Thomas Loy
Garry Michael Faulkner
Gary F. Massey and Mary H. Massey
Gary L. Allred and Robin Allred
Gary Lee Loye
Gary Neil Pennington and Elizabeth Cheek Pennington
Gary Purgason
Geneva Journigan
Geneva M. Carden and Lora C. Davis
George J. Hicks and Jeanette G. Hicks
George T. Freeman and Wanda C. Freeman
George Thomas Lowe, Jr., Faye L. Lowe, and Glenn Anthony Lowe
George W. Tucker Estate c/o Ida Williamson Tucker
George Walter Johnson, III
George Walter Johnson, Jr.
Gerald E. Phaup and Jo Anne A. Phaup
Gerald Franklin Mills and Ratiscqua Tierra-Nicol Mills
Gerald Wayne Stone and Peggy P. Stone

Geraldine Johnson
Geraldine Millner
Gladys Geneva King Life Estate
Glenn Anthony Lowe
Glenn Bozorth
Glenn David Roach
Glenn E. Nordh and Jordan B. Nordh
Glenn L. Cantrell, Gaynell C. Leazer, Janet C. Radford
Glenna S. Jackson
Gloria H. Allen, et al
Gloria W. Whitfield
Gordon Allen Gunn and Martha Gunn
Gordon Jay Shropshire and Teresa Townsend Shropshire
Graciela E. Cornejo
Gregg Huffine
Gregg Alvin Huffine and Shannon Huffine
Gregory Harold Purdy and Mitzi Joyce Purdy
Gregory J. Gunderson
Gregory Scott Hughes
Gurney E. Montgomery
H. Jackson Lee
Harold H. Tate and Peggy W. Tate
Harris Lee Taylor and Frances A. Taylor
Harry Do Welker, Jr.
Harry Lee Carter and Stacy Somers Carter
Harry Phillips
Harry Porterhouse
Harvey Wayne Joyner and Jannice Williams Joyner
Heather Page Morton
Helen S. Moore and William B. Moore, Jr.;
Henry Hall
Henry W. Summers and Marsette C. Summers
Herbert E. Hooper and Doris Roberts Hooper
Herman C. Johnson
    The Herman Colon Johnson Irrevocable Trust of December 2012
Howard Frank Pickrell
Howard J. Shelton and Lana E. Shelton
Howard L. Dunn, Jr. and Patricia L. Dunn
Ilene Byrd and Eve Sharpe
Ilona Flowers
Irye Ray Emerson and Carol H. Emerson c/o J. Ray Carper, Attorney
Irye Ray Emerson, Sr.
Issac C. Hill and Brandy A. Hill
Ivey Dunn Gilliam
J. I. Chandler and Irene Chandler
J. Leon Moser and Martha A. Moser
J. Mack Garrison and M. Earl Garrison
J. Scott Sharp and Paige D. Sharp
Jack Cecil Willis and Margaret L. Willis
Jackie Burris Johnson and Ted Mack Johnson
Jackie Jobe, Annie Burke, et al
Jackie Lee Reese
Jackie R. Thompson and Eldean W. Thompson
Jackie Ray Atkinson
Jackie Ray Atkinson, Jr.
Jacqueline Howlett Aheron
Jake Elmer Wade
James Arthur Quesinberry
James B. Martin and Rachel B. Martin
James C. Trent, Jr.
James Cecil Stone and June C. Stone
James D. Hauser and Kim S. Hauser
James D. Norris
James D. Smith and Carol W. Smith
James Daniel Fleming and Brandy Bright Fleming
James David Browder
James E. Bolden and Mary L. Bolden
James Early Estes
James Edward Laws and Joan Laws
James Edward Powell
James Elmoe Woods
James F. Curry and Pauline K. Curry
James Felix Stanley
James Franklin Richardson
James J. King
James Knapp
James L. Chaney
James L. Howlett Trust
James Leroy Hazelwood and Alma H. Boaze
James Lowell Kernodle and Mary Ann Kernodle
James Michael Buckner and Denise E. Buckner
James Michael Powell
James R. Harper
James Reed Barber and Marion Barber
James Robert Lewis
James T. Walker and Brandi M. Walker
James Thomas Brim and Betty Earline Brim
James Trotter Scearce and Wanda A. Scearce
James Wayne Kernodle
James William Walker

Jamie T. Fonville, Jr.
Janek Patel
Janelle Austin and Wesley Austin, Sr.
Janette L. Riggan and Laura S. Hale
Janette L. Riggan and Marsha E. Firth c/o Coy Firth
Janice Timpson
Janie Barber Patterson
Janie Tew
Jason M. Broyles and Angela N. Broyles
Jay Michael Smith
Jean H. Caldwell
Jean W. Lucy
Jeanne O. Bagby
Jeff Harbinson
Jeffery B. Harrison, Executor
Jeffrey A. Eichinger and Jeanne R. Eichinger
Jeffrey Carr Whitley and Tonia Pillow Whitley
Jeffrey Lynn Clayton and Angelia Wyatt Clayton
Jeffrey T. Catherman
Jennifer L. Simpson
Jeremy Walker
Jerry A. Beckom
Jerry A. Lewis and Ardenia W. Lewis, c/o Alan Lewis
Jerry B. Blackwell and Elinor Blackwell
Jerry Ben Betterton and Joyce M. Betterton
Jerry E. Farmer
Jerry Lee Warren and Nancy Martin Warren
Jerry Leon Bell and Pricilla Gerringer Bell
Jerry Richmond and Penny Richmond
Jerry Robertson Davis
Jerry W. Holyfield and Betty W. Holyfield
Jerry Wayne Martin, Jr. and Rebecca Henderlite Martin
Jesse H. Taylor and Dewey T. Taylor c/o J. Ray Carper
Jesse James Davis and Cheri Booth Davis
Jesse K. Kendrick and Shirley H. Hendrick
Jesse Steven Gwynn
Jessica L. Alcon-Bright and David E. Alcon
Jessica Nicole Waller, Stanley Heath Shelton, Leslie Howard Shelton and Betty Heath Shelton
Jo Ann Parrish Atkinson c/o Glenn Berger, Attorney
Joe Torres
Joel Larry Boggs
John Andrew Kallam
John Brewer and Mary Brewer
John R. Catelmo
Catelmo Family Irrevocable Trust
John G. Mitchell and Phyllis H. Mitchell
John H. Winn, Jr. and Tracy L. Winn
John Herold and Anne Cassebaum
John Inge
John Morton Glenn and Mary Leigh Copeland Glenn
John N. Hester, III et al
John O'Keefe
John P. McMichael and Susan L. McMichael
John R. Schwarz
John Ray Cole and Ravonda Lynn Cole
John Thomas Berry, Jr. and Dorothy C. Berry
John Thomas Hyler and Elizabeth Smith Hyler
John W. Craddock, Jeffrey E. Craddock and Kenneth M. Craddock
John W. McCollum and Ruth M. McCollum
John Wilbur Ring c/o Judith Bridges
Johnnie W. Foster, Sr. et al.
Johnny C Porter and Margaret D. Porter
Johns M. Martin and Johnnie M. Martin
Jonathan D. Hall
Jonathan L. Glenn
Jonathan N. Hollie and Christina R. Hollie
Jordan Delano Simmons and Patricia B. Simmons
Jose A. Zamora and Tammy B. Alverez
Joseph Erwin Gant
Joseph Garvin Sutliff
Joseph R. Jacaruso and Susan M. Jacaruso
Joseph Williams and Dina Williams
Joyce C. Vaughn Revocable Trust
Joyce F. and James G. Anderson
Joyce Hyler Marshall
Juanita M. Howlett
Judith Sandridge Bridges
Judy M. Johnson
Julian W. Robertson et al
Julie Wynn Snead
June T. Soyars
Junior Franklin McBride and Joyce W. McBride
Justin Tuggle and Kelly Tuggle
Justin William Smith
K. Raney
Kalyn Hamilton
Karen Amos Hodnett
Karen B. Maute
Karen M. Harris and Joseph L. Clark

Karen McMasters
Katherine Fox
Katherine V. Bayless
Kathleen M. VanDerHyde
Kathryn Knapp Collins c/o James Knapp
Kathryn M. Nicholson
Kathy Crutchfield Nelson and Jeffrey Davis Nelson
Keith C. Hylton, Sr. and Linda B. Hylton
Keith James Flinchum
Keith L. Miller, Jr. et al
Kelly Rudd Bollinger and Daniel G. Bollinger
Kenneth D. Hawkins and Teresia E. Hawkins
Kenneth Hall and Margaret Evelyn South Hall
Kenneth L. Hudson and Patricia A. Hudson
Kenneth Hayes c/o Dennis Boring, Attorney
Kenneth R. Hayes and Teresa G. Hayes c/o Robert A. Brinson
Kenneth W. Bates c/o Dennis Boring, Attorney
Kenneth Wayne Bates, Kenneth W Bates, II and David Lee Bates
Kevin Paul Cobb and Christina Rene Cobb
Kevin W. Hogsed and Jane Turner Hogsed
Kim F. Umstadter c/o Coy Frith
Kimberly L. Capps and Alan G. Capps
Kimberly Michelle Kellam and Carol Lavone Kellam
Kyle O. Garner and Sherri S. Garner c/o Scott A. Windowm, Esq.
Lacosta J. Hayes and Roger D. Hayes
Lacy Allen
Larry B. Kessler
Larry D. Shambley and Donna S. Shambley
Larry Johnson & Julia R. Johnson
Larry K. Thacker and Judy B. Thacker
Larry Lee Denny and Christine L. Doss and Brad Lee Denny
Larry Wayne Pinnix
Laura K. Mobley
Laura K. Palmer
Laurence Tipton
Laury M. Hayes
Lawrence E. Hylton and Robin B. Hylton
Lee Nathaniel Johnson and Abby Dalton Johnson
Leila Wright
Lelia H. Brown
Lelia Jones Tranbarger
Len McCauley
Lenore G. Zamora
Leonard T. Johnson, Jr.
Leonard W. Strickland and Doris O. Strickland
Lewis B. Aldridge and Barbara Aldridge
Lewis E. Dishmon and Kay S. Dishmon
Lib Hutchby
Linda Gail Mckinney Kennedy
Linda Rosborough
Maxine K. Rosborough Estate
Lisa B. Shorter
Lisa Rudine W. Gillie
Lisa Rumley Conklin
Lloyd C. Duffey and Deborah Y. Duffey
Lloyd G. Tucker and Faye Isley Tucker
Lonnie and Patricia Seibert
Lonnie M. Williams and Michelle L. Williams
Lora A. Carden, Samuel J. Carden, Karen C. Crusberg and Susan C. Parker
Loretta B. Madren
Lori A. Whitfield
Lori D. Webster and R. Alan Dyer
Lori Dyer Webster
Lori Thorn
Lou Ann Harris
Lowell Strickland, Estate and Glenn C. Strickland
Lue Hester Finch
Luther Marshall Cobb, Jr., Steven L. Cobb, Kenneth W. Cobb and Teresa Cobb Massey
Lyn Carlisle
Lynda Dodd Justice
Lynn C. Horner and Lisa J. Horner
Makayla J. Maness and Colby B. Scott
Malcolm Dale Roach, Jr.
Margaret Ann McDaniel Estate
Margaret Earlene Odell Estes, Pamela Estes Ragland and Ralph Edward Estes
Margaret H. Paschal
Margaret Katherine Whitehead and Robert Walton McNutt Jr.
Margaret Marie Kendrick Corum Thomas
Margaret W. Smith and Robert L. Smith
Margie P. Manley
Margie Williamson
Estate of Elnora Miles
Marie O. Bass
Marilyn Tucker
Marion H. Gwynn
Mark A. Jarrett and Virginia G. Jarrett

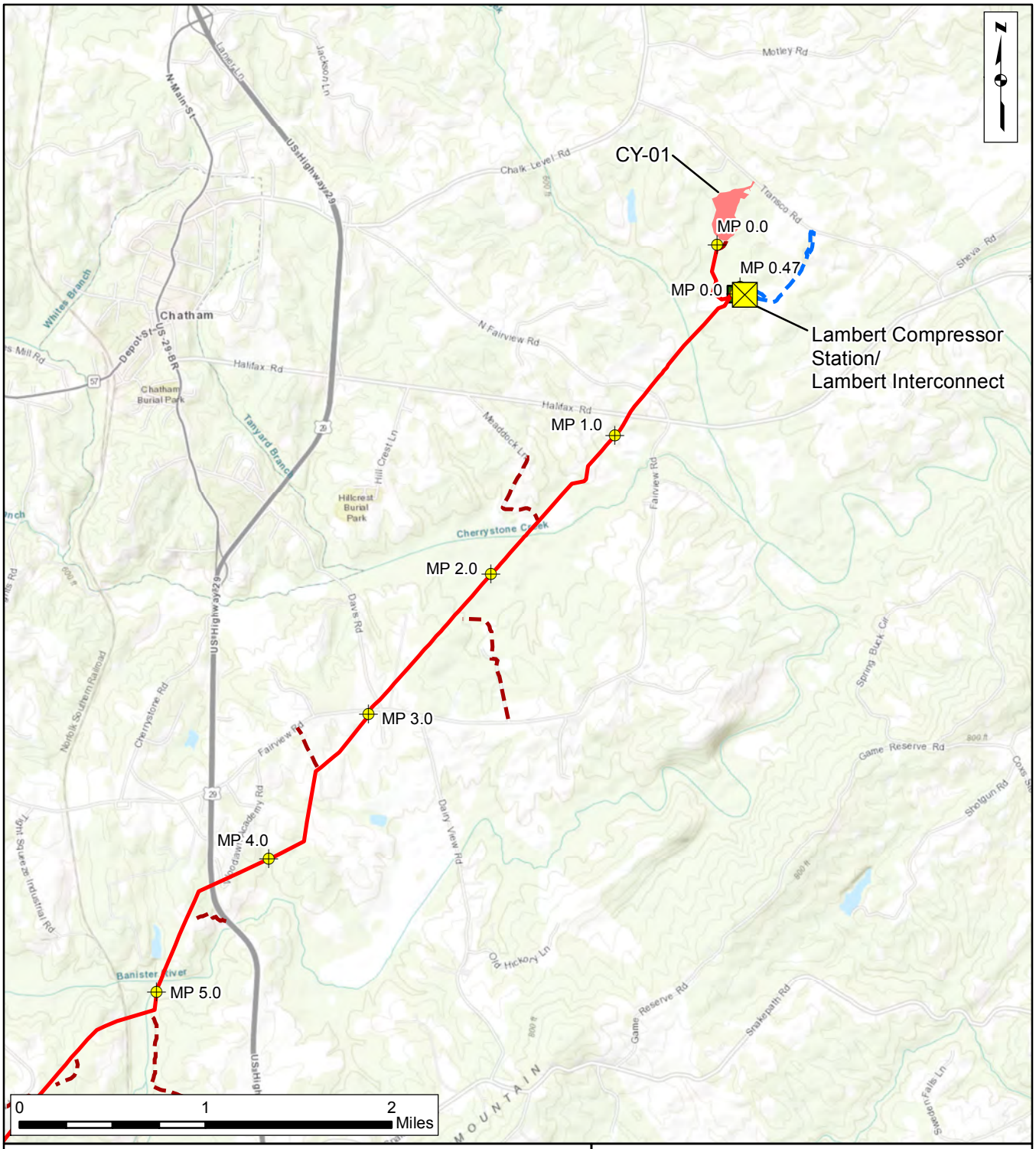
Mark Hampton Kennon
Mark L. Faucette, Trustee of the Betty B Faucette Irrevocable Trust, Mary Emogene Faucette
Mark Leatherwood
Mark M. Johnston and Tammy M. Martin
Mark W. Hallman and Gail G. Hallman, Wanda G. Hallman, and Steve Hutchinson
Mark R. Hall and Lisa H. Hall
Mark W. Hallman, Jr.
Marsha Blanchard Hicks
Marsha F. Fernandez c/o Coy Firth
Marshall H. Kendall
Martha B. Brown
Martha Diane Soyars
Martha Vernon McCollum and Robert Edward McCollum
Marva Brim Jumper
Marvin E. Hylton and Margaret E. Hylton
Marvin Lee Strickland
Mary and Joe Gant
Mary Barnes Murphy and Clinton Irene Barnes
Mary Ella Scott
Mary Emogene Faucette c/o Mark L. Faucette
Mary Gant
Mary Hardy Betterton c/o Benjamin L. Perdue
Mary Hyler Fitch and James David Fitch
Mary Mitchell Thomas
Mary Nelson Underwood
Mary Rainey, Rainey Family Irrevocable Trust
Maureen B. Sweeney
Maurice H. Vaughan, Jr. and Lusanna L. Vaughan
Maxine K. Rosborough Estate c/o Nancy Rosborough
Maxine K. Rosborough Estate, c/o Linda Rosborough
Maynard M. Smith and Lois I. Smith
Mel Aldridge and Angela Hinton Aldridge Family Revocable Trust
Melanie J. Ogletree and Larry D. Clark
Melinda L. Smith
Melissa Sims Hairston C/O Laura Hoey, Mark Short Kaufman & Canoles, P.C.
Melissa Summerlin Pruitt and Brian Michael Pruitt
Melody Lynn Speaks
Melvin E. Sheckells
Melvin F. Stone and Deborah S. Stone
Melvin S. King
Michael A. Greene and Jane N. Greene
Michael A. Warren and Karen Warren
Michael Brown
Michael Brown and Laureen Brown
Michael C. Bray and Teresa S. Bray
Michael Edison Rascoe
Michael Glenn Wallace and Paula Rochelle Wallace
Michael Harrison
Michael J. Dishmon and Joyce M. Dishmon
Michael Lee Ward
Michael Lewis Neal and Janine R. Neal
Michael Lynn Barnette and Karen Barnette
Michael O. Paschal and Barbara Knowles Paschal
Michael R. Stowe
Michael Robert Comer and Jonna C. Comer
Michael Stephen Madren
Michael T. Benesch and Darlene B. Benesch
Michael Wheeley and Wanda Wheeley
Michele Aust
Michele P. Moon
Michelle S. Morris
Michelle T. Kennon and Melissa Kennon
Mildred W. Emerson, Clarence A. Emerson, Jr. and Robin K. Emerson
Milton Dickerson and Sherrie Darlene Dickerson
Minnie Lee Cox
Mitch and Stephanie
Mitchell M. McEntire and Virginia McEntire
Morgan Blanchard Thompson
Munsey R. Jones and Judieth W. Jones
Myra P. Cathey and Anthony Cathey
Nadine L. Maness Life Estate Indian Village
Nancy H. Weatherford
Nancy M. Evans and Sherry Ellen Evans Reynolds
Nancy Roscoe Hughes
Nasser Hallaji and Violet Ann Hallaji
Neil R. Fedin and George Thomas Foster
Nellie Mann and William Franklin King
Nicole Spiven
Nicole Tafton Balderas and Jose Juan Balderas Camargo
Norma Blakey
Norman Lehnhardt
Noyd Grayson Eaton and Joseph T. Eaton
Otis L. Foster and Louise J. Foster
Owen McKenzie Living Trust and Marta

McKenzie Living Trust c/o Butch McKenzie
Pamela J. Muller
Pamela Knowles Isley and William Jerry Isley
Patsy Sharon Patterson
Patty Johnson Wilson
The Herman Colon Johnson Irrevocable Trust of December 2012
Paul Bennett East, Jr. and Samuel D. East
Paul Edward Robertson
Paul Franklin Wilson
Paul G. and Zenella R. Radford
Pearl T. Mansfield
Peggy R. Dishmon
Peggy W. May and Donnie L. Warren
Perry Blanchard Slade and Jack Daniel Slade
Pete Witty
Phaivanh Khamdy and Ketmany Khamdy
Phillip D. Hylton and Brenda L. Hylton
Phillip H. Brown
Phillip McCalister and Sheila McCalister
Phillip V. Cantrell and Donice J. Cantrell
Phillip W. Hutson and Susan H. Hutson
Phyllis B. Hunter
Phyllis Mitchell
Porter Lee Raines and Katie Travis Raines
Posey W. McBride
R.E. McCauley Heirs c/o Ralph McCauley
R.M. Jordan
Raeford A. Rogers and Janice A. Rogers
Ralph Loeb and Elizabeth H. Loeb
Ralph Lynn Denny
Ralph Robert Swink and Patricia Dewald Hall
Ramona Faye Millner
Randall and Janna Smith
Randy Alan Bryant
Randy C. Kernodle
Randy E. Bright and Yvonne H. Bright
Raven Lee Broeker and Cathi Jo Broeker
Ray Schaffer
Raymond Carl Thomas
Raymond D. Shisler and Anna M. Shisler
Raymond Devine and Michael L. Devine
Raymond William Batterman, Jr.
Rehwick G. James and Phyllis Rivers James
Reid N. Oakley and James Lynn Oakley
Reid Nash Oakley
Renee Womack
Rex R. Paschal and Bernice Paschal
Richard Belton and Darlene Belton
Richard G. Motley and Reva A. Motley
Richard Garner and Deborah Garner
Richard K. Lowe
Richard L. Rust and Lori R. Rust
Richie Belton and Darlene Belton
Rick King
Rickie S. Manuel
Ricky Dale Jones
Rinda G. Brewbaker
Robert and Marcia Cauthren
Robert Andrew Cagle
Robert B. Stump
Robert Benton Dishmon
Robert C. Teeters and Elva Teeters
Robert C. Warren, Jr. and Lena Kay Warren
Robert Charles Welch Basler and Jami Basler
Robert F. Brown and Karen V. Brown
Robert F. Rhodes
Robert F. Woody, Jr.
Robert H. Gillespie and Estelle Matherly Gillespie
Robert J. Mullis and Connie R. Mullis
Robert L. Carter and Peggy G. Carter
Robert Lee Martin, Jr. and Carolyn Estes Martin
Robert M. Walker and Elizabeth Walker
Robert Matthew Overby and Kathleen M. Overby
Robert Morris Pollok, Jr.
Robert R. Bennett and Mary C. Bennett
Robert S. Fonville
Robert T. Lunsford and Karen M. Lunsford
Robert Travis Mullen
Robert W. Hensley and Mary H. Hensley
Robert William Pollok
Robert Woodson Smith and Carol S. Smith
Robin Denise Morrow
Robin T. Mullins and Rodney E. Turner
Roderick Miller
Roger D. Moser and Tammy C. Moser
Roger H. Sisson and Marie L. Sisson
Ronald David Smith, Jr. and Johanna C. Smith
Ronald Eugene Turner
Ronald K. Ward and Doris H. Ward
Ronald M. Jordan II
Ronald Michael Jordan, II
Ronnie James Snowdy and Kimberly L. Snowdy
Roscoe D. Anderson Estate c/o Eric C. Anderson
Roy L. Tranbarger and Lelia Jones

Tranbarger
Roy R. Loftis and Judy J. Loftis
Roy Vanderhyde and Kathleen M. VanDerHyde
Ruby Hardin c/o Michael Harrison
Ruth Moore
Ruth S. Anderson
Ruthie Mae Johnson
Sadee Allen
Sam Bobby Stallings and Jean G. Stallings
Sam L. Coleman and Linda H .Coleman
Samantha Hatt
Samantha Parsons
Samuel Elliott Benton
Samuel Eugene Benton and Deborah Saul Benton
Samuel J. Adkins and Christie O. Adkins
Sandra Batterman Church
Sandra D. Payne
Sandra Madren Shoe
Sandra Thomas Jones
Sarah Faucette
Scot M. Gilbert and Louise M. Gilbert
Sean Leigh Moore and Lisa Moore
Seth Trevis Edwards and Whitney Poole Edwards
Sharon Patsy Patterson
Shawn Dwight Simpson and Karen Renee Firth
Shawn Gorman
Sherry B. Gunn
Sherry W. Burris and Ken Whitesell
Shiloh Daum
Shirley B. Baggerly c/o Stephen Clarke
Shirley McCain Miller
Stella H. Emerson
Stephen D. Joyce and Autumn S. Joyce
Stephen P. Wilson
Steve E. Smith and Michael David Hardingham
Steven D. Allen
Steven D. Cannon and Tambitha P. Cannon
Steve E. Smith and Michael David Hardingham
Steven L. Cobb and Cynthia Cobb
Steven L. Coleman and Debra C. Coleman
Sue I. Tipton and Laurence W. Tipton c/o Stan G. Abrams
Sue Nash Cox
Susan J. Tucker
Susano B. Jaimes
Sydney L. Miller, Keith L. Miller, Jr. et al.
Sylvia Hutson Cusumano and Linda Hutson Green
Sylvia Suriani
Taftan Nicole Balderas
Takwana Stout Hopkins
Tammy Ann Hale
Tangela D. Williams
Terry Haith
Terry J Powell et al c/o Conrad Powell
Terry J. Blackstock and George L. Blackstock, Jr.
Terry Scott and Pamela Scott
Terry Wayne Sawyer
The Allens
Thelma C. Bell
Thomas D. Newcomb, Jr.
Thomas De Wayne Brim and Monique Moore Brim
Thomas E. Annas
Thomas E. Echols, Ronnie W. Echols, Timothy K. Echols, and Norris E. Echols
Thomas E. Marsh
Thomas E. Tomerlin and Frances B. Tomerlin
Thomas Hiatt and Thomas Richard Hiatt
Thomas Michael Edwards
Thomas Michael Hand and Barry Spencer Frank
Thomas O. Martin and Amy G. Martin
Thomas R. Buccier
Thomas R. Wangard and Janice U. Wangard
Thomas S. Stump and Kathryn F. Stump
Thomas W. Pritchett and Lydia P. Brincefield
Tiffney Renee Jones
Tim Hamilton
Timothy Duke Roney c/o Carol Roney
Timothy L. Shelton and Elaine K. Shelton c/o Michael R. Stowe
Timothy M. Hale and Michelle P. Hale
Timothy Mark Barber and Danny Madison Barber
Timothy W. Moore and Patricia S. Moore
Todd H. Whitt and Joyce F. Whitt
Todd Sherrill
Toni D. Deaton and Tangela D. Williams
Tony D. Estes and Christina Estes
Torrey L. Roach and Amanda R. Roach
Torry and Amy Roach
Tracey A. White
Tracey James
Travis Garrett

Trevor Wayne Hale
Trojan Smith and Suzanne Smith
Valerie Mae Stone
Van W. Walker
Velma Lorene Haynes Hutson
Velma Samuel Adkins Heirs c/o John R. Adkins
Vera Kernodle Bullock
Vernon Allen Morris, Jr. and Karen Rudd Morris
Vernon S. Wilson and Cora Marie Wilson
Vince DiGirolamo
Virgil Alexander Cochran
Virginia Ann Jones Wilmouth
Virginia B. Sharpe, et al
Virginia D. Moore
Virginia Mitchell Smithers and Allen Scott Mitchell
Vivian Parsons Parrish
W. Garland Lynn and Susan Lynn
Wade L. Ray and Amber L. Ray
Wallace D. Dishmon and Patricia W. Dishmon
Walter Donald Gerringer and Tammy Haizlip Gerringer
Walter E. Vanhorn and Patricia S. Halley
Walter H. James and Tracey W. James c/o Cathy R. Stroupe, P.A.
Walter H. James and Tracey W. James and Walter James
Walter L. Romine and Tammi H. Romine
Walter Randall Weddle
Walter Sanford Harrison, Jr. c/o Michael Harrison
Wanda H. Overby and J. Pete Overby
Wayne B. Perry and Doris R. Perry and Wayne B. Perry, Jr.
Wayne Hilliard Gillie
Wayne P. Rose and Donna T. Rose
Wayne S. Apple
Wendy P. Snow and Robert Lee Pruitt
Wesley T. French and Kristi M. French
Wetona Inez Moore
Willard L. Williams
William A. Emerson, II
William A. Lineberry
William Brian Chapmon and Meredith Lee Chapmon
William Clifford Steele, Jr.
William E Slade and Kay D. Slade
William G. Dougherty and Teresa D. Parks
William G. Williams and Margaret Williams
William H. Johnson and Geraldine Johnson
William H. Rogers, Jr. and Judith R. Rogers
William Henry Price, Jr.
William Holt Boone and Wilma Byrd Boone
William I. Crabtree and Carolyn W. Crabtree Crabtree Family Irrevocable Trust
William Jerry Fonville, Jr.
William Jerry Fonville, Jr. c/o Belinda Beeson
William K. Strader
William K. Tapscott and Roxanne O. Tapscott
William Leonard Merritt
William Lynwood Irving
William M. Hales and Lisa S. Hales
William Melvin Pickrell and Mary Ann Pickrell
William Michael Spain and Ashley Nicole Hardy
William R. Lowry
William Roger Cobb, Jr.
Az William S. Jones et al
William Seth Rascoe
William Simpson and Wanda Simpson
William T. Strickland and Ellen S. Roberts
William Timothy Walker
Wilma Anne Johnson and Andrew Nathaniel Johnson
Xanthan William Lee and Charmin Britt Lee
Yesica Becerra
Yvonne Martin Whitt
Zachary Michael Neefe and Elizabeth Seaks Neefe
The Jimmy H. Coble Revocable Trust dated April 13, 2000

APPENDIX B.1 Project Overview Maps



Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
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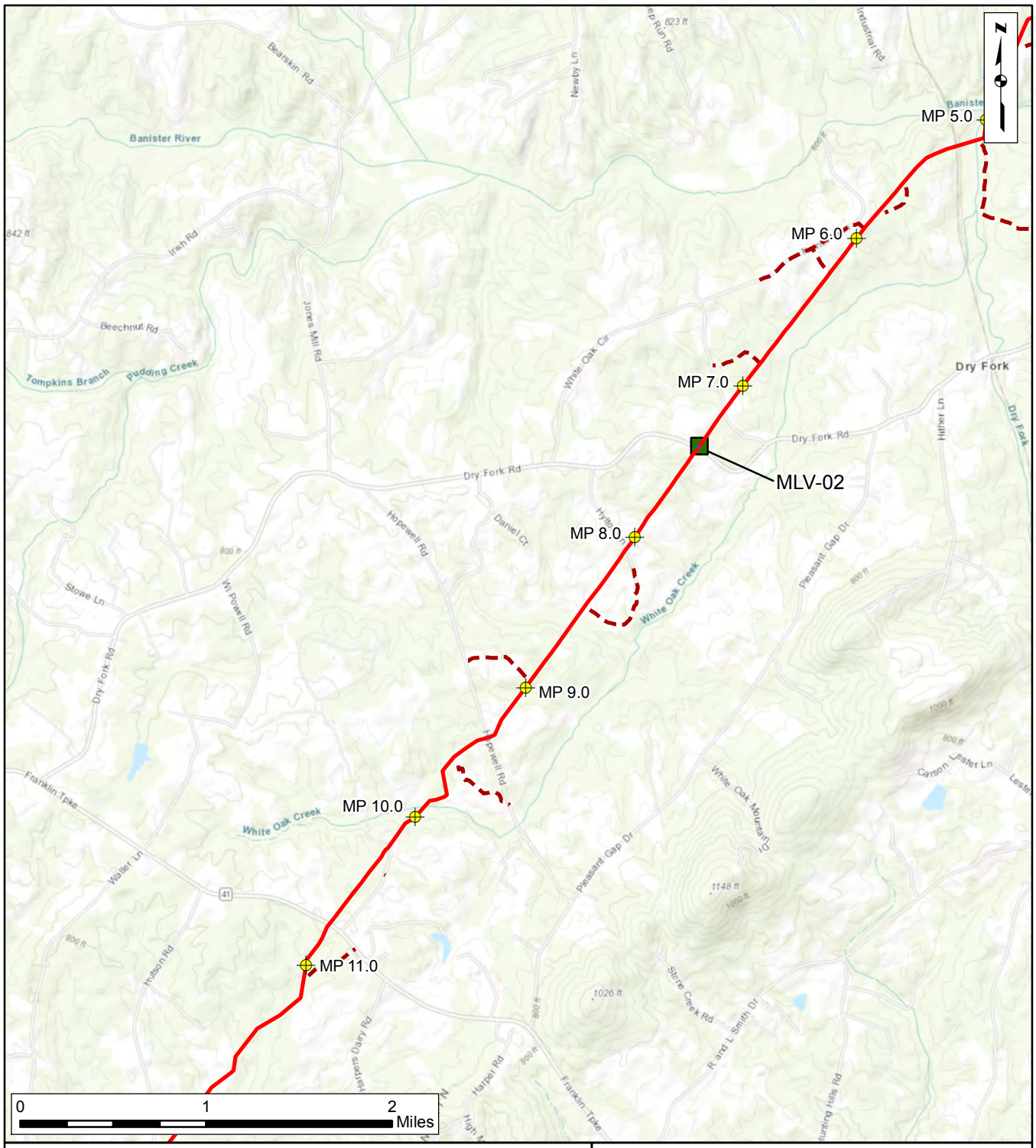

Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
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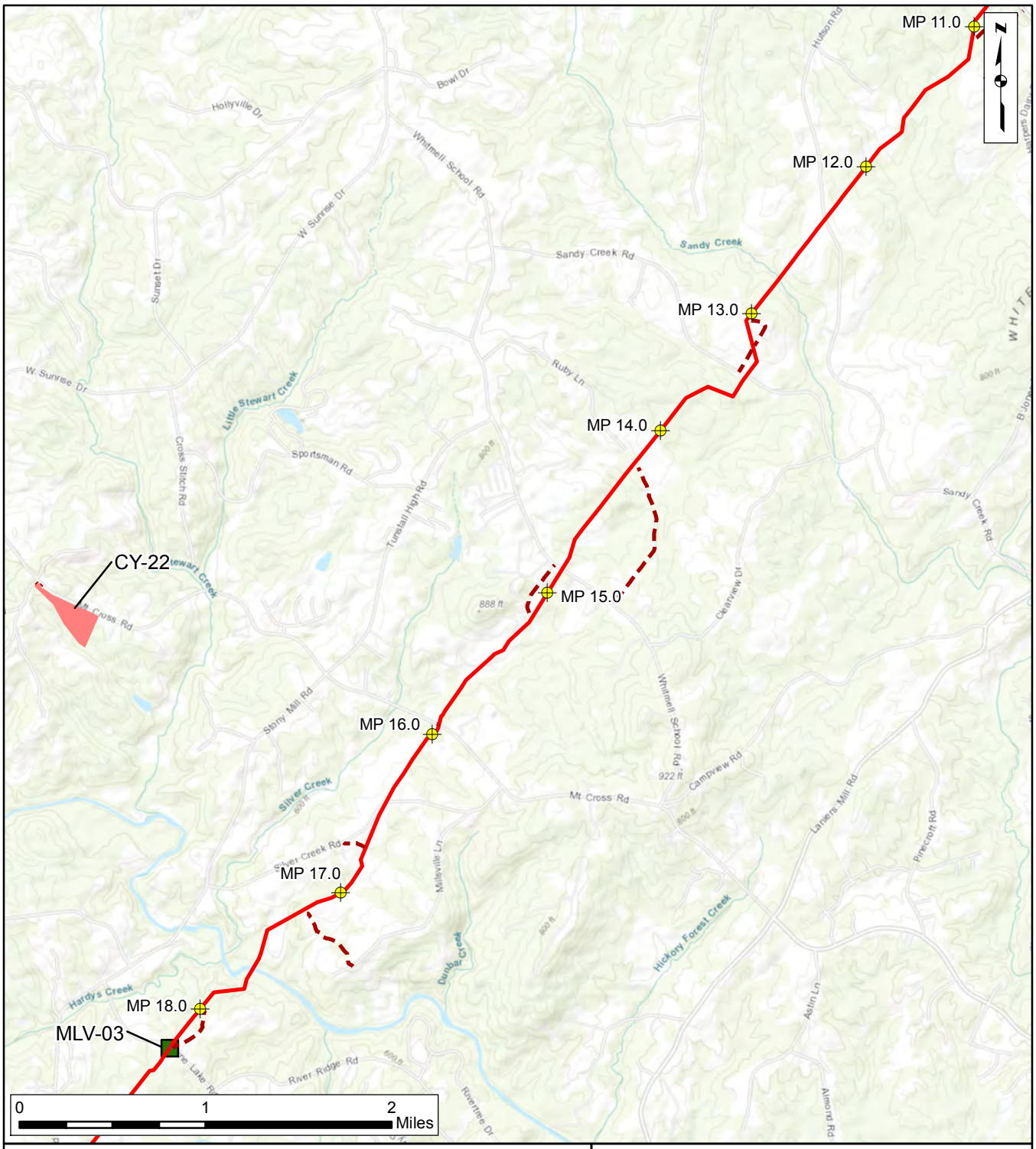

Appendix B.1

MVP Southgate Project

Project Overview Map
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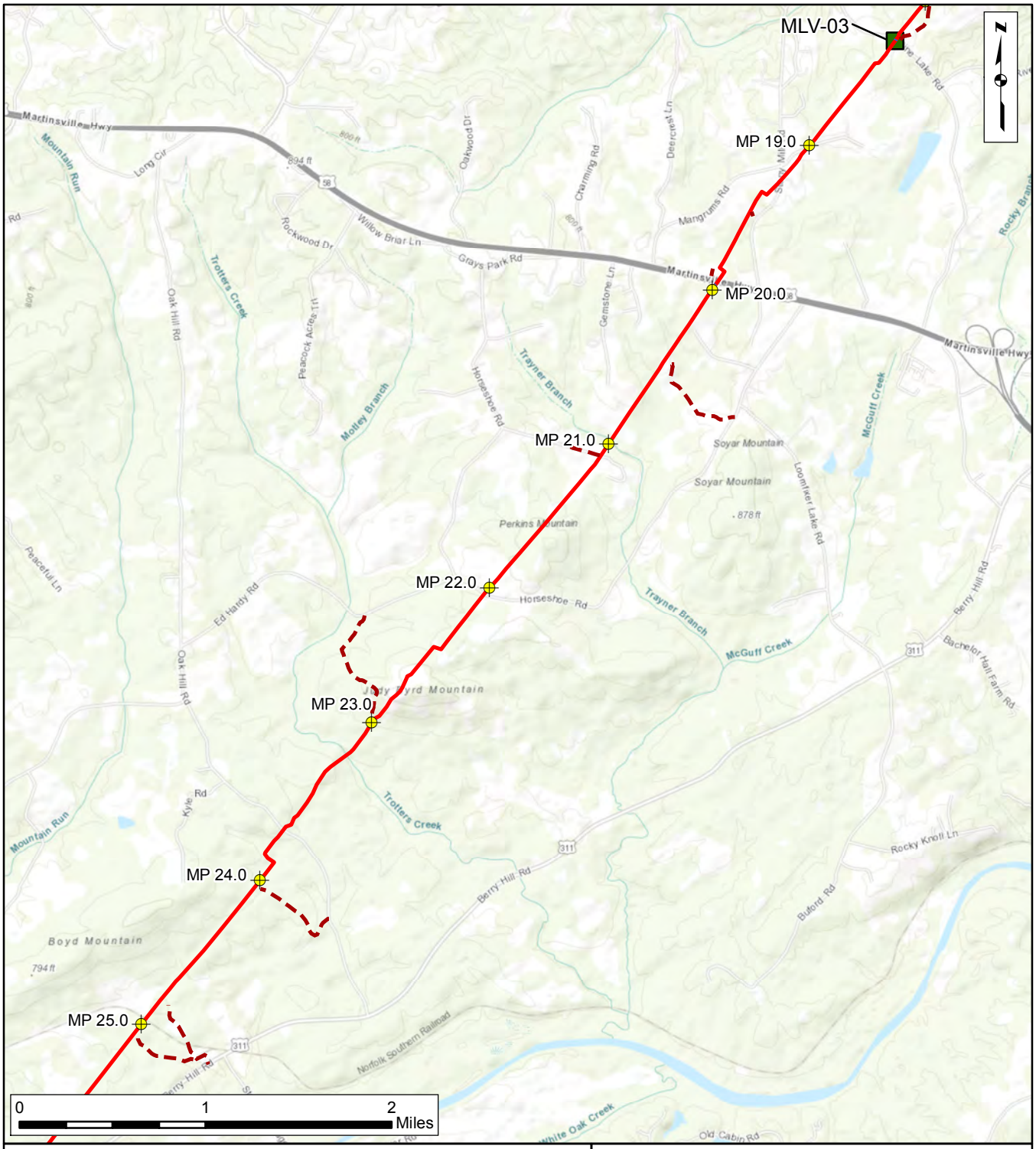

Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
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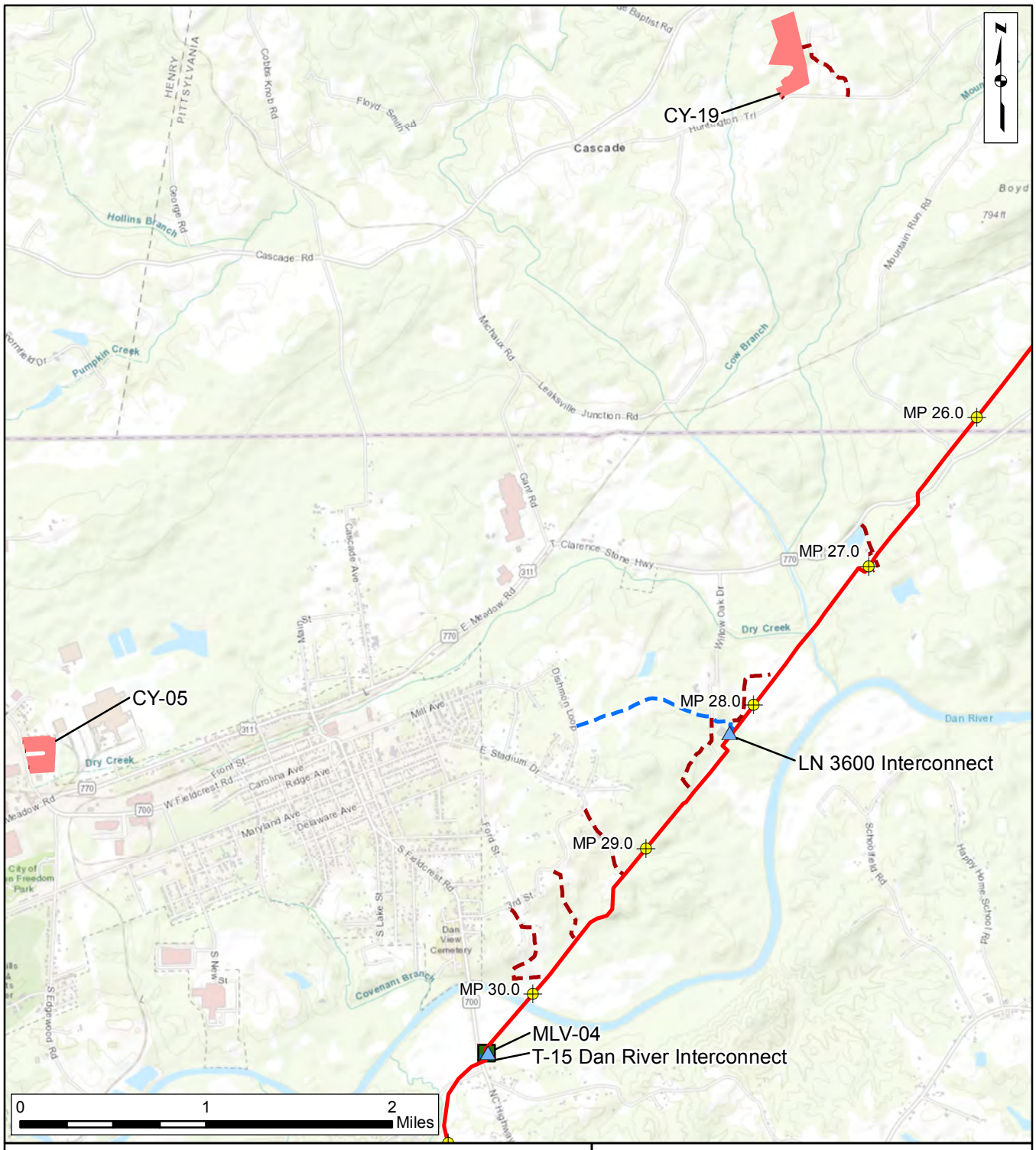
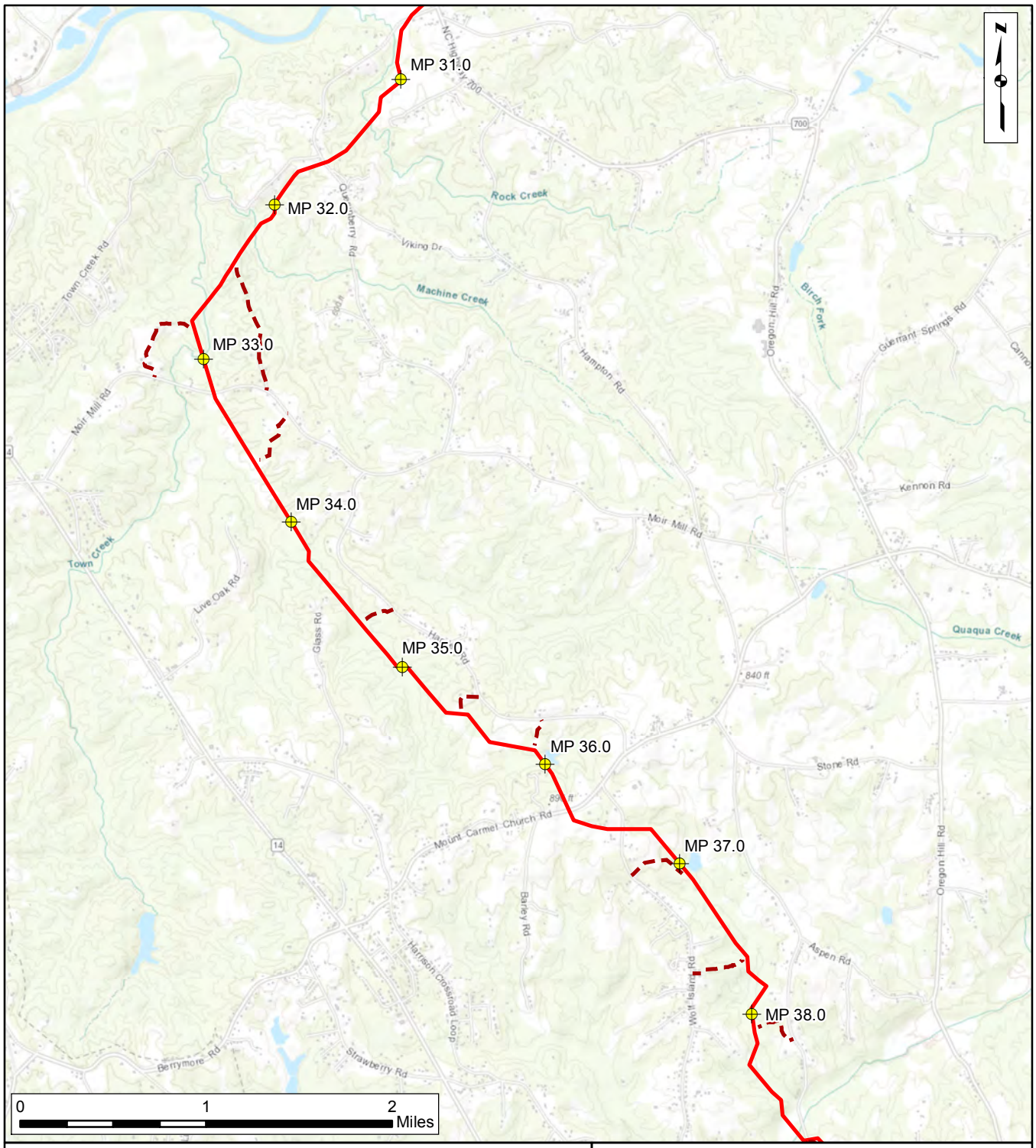


Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
Page 5 of 14



Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
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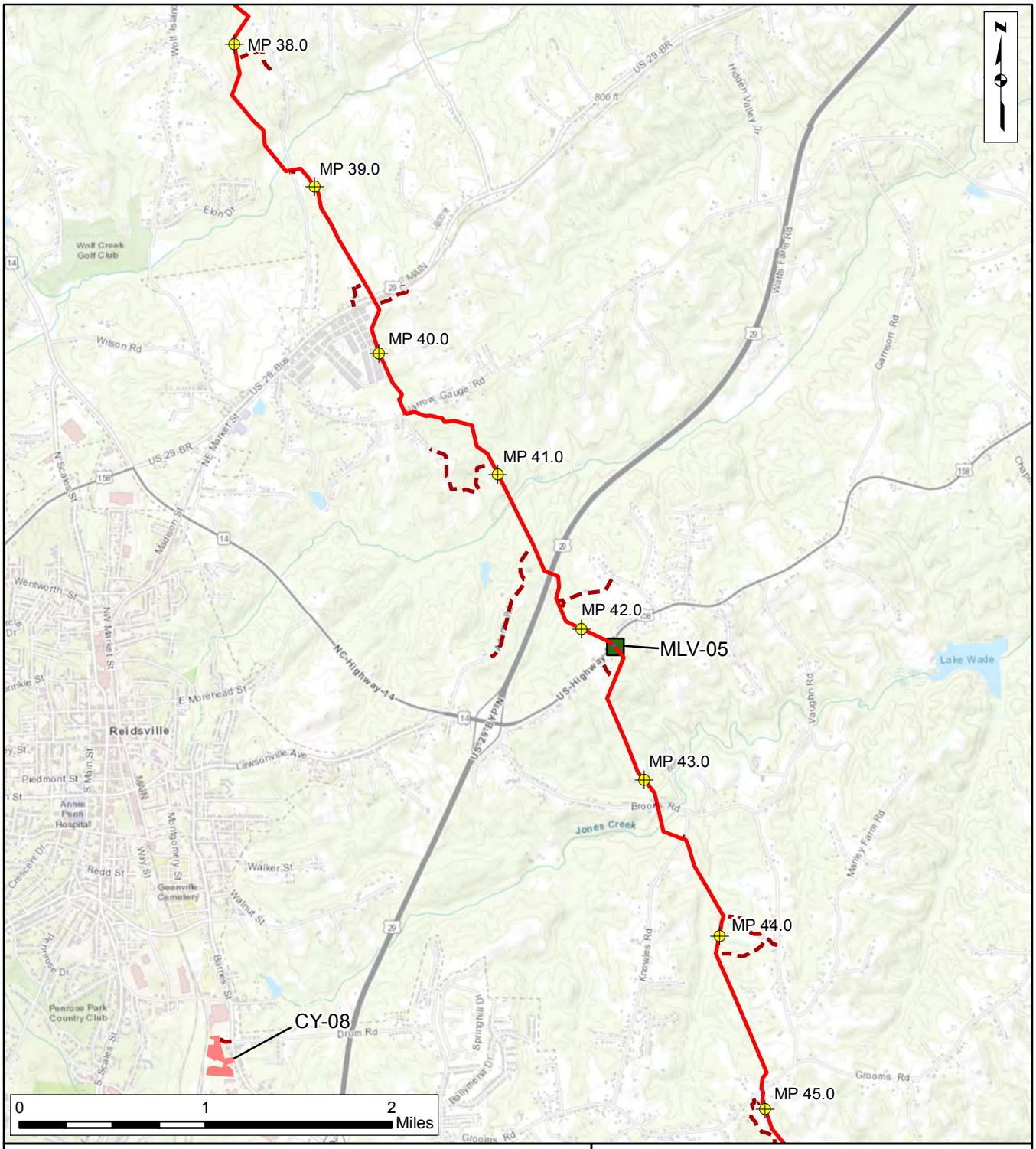

Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
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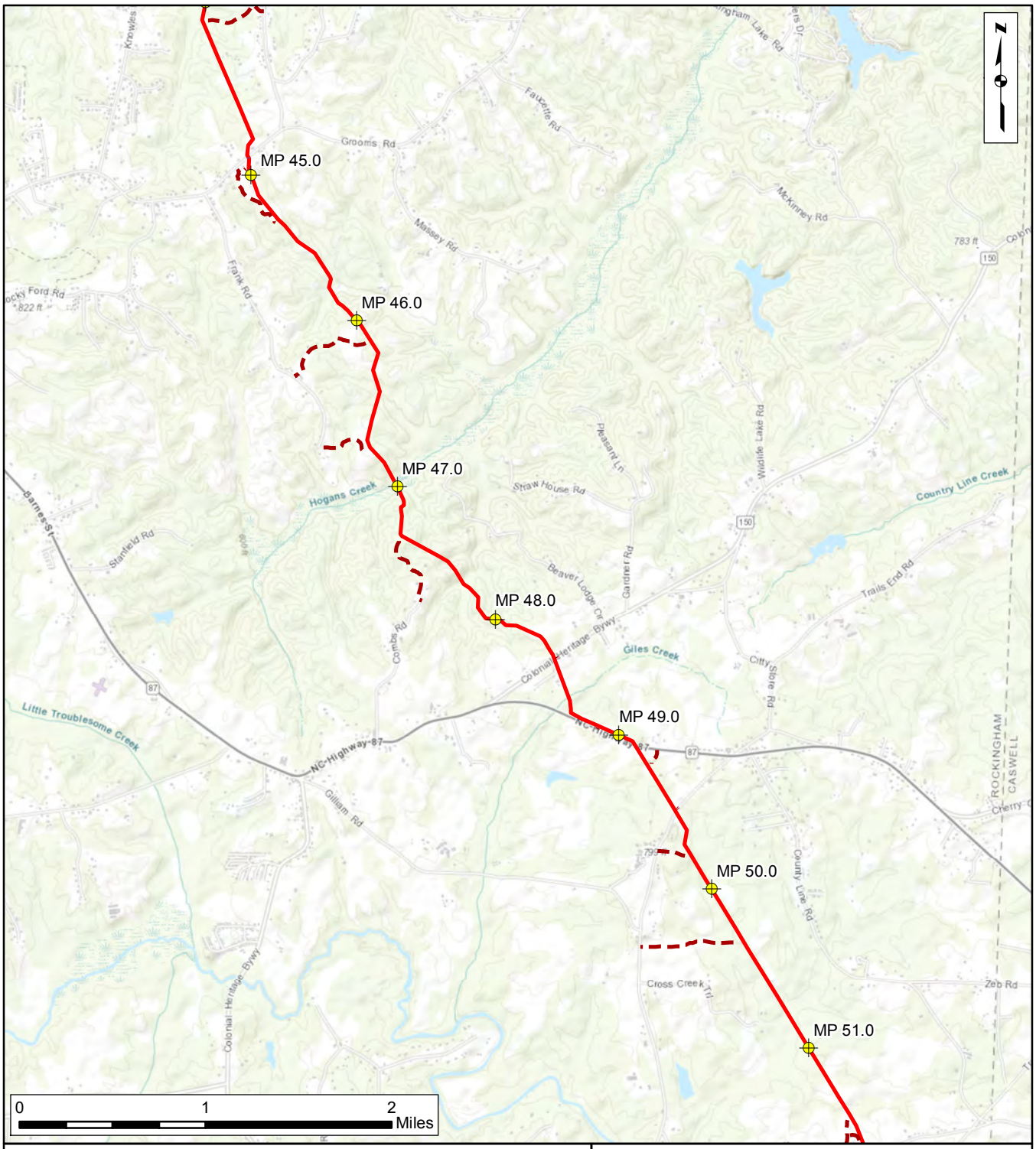

Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
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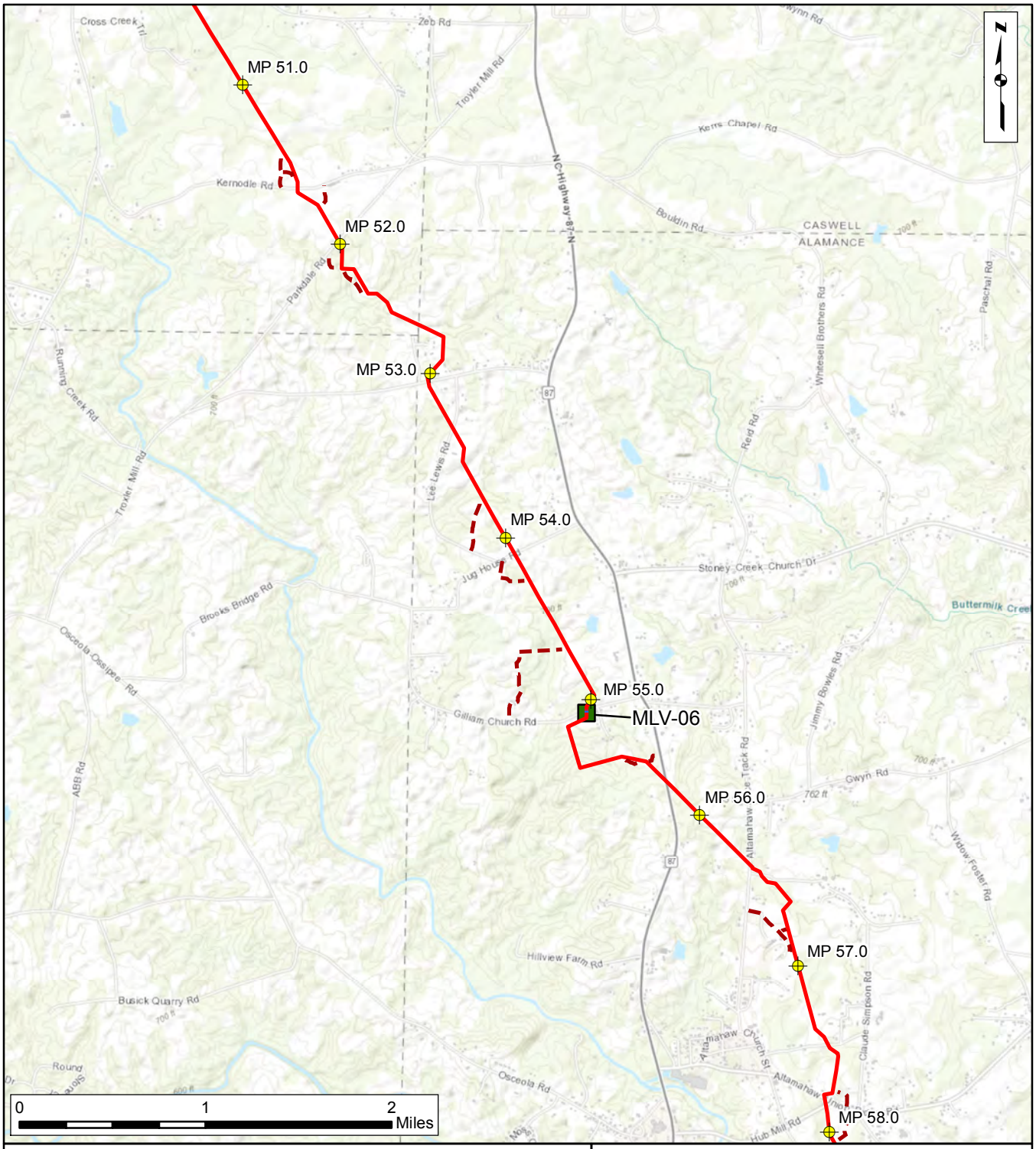

Appendix B.1

MVP Southgate Project

Project Overview Map
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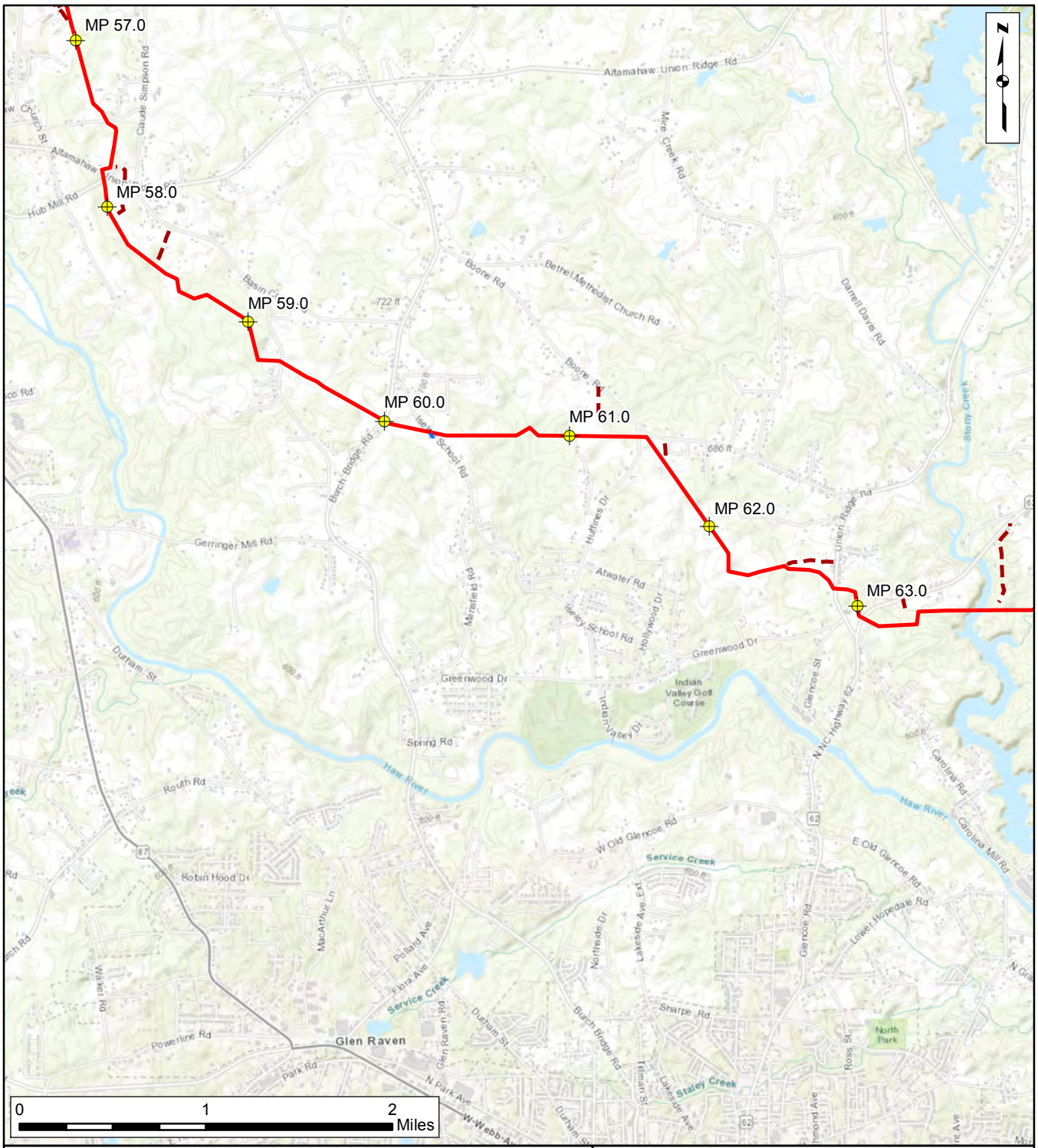

Appendix B.1

MVP Southgate Project

Project Overview Map
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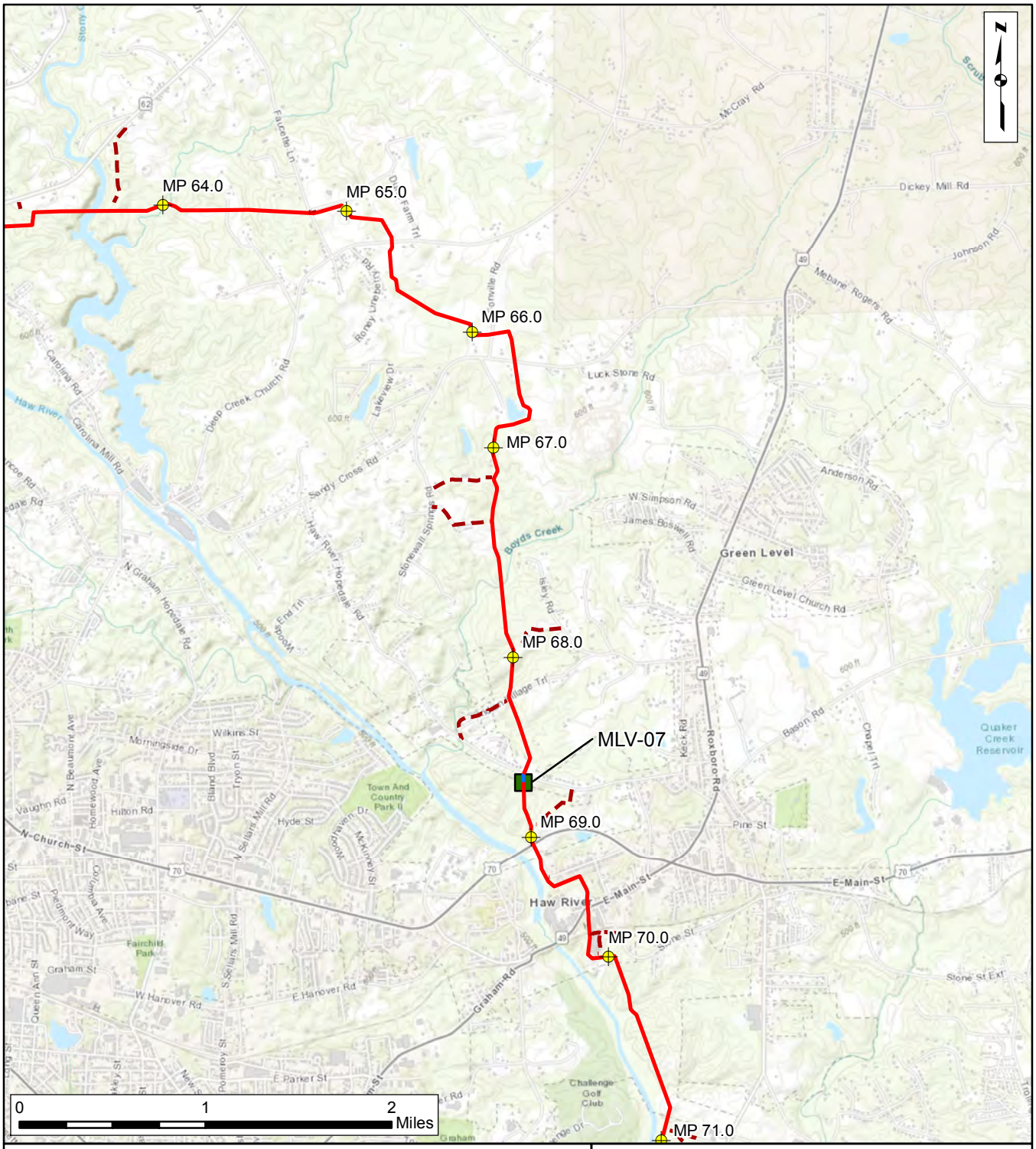
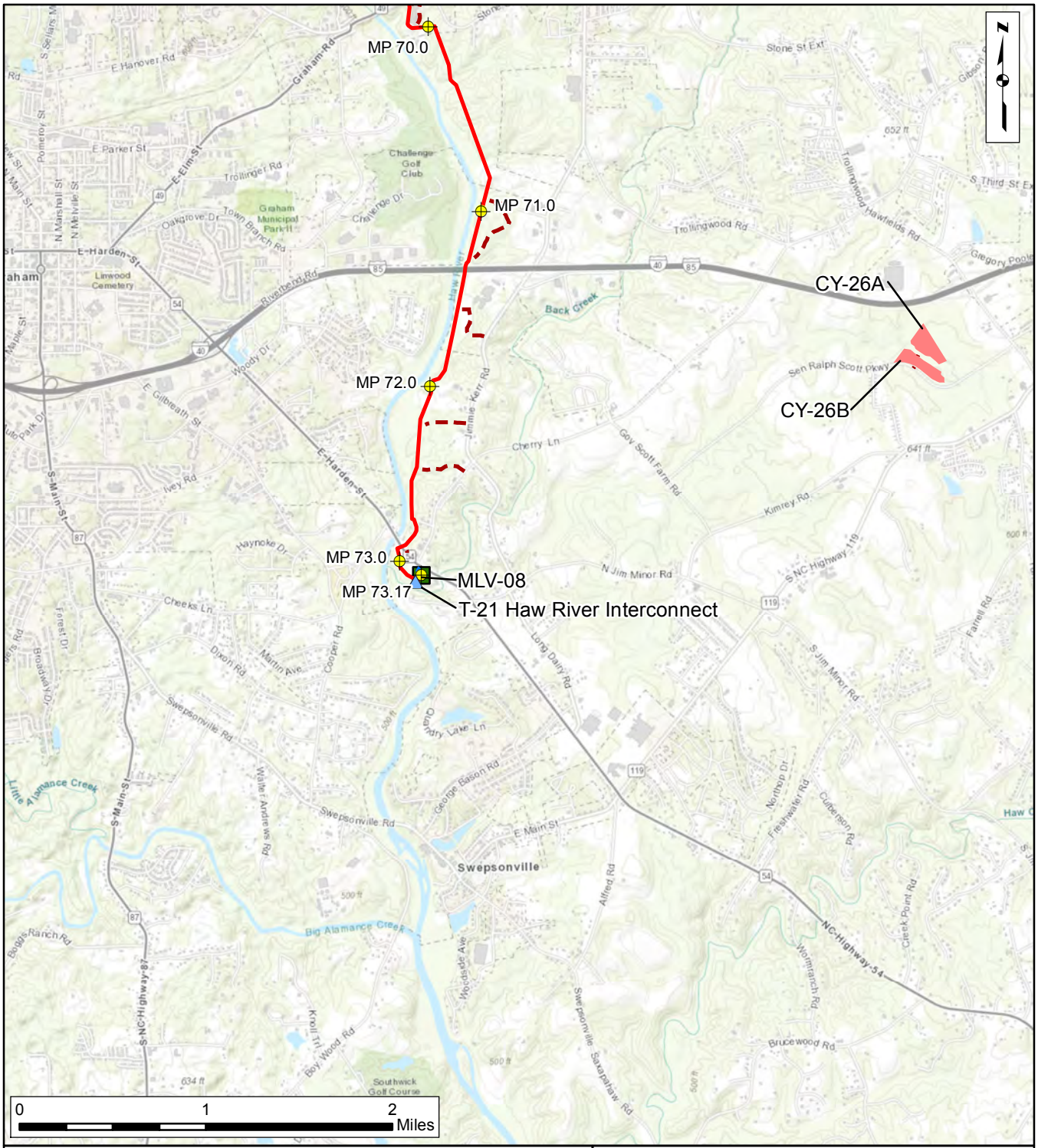


Appendix B.1

MVP Southgate Project

Project Overview Map
Page 11 of 14

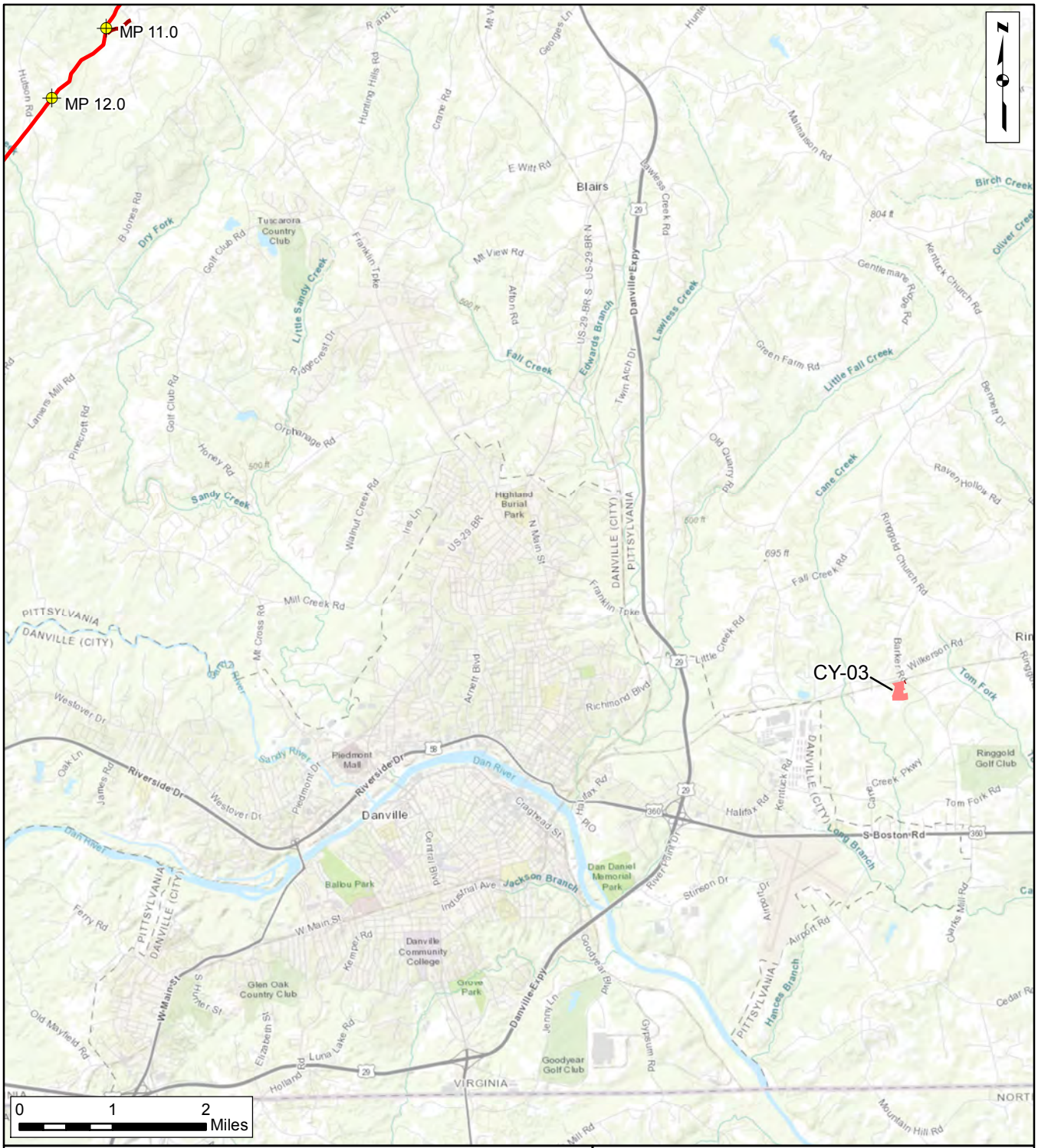


Milepost
Proposed Pipeline Route
Permanent Access Road
Temporary Access Road
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
Page 12 of 14



Milepost
Proposed Pipeline Route
Permanent Access Road
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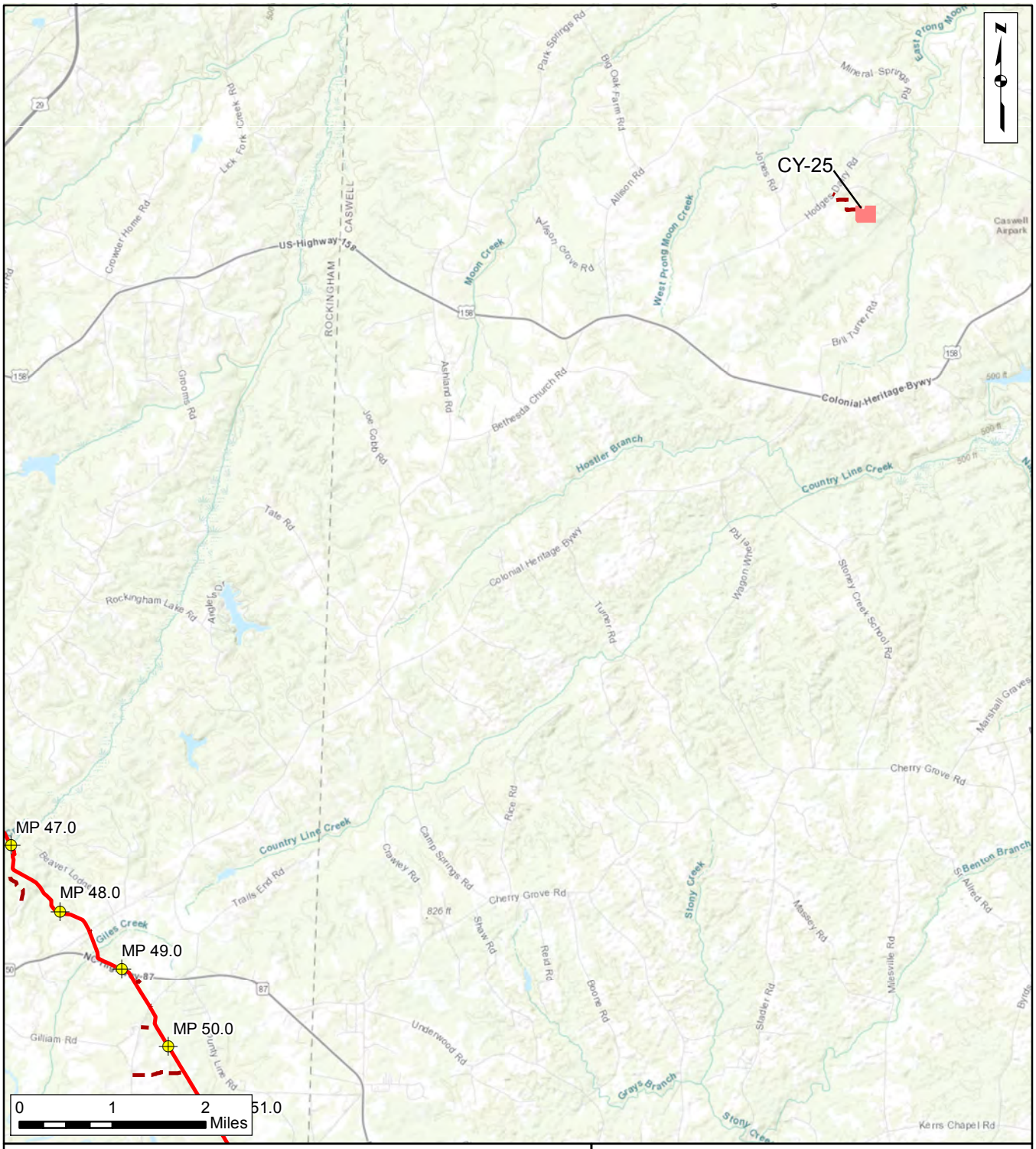
Mainline Valve
Yard
Meter Station/Interconnect
Compressor Station

Appendix B.1

MVP Southgate Project

Project Overview Map
Page 13 of 14



Milepost
Proposed Pipeline Route
Permanent Access Road
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Compressor Station

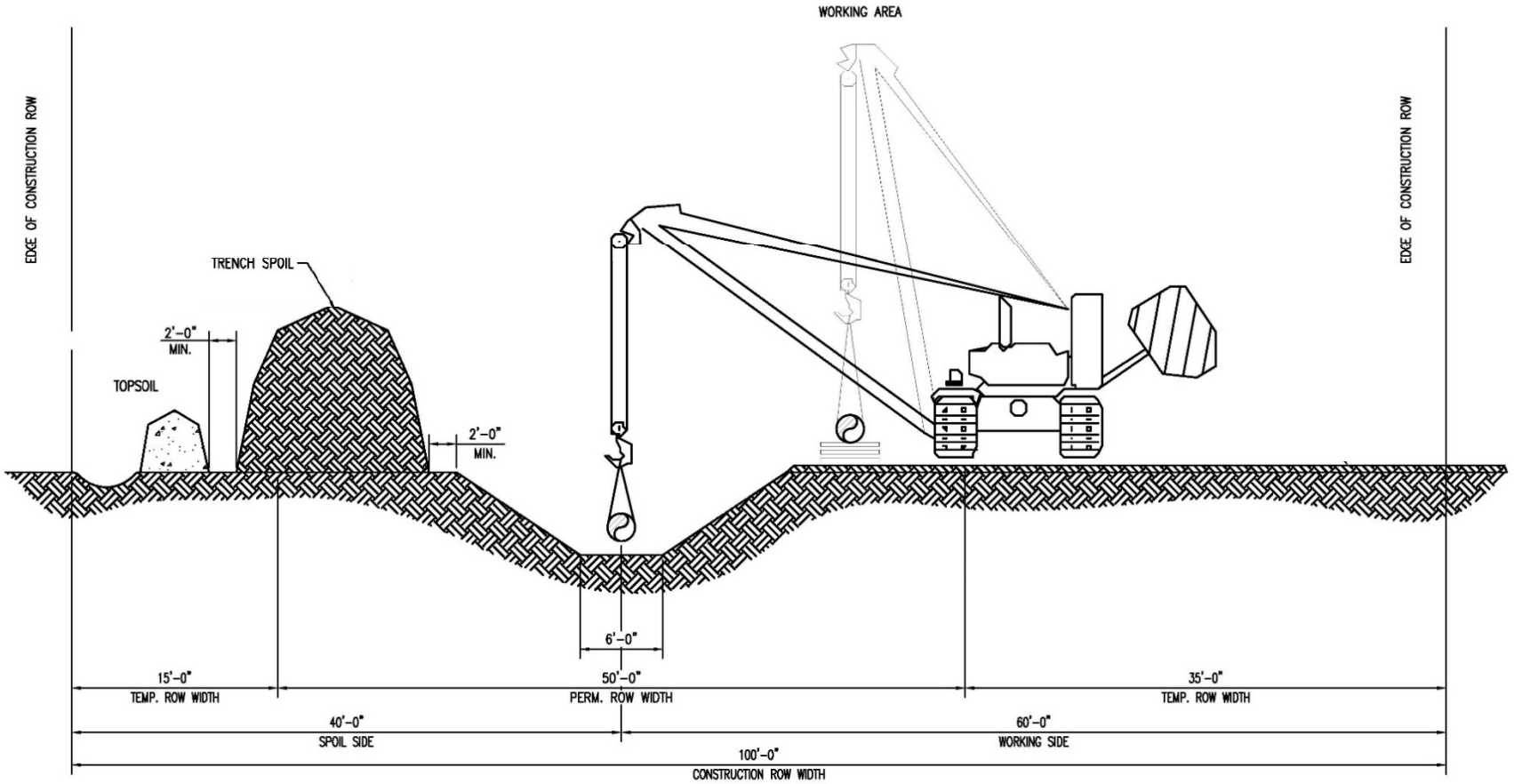
Appendix B.1

MVP Southgate Project

Project Overview Map
Page 14 of 14

APPENDIX B.2

Typical Right-of-Way Configurations

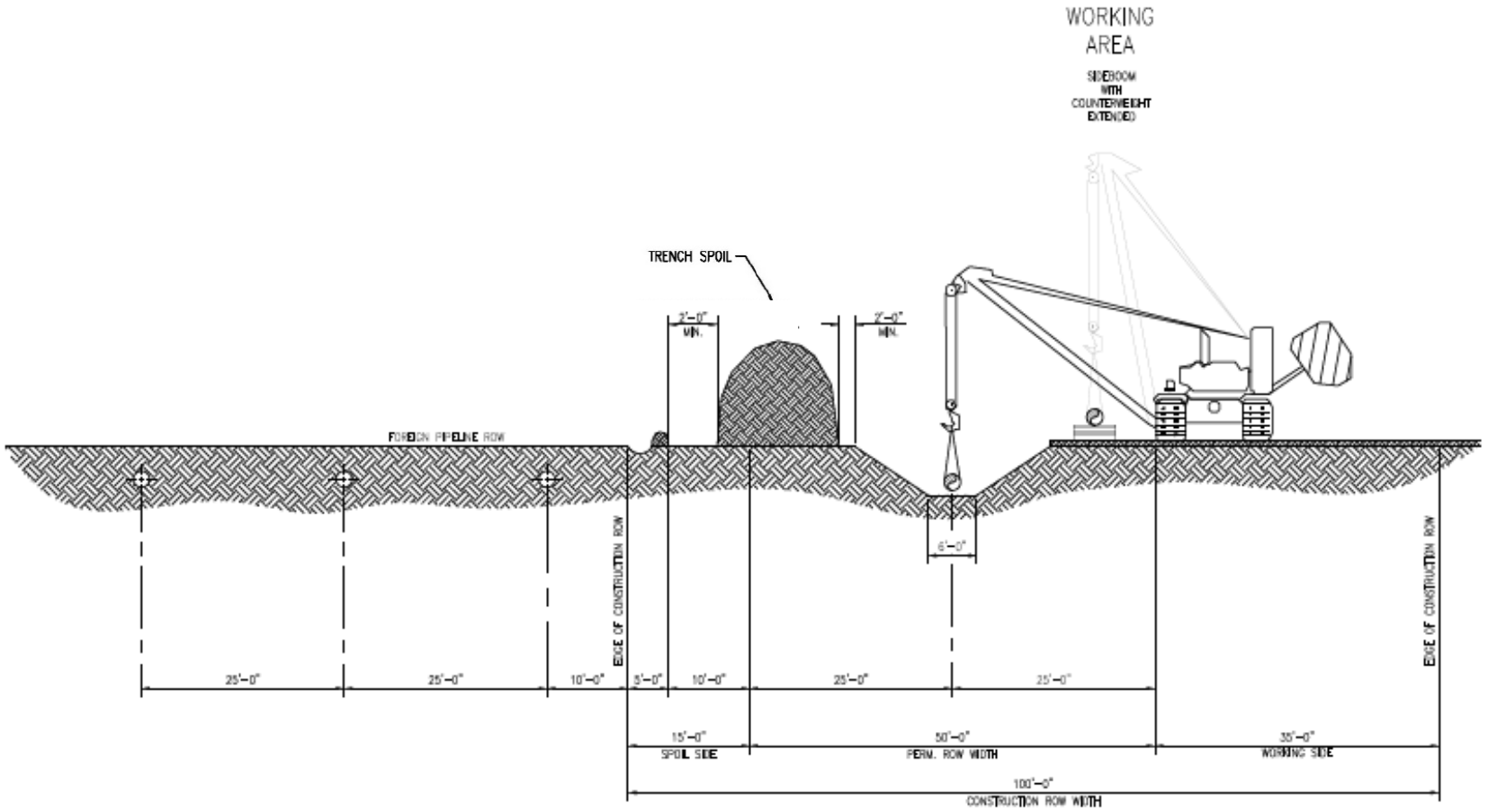


NOTE:
1. DRAWING DEPICTS SOIL SWELL OF 20% AND ROCK SWELL OF 40%.
2. DRAWING ASSUMES TYPE "C" SOIL

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Source: Mountain Valley Pipeline LLC FERC Application

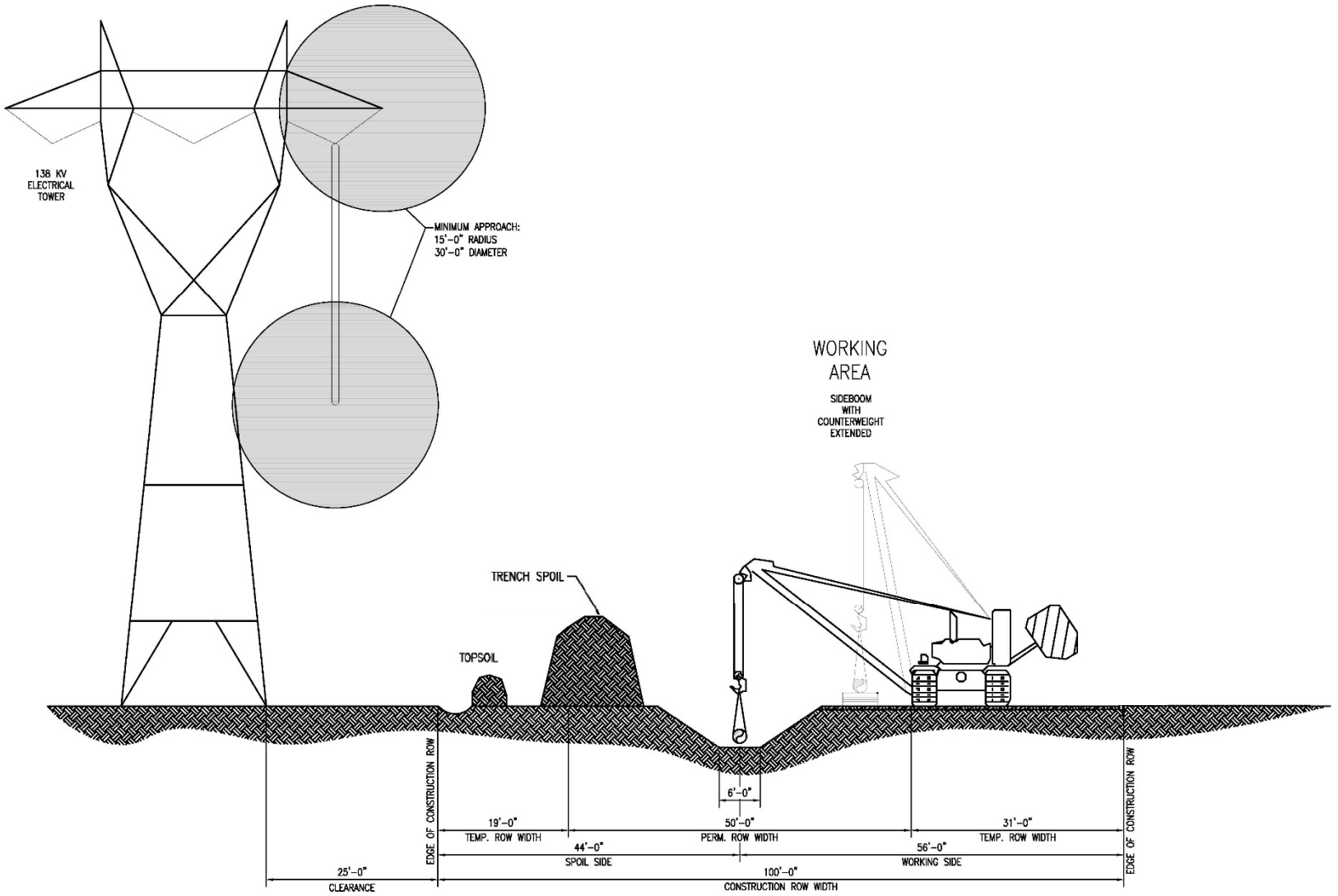
B.2-1
Southgate Project
Mainline Construction
Non-Parallel Construction
With Top Soil Segregation
100' Right of Way



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Source: Mountain Valley Pipeline LLC FERC Application

B.2-2
Southgate Project
Mainline Construction
Parallel to Foreign Lines
Construction With Top Soil Segregation
100' Right of Way

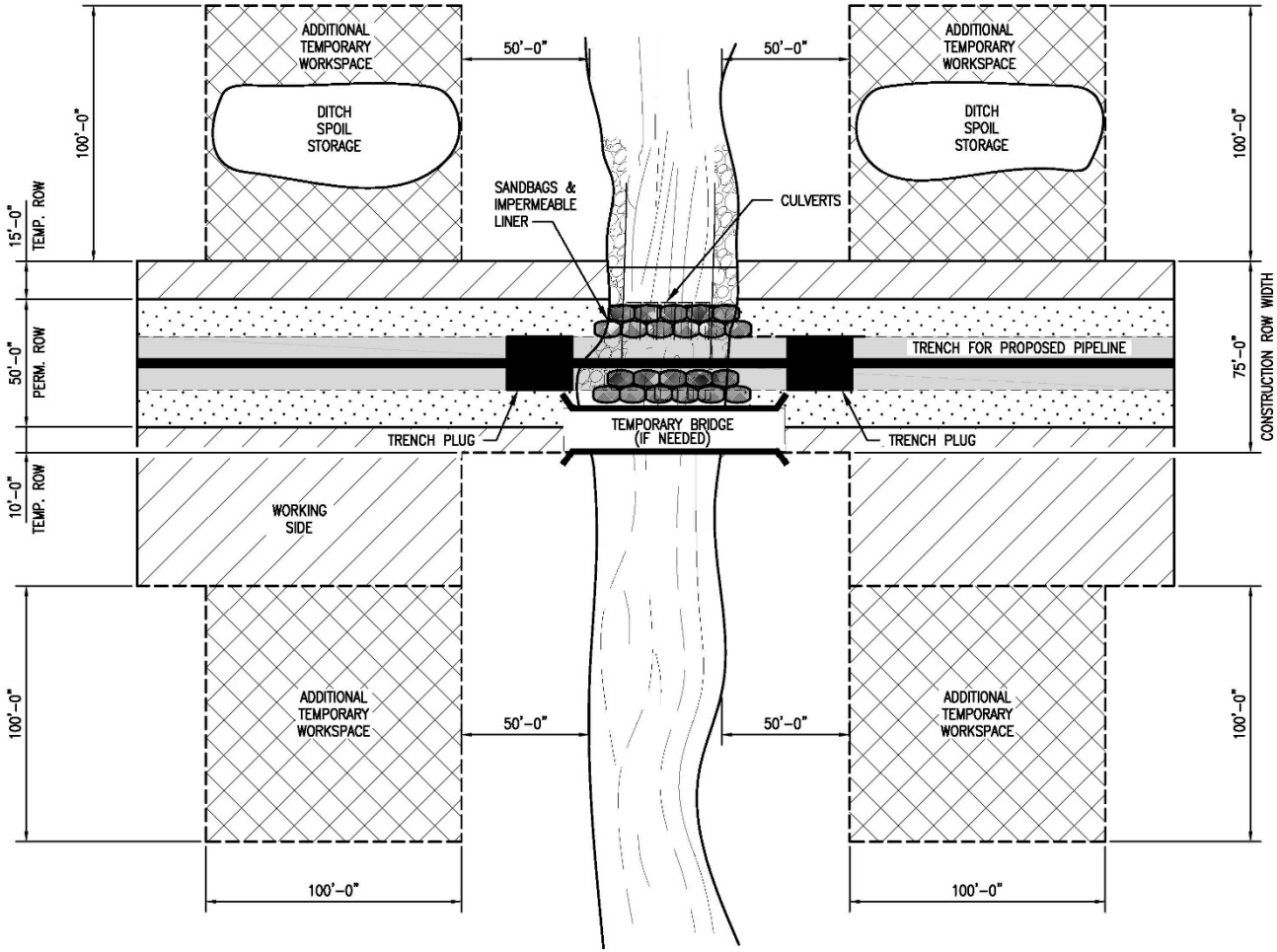


THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Source: Mountain Valley Pipeline LLC FERC Application

B.2-3
Southgate Project
Mainline Construction
Parallel to Power Lines
100' Right-of-Way



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DRAWING ASSUMES TYPE "C" SOIL

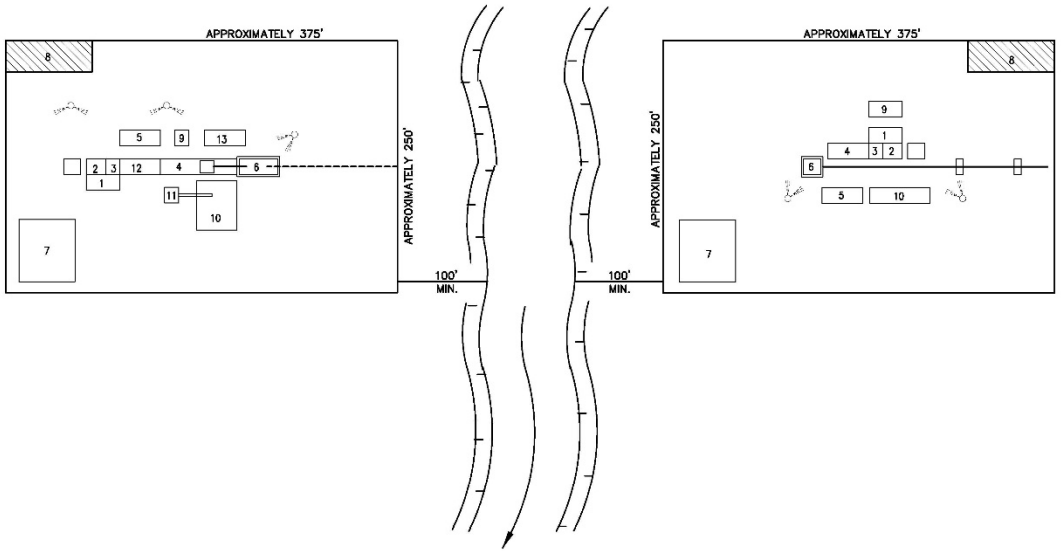
Source: Mountain Valley Pipeline LLC FERC Application

B.2-4
Southgate Project
Mainline Construction
Waterbody Crossing
Open Cut – Flume

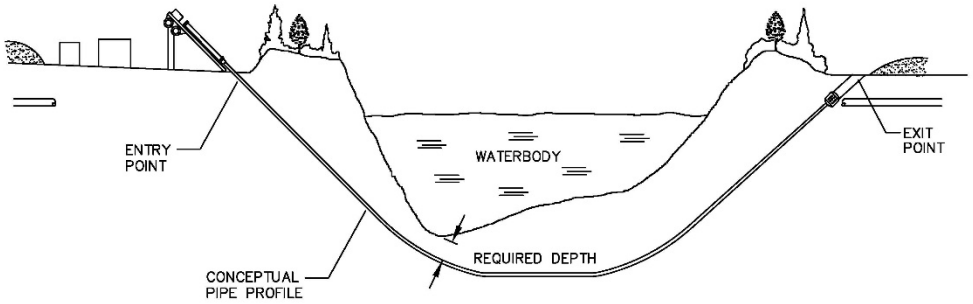
EQUIPMENT:

1. SPOIL CONTAINER: 8' X 20'
2. SHAKER: 8' X 12'
3. DESILTER: 8' X 8'
4. MUD RIG: 8' X 25'
5. SUPPLY TRAILER: 8' X 25'
6. EXIT PIT: 8' X 10'
7. STORAGE: 30' X 30'
8. VEHICLE PARKING: 15' X 50'
9. DEWATERING UNIT: 8' X 20'
10. PIPE TRAILER: 8' X 40'

HORIZONTAL DIRECTIONAL DRILL METHOD 7



PLAN



PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERCOURSE. DO NOT CLEAR OR GRADE WITHIN THE 100 FOOT ZONE.
2. ENSURE THAT ONLY BENTONITE BASED DRILLING MUD IS USED. DO NOT ALLOW THE USE OF ANY ADDITIVES TO THE DRILLING MUD WITHOUT THE APPROVAL OF COMPANY INSPECTOR.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERCOURSE.
4. INSTALL BERMS DOWNSLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
5. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.
6. A SEDIMENT BARRIER SHALL BE PLACE ON THE DOWN SLOPE SIDE OF THE RIGHT-OF-WAY, PER THE PROJECT NARRATIVE.

NOTES:

1. EQUIPMENT ORIENTATION MAY VARY DEPENDING ON CONTRACTOR OR SITE CONDITIONS.
2. EQUIPMENT TO BE SUPPORTED ON THE GROUND SURFACE OR TIMBER MATS AS CONDITIONS DICTATE.
3. SILT FENCE, BERMS AND/OR STRAW BALE BARRIER TO BE USED AS REQUIRED TO PREVENT IMPACTS FROM OCCURRING OUTSIDE OF PROJECT LIMITS.
4. HAND CLEARED ACCESS PATH WILL BE USED TO OBTAIN WATER FROM SOURCE WHERE PERMITTED.
5. ENTRANCE & EXIT ANGLES VARY BY LOCATION. REFER TO BORE PROFILE FOR DETAILED INFORMATION.

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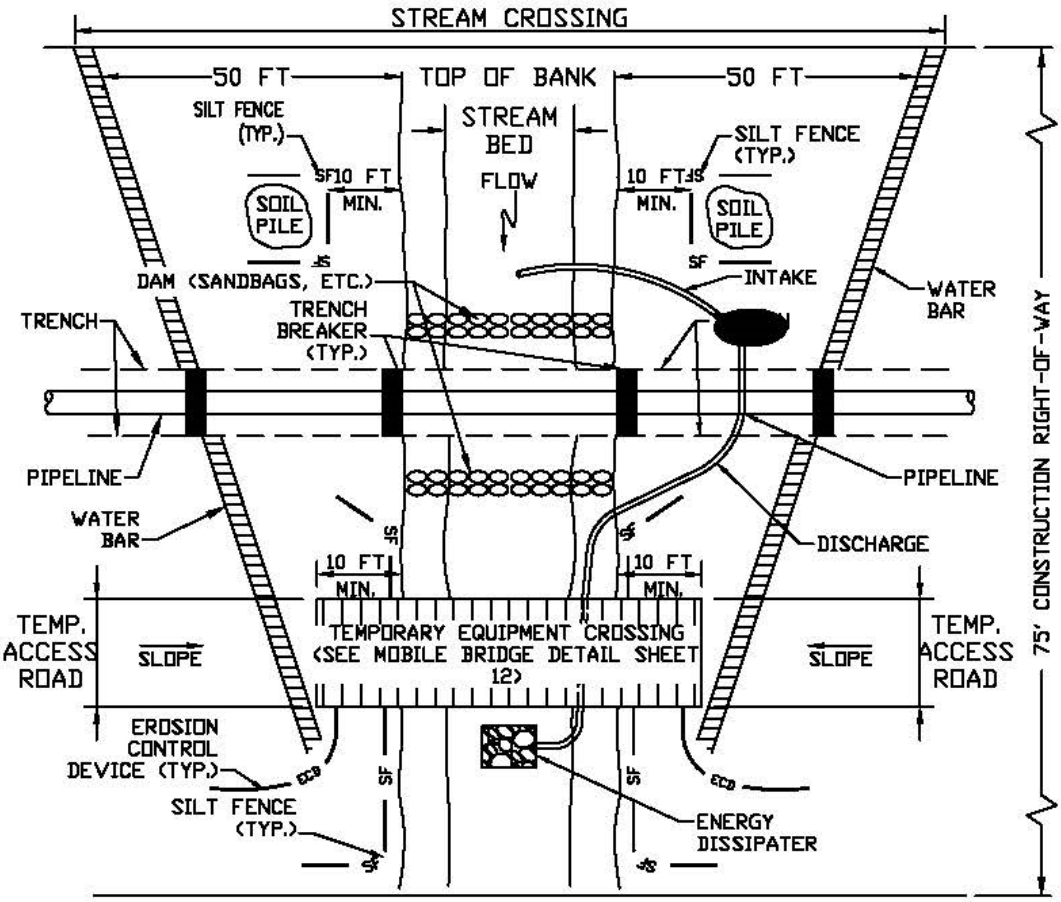
DRAWING ASSUMES TYPE "C" SOIL

Source: Mountain Valley Pipeline LLC FERC Application

B.2-5
Southgate Project
Mainline Construction
Horizontal Directional Drill
(HDD)



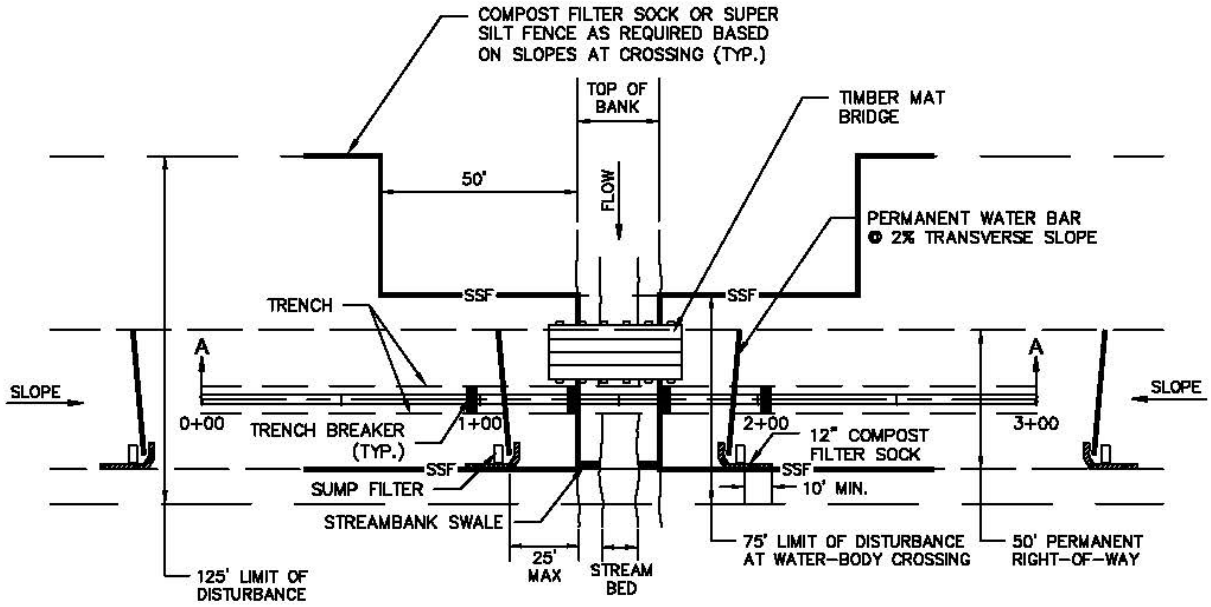
PLAN VIEW

NOTES:

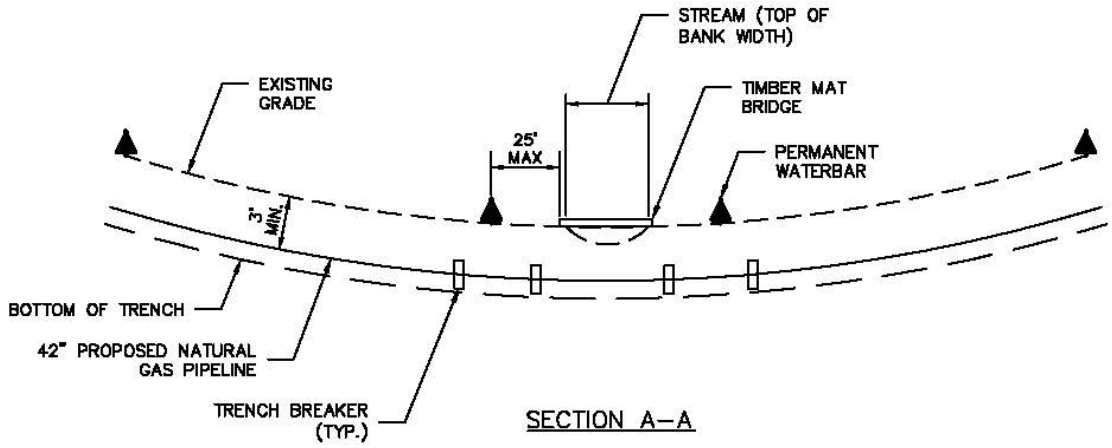
1. INSTALL EROSION CONTROL DEVICES, TRENCH BREAKERS, PUMP, ENERGY DISSIPATER, AND DAMS BEFORE TRENCHING STREAM.
2. PUMP MUST BE OF SUFFICIENT CAPACITY TO CONVEY NORMAL AND/OR EXISTING STREAM FLOW OVER TRENCH. A BACK-UP PUMP OF EQUAL CAPACITY MUST BE AVAILABLE ON-SITE DURING CONSTRUCTION OF THE PIPELINE CROSSING. PUMPS WILL BE PLACED WITHIN SECONDARY CONTAINMENT.
3. PLACE SOIL PILES A MINIMUM OF 10 FEET FROM TOP OF BANK.
4. INSTALL WATER BARS AT APPROACHES TO STREAM CROSSING AND EROSION CONTROL DEVICES, SILT FENCE, OR SUPER SILT FENCE (AS INDICATED ON PLAN SHEETS).
5. MAINTAIN SURFACE OF TEMPORARY EQUIPMENT CROSSING TO PREVENT SOIL DISCHARGES TO STREAM.
6. APPROACHES TO CROSSINGS ARE NOT TO EXCEED A DEPTH OF 6 INCHES ABOVE ORIGINAL GRADE.
7. RESTORE AREA TO ORIGINAL CONTOURS.

Source: Mountain Valley Pipeline LLC FERC Application

B.2-6
Southgate Project
Stream Crossing
Dam and Pump



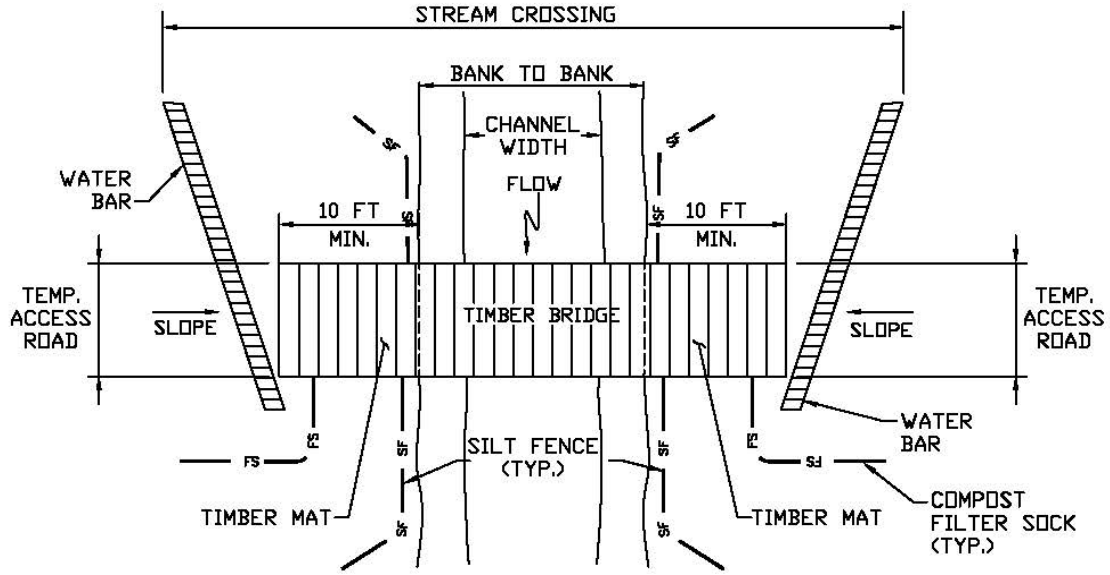
PLAN



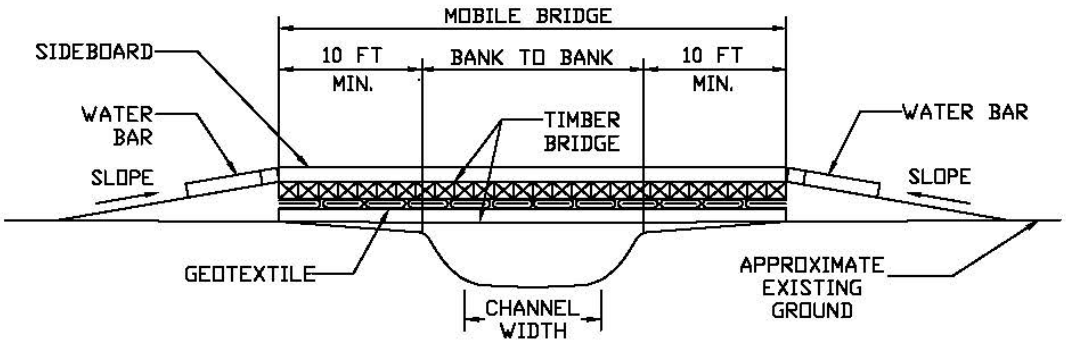
SECTION A–A

Source: Mountain Valley Pipeline LLC FERC Application

B.2-7
Southgate Project
Timber Mat Bridge
Stream Crossing



PLAN VIEW



CROSS SECTION - MOBILE BRIDGE

NOTES:

1. INSTALL WATER BARS OR SILT FENCE AT APPROACHES TO STREAM CROSSING AND COMPOST FILTER SOCKS ALONG STREAM BANKS. INSTALL COMPOST FILTER SOCK AT OUTLET OF WATER BARS.
2. MAINTAIN SURFACE OF TEMPORARY EQUIPMENT CROSSING TO PREVENT SOIL DISCHARGES TO STREAM.
3. APPROACHES TO CROSSINGS ARE NOT TO EXCEED A DEPTH OF 6 INCHES ABOVE ORIGINAL GRADE.
4. GEOTEXTILE LINER TO COME UP ON THE SIDES OF THE BRIDGE A MINIMUM OF 18".
5. SIDEBOARDS TO BE ATTACHED TO THE UPPER DECK. GEOTEXTILE TO BE WRAPPED AROUND SIDEBOARDS PRIOR TO FASTENING.

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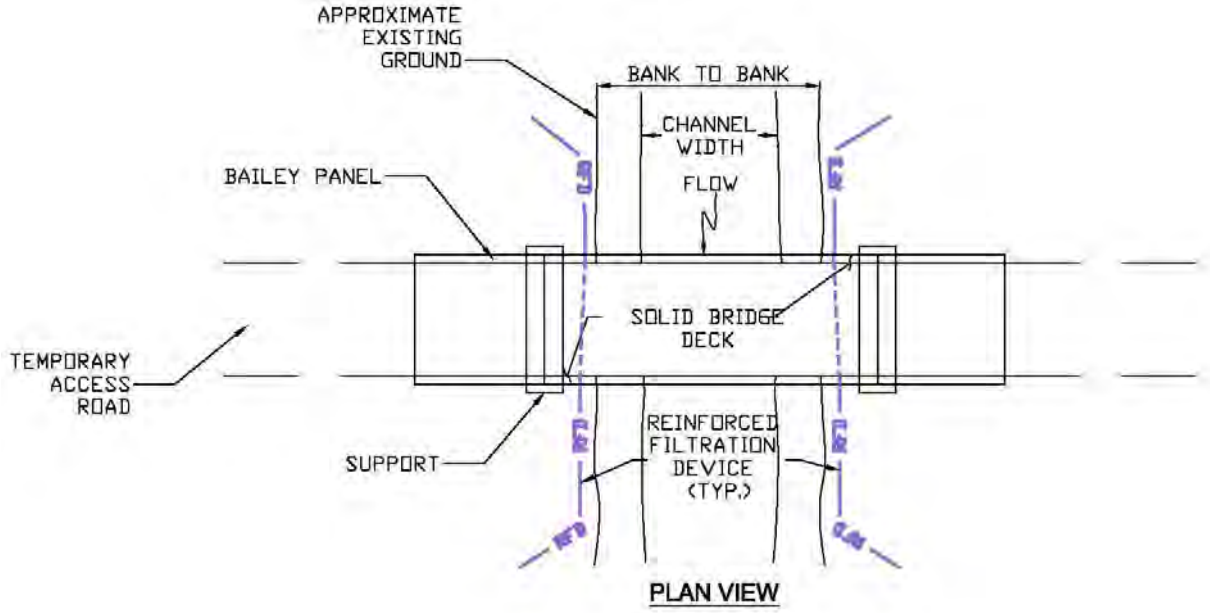
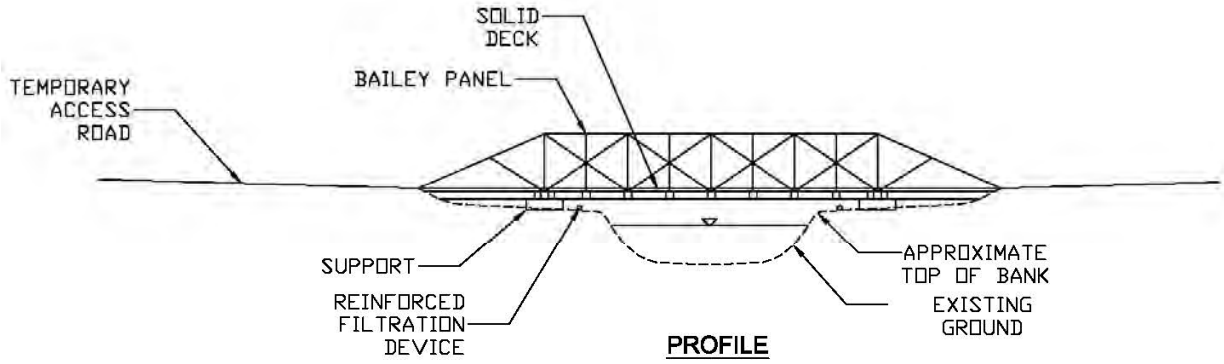
Source: Mountain Valley Pipeline LLC FERC Application

B.2-8
Southgate Project
Mobile Bridge





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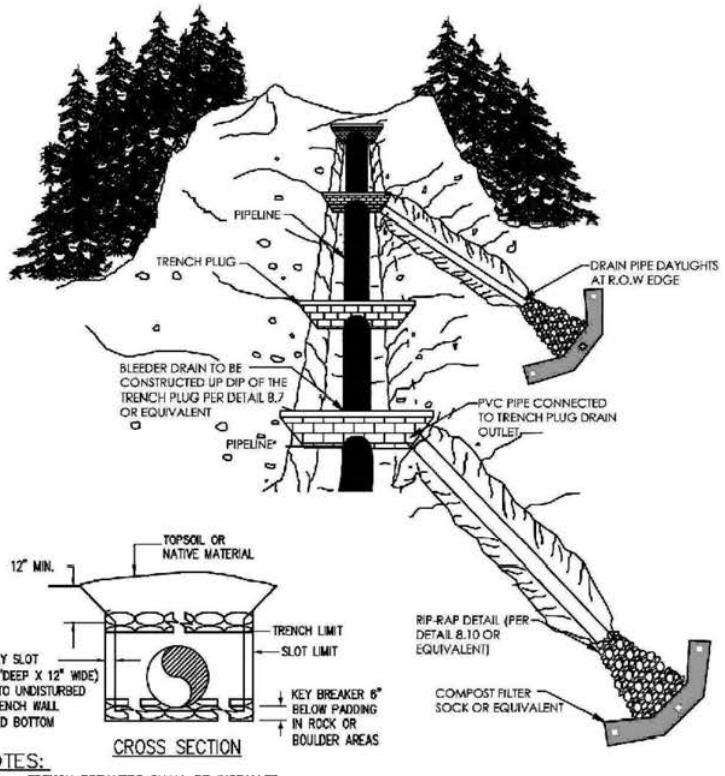
Source: Mountain Valley Pipeline LLC FERC Application

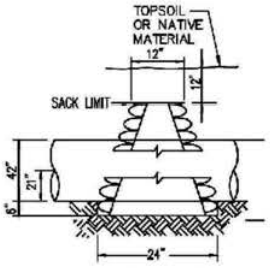
B.2-9
Southgate Project
Modular Temporary
Bailey Bridge

SLOPE %	DISTANCE	PLUG MATERIAL
0% – 5%	SEE NOTE 6	CONCRETE FILLED SACKS
5% – 15%	500 FT	SANDBAGS OR CONCRETE FILLED SACKS
15% – 25%	300 FT	SANDBAGS OR CONCRETE FILLED SACKS
25% – 35%	200 FT	SANDBAGS OR CONCRETE FILLED SACKS
35% – 100%	100 FT	SANDBAGS OR CONCRETE FILLED SACKS
> 100%	50 FT	CONCRETE FILLED BAGS (WETTED)

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.



CROSS SECTION



SIDE VIEW

NOTES:

1. TRENCH BREAKERS SHALL BE INSTALLED:
   - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN;
   - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS;
   - WHERE NEEDED TO AVOID DRAINING A WETLAND;
   - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS;
   - IN CULTIVATED LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYPICALLY INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WHERE REQUIRED.
2. MATERIALS APPROPRIATE FOR USE AS PERMANENT TRENCH BREAKERS INCLUDE SANDBAGS OR CONCRETE FILLED SACKS. TOPSOIL SHALL NOT BE USED FOR TRENCH BREAKERS.
3. TRENCH BREAKERS INSTALLED AT WATERBODY AND WETLAND CROSSINGS SHALL BE CONSTRUCTED OF IMPERVIOUS MATERIALS (CONCRETE FILLED SACKS).
4. BREAKER SPACING AND CONFIGURATION MAY BE CHANGED AS DIRECTED BY MVP. DEPTH OF DITCH MAY VARY WITH SITE CONDITIONS.
5. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
6. TRENCH BREAKERS ARE REQUIRED AT ALL WATERBODY CROSSINGS REGARDLESS OF TRENCH SLOPE. OTHERWISE NOTE REQUIRED AT SLOPES < 5%.
7. SINGLE TRENCH BREAKERS WILL BE A MINIMUM WIDTH OF 24" AND DOUBLE TRENCH BREAKERS WILL BE A MINIMUM WIDTH OF 36".
8. FOR SUBSURFACE AND TRENCH BREAKER DRAINAGE DETAILS INCLUDING THOSE FOR STEEP SLOPES, SEE LANDSLIDE MITIGATION TYPICAL DETAILS.
9. FOR SLOPES EXCEEDING 50%, CONCRETE FILLED SACKS ARE REQUIRED UNLESS OTHERWISE APPROVED BY MVP.

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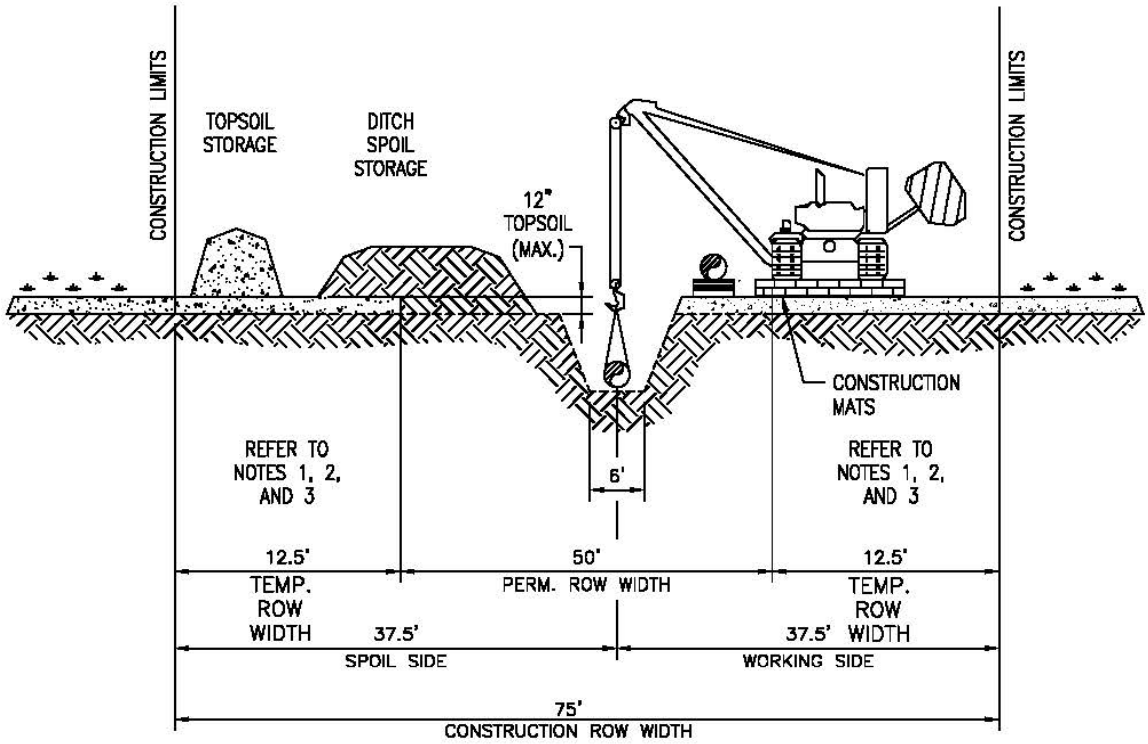
Source: Mountain Valley Pipeline LLC FERC Application

B.2-10
Southgate Project
Typical Trench Breaker Requirements



NOTES:

1. TOPSOIL SEGREGATION/REMOVAL WILL ONLY BE CONDUCTED WITHIN THE PERMANENT EASEMENT AT ALL WETLAND CROSSINGS IN VIRGINIA.

2. GRUBBING ACTIVITIES SHALL BE LIMITED TO THE PERMANENT EASEMENT AT ALL WETLAND CROSSINGS IN VIRGINIA. OUTSIDE OF THE PERMANENT EASEMENT, WETLAND VEGETATION SHALL ONLY BE REMOVED AT OR ABOVE THE GROUND SURFACE. WOODY VEGETATION WITHIN THE TEMPORARY EASEMENT SHALL BE CUT AT GROUND SURFACE WITH THE STUMPS TO REMAIN IN-PLACE.

3. WETLAND CROSSINGS IN VIRGINIA SHALL BE CONDUCTED IN ACCORDANCE WITH NWP12 GENERAL AND NORFOLK DISTRICT REGIONAL CONDITIONS.

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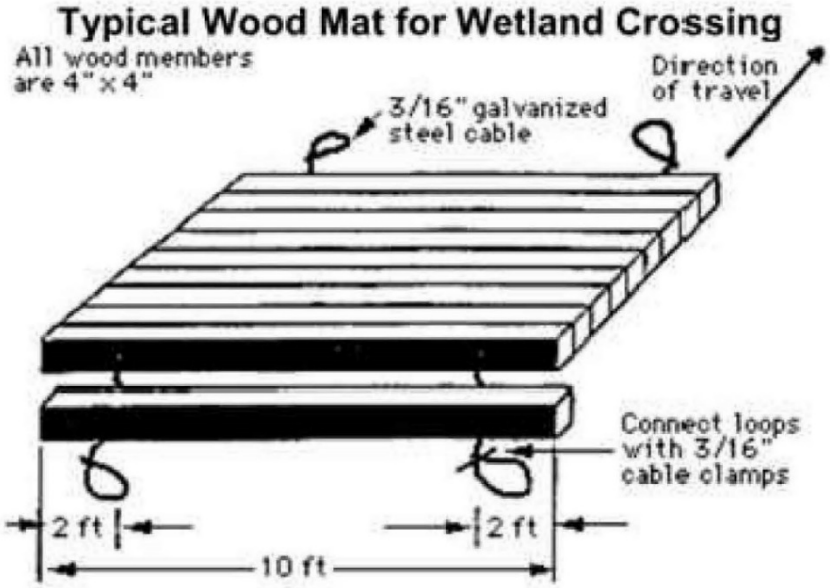
Source: Mountain Valley Pipeline LLC FERC Application

B.2-11
Southgate Project
Wetland Crossing Typical for
USACE Norfolk (VA) District



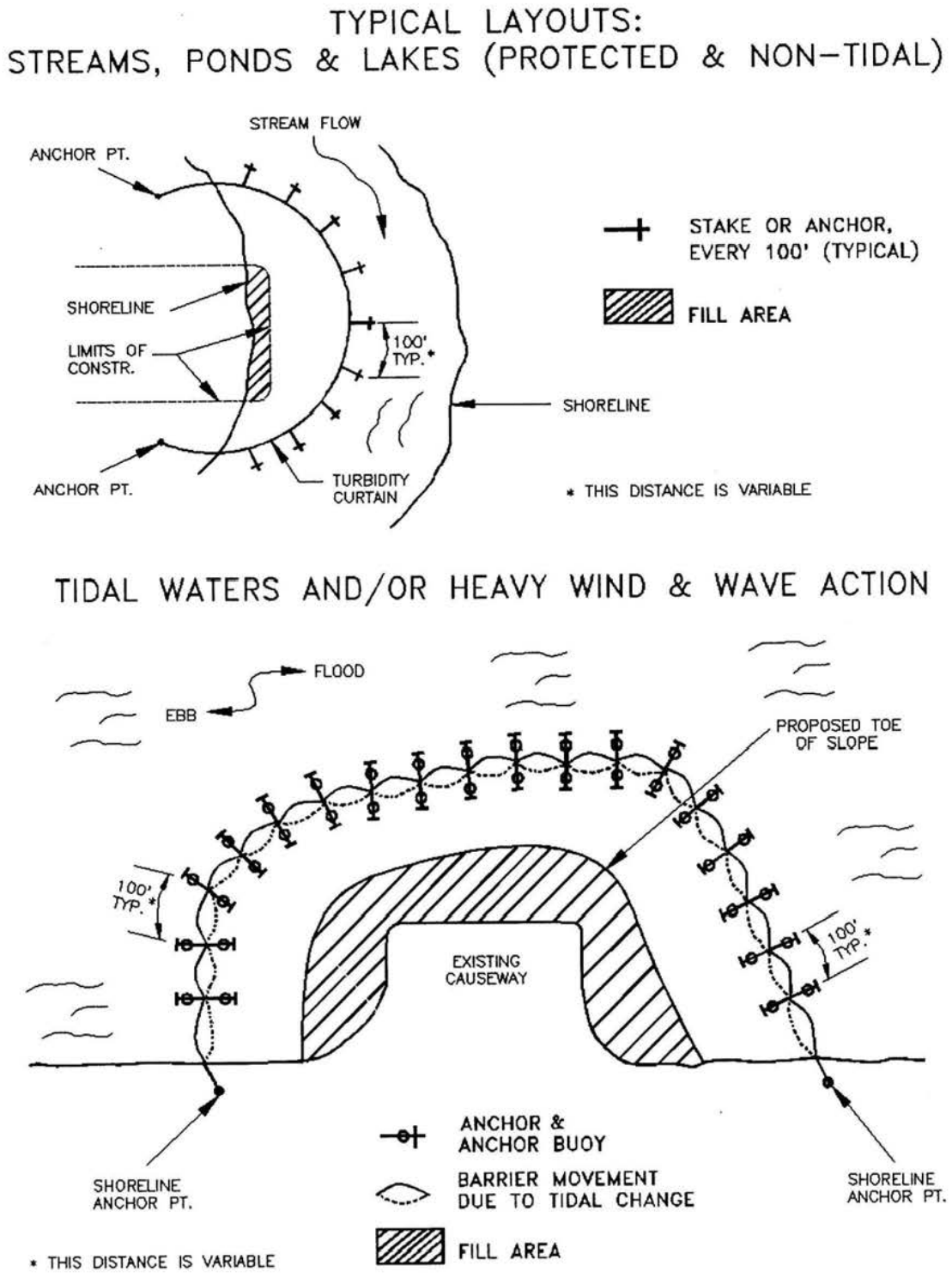
University of Minnesota FS 07009

A geotextile underlayment shall be used under the wood mat.

Source: PaDEP, E&S Pollution Control Manual, March 2012

Source: Mountain Valley Pipeline LLC FERC Application

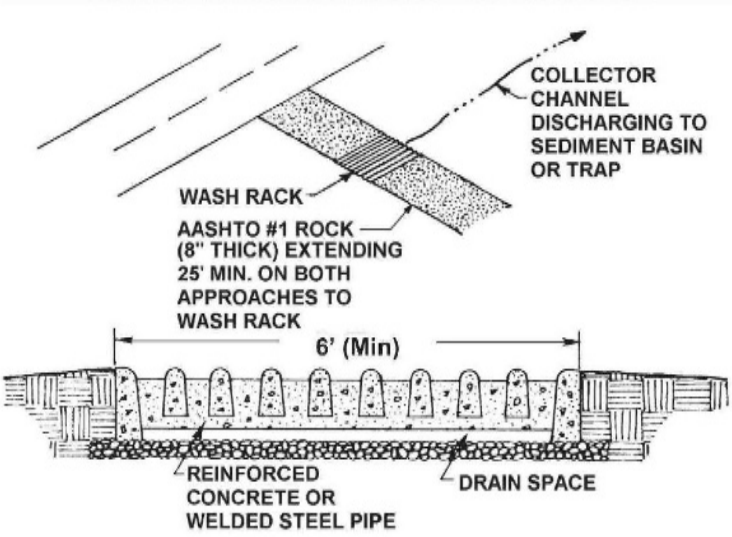
B.2-12
Southgate Project
Timber Mat / Wetland Crossing



Source: Mountain Valley Pipeline LLC FERC Application

B.2-13
Southgate Project
Turbidity Curtain Detail

Rock Construction Entrance with Wash Rack



Modified from Smith Cattleguard Company

IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 70 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK.

Wash rack shall be 20 feet (min.) wide or total width of access.

Wash rack shall be designed and constructed to accommodate anticipated construction vehicular traffic.

A water supply shall be made available to wash the wheels of all vehicles exiting the site.

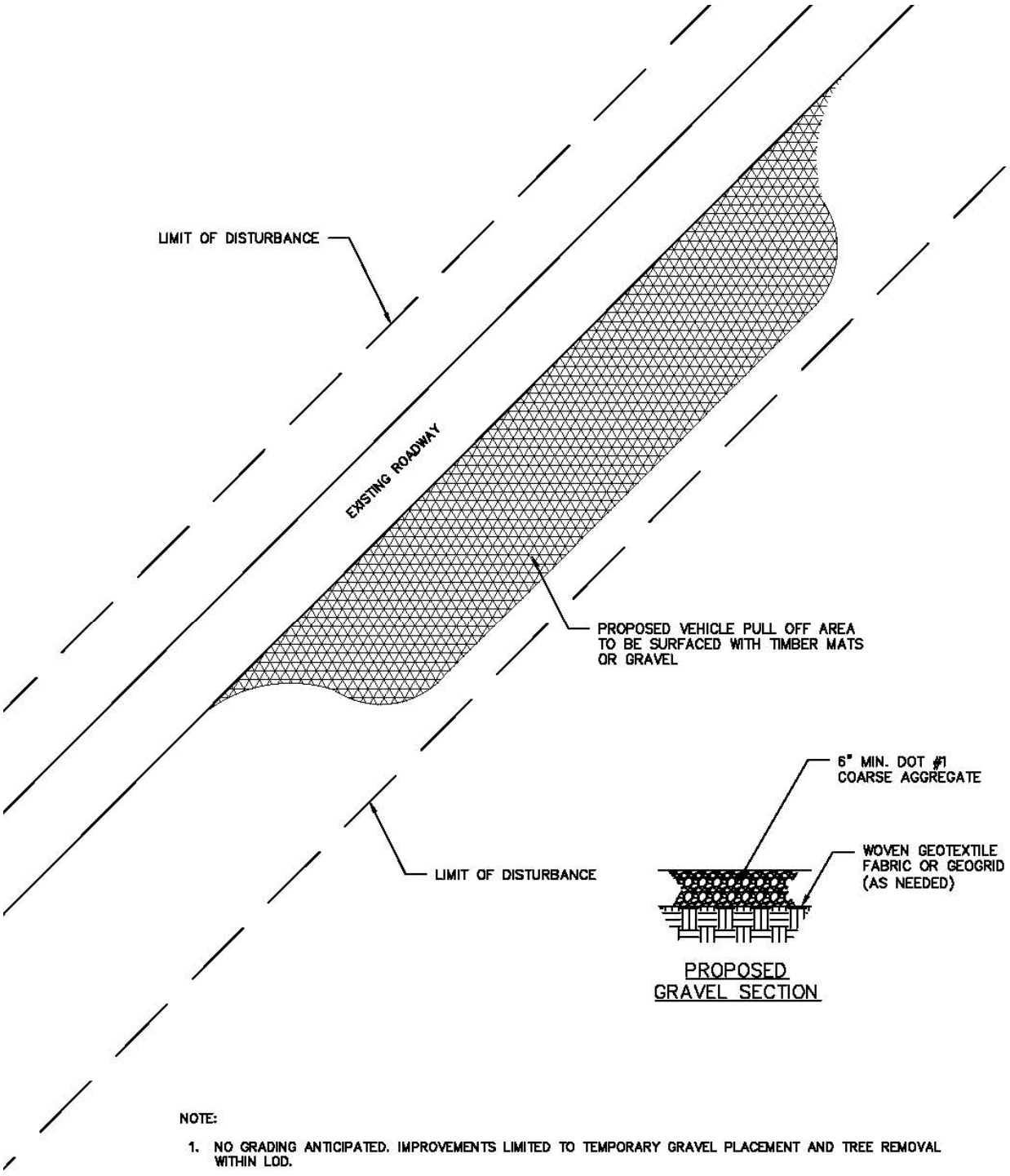
MAINTENANCE: Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile of rock material shall be maintained on site for this purpose. Drain space under wash rack shall be kept open at all times. Damage to the wash rack shall be repaired prior to further use of the rack. All sediment deposited on roadways shall be removed and returned to the construction site immediately. Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.

A metal wash rack or livestock grate is an acceptable alternative to the reinforced concrete one shown in the standard detail. Approaches to the wash rack should be lined with aashto #1 at a minimum of 25' on both sides. The wash rack should discharge to a sediment removal facility, such as a vegetated filter strip or into a channel leading to a sediment removal device (e.g. a sediment trap or sediment basin). Rock construction entrances with wash racks should be maintained to the specified dimensions by adding rock when necessary at the end of each workday. A stockpile of rock material should be maintained on site for this purpose. Sediment deposited on paved roadways should be removed and returned to the construction site.

NOTE: Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable. Damaged wash racks should be repaired as necessary to maintain their effectiveness. In lieu of washrack installation, MVP will extend the RCE by 70' increments until mud tracking condition is alleviated.

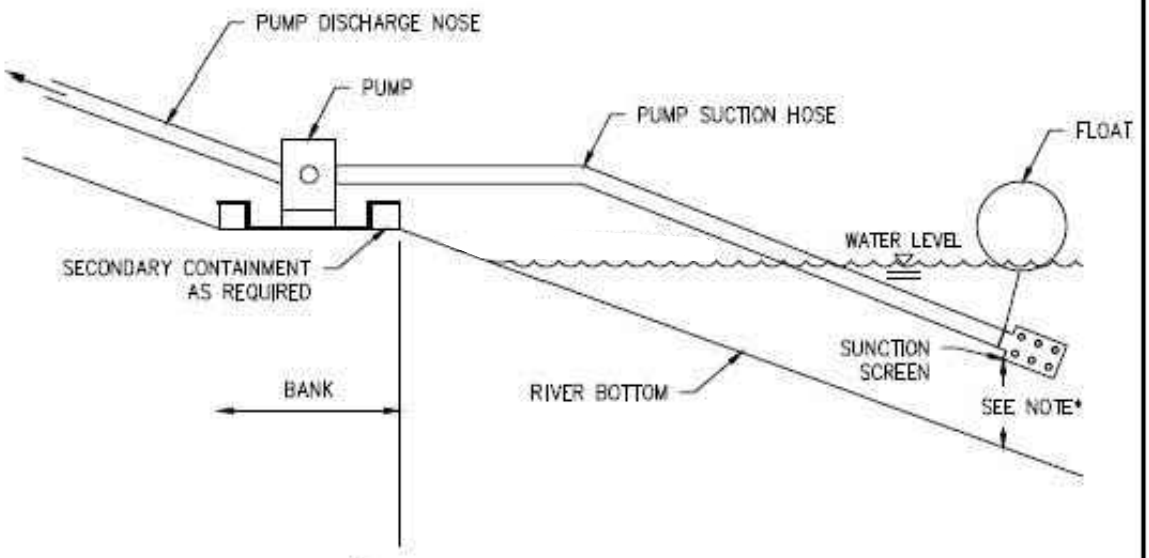
Source: Mountain Valley Pipeline LLC FERC Application

B.2-14
Southgate Project
Rock Construction Entrance
With Wash Rack



Source: Mountain Valley Pipeline LLC FERC Application

B.2-15
Southgate Project
Temporary Vehicle
Pull Off Detail



PROFILE
SCALE: N.T.S.

NOTES:

* CONTRACTOR SHALL MAINTAIN A SUFFICIENT DISTANCE FROM THE BOTTOM OF THE WATERBODY TO THE PUMP INTAKE TO PREVENT SEDIMENT FROM ENTERING THE SYSTEM.

* WITHDRAW NO MORE THAN 10% OF THE INSTANTANEOUS FLOW RATE FROM THE CHANNEL;
* SCREEN INTAKE OPENINGS NO LARGER THAN 1 MILLIMETER AND;
* SCREEN FACE INTAKE VELOCITIES MUST BE NO GREATER THAN 0.25 FEET PER SECOND

FLOATING PUMP INTAKE WITH HOSE

B.2-16
Southgate Project
Water Withdrawal Typical

APPENDIX B.3

Additional Temporary Workspaces – Within 50 Feet of a Waterbody or Wetland

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
Virginia, Pittsylvania County							
1052	5.2	Wetland	W-D18-1	0	ATWS situated in this location to support conventional bore and associated equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1088B	9.8	Wetland	W-F18-58	47	ATWS situated in this location for storage of material, pumps, mats, pipe for wetland crossing and point of intersect.	N	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1136C	17.7 RR	Wetland/ Waterbody	S-A19-295/ S-E18-44/ W-A19-296	1 49 0	ATWS situated in this location for storage of material, pumps, mats, pipe for wetland and stream crossing.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation
1173D	22.7 RR	Waterbody	S-A19-317	0	ATWS situated in this location for storage of material, pumps, mats, and pipe for stream crossing.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
North Carolina, Rockingham County							
1213	27.0 RR	Wetland	W-A18-44	0	This ATWS is in an agriculture field and would be used for pipeline crossing.	N	The request for ATWS within 50 feet of the wetland appears justified in order to cross Transco facilities. Potential impacts would be minimized by the proposed mitigation.

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
1213A	27.0 RR	Wetland	W-A18-44	6	This ATWS is in an agriculture field and would be used for pipeline crossing.	N	The request for ATWS within 50 feet of the wetland appears justified in order to cross Transco facilities. Potential impacts would be minimized by the proposed mitigation.
1213D	27.3	Wetland	W-A18-44	0	ATWS in this location to be used for support during stream crossing.	Y	The request for ATWS within 50 feet of the wetland appears justified in order to cross Transco facilities. Potential impacts would be minimized by the proposed mitigation.
1222	27.6	Wetland	W-A19-274	0	ATWS in this location to be used for support during stream crossing.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1244	29.9	Wetland	W-A18-18	0	ATWS situated in this location to support HDD and associated equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1244A	29.9	Wetland	W-A18-18	2	ATWS situated in this location to support HDD and associated equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
			S-B18-38	0	ATWS situated in this location to support HDD and associated equipment	Y	The request for ATWS within 50 feet of the waterbody appears justified and potential impacts would be minimized by the proposed mitigation.
1249	30.4	Wetland/ Waterbody	W-B18-34	35	ATWS situated in this location to support HDD and associated equipment	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
			AW-B18-36 / W-B18-36	0	ATWS situated in this location to support HDD and associated equipment// hydrostatic testing equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1250	30.5	Wetland	W-B18-34	0	ATWS situated in this location to support conventional bore and associated equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1251	30.4	Wetland	W-B18-36	0	ATWS situated in this location to support HDD and associated equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
1251A	30.3	Wetland	W-B18-34	0	Staging of mats / equipment needed to perform foreign line crossings, then used as needed for parking, materials, pipe, and equipment to support Dan River HDD, and also to support connection point between spreads.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1368	41.5	Waterbody	S-B18-44	15	ATWS situated in this location to support conventional bore and associated equipment.	Y	The request for ATWS within 50 feet of the waterbody appears justified and potential impacts would be minimized by the proposed mitigation.
1396	43.8	Waterbody	S-A18-106	41	Mountain Valley stated that ATWS would be moved further than 50 feet from waterbody Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.
North Carolina, Alamance County							
1577D	63.4 RR	Waterbody	S-B18-12	49	Mountain Valley stated that ATWS is to be reduced so that it is not within 50 feet of waterbody. Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
1581A	63.4 RR	Waterbody	S-B18-12	46	Mountain Valley stated that ATWS is to be reduced so that it is not within 50 feet of waterbody. Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.
1588A	64.4	Waterbody	S-A19-350	35	Mountain Valley stated that ATWS would be moved further than 50 feet from waterbody. Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.
1588A	64.4	Waterbody	S-A19-351	0	Mountain Valley stated that ATWS would be moved further than 50 feet from waterbody. Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.
1588B	64.5	Waterbody	S-A19-350	27	Mountain Valley stated that ATWS would be moved further than 50 feet from waterbody. Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
1653G	69.7 RR	Waterbody	S-C18-70	0	ATWS required in this location to facilitate storage of materials and equipment for stream crossing in a congested area.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1681	71.9	Waterbody	AS-A19-337	44	Mountain Valley stated that ATWS would be moved further than 50 feet from waterbody. Mountain Valley would provide details in their Implementation Plan.	Y	New ATWS details would be reviewed and approved by the director of OEP prior to construction.
1692A	73.0 RR	Wetland	W-A18-111	0	ATWS situated in this location to support conventional bore and associated equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.
1692	73.1 RR	Wetland/ Waterbody	AS-B18-58 / SB18-58	43	This ATWS to be used as a support for crews performing multiple pipeline crossings in this area	Y	The request for ATWS within 50 feet of the waterbody appears justified and potential impacts would be minimized by the proposed mitigation
			S-B19-150	0	ATWS situated in this location to support conventional bore and associated equipment / hydrostatic test support equipment.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.

Appendix B.3

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Feature within 50 feet	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)	FERC Comment
			W-B19-151	0	This ATWS to be used as a support for crews performing multiple pipeline crossings in this area.	Y	The request for ATWS within 50 feet of the wetland appears justified and potential impacts would be minimized by the proposed mitigation.

a/ Distance from resource area of 0 feet indicate the wetland or waterbody is located within the ATWS.

APPENDIX B.4

Access Roads

Appendix B.4

Proposed New, Improved, and Private Access Roads for the Southgate Project

State/ Facility/ Road ID a/	Road Name	Milepost b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership / Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
Virginia												
TAR	TA-PI-000	0.0	Existing	Temporary	Mountain Valley Pipeline, LLC	25	334	Gr	FW, OL	G, S	0.19	0.00
TAR	TA-PI-000A	CY-01	Existing	Temporary	Mountain Valley Pipeline, LLC	60	9	G	CI, OL	S, W	0.01	0.00
TAR	TA-PI-065	CY-19	Existing	Temporary	Private	25	60	D	OL	S, W	0.04	000
TAR	TA-PI-065A	CY-19	Existing	Temporary	Private	25	2,230	D	CI, OL	S, W	1.29	0.00
TAR	TA-PI-040	CY-22	Existing	Temporary	Private	25	45	D	CI, OL	S, W	0.04	0.00
TAR	TA-PI-040A	CY-22	Existing	Temporary	Private	25	31	D	CI, OL	S, W	0.03	0.00
TAR	TA-PI-000B	CY-03	Existing	Temporary	Private	38	62	A	CI	None	0.10	0.00
PAR	PA-PI-001A	0.47	Existing	Permanent	Transcontinental Gas Pipeline Company, LLC Private Mountain Valley Pipeline, LLC	20	3,028	A, G, D	AG, CI, FW, OL	S, W	1.46	1.46
PAR	PA-PI-001B	0.47	New	Permanent	Transcontinental Gas Pipeline Company, LLC Private Mountain Valley Pipeline, LLC	20	827	Gr	AG, FW, OL	S, W	0.49	0.49
PAR	PA-PI-001C	0.47	Existing	Permanent	Private	20	713	D	OL	S, W	0.34	0.34
TAR	TA-PI-004	1.6	Existing	Temporary	Private	25	2,874	D	CI, FW, OL, RD	S, W	1.82	0.00
TAR	TA-PI-005	2.3	Existing	Temporary	Private	25	3,755	G, D, Gr	CI, FW, OL, OW, RD	S, C, W	2.20	0.00
TAR	TA-PI-006	3.4	Existing	Temporary	Private	25	1,285	G, D, Gr	AG, CI, OL	S, C, W	0.75	0.00
TAR	TA-PI-007	4.6	Existing	Temporary	Private	25	896	G, D, Gr	OL, RD	S, W	0.53	0.00
TAR	TA-PI-008	4.5	Existing	Temporary	Private	25	303	G	CI, RD	S, W	0.17	0.00
TAR	TA-PI-011	5.1	Existing	Temporary	Private	25	5,360	D	AG, CI, FW, OL, RD, WL	S, W	3.08	0.00
TAR	TA-PI-015	5.6	Existing	Temporary	Pittsylvania County, VA	25	1,076	G	FW, OL	S, W	0.62	0.00
TAR	TA-PI-016	5.9	Existing	Temporary	Pittsylvania County, VA	25	3,461	G, Gr	CI, FW, OL	S, W	1.99	0.00
TAR	TA-PI-017	6.2	Existing	Temporary	Pittsylvania County, VA	25	823	G	CI, OL	S, W	0.51	0.00
TAR	TA-PI-018	6.8	Existing	Temporary	Private	25	1,530	D	FW, OL	S, W	0.89	0.00
PAR	PA-PI-018B	7.4	New	Permanent	Private	12.5	50	Gr	CI	S, W	0.02	0.02
TAR	TA-PI-022	8.5	Existing	Temporary	Private	25	2,899	D	AG, CI, FW, OL, RD	S, W	1.66	0.00
TAR	TA-PI-023	9	Existing	Temporary	Private	25	2,121	G	AG, CI, FW, OL, RD	S, W	1.23	0.00
PAR	PA-PI-024	9.3	New	Permeant	Private	12.5	16	Gr	FW, OL	S, W	0.01	0.00
TAR	TA-PI-025	9.6	Existing	Temporary	Private	25	2,226	D, Gr	AG, CI, FW, OL	S, W	1.37	0.00
TAR	TA-PI-026B	10.4	New	Temporary	Private	25	31	D, Gr	CI, OL	S, W	0.03	0.00
TAR	TA-PI-027	11.1	Existing	Temporary	Independent Timber, Inc.	25	1,590	G, D	FW, OL	S, W	0.92	0.00
TAR	TA-PI-032	13.2	Existing	Temporary	Private	25	1,052	G	OL	S, W	0.60	0.00

Appendix B.4

Proposed New, Improved, and Private Access Roads for the Southgate Project

State/ Facility/ Road ID a/	Road Name	Milepost b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership / Management	Road Dimensions Width (feet)	Road Dimensions Length (feet)	Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
TAR	TA-PI-033	13.2	Existing	Temporary	Private	25	735	G	FW, OL	S, W	0.43	0.00
TAR	TA-PI-035	14.2RR	Existing	Temporary	Private	25	4,378	D, Gr	AG, FW, OL, OW, RD, WL	S, W	2.52	0.00
TAR	TA-PI-037	15.2	Existing	Temporary	Private	25	1,698	G	AG, CI, OL	S, W	0.98	0.00
TAR	TA-PI-037A	15.9	New	Temporary	Private	15	25	Gr	CI, FW, OL	S, W	0.01	0.00
TAR	TA-PI-037B	15.9	New	Temporary	Private	15	41	Gr	CI, OL	S, W	0.02	0.00
TAR	TA-PI-041	16.7	Existing	Temporary	Private	25	639	G	FW, OL, RD	S, W	0.38	0.00
TAR	TA-PI-043	17.2	Existing	Temporary	Private	25	2,123	D	AG, CI, FW, OL, OW, RD	S, W	1.23	0.00
TAR	TA-PI-046	18.0	Existing	Temporary	Private	25	1,543	G, D, Gr	AG, CI, FW, OL	S, W	0.89	0.00
PAR	PA-PI-046A	18.3	New	Permanent	Private	12.5	24	Gr	AG, CI	S, W	0.01	0.01
TAR	TA-PI-049	19.5	Existing	Temporary	Private	25	273	G	OL, RD	S, W	0.17	0.00
TAR	TA-PI-050	20	Existing	Temporary	Private	25	307	A	CI, OL	None	0.19	0.00
PAR	PA-PI-050	20	New	Permanent	Private	35	17	Gr	CI	S, W	0.01	0.01
TAR	TA-PI-051A	20.2	Existing	Temporary	Private	25	101	D	CI, RD	S, W	0.06	0.00
TAR	TA-PI-052	20.4	Existing	Temporary	Private	25	2,871	D	AG, CI, FW, OL, WL	S, W, C	1.66	0.00
TAR	TA-PI-053	21.1	Existing	Permanent	Private	25	916	G	OL, RD	S, W	0.53	0.00
TAR	TA-PI-061	23.0RR	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	3,508	G, D, Gr	FW, OL, OW, WL	S, W, C	2.02	0.00
TAR	TA-PI-063	24.0	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	2,750	G, D, Gr	CI, FW, OL, OW	S, W, C	1.59	0.00
TAR	TA-PI-066	24.8	Existing	Temporary	Private	25	2,345	G, D, Gr	CI, FW, OL	S, W	1.45	0.00
TAR	TA-PI-067	25.1	Existing	Temporary	Private	25	1,917	G, D, Gr	FW, OL, OW, WL	S, W	1.19	0.00
										Virginia Subtotal:	*37.71*	*2.34*
North Carolina												
TAR	TA-RO-072	26.9	Existing	Temporary	Private	25	1,049	G	CI, FW, OL, RD	S, W	0.61	0.00
TAR	TA-RO-072A	26.9	New	Temporary	Private	25	229	Gr	AG, OL, RD	S, W	0.14	0.00
TAR	TA-RO-072B	27.0 RR	Existing	Temporary	Private	25	423	G, GR	AG, CI, FW, OL	S, W	0.25	0.00
TAR	TA-RO-075	28.1 RR	Existing	Temporary	Private	25	2,219	G, D, Gr	AG, OL, WL	S, W	1.28	0.00
PAR	PA-RO-000	28.2 RR	Existing	Permanent	Private	25	4,959	G, Gr	CI, FW, OL	S, W	2.84	2.84
TAR	TA-RO-076	28.6 RR	Existing	Temporary	Private	25	2,506	G, D	FW, OL	S, W	1.45	0.00
TAR	TA-RO-078	29.2	Existing	Temporary	Private	25	2,209	C, G, D	CI, FW, OL, RD	S, W	1.29	0.00
TAR	TA-RO-079	29.6	Existing	Temporary	Private	25	288	G, D, Gr	AG, OL	S, W	0.17	0.00
TAR	TA-RO-079A	29.6	Existing	Temporary	Private	25	1,846	G, D, Gr	OL, RD	S, W	1.06	0.00

Appendix B.4

Proposed New, Improved, and Private Access Roads for the Southgate Project

State/ Facility/ Road ID a/	Road Name	Milepost b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership / Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-RO-080	29.9	Existing	Temporary	Private	25	3,587	G, D, Gr	AG, CI, OL, RD	S, W	2.15	0.00
TAR	TA-RO-081	30.4	New	Temporary	Private	34	17	G	OL	S, W	0.02	0.00
PAR	PA-RO-082	30.4	Existing	Permanent	Public Service Company of North Carolina, Inc.	25	161	G	CI, OL	S, W	0.12	0.12
PAR	PA-RO-082A	30.4	Existing	Permanent	Public Service Company of North Carolina, Inc.	25	118	G	CI, OL	S,W	0.06	0.06
TAR	TA-RO-082C	CY-05	Existing	Temporary	Private	80	8	C	CI	None	0.02	0.00
TAR	TA-RO-082D	CY-05	Existing	Temporary	Private	72	6	A	CI	None	0.01	0.00
TAR	TA-RO-082E	CY-05	Existing	Temporary	Private	70	7	A	CI	None	0.01	0.00
TAR	TA-RO-000A	CY-08	Existing	Temporary	Private	25	344	A	CI, OL	None	0.21	0.00
TAR	TA-CA-105	CY-25	Existing	Temporary	Private	25	2,133	D	CI, FW, OL, RD	S, W	1.29	0.00
TAR	TA-AL-195	CY-26A	Existing	Temporary	Private	25	126	D	OL	S, W, C	0.07	0.00
TAR	TA-AL-196	CY-26B	Existing	Temporary	Private	25	47	D	CI, OL	S, W	0.04	0.00
TAR	TA-AL-197	CY-26B	Existing	Temporary	Private	25	82	D	OL	S, W	0.06	0.00
TAR	TA-RO-085	32.4	Existing	Temporary	Private	25	3,667	G, D	CI, FW, OL, RD	S, W	2.05	0.00
TAR	TA-RO-087	32.8	Existing	Temporary	Private	25	2,654	G, D, Gr	FW, OL, RD	S, W	1.54	0.00
TAR	TA-RO-088	33.6	Existing	Temporary	Private	25	1,752	G, D, Gr	CI, FW, OL, RD	S, W	1.05	0.00
TAR	TA-RO-091	34.7	Existing	Temporary	Private	25	1,001	D	FW, OL	S, W	0.58	0.00
TAR	TA-RO-092	35.4	Existing	Temporary	Private	25	867	G, D	FW, OL, RD	S, W	0.51	0.00
TAR	TA-RO-094	35.9	Existing	Temporary	Private	25	778	D	AG, FW, OL	S, W	0.46	0.00
TAR	TA-RO-100	37	Existing	Temporary	Private	25	1,744	D	FW, OL	S, W	1.00	0.00
TAR	TA-RO-102	37.6	Existing	Temporary	Private	25	1,532	A, G, D, Gr	OL, RD	S, W	0.89	0.00
TAR	TA-RO-103	38.1	Existing	Temporary	Private	25	1,440	G, D	FW, OL, RD	S, W	0.87	0.00
TAR	TA-RO-106	38.8	Existing	Temporary	City Of Reidsville	25	271	G	FW, OL	S, W	0.16	0.00
TAR	TA-RA-106A	38.8	New	Temporary	Private	25	20	Gr	CI, OL			
TAR	TA-RO-107	39.6	Existing	Temporary	Private	25	673	D	CI, OL, RD	S, W	0.40	0.00
TAR	TA-RO-108	39.6	New	Temporary	Private	25	195	Gr	FW, OL	S, W	0.12	0.00
TAR	TA-RO-109	39.7	Existing	Permanent	Duke Power Company	25	1,148	G, Gr	CI, OL	S, W	0.67	0.67
TAR	TA-RO-110	40.4 RR	New	Temporary	Private	45	22	Gr	CI, FW, OL	S, W	0.02	0.00
TAR	TA-RO-111	40.9	Existing	Temporary	Private	25	3,243	G, D, Gr	AG, CI, FW, OL, RD	S, W	1.90	0.00
TAR	TA-RO-112	41.4	Existing	Temporary	Private	25	3,433	G, D	CI, FW, OL	S, W	1.97	0.00
TAR	TA-RO-113	41.8	Existing	Temporary	Private	25	162	D, Gr	FW, OL	S, W	0.11	0.00
TAR	TA-RO-113A	41.8	New	Temporary	Private	25	1,870	Gr	FW, OL, WL	S, W	1.03	1.09
PAR	PA-RO-114A	42.2	New	Permanent	Private	25	83	Gr	CI, FW, OL	S, W	0.03	0.03

Appendix B.4

Proposed New, Improved, and Private Access Roads for the Southgate Project

State/ Facility/ Road ID a/	Road Name	Milepost b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership / Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-RO-115	42.4	Existing	Temporary	Private	25	586	G	CI, FW, OL, RD	S, W	0.34	0.00
TAR	TA-RO-115B	43.2	New	Temporary	Private	25	27	Gr	CI, OL	S, W	0.02	0.00
TAR	TA-RO-115C	43.2	New	Temporary	Private	25	10	Gr	OL	S, W	0.01	0.00
TAR	TA-RO-118A	43.4	New	Temporary	Private	25	41	Gr	CI, OL	S, W	0.03	0.00
TAR	TA-RO-118B	43.4	New	Temporary	Private	25	9	Gr	CI, OL	S, W	0.01	0.00
TAR	TA-RO-119	43.9	Existing	Temporary	Private	25	1,889	G, D	CI, FW, OL, RD	S, W	1.11	0.00
TAR	TA-RO-122	44.1	Existing	Temporary	Private	25	1,845	G, D	CI, FW, OL, RD	S, W	1.09	0.00
PAR	PA-RO-124A	44.9	New	Permanent	Private	14	16	Gr	AG	S, W	0.01	0.01
TAR	TA-RO-125	45	New	Temporary	Private	25	227	Gr	AG, FW	S, W	0.14	0.00
TAR	TA-RO-126	45.3	Existing	Temporary	Private	25	2,268	D	AG, FW, OL, RD	S, W	1.31	0.00
TAR	TA-RO-127	46.1 RR	Existing	Temporary	Private	25	2,745	G, D	AG, FW, OL, RD	S, W	1.59	0.00
TAR	TA-RO-129	46.7	Existing	Temporary	Private	25	1,542	G, D	AG, CI, FW, OL	S, W	0.91	0.00
TAR	TA-RO-130	47.3	Existing	Temporary	Private	25	2,200	G, D	CI, FW, OL, RD	S, W	1.27	0.00
TAR	TA-RO-131A	48.4	New	Temporary	Private	25	30	Gr	AG, CI	S, W	0.03	0.00
TAR	TA-RO-131B	48.4	Bew	Temporary	Private	25	18	Gr	Ag, CI	S, W	0.02	0.00
TAR	TA-RO-134	48.9	Existing	Temporary	Private	34	26	G	CI	S, W	0.03	0.00
TAR	TA-RO-135	49.2	Existing	Temporary	Private	25	446	D	CI, OL	S, W	0.27	0.00
TAR	TA-RO-136A	49.5	New	Temporary	Private	25	19	Gr	CI, OL	S, W	0.02	0.00
TAR	TA-RO-136B	49.5	New	Temporary	Private	25	20	Gr	CI, FW	S, W	0.02	0.00
TAR	TA-RO-138	49.8 RR	Existing	Temporary	Private	25	785	D, Gr	CI, FW, OL	S, W	0.46	0.00
TAR	TA-RO-139	50.3 RR	Existing	Temporary	Private	25	2,779	D	AG, FW, OL	S, W	1.60	0.00
TAR	TA-RO-140	51.4 RR	Existing	Temporary	Private	25	871	D	AG, CI, FW, OL	S, W	0.51	0.00
TAR	TA-RO-141	51.6 RR	Existing	Temporary	Private	25	438	D	AG, OL	S, W	0.26	0.00
TAR	TA-RO-142	51.8	Existing	Temporary	Private	25	668	D	AG, CI, OL	S, W	0.39	0.00
TAR	TA-RO-144	52.1 RR	Existing	Temporary	Private	25	525	D	AG, CI, FW, OL	S, W	0.31	0.00
TAR	TA-RO-144A	52.2 RR	Existing	Temporary	Private	25	461	D	FW, OL	S, W	0.28	0.00
TAR	TA-RO-145	52.3	Existing	Temporary	Private	25	533	D	FW, OL	S, W	0.32	0.00
TAR	TA-AL-147	53.0	Existing	Temporary	Private	25	116	D	CI, FW, OL, RD	S, W	0.08	0.00
TAR	TA-AL-149A	53.3	New	Temporary	Private	25	18	Gr	CI, OL	S, W	0.01	0.00
TAR	TA-AL-149B	53.3	New	Temporary	Private	25	15	Gr	OL	S, W	0.02	0.00
TAR	TA-AL-153	53.8	Existing	Temporary	Private	25	1,411	D	AG, OL	S, W	0.82	0.00
TAR	TA-AL-154	54.2	Existing	Temporary	Private	25	1,227	D	AG, FW, OL	S, W	0.72	0.00

Appendix B.4

Proposed New, Improved, and Private Access Roads for the Southgate Project

State/ Facility/ Road ID a/	Road Name	Milepost b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership / Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-AL-155	54.7	Existing	Temporary	Private	25	3,468	D	AG, CI, FW, OL, OW	S, W	2..02	0.00
PAR	PA-AL-155A	55.1	New	Permanent	Private	25	40	Gr	AG, OL	S, W	0.02	0.03
PAR	PA-AL-155B	55.1	New	Permanent	Private	12.5	16	Gr	AG, OL	S, W	0.01	0.01
TAR	TA-AL-156	55.5	Existing	Temporary	Private	25	599	D	AG, FW, OL	S, W	0.34	0.00
TAR	TA-AL-157	55.6	Existing	Temporary	Private	25	427	D	FW, OL	S, W	0.28	0.00
TAR	TA-AL-159B	56.8	Existing	Temporary	Private	25	212	G, D, Gr	CI, OL	S, W	0.13	0.00
TAR	TA-AL-159A	56.9	Existing	Temporary	Private	25	1,816	A, G, Gr	CI, OL	S, W	1.07	0.00
TAR	TA-AL-161	57.7	New	Temporary	Private	25	651	G, Gr	CI, FW, OL, RD	S, W	0.38	0.00
TAR	TA-AL-162	58.1	Existing	Temporary	Private	25	993	Gr, D	AG, FW, OL	S, W	0.58	0.00
TAR	TA-AL-163	58.4	Existing	Temporary	Private	25	1,032	OL, G	CI, OL	S, W	0.60	0.00
TAR	TA-AL-165A	60	New	Temporary	Private	25	17	Gr	OL	S, W	0.02	0.00
TAR	TA-AL-165B	60	New	Temporary	Private	25	16	Gr	OL	S, W	0.02	0.00
TAR	TA-AL-166A	60.2	New	Temporary	Private	12.5	16	Gr	CI, OL	S, W	0.01	0.00
TAR	TA-Al-166B	60.2	New	Temporary	Private	12.5	16	Gr	CI, OL	S, W	0.01	0.00
PAR	PA-AL-166	60.3	Existing	Permanent	Private	25	144	Gr	CI, OL	S, W	0.09	0.09
TAR	TA-AL-167	61.2	Existing	Temporary	Private	25	757	D	AG, CI, FW, OL	S, W	0.44	0.00
TAR	TA-AL-168	61.6	Existing	Temporary	Private	25	578	G, Gr	AG, CI, FW, OL	S, W	0.36	0.00
TAR	TA-AL-169	62.5	Existing	Temporary	Private	25	1,431	D	OL, RD	S, W	0.83	0.00
TAR	TA-AL-171A	63.3 RR	New	Temporary	Private	25	269	Gr	AG, FW	S, W	0.16	0.00
TAR	TA-AL-172	63.7	New	Temporary	Private	25	2,384	Gr	CI, FW, OL, SC	S, W	1.38	0.00
TAR	TA-AL-175A	64.8	New	Temporary	Private	12.5	60	Gr	CI, OL	S, W	0.02	0.00
TAR	TA-AL-172A	64.8	New	Temporary	Private	25	20	Gr	CI, FW, OL	S, W	0.02	0.00
TAR	TA-AL-172B	64.8	New	Temporary	Private	25	22	Gr	CI, OL	S, W	0.02	0.00
TAR	TA-AL-179B	67.2 RR	Existing	Temporary	Private	25	1,878	G	CI, OL	S, W	1.09	0.00
TAR	TA-AL-180	67.4 RR	New	Temporary	Private	25	1,906	G, Gr	AG, CI, FW, OL, RD	S, W	1.12	0.00
TAR	TA-AL-181	68.0	Existing	Temporary	Private	25	1,527	G, D	CI, FW, OL, RD	S, W	0.88	0.00
TAR	TA-AL-181A	68.2	Existing	Permanent	Private	25	1,991	G	CI, OL, RD	S, W	1.16	0.00
PAR	PA-AL-182	68.7	New	Permanent	Private	12.5	220	Gr	CI, FW, OL	S, W	0.07	0.07
TAR	TA-AL-185	68.9	Existing	Temporary	Private	25	1,586	Gr	FW, OL, RD	S, W	0.92	0.00
TAR	TA-AL-186	69.2	Existing	Temporary	Private	45	11	G, Gr	FW, RD	S, W	0.02	0.00
TAR	TA-AL-187B	69.8 RR	Existing	Temporary	Private	25	302	G	CI	S, W	0.18	0.00
TAR	TA-AL-187A	69.9 RR	Existing	Temporary	Private	20	1,1087	G	CI, FW, OL	S, W	0.65	0.00
TAR	TA-AL-188	70.9	Existing	Temporary	Private	25	784	C, D	CI, FW, OL	S, W	0.45	0.00

Appendix B.4

Proposed New, Improved, and Private Access Roads for the Southgate Project

State/ Facility/ Road ID a/	Road Name	Milepost b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership / Management	Road Dimensions Width (feet)	Road Dimensions Length (feet)	Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
TAR	TA-AL-189	71.2	Existing	Temporary	Private	25	2,151	Gr	FW, OL	S, W	1.32	0.00
TAR	TA-AL-190	71.5	Existing	Temporary	Alamance Community College	25	1,512	A, G, Gr	CI, FW, OL	S, W	0.89	0.00
TAR	TA-AL-192	72.2	Existing	Temporary	Private	25	1,275	G, D, Gr	CI, FW, OL, RD	S, W	0.74	0.00
TAR	TA-AL-193	72.4	Existing	Temporary	Private	25	1,262	Gr	CI, FW, OL	S, W	0.73	0.00
TAR	TA-AL-193A	72.9 RR	Existing	Temporary	Private	25	67	Gr	CI, OL	S, W	0.05	0.00
PAR	PA-AL-194	73.17 RR	Existing	Permanent	Transcontinental Gas Pipeline Company, LLC Public Service Company Of North Carolina, Inc. Private	25	205	G	CI, FW, OL	S	0.12	0.12
										North Carolina Subtotal:	*61.78*	*3.36*
										PROJECT TOTAL:	**99.50**	**5.70**

Note: The totals shown in this table may not equal the sum of addends due to rounding.

a/ TAR=Temporary, PAR=Permanent Access Road.

b/ Milepost (MP) at final intersection of access road with construction workspace. Approximate MP rounded to the nearest tenth.

c/ Dominant surface condition provided. A=Asphalt, C=Concrete, G=Gravel, D=Dirt, Gr=Greenfield.

d/ AG = Agricultural; CI = Commercial / Industrial; FW = Upland Forest / Woodland; OL = Upland Open Land; OW = Open Water; RD = Residential; SC = Silviculture; WL = Wetland. Where wetlands (WL) are identified within permanent access roads, permanent impacts are not anticipated.

e/ P=Paving, G=Grading, S=Stone, C=Culverts, W=Widening, R=Realignment. No improvements to occur within WLs crossed by the access road.

f/ Does not include area overlapping with pipeline, aboveground facility, or contractor/pipe storage yard construction workspaces.

g/ Does not include area overlapping with pipeline permanent right-of-way or aboveground facility permanent facility boundary (fence line/footprint). Only PARs will have an operational area impact.

APPENDIX B.5

Waterbodies Crossed by the Southgate Project

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
Virginia - Pittsylvania								
H-605 Pipeline								
S-F18-6	0.1	Trib. To Little Cherrystone Creek	Intermittent	6	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
H-650 Pipeline								
S-F18-65	0.4	Little Cherrystone Creek	Perennial	22	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry-Ditch - Dam and pump, Flume
S-F18-63	0.6	Trib. To Sandy Creek	Intermittent	14	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-18	1.1	Trib. To Cherrystone Creek	Perennial	5	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-56	1.4	Trib. To Cherrystone Creek	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-18	1.7	Cherrystone Creek	Perennial	29	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-2	3.2	Trib. To Banister River	Intermittent	8	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-6	3.6	Trib. To Banister River	Intermittent	9	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-10	4.0	Trib. To Banister River	Intermittent	6	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-9	4.1	Trib. To Banister River	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-4	4.8	Trib. To Banister River	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-3	4.9	Banister River	Perennial	48	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-2	5.0	White Oak Creek	Perennial	33	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-D18-2	5.1	White Oak Creek	Perennial	23	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-36	6.6	Trib. To White Oak Creek	Intermittent	5	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-7	7.0	Trib. To White Oak Creek	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-6	7.0	Trib. To White Oak Creek	Intermittent	5	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-13	7.6	Trib. To White Oak Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-13	8.0	Trib. To White Oak Creek	Intermittent	9	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-16	8.5	Trib. To White Oak Creek	Intermittent	8	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-14	8.6	Trib. To White Oak Creek	Perennial	9	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
WB-E18-24	9.0	Trib. To White Oak Creek	Pond	23	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-15	9.9	Trib. To White Oak Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-17	9.9	White Oak Creek	Perennial	14	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-22	11.0	Trib. To Sandy Creek	Intermittent	0	N/A	WWH	AL, R, FC, W	N/A
S-F18-20	11.0	Trib. To Sandy Creek	Perennial	40	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-28	11.4	Trib. To Sandy Creek	Intermittent	0	N/A	WWH	AL, R, FC, W	N/A
S-F18-20	11.4	Trib. To Sandy Creek	Perennial	12	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-85	11.6	Trib. To Sandy Creek	Perennial	4	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-C18-86	11.9	Trib. To Sandy Creek	Perennial	23	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-21	12.8	Sandy Creek	Perennial	15	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-27	13.4	Trib. To Sandy Creek	Perennial	11	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-22	14.3 RR	Trib. To Sandy Creek	Perennial	10	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-47	14.7	Trib. To Sandy Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-188	15.2	Trib. To Silver Creek	Perennial	5	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-37	15.7	Trib. To Silver Creek	Perennial	24	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-190	15.9	Trib. To Silver Creek	Intermittent	6	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-194	16.0	Trib. To Silver Creek	Perennial	7	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-195	16.2	Trib. To Silver Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-G18-10	16.2	Trib. To Silver Creek	Intermittent	0	N/A	WWH	AL, R, FC, W	N/A
S-C18-97	16.8	Trib. To Sandy River	Intermittent	6	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-202	17.0	Trib. To Sandy River	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-51	17.3	Trib. To Sandy River	Perennial	12	Intermediate	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-44	17.7 RR	Sandy River	Perennial	113	Major	WWH	AL, R, FC, W	Open Cut – Dry Ditch -, Flume
S-A19-292	17.8 RR	Trib.to Sandy River	Perennial	6	Minor	WWH	AL,R,W	Open Cut – Dry Ditch - Dam and pump, Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-E18-42	18.0	Trib. To Hardys Creek	Perennial	6	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-38	19.4	Trib. To Sandy River	Ephemeral	4	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-50	19.7	Trib. To Sandy River	Perennial	9	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-52	20.4	Trib. To Trayner Branch	Perennial	13	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-54	20.6	Trib. To Trayner Branch	Perennial	6	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-34	21.0	Trayner Branch	Perennial	7	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-D18-40	21.2	Trib. To Trayner Branch	Perennial	5	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-94	21.7	Trib. To Trotters Creek	Intermittent	0	N/A	WWH	AL, R, FC, W	N/A
WB-C18-93	21.9	Trib. To Trotters Creek	Pond	0	N/A	WWH	AL, R, FC, W	N/A
S-A18-205	22.0	Trib. To Trotters Creek	Intermittent	19	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-203	22.1	Trib. To Trotters Creek	Intermittent	1	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-206	22.2	Trib. To Trotters Creek	Intermittent	9	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-315	22.5 RR	Trib. To Trotters Creek	Intermittent	4	Minor	WWH	Al, R, FC, W	Open Cut - Dam and pump, Flume
S-A19-317	22.7 RR	Trib. To Trotters Creek	Intermittent	4	Minor	WWH	Al,R,FC,W	Open Cut - Dam and pump, Flume
S-F18-42	23.2 RR	Trib. To Trotters Creek	Ephemeral	6	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-40	23.2 RR	Trotters Creek	Perennial	25	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-F18-38	23.6 RR	Trib. To Dan River	Intermittent	8	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-F18-35	23.9 RR	Trib. To Dan River	Ephemeral	10	Minor	WWH	AL, R, FC, W	Open Cut – Dry Ditch - Dam and pump, Flume
S-E18-34	23.9	Trib. To Dan River	Intermittent	0	N/A	WWH	AL, R, FC, W, PWS	N/A
S-F18-34	24.4	Trib. To Dan River	Ephemeral	7	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
AS-F18-33/S-F18-33	24.8	Trib. To Dan River	Perennial	9	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-89	25.1	Trib. To Dan River	Perennial	19	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-90	25.7	Trib. To Dan River	Perennial	11	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-92	25.9	Trib. To Dan River	Intermittent	7	Minor	WWH	AL, R, FC, W, PWS	Open Cut – Dry Ditch - Dam and pump, Flume
North Carolina - Rockingham								
S-B18-99	26.5	Trib. To Cascade Creek	Intermittent	0	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-42	27.3	Trib. To Cascade Creek	Intermittent	20	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-40	27.5	Cascade Creek	Perennial	108	Major	WWH	Class C	Conventional Bore
S-A19-273	27.5	Dry Creek	Perennial	29	Intermediate	WWH	Class C	Conventional Bore
S-A18-31	28.3 RR	Trib. To Dan River	Intermittent	0	N/A	WWH	Class C	N/A
S-A18-32	28.4 RR	Trib. To Dan River	Perennial	14	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-34	28.4 RR	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-36	28.4 RR	Trib. To Dan River	Perennial	0	N/A	WWH	Class C	N/A

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A18-37	28.6 RR	Trib. To Dan River	Perennial	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-49	28.8	Trib. To Dan River	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-47	29.6	Trib. To Dan River	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-17	30.1	Dan River	Perennial	248	Major	WWH	Class C	HDD
S-B18-38	30.3	Trib. To Dan River	Ephemeral	3	Minor	WWH	Class C	HDD
S-B18-104	30.8	Trib. To Rock Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B19-153	30.9	Trib. To Rock Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-105	31.1	Trib. To Rock Creek	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-102	31.1	Trib. To Rock Creek	Perennial	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-95	31.3	Rock Creek	Perennial	28	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-120	31.7	Trib. To Machine Creek	Ephemeral	0	N/A	WWH	Class C	N/A
S-A18-143	31.9	Trib. To Machine Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-140	31.9	Trib. To Machine Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-144	32.0	Trib. To Machine Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-140	32.0	Trib. To Machine Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-147	32.2	Machine Creek	Perennial	20*	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A18-153	32.6	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-151	32.7	Town Creek	Perennial	55	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-151	33.0	Town Creek	Perennial	48	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-154	33.0	Trib. To Town Creek	Intermittent	0	N/A	WWH	Class C	N/A
S-A18-154	33.0	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-154	33.0	Trib. To Town Creek	Intermittent	0	N/A	WWH	Class C	N/A
S-A18-220	33.3	Trib. To Town Creek	Ephemeral	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-221	33.3	Trib. To Town Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-52	33.4	Trib. To Town Creek	Intermittent	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-51	33.5	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-223	33.7	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-225	33.7	Trib. To Town Creek	Perennial	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-49	33.9	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-38	34.2 RR	Trib. To Town Creek	Perennial	33	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-39	34.5	Trib. To Town Creek	Ephemeral	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-38	34.6	Trib. To Town Creek	Perennial	17	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-C18-53	34.7	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-38	34.8	Trib. To Town Creek	Perennial	23	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-74	34.8	Trib. To Town Creek	Ephemeral	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-38	35.0	Trib. To Town Creek	Perennial	8	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-57	35.1	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-35	36.0	Trib. To Town Creek	Perennial	10	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-94	37.0	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-97	37.2	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-101	37.3	Trib. To Wolf Island Creek	Perennial	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B19-157	37.6	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-B18-117	37.7	Trib. To Wolf Island Creek	Perennial	12	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-2	38.2	Trib. To Wolf Island Creek	Perennial	20	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-9	38.4	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-4	38.5	Trib. To Wolf Island Creek	Perennial	0	N/A	WWH	Class C	N/A
S-A18-4	38.5	Trib. To Wolf Island Creek	Perennial	0	N/A	WWH	Class C	N/A
S-A18-8	38.8	Wolf Island Creek	Perennial	53	Intermediate	WWH	Class C	Conventional Bore

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Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A19-269	38.8	Trib. To Wolf Island Creek	Intermittent	2	Minor	WWH	Class C	Conventional Bore
S-B18-72	39.0	Trib. To Wolf Island Creek	Ephemeral	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-74	39.1	Trib. To Wolf Island Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-74	39.6	Trib. To Wolf Island Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-108	40.2	Trib. To Lick Fork	Perennial	27	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-210	40.5 RR	Trib. To Lick Fork	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-210	40.5 RR	Trib. To Lick Fork	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-51	40.6	Trib. To Lick Fork	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-52	40.7	Trib. To Lick Fork	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-57	41.1	Trib. To Lick Fork	Perennial	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-56	41.2	Lick Fork	Perennial	39	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-171	41.2	Trib. To Lick Fork	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-B18-44	41.6	Trib. To Lick Fork	Intermittent	0	N/A	WWH	Class C	N/A
S-B18-44	41.7	Trib. To Lick Fork	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-41	41.8	Trib. To Lick Fork	Perennial	20	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-89	42.3	Trib. To Jones Creek	Ephemeral	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A18-256	42.9	Trib. To Jones Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-92	43.1	Trib. To Jones Creek	Perennial	12	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-176	43.3	Jones Creek	Perennial	26	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-181	43.3	Trib. To Jones Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-80	43.7	Trib. To Jones Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-105	43.7	Trib. To Jones Creek	Perennial	53	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-25	44.1	Trib. To Jones Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-102	44.1	Trib. To Jones Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-228	44.5	Trib. To Jones Creek	Ephemeral	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-213	45.7	Trib. To Hogans Creek	Intermittent	0	N/A	WWH	Class C	N/A
S-B18-71	45.7	Trib. To Hogans Creek	Perennial	23	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-68	45.8	Trib. To Hogans Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-345	46.1 RR	Trib. To Hogans Creek	Ephemeral	3	Minor	WWh	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-344	46.2 RR	Trib To Hogans Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-231	46.4	Trib. To Hogans Creek	Ephemeral	0	N/A	WWH	Class C	N/A
S-A18-234	46.5	Trib. To Hogans Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A18-235	46.5	Trib. To Hogans Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-76	47.0	Hogans Creek	Perennial	19	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-79	47.4	Trib. To Hogans Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-90	47.6	Trib. To Hogans Creek	Perennial	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B19-167	47.7	Trib. To Hogans Creek	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-242	47.7	Trib. To Hogans Creek	Perennial	19	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-60	48.7	Giles Creek	Perennial	4	Minor	WWH	Class C, WS-IV, NSW	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-55	49.3	Trib. To Giles Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-183	49.9 RR	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-185	49.9 RR	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-A18-182	49.9 RR	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-244	50.2 RR	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-289	50.7 RR	Trib. To Haw River	Intermittent	0	N/A	WWH	Class C	N/A
S-A19-286	50.8 RR	Trib. To Haw River	Perennial	43*	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-285	51.2 RR	Trib. To Haw River	Intermittent	0	N/A	WWH	Class C	N/A
S-C18-22	51.3 RR	Trib. To Haw River	Ephemeral	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-C18-21	51.4 RR	Trib. To Haw River	Perennial	0	N/A	WWH	Class C	N/A
WB-C18-19	51.4 RR	Trib. To Haw River	Pond	0	N/A	WWH	Class C	N/A
S-C18-15	52.2 RR	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-A18-219	52.4 RR	Trib. To Haw River	Perennial	9	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
North Carolina - Alamance								
S-B18-94	52.7	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-84	53.7	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-87	53.7	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-89	54.0	Trib. To Haw River	Intermittent	0	N/A	WWH	Class C	N/A
S-C18-63	54.5	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-62	54.6	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-60	54.9	Trib. To Haw River	Intermittent	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-143	54.9	Trib. To Haw River	Ephemeral	0	N/A	WWH	Class C	N/A
S-B18-142	54.9	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-61	54.9	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-68	55.3 RR	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-B18-59	55.6 RR	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-65	56.4 RR	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-120	56.4 RR	Trib. To Haw River	Perennial	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
WB-A18-121	56.5	Trib. To Haw River	Pond	31	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-123	56.6 RR	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-129	56.6 RR	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
WB-A18-128	56.7 RR	Trib. To Haw River	Pond	68	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-132	57.1	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-2	57.9	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-11	58.7 RR	Trib. To Haw River	Perennial	31	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-12	58.7 RR	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
AS-NHD-1549	59.6	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-30	60.7	Trib. To Haw River	Intermittent	16	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-28	60.8 RR	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A19-340	61.3	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-339	61.4	Trib. To Haw River	Ephemeral	0	N/A	WWH	Class C	N/A
S-A18-78	61.8	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-70	62.5	Trib. To Haw River	Perennial	13	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-24	63.0 RR	Trib. To Stony Creek	Intermittent	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-14	63.2 RR	Trib. To Stony Creek	Ephemeral	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-113	63.3 RR	Trib. To Stony Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-12	63.4 RR	Trib. To Stony Creek	Perennial	18	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-15	63.5	Trib. To Stony Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-16	63.6	Stony Creek Reservoir	Perennial	296	Major	WWH	Class C, WS-II, HQW, NSW, CA	HDD
S-B18-20	63.8	Trib. To Deep Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-331	64.1 RR	Deep Creek	Perennial	34	Intermediate	WWH	Class C, WS-II, HQW, NSW, CA	Conventional Bore
S-A19-351	64.4	Trib. To Deep Creek	Ephemeral	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-350	64.5	Trib. To Deep Creek	Perennial	13	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-319	65.0 RR	Trib. To Boyds Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-321	65.1 RR	Trib. To Boyds Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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S-A19-324	65.2 RR	Trib. To Boyds Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-251	65.6	Trib. To Boyds Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-250	65.6	Trib. To Boyds Creek	Perennial	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-A19-353	66.5 RR	Trib. To Boyds Creek	Intermittent	2	Minor	WWH	N/A	Open Cut – Dry Ditch - Dam and pump, Flume
AS-NHD-3025	66.8 RR	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-A18-177	67.3 RR	Trib. To Boyds Creek	Perennial	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-A18-180	67.3 RR	Trib. To Boyds Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-80	67.3 RR	Trib. To Boyds Creek	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-233	67.6	Boyds Creek	Perennial	24	Intermediate	WWH	Class C, WS-V, NSW	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-335	67.9	Trib. To Boyds Creek	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-336	68.1	Trib. To Boyds Creek	Intermittent	8	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B-18-7	68.4	Trib. To Boyd Creek	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-NHD-1552	68.6	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-8	68.8	Trib. To Haw River	Intermittent	12	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-11	68.9	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-A18-15	69.2	Trib. To Haw River	Intermittent	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-B18-132	69.5	Trib. To Haw River	Perennial	8	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-70	69.7 RR	Trib. To Haw River	Intermittent	0	Minor	WWH	N/A	N/A
S-A18-115	70.0 RR	Trib. To Haw River	Perennial	6	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-135	70.3	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-133	70.3	Trib. To Haw River	Perennial	11	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-82	70.4	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-C18-81	70.7	Trib. To Haw River	Perennial	24	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-109	70.9	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-108	71.0	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-107	71.0	Trib. To Haw River	Ephemeral	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-64	71.5	Trib. To Haw River	Perennial	26	Intermediate	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-65	71.6	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-68	71.8	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
AS-A19-337 / S-A19-337	71.9	Trib. To Haw River	Ephemeral	4	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A19-338	72.0	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume

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Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
AS-NHD-1560	72.1	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-A18-207	72.2	Trib. To Haw River	Intermittent	0	N/A	WWH	Class C	N/A
S-B18-125	72.4	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B18-127	72.5	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Open Cut – Dry Ditch - Dam and pump, Flume
S-B19-150	73.0 RR	Trib. To Back Creek	Perennial	0	N/A	WWH	Class C	N/A
Aboveground Facilities								
North Carolina - Rockingham								
S-B18-38 - T-15 Dan River Interconnect	30.3	Trib. To Dan River	Ephemeral	0	N/A	WWH	Class C	N/A
Access Roads								
Virginia - Pittsylvania								
S-D18-20 - TA-PI-005	2.2	Trib. To Cherrystone Creek	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
S-F18-61 - TA-PI-035	14.3 RR	Trib. To Sandy Creek	Perennial	7	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-F18-47 - TA-PI-043	17.2	Trib. To Sandy River	Intermittent	0	N/A	WWH	AL, R, FC, W	N/A
S-E18-41 - TA-PI-061	22.7 RR	Trib. To Trotters Creek	Ephemeral	0	N/A	WWH	AL, R, FC, W	N/A
S-E18-39 - TA-PI-061	22.6 RR	Trib. To Trotters Creek	Perennial	4	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-E18-38 – TA-PI-061	22.6 RR	Trib. To Trotters Creek	Intermittnet	0	N/A	WWH	AL, R, FC, W	N/A
S-E18-32 - TA-PI-063	24.0	Trib. To Dan River	Intermittent	4	Minor	WWH	AL, R, FC, W	Bridge or Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-C18-88 - TA-PI-067	25.0	Trib. To Dan River	Intermittent	0	N/A	WWH	AL, R, FC, W	N/A
North Carolina - Rockingham								
S-A18-23 - TA-RO-076	28.3 RR	Trib. To Dan River	Perennial	0	N/A	WWH	Class C	N/A
S-A18-27 - TA-RO-076	28.4 RR	Trib. To Dan River	Intermittent	1	Minor	WWH	Class C	Bridge or Flume
S-A18-19 - TA-RO-080	29.7	Trib. To Dan River	Perennial	0	N/A	WWH	Class C	N/A
S-A18-19 - TA-RO-080	29.8	Trib. To Dan River	Perennial	0	N/A	WWH	Class C	N/A
S-A18-1 - TA-RO-103	38.1	Trib. To Wolf Island Creek	Ephemeral	0	N/A	WWH	Class C	N/A
S-B18-42 - TA-RO-113A	41.8	Trib. To Lick Fork	Intermittent	0	N/A	WWH	Class C	N/A
S-A18-239 - TA-RO-129	46.7	Trib. To Hogans Creek	Intermittent	0	N/A	WWH	Class C	N/A
S-A18-238 – TA-RO-129	46.7	Trib. To Hogans Creek	Intermittent	0	N/A	WWH	Class C	N/A
S-C18-71 - TA-RO-139	50.2 RR	Trib. To Haw River	Ephemeral	0	N/A	WWH	Class C	N/A
S-C18-15 - TA-RO-144A	52.2 RR	Trib. To Haw River	Intermittent	0	N/A	WWH	Class C	N/A
North Carolina - Alamance								
S-A18-215 - TA-AL-155	54.6	Trib. To Haw River	Perennial	11	Intermediate	WWH	Class C	Bridge or Flume
S-A18-216 - TA-AL-155	54.6	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Bridge or Flume
S-B18-138 - TA-AL-172	63.7	Trib. To Stony Creek	Perennial	3	Minor	WWH	Class C	Bridge or Flume

Appendix B.5

Waterbodies Crossed by the Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification / Designations g/	Crossing Method h/ i/
S-B18-137 - TA-AL-172	63.7	Trib. To Stony Creek	Intermittent	2	Minor	WWH	Class C	Bridge or Flume
S-A19-308-TA-Al195	71.2	Trib. To Back Creek	Perennial	0	N/A	WWH	Class C	N/A

a/ Data is based on waterbody field delineations completed through May 9, 2019 where access has been obtained, National Hydrography Database (NHD), and desktop analysis of approximated resources. "S" indicates stream, "WB" indicates pond, "AS" indicates approximate stream or pond. Approximated streams are also indicated with "*"

b/ MP is closest milepost to waterbody. Mileposts with an "RR" indicate locations where a re-route was incorporated into the pipeline alignment.

c/ Perennial: flowing throughout the year for all or most years, Intermittent: flowing water during certain times of the year, Ephemeral: flowing water only during short periods of the year. For delineated waterbodies, flow type in North Carolina was determined using the NCDWQ Stream Identification Form Version 4.11 and flow type in Virginia has been field estimated. For approximated waterbodies, flow type was estimated based on aerial imagery unless the approximated stream is directly associated with a delineated waterbody in which the approximated waterbody was assigned the same flow type as the associated delineated waterbody.

d/ Crossing width is the intersection of the waterbody and the centerline of the pipeline or access road (unless followed by "*" which indicates the stream width for a parallel pipeline crossing),. For approximated streams, the crossing width was measure using aerial imagery if wide enough to discern, and defaulted to 5 feet if too narrow to be measured using aerial imagery. If the crossing width is "0", the waterbody is not crossed by the centerline, but is within the Project workspace. .

e/ FERC Classification from the 2013 FERC Procedures. Minor (<10 feet); Intermediate (>10 - <100 feet); Major (>100 feet). N/A indicates the stream is not crossed by the Project pipeline..

f/ WWH - Warm Water Habitat.

g/ Virginia Water Quality Designations (VADEQ, 2016b). North Carolina Water Quality Classifications (NCDEQ, 2018d). In Virginia AL = Aquatic Life, R = Recreation, W = Wildlife, FC = Fish Consumption, PWS = PUBLIC Water Source. In North Carolina WS-II = Water Supply II, WA-IV = Water Supply IV, WS-V = Water Supply V, HQW = High Quality Waters, NSW = Nutrient Sensitive Waters

h/ June 1 through November 30 is the FERC mandated warmwater habitat construction window; in-water work, except that required to install or remove equipment bridges, must be completed between these dates unless expressly permitted or further restricted in writing on a site-specific basis by the appropriate federal or state agency. Construction timing windows for mussels may be applicable depending on final consultation with the applicable agencies.

i/ Conventional Open-Cut Crossing will only be used when there is no discernable flow within the waterbody at the time of crossing. Dry Open-Cut Crossing will consist of either Flume, Dam and Pump, or Cofferdam. N/A indicates that the waterbody is not crossed by centerline.

APPENDIX B.6

Wetlands Crossed by the Southgate Project

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-F18-7	Virginia	Pittsylvania	H-605 Pipeline	PEM	0.1	11	<0.01	<0.01	Open-cut
W-F18-11	Virginia	Pittsylvania	H-650 Pipeline	PFO	0.2	57	0.12	0.04	Open-cut
W-F18-66	Virginia	Pittsylvania	H-650 Pipeline	PEM	0.4	356	0.48	0.08	Open-cut
W-F18-66	Virginia	Pittsylvania	H-650 Pipeline	PFO	0.4	0	0.14	0.00	Workspace
W-F18-64	Virginia	Pittsylvania	H-650 Pipeline	PEM	0.6	225	0.36	0.05	Open-cut
W-G18-2	Virginia	Pittsylvania	H-650 Pipeline	PEM	1.0	13	0.04	<0.01	Open-cut
W-G18-2	Virginia	Pittsylvania	H-650 Pipeline	PFO	1.0	0	<0.01	<0.01	Workspace
W-F18-57	Virginia	Pittsylvania	H-650 Pipeline	PEM	1.1	0	<0.01	0.00	Workspace
W-F18-57	Virginia	Pittsylvania	H-650 Pipeline	PEM	1.1	0	<0.01	0.00	Workspace
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PFO	1.4	156	0.16	0.10	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PEM	1.4	0	0.01	<0.01	Workspace
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PFO	1.4	11	0.01	<0.01	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PFO	1.4	255	0.39	0.16	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PEM	1.6	770	1.25	0.18	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PSS	1.5	0	0.14	0.00	Workspace
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PEM	1.7	55	0.07	0.01	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PSS	1.8	362	0.45	0.08	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PEM	2.1	1,470	2.90	0.34	Open-cut
W-F18-5	Virginia	Pittsylvania	H-650 Pipeline	PFO	1.9	290	0.34	0.20	Open-cut
W-D18-5	Virginia	Pittsylvania	H-650 Pipeline	PFO	3.6	44	0.07	0.02	Open-cut
W-D18-5	Virginia	Pittsylvania	H-650 Pipeline	PFO	3.6	2	<0.01	<0.01	Open-cut
W-D18-11	Virginia	Pittsylvania	H-650 Pipeline	PFO	4.0	0	<0.01	0.00	Open-cut
W-D18-11	Virginia	Pittsylvania	H-650 Pipeline	PFO	4.0	5	<0.01	<0.01	Open-cut
W-D18-7	Virginia	Pittsylvania	H-650 Pipeline	PFO	4.9	373	0.46	0.25	Open-cut

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Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-D18-7	Virginia	Pittsylvania	H-650 Pipeline	PEM	4.9	9	0.20	0.01	Open-cut
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.0	14	0.02	<0.01	Open-cut
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.0	123	0.18	0.07	Open-cut
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.1	87	0.15	0.05	Open-cut
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.2	309	0.51	0.21	Open-cut
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.2	0	0.06	0.00	Workspace
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.2	113	0.31	0.08	Open-cut
W-D18-1	Virginia	Pittsylvania	H-650 Pipeline	PFO	5.2	10	0.00	0.00	Conventional Bore
W-D18-10	Virginia	Pittsylvania	H-650 Pipeline	PFO	6.5	0	0.01	0.00	Workspace
W-D18-10	Virginia	Pittsylvania	H-650 Pipeline	PEM	6.6	0	0.14	<0.01	Workspace
W-D18-10	Virginia	Pittsylvania	H-650 Pipeline	PFO	6.6	53	0.10	0.04	Open-cut
W-D18-8	Virginia	Pittsylvania	H-650 Pipeline	PEM	7.0	0	<0.01	0.00	Workspace
W-D18-8	Virginia	Pittsylvania	H-650 Pipeline	PEM	7.0	0	<0.01	0.00	Workspace
W-D18-14	Virginia	Pittsylvania	H-650 Pipeline	PEM	7.6	0	<0.01	0.00	Workspace
W-D18-14	Virginia	Pittsylvania	H-650 Pipeline	PFO	7.6	0	<0.01	0.00	Workspace
W-F18-14	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.0	0	<0.01	0.00	Workspace
W-F18-14	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.0	0	<0.01	0.00	Workspace
W-F18-14	Virginia	Pittsylvania	H-650 Pipeline	PFO	8.0	3	0.01	<0.01	Open-cut
W-F18-14	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.0	0	0.01	<0.01	Workspace
W-F18-14	Virginia	Pittsylvania	H-650 Pipeline	PFO	8.0	5	<0.01	<0.01	Open-cut
W-E18-17	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.4	98	0.16	0.02	Open-cut
W-E18-13	Virginia	Pittsylvania	H-650 Pipeline	PFO	8.5	94	0.15	0.05	Open-cut
W-E18-13	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.5	0	0.02	0.00	Workspace
W-E18-13	Virginia	Pittsylvania	H-650 Pipeline	PFO	8.6	32	0.05	0.01	Open-cut

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Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-E18-13	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.6	0	0.01	0.00	Workspace
W-E18-13	Virginia	Pittsylvania	H-650 Pipeline	PFO	8.6	47	0.07	0.03	Open-cut
W-E18-13	Virginia	Pittsylvania	H-650 Pipeline	PEM	8.6	0	0.01	0.00	Workspace
W-E18-24	Virginia	Pittsylvania	H-650 Pipeline	PFO	9.0	0	0.01	<0.01	Workspace
W-E18-24	Virginia	Pittsylvania	H-650 Pipeline	PEM	9.1	0	0.09	0.00	Workspace
W-F18-58	Virginia	Pittsylvania	H-650 Pipeline	PFO	9.7	393	0.46	0.24	Open-cut
W-F18-16	Virginia	Pittsylvania	H-650 Pipeline	PFO	9.9	27	0.05	0.01	Open-cut
W-F18-18	Virginia	Pittsylvania	H-650 Pipeline	PFO	9.9	0	0.01	<0.01	Workspace
W-F18-18	Virginia	Pittsylvania	H-650 Pipeline	PFO	9.9	0	<0.01	0.00	Workspace
W-F18-18	Virginia	Pittsylvania	H-650 Pipeline	PFO	9.9	40	0.06	0.03	Open-cut
W-E18-23	Virginia	Pittsylvania	H-650 Pipeline	PEM	10.1	0	<0.01	0.00	Workspace
W-E18-23	Virginia	Pittsylvania	H-650 Pipeline	PFO	10.1	4	0.01	<0.01	Open-cut
W-F18-24	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.0	0	0.03	0.00	Workspace
W-F18-21	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.0	0	<0.01	0.00	Workspace
W-F18-21	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.1	0	<0.01	0.00	Workspace
W-F18-29	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.4	0	0.01	0.00	Workspace
W-F18-27	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.4	0	<0.01	<0.01	Workspace
W-C18-84	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.6	29	0.06	0.01	Open-cut
W-C18-84	Virginia	Pittsylvania	H-650 Pipeline	PFO	11.6	20	0.02	<0.01	Open-cut
W-F18-53	Virginia	Pittsylvania	H-650 Pipeline	PFO	12.8	8	<0.01	<0.01	Open-cut
W-F18-53	Virginia	Pittsylvania	H-650 Pipeline	PFO	12.8	0	<0.01	0.00	Workspace
W-F18-53	Virginia	Pittsylvania	H-650 Pipeline	PFO	12.8	6	<0.01	<0.01	Open-cut
W-F18-53	Virginia	Pittsylvania	H-650 Pipeline	PFO	12.8	0	<0.01	0.00	Workspace
W-E18-28	Virginia	Pittsylvania	H-650 Pipeline	PFO	13.4	64	0.11	0.03	Open-cut

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Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-E18-28	Virginia	Pittsylvania	H-650 Pipeline	PFO	13.4	0	<0.01	0.00	Workspace
W-E18-28	Virginia	Pittsylvania	H-650 Pipeline	PFO	13.5 RR	26	0.06	0.02	Open-cut
W-E18-28	Virginia	Pittsylvania	H-650 Pipeline	PFO	13.5 RR	23	0.04	0.02	Open-cut
W-D18-23	Virginia	Pittsylvania	H-650 Pipeline	PFO	14.3 RR	61	0.11	0.04	Open-cut
W-E18-45	Virginia	Pittsylvania	H-650 Pipeline	PEM	14.7	0	<0.01	0.00	Workspace
W-E18-45	Virginia	Pittsylvania	H-650 Pipeline	PEM	14.7	0	<0.01	0.00	Workspace
W-E18-45	Virginia	Pittsylvania	H-650 Pipeline	PEM	14.7	3	<0.01	<0.01	Open-cut
W-E18-45	Virginia	Pittsylvania	H-650 Pipeline	PEM	14.7	0	<0.01	0.00	Workspace
W-A18-198	Virginia	Pittsylvania	H-650 Pipeline	PEM	16.2	39	0.03	0.01	Open-cut
W-A18-198	Virginia	Pittsylvania	H-650 Pipeline	PFO	16.2	0	<0.01	0.00	Workspace
W-A18-200	Virginia	Pittsylvania	H-650 Pipeline	PSS	16.7	0	0.05	0.00	Workspace
W-A18-201	Virginia	Pittsylvania	H-650 Pipeline	PEM	16.7	0	0.02	0.00	Workspace
W-A18-201	Virginia	Pittsylvania	H-650 Pipeline	PEM	16.8	0	0.02	<0.01	Workspace
W-A19-296	Virginia	Pittsylvania	H-650 Pipeline	PFO	17.7 RR	34	0.16	0.02	Open-cut
W-E18-43	Virginia	Pittsylvania	H-650 Pipeline	PEM	18.0	0	0.01	0.00	Workspace
W-E18-43	Virginia	Pittsylvania	H-650 Pipeline	PFO	18.0	0	<0.01	0.00	Workspace
W-E18-43	Virginia	Pittsylvania	H-650 Pipeline	PFO	18.0	0	<0.01	0.00	Workspace
W-D18-42	Virginia	Pittsylvania	H-650 Pipeline	PEM	19.4	0	0.03	0.00	Workspace
W-F18-51	Virginia	Pittsylvania	H-650 Pipeline	PFO	19.7	0	<0.01	0.00	Workspace
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	0	0.04	0.00	Workspace
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	0	<0.01	0.00	Workspace
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	0	<0.01	0.00	Workspace
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	0	<0.01	0.00	Workspace
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	6	<0.01	<0.01	Open-cut

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	0	<0.01	0.00	Workspace
W-E18-53	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.4	3	<0.01	<0.01	Open-cut
W-E18-55	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.6	0	<0.01	0.00	Workspace
W-E18-55	Virginia	Pittsylvania	H-650 Pipeline	PEM	20.6	3	<0.01	<0.01	Open-cut
W-D18-35	Virginia	Pittsylvania	H-650 Pipeline	PFO	21.0	54	0.08	0.04	Open-cut
W-D18-35	Virginia	Pittsylvania	H-650 Pipeline	PEM	21.0	0	0.04	0.00	Workspace
W-D18-41	Virginia	Pittsylvania	H-650 Pipeline	PEM	21.2	47	0.09	0.01	Open-cut
W-D18-41	Virginia	Pittsylvania	H-650 Pipeline	PFO	21.2	7	0.01	<0.01	Open-cut
W-D18-41	Virginia	Pittsylvania	H-650 Pipeline	PFO	21.2	75	0.09	0.04	Open-cut
W-D18-41	Virginia	Pittsylvania	H-650 Pipeline	PEM	21.3	8	0.09	0.02	Open-cut
W-C18-95	Virginia	Pittsylvania	H-650 Pipeline	PEM	21.7	0	0.03	0.00	Workspace
W-A18-204	Virginia	Pittsylvania	H-650 Pipeline	PFO	22.0	0	<0.01	0.00	Workspace
W-A18-204	Virginia	Pittsylvania	H-650 Pipeline	PFO	22.0	2	0.02	<0.01	Open-cut
W-A18-204	Virginia	Pittsylvania	H-650 Pipeline	PFO	22.0	40	0.10	0.03	Open-cut
W-A18-204	Virginia	Pittsylvania	H-650 Pipeline	PEM	22.1	0	0.02	0.00	Workspace
W-A18-204	Virginia	Pittsylvania	H-650 Pipeline	PEM	22.1	0	0.01	0.00	Workspace
W-A18-204	Virginia	Pittsylvania	H-650 Pipeline	PFO	22.1	18	0.02	0.01	Open-cut
W-A19-316	Virginia	Pittsylvania	H-650 Pipeline	PFO	22.5 RR	0	<0.01	0.00	Workspace
W-A19-318	Virginia	Pittsylvania	H-650 Pipeline	PFO	23.1 RR	20	0.03	0.01	Open-cut
W-A19-314	Virginia	Pittsylvania	H-650 Pipeline	PFO	23.8 RR	0	<0.01	0.00	Workspace
W-E18-33	Virginia	Pittsylvania	H-650 Pipeline	PFO	23.9	0	<0.01	0.00	Workspace
W-E18-33	Virginia	Pittsylvania	H-650 Pipeline	PFO	23.9	0	0.01	0.00	Workspace
W-A19-297	Virginia	Pittsylvania	H-650 Pipeline	PEM	24.6	0	0.01	0.00	Workspace
W-C18-91	Virginia	Pittsylvania	H-650 Pipeline	PFO	25.9	18	0.04	0.01	Open-cut

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-C18-91	Virginia	Pittsylvania	H-650 Pipeline	PFO	25.8	3	<0.01	0.00	Open-cut
W-C18-96	Virginia	Pittsylvania	H-650 Pipeline	PEM	26.1	0	0.03	<0.01	Workspace
W-C18-96	Virginia	Pittsylvania	H-650 Pipeline	PFO	26.1	97	0.08	0.05	Open-cut
W-C18-96	North Carolina	Rockingham	H-650 Pipeline	PFO	26.1	0	<0.01	<0.01	Workspace
W-B18-98	North Carolina	Rockingham	H-650 Pipeline	PFO	26.5	15	0.03	0.01	Open-cut
W-A18-22	North Carolina	Rockingham	H-650 Pipeline	PEM	26.7 RR	72	0.15	0.02	Open-cut
W-A18-44	North Carolina	Rockingham	H-650 Pipeline	PEM	27.0 RR	0	<0.01	0.00	Workspace
W-A18-44	North Carolina	Rockingham	H-650 Pipeline	PEM	27.1	1,197	3.07	0.27	Open-cut
W-A18-44	North Carolina	Rockingham	H-650 Pipeline	PFO	27.3	38	0.05	0.01	Open-cut
W-A19-274	North Carolina	Rockingham	H-650 Pipeline	PEM	27.6	42	0.19	0.01	Open-cut
W-A19-274	North Carolina	Rockingham	H-650 Pipeline	PEM	27.6	38	0.04	0.01	Open-cut
W-A19-274	North Carolina	Rockingham	H-650 Pipeline	PEM	27.6	0	0.17	0.00	Workspace
W-A18-39	North Carolina	Rockingham	H-650 Pipeline	PEM	28.0 RR	0	0.02	0.00	Workspace
W-A18-26	North Carolina	Rockingham	H-650 Pipeline	PEM	28.1 RR	24	0.06	0.01	Open-cut
W-A18-30	North Carolina	Rockingham	H-650 Pipeline	PEM	28.3 RR	26	0.03	0.01	Open-cut
W-A18-30	North Carolina	Rockingham	H-650 Pipeline	PFO	28.3 RR	18	0.01	0.01	Open-cut
W-A18-38	North Carolina	Rockingham	H-650 Pipeline	PEM	28.6 RR	0	0.02	<0.01	Workspace
W-A18-38	North Carolina	Rockingham	H-650 Pipeline	PFO	28.6 RR	41	0.04	0.03	Open-cut
W-B18-48	North Carolina	Rockingham	H-650 Pipeline	PFO	29.1	23	0.05	0.02	Open-cut
W-B18-48	North Carolina	Rockingham	H-650 Pipeline	PEM	29.1	0	0.01	<0.01	Workspace
W-A18-18	North Carolina	Rockingham	H-650 Pipeline	PFO	29.8	935	2.33	0.64	Open-cut
W-A18-18	North Carolina	Rockingham	H-650 Pipeline	PEM	29.9	50	0.07	0.01	Open-cut
W-B18-39	North Carolina	Rockingham	H-650 Pipeline	PEM	30.2	25	<0.01	0.00	HDD
W-B18-39	North Carolina	Rockingham	H-650 Pipeline	PEM	30.2	40	<0.01	0.00	HDD

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-B18-39	North Carolina	Rockingham	H-650 Pipeline	PEM	30.2	30	<0.01	0.00	HDD
W-B18-39	North Carolina	Rockingham	H-650 Pipeline	PEM	30.2	32	<0.01	0.00	HDD
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PEM	30.2	36	<0.01	0.00	HDD
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PEM	30.3	16	<0.01	0.00	HDD
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PFO	30.3	32	<0.01	0.00	HDD
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PEM	30.3	18	<0.01	0.00	HDD
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PEM	30.4	0	0.00	0.00	HDD
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PEM	30.4	27	0.03	0.01	Open-cut
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PEM	30.4	0	<0.01	0.00	Workspace
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PFO	30.3	0	0.01	0.00	Workspace
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PFO	30.4	0	<0.01	0.00	Workspace
W-B18-36	North Carolina	Rockingham	H-650 Pipeline	PFO	30.4	0	0.01	0.00	Workspace
W-B18-34	North Carolina	Rockingham	H-650 Pipeline	PFO	30.4	0	0.01	0.00	Workspace
W-B18-34	North Carolina	Rockingham	H-650 Pipeline	PFO	30.5	180	0.45	0.12	Open-cut
W-A18-54	North Carolina	Rockingham	H-650 Pipeline	PEM	30.7	11	0.01	<0.01	Open-cut
W-B18-103	North Carolina	Rockingham	H-650 Pipeline	PEM	31.1	0	<0.01	0.00	Workspace
W-A18-141	North Carolina	Rockingham	H-650 Pipeline	PFO	32.0	183	0.34	0.13	Open-cut
W-A18-141	North Carolina	Rockingham	H-650 Pipeline	PEM	32.0	0	0.02	0.00	Workspace
W-A18-149	North Carolina	Rockingham	H-650 Pipeline	PSS	32.2	51	0.07	0.01	Open-cut
W-A18-149	North Carolina	Rockingham	H-650 Pipeline	PEM	32.2	52	0.16	0.01	Open-cut
W-A18-152	North Carolina	Rockingham	H-650 Pipeline	PEM	32.6	21	0.06	0.01	Open-cut
W-A18-152	North Carolina	Rockingham	H-650 Pipeline	PFO	32.6	29	0.03	0.02	Open-cut
W-A18-155	North Carolina	Rockingham	H-650 Pipeline	PEM	33.1	0	0.06	0.00	Workspace
W-A18-155	North Carolina	Rockingham	H-650 Pipeline	PSS	33.1	0	<0.01	0.00	Workspace

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-A18-155	North Carolina	Rockingham	H-650 Pipeline	PSS	33.1	68	0.16	0.02	Open-cut
W-A18-222	North Carolina	Rockingham	H-650 Pipeline	PFO	33.4	43	0.08	0.03	Open-cut
W-A18-222	North Carolina	Rockingham	H-650 Pipeline	PEM	33.4	0	<0.01	0.00	Workspace
W-A18-224	North Carolina	Rockingham	H-650 Pipeline	PFO	33.7	10	0.02	0.01	Open-cut
W-A18-224	North Carolina	Rockingham	H-650 Pipeline	PEM	33.7	0	<0.01	0.00	Workspace
W-C18-40	North Carolina	Rockingham	H-650 Pipeline	PEM	34.6	0	<0.01	0.00	Workspace
W-A18-95	North Carolina	Rockingham	H-650 Pipeline	PEM	37.0	8	0.02	<0.01	Open-cut
W-A18-98	North Carolina	Rockingham	H-650 Pipeline	PFO	37.2	0	0.01	0.00	Workspace
W-S18-1	North Carolina	Rockingham	H-650 Pipeline	PFO	37.3	8	0.01	0.01	Open-cut
W-A18-6	North Carolina	Rockingham	H-650 Pipeline	PFO	38.5	130	0.15	0.08	Open-cut
W-A18-6	North Carolina	Rockingham	H-650 Pipeline	PFO	38.5	0	<0.01	0.00	Workspace
W-A18-6	North Carolina	Rockingham	H-650 Pipeline	PFO	38.5	92	0.09	0.06	Open-cut
W-A18-6	North Carolina	Rockingham	H-650 Pipeline	PEM	38.5	46	0.09	0.01	Open-cut
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PFO	38.6	0	<0.01	0.00	Workspace
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PEM	38.6	76	0.18	0.02	Open-cut
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PSS	38.6	34	0.08	0.01	Open-cut
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PEM	38.6	0	<0.01	0.00	Workspace
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PEM	38.7	17	0.05	<0.01	Open-cut
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PEM	38.7	28	0.07	0.01	Open-cut
W-A18-7	North Carolina	Rockingham	H-650 Pipeline	PEM	38.7	16	0.04	<0.01	Open-cut
W-A19-270	North Carolina	Rockingham	H-650 Pipeline	PFO	38.8	0	0.02	<0.01	Workspace
W-B18-78	North Carolina	Rockingham	H-650 Pipeline	PFO	39.7	56	0.06	0.03	Open-cut
W-B18-112	North Carolina	Rockingham	H-650 Pipeline	PEM	40.1	0	0.01	0.00	Workspace
W-B18-110	North Carolina	Rockingham	H-650 Pipeline	PFO	40.2	0	0.02	0.01	Workspace

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-B18-55	North Carolina	Rockingham	H-650 Pipeline	PEM	41.1	0	<0.01	0.00	Workspace
W-B18-55	North Carolina	Rockingham	H-650 Pipeline	PFO	41.1	84	0.13	0.06	Open-cut
W-B18-46	North Carolina	Rockingham	H-650 Pipeline	PFO	41.7	6	0.02	0.01	Open-cut
W-A19-346	North Carolina	Rockingham	H-650 Pipeline	PEM	46.1 RR	0	<0.01	0.00	Workspace
W-A19-343	North Carolina	Rockingham	H-650 Pipeline	PFO	46.2 RR	0	0.02	<0.01	Workspace
W-C18-77	North Carolina	Rockingham	H-650 Pipeline	PFO	46.0	46	0.08	0.03	Open-cut
W-B18-139	North Carolina	Rockingham	H-650 Pipeline	PFO	48.5	24	0.03	0.02	Open-cut
W-A18-62	North Carolina	Rockingham	H-650 Pipeline	PSS	48.6	40	0.11	0.01	Open-cut
W-A18-62	North Carolina	Rockingham	H-650 Pipeline	PSS	48.6	0	<0.01	0.00	Workspace
W-A18-61	North Carolina	Rockingham	H-650 Pipeline	PEM	48.7	1	0.01	<0.01	Open-cut
W-A18-184	North Carolina	Rockingham	H-650 Pipeline	PEM	49.9 RR	0	0.01	0.00	Workspace
W-A18-184	North Carolina	Rockingham	H-650 Pipeline	PEM	49.9 RR	0	0.01	0.00	Workspace
W-A18-184	North Carolina	Rockingham	H-650 Pipeline	PFO	49.9 RR	39	0.06	0.03	Open-cut
W-A19-284	North Carolina	Rockingham	H-650 Pipeline	PSS	51.2 RR	0	0.01	0.00	Workspace
W-C18-20	North Carolina	Rockingham	H-650 Pipeline	PFO	51.4 RR	19	0.02	0.01	Open-cut
W-C18-20	North Carolina	Rockingham	H-650 Pipeline	PFO	51.4 RR	135	0.21	0.09	Open-cut
W-C18-20	North Carolina	Rockingham	H-650 Pipeline	PEM	51.4 RR	0	<0.01	0.00	Workspace
W-A18-83	North Carolina	Alamance	H-650 Pipeline	PEM	53.3	26	0.06	0.01	Open-cut
W-A18-85	North Carolina	Alamance	H-650 Pipeline	PEM	53.6	9	0.03	<0.01	Open-cut
W-A18-85	North Carolina	Alamance	H-650 Pipeline	PSS	53.7	0	0.04	0.00	Workspace
W-A18-85	North Carolina	Alamance	H-650 Pipeline	PEM	53.7	0	<0.01	0.00	Workspace
W-C18-67	North Carolina	Alamance	H-650 Pipeline	PFO	54.3	103	0.26	0.07	Open-cut
W-B18-60	North Carolina	Alamance	H-650 Pipeline	PSS	55.6 RR	0	0.02	0.00	Workspace
W-B18-60	North Carolina	Alamance	H-650 Pipeline	PSS	55.6 RR	0	0.01	0.00	Workspace

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-B18-61	North Carolina	Alamance	H-650 Pipeline	PEM	55.5	39	0.06	0.01	Open-cut
W-A18-119	North Carolina	Alamance	H-650 Pipeline	PFO	56.4 RR	90	0.12	0.06	Open-cut
W-A18-119	North Carolina	Alamance	H-650 Pipeline	PEM	56.4 RR	0	0.02	0.00	Workspace
W-A18-119	North Carolina	Alamance	H-650 Pipeline	PFO	56.5	63	0.09	0.05	Open-cut
W-A18-119	North Carolina	Alamance	H-650 Pipeline	PEM	56.5	0	0.02	0.00	Workspace
W-A18-119	North Carolina	Alamance	H-650 Pipeline	PFO	56.6 RR	0	0.01	0.00	Workspace
W-A18-119	North Carolina	Alamance	H-650 Pipeline	PFO	56.6 RR	77	0.16	0.06	Open-cut
W-A18-127	North Carolina	Alamance	H-650 Pipeline	PFO	56.6 RR	128	0.14	0.07	Open-cut
W-A18-127	North Carolina	Alamance	H-650 Pipeline	PFO	56.7 RR	0	0.02	0.00	Workspace
W-A18-130	North Carolina	Alamance	H-650 Pipeline	PEM	56.8	0	0.01	0.00	Workspace
W-A18-130	North Carolina	Alamance	H-650 Pipeline	PFO	56.9	17	0.09	0.03	Open-cut
W-A18-133	North Carolina	Alamance	H-650 Pipeline	PFO	57.1	56	0.10	0.04	Open-cut
W-A18-133	North Carolina	Alamance	H-650 Pipeline	PEM	57.1	0	0.02	0.00	Workspace
W-A18-133	North Carolina	Alamance	H-650 Pipeline	PEM	57.1	0	0.01	0.00	Workspace
W-A18-135	North Carolina	Alamance	H-650 Pipeline	PFO	57.2	146	0.20	0.10	Open-cut
W-A18-135	North Carolina	Alamance	H-650 Pipeline	PEM	57.2	0	0.02	0.00	Workspace
W-A18-254	North Carolina	Alamance	H-650 Pipeline	PFO	57.6	154	0.22	0.10	Open-cut
W-C18-3	North Carolina	Alamance	H-650 Pipeline	PEM	57.8	13	0.04	<0.01	Open-cut
W-C18-3	North Carolina	Alamance	H-650 Pipeline	PFO	57.9	0	0.00	0.00	Workspace
W-C18-3	North Carolina	Alamance	H-650 Pipeline	PEM	57.9	13	0.02	<0.01	Open-cut
W-C18-3	North Carolina	Alamance	H-650 Pipeline	PFO	57.9	8	0.01	0.01	Open-cut
W-C18-5	North Carolina	Alamance	H-650 Pipeline	PSS	58.0	52	0.07	0.01	Open-cut
W-C18-5	North Carolina	Alamance	H-650 Pipeline	PEM	58.0	0	0.03	<0.01	Workspace
W-C18-29	North Carolina	Alamance	H-650 Pipeline	PFO	60.7	116	0.20	0.07	Open-cut

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Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-C18-29	North Carolina	Alamance	H-650 Pipeline	PFO	60.8 RR	33	0.07	0.02	Open-cut
W-A18-79	North Carolina	Alamance	H-650 Pipeline	PFO	61.8	0	<0.01	0.00	Workspace
W-A18-74	North Carolina	Alamance	H-650 Pipeline	PFO	62.5	8	0.01	0.01	Open-cut
W-A18-80	North Carolina	Alamance	H-650 Pipeline	PEM	62.7	64	0.09	0.01	Open-cut
W-B18-32	North Carolina	Alamance	H-650 Pipeline	PEM	62.9	0	<0.01	0.00	Workspace
W-A19-348	North Carolina	Alamance	H-650 Pipeline	PFO	63.0 RR	24	0.02	0.02	Open-cut
W-B18-19	North Carolina	Alamance	H-650 Pipeline	PFO	63.8	63	0.11	0.04	Open-cut
W-A19-332	North Carolina	Alamance	H-650 Pipeline	PFO	64.1 RR	49	0.08	0.02	Conventional Bore
W-A19-320	North Carolina	Alamance	H-650 Pipeline	PEM	65.0 RR	69	0.10	0.02	Open-cut
W-A19-326	North Carolina	Alamance	H-650 Pipeline	PFO	65.2 RR	6	0.02	0.01	Open-cut
W-B19-168	North Carolina	Alamance	H-650 Pipeline	PEM	65.6	0	0.05	0.00	Workspace
W-A19-352	North Carolina	Alamance	H-650 Pipeline	PFO	66.5 RR	0	<0.01	0.00	Workspace
*AW-A19-352	North Carolina	Alamance	H-650 Pipeline	PFO	66.5 RR	0	0.04	0.00	Workspace
W-B19-164	North Carolina	Alamance	H-650 Pipeline	PFO	66.6 RR	34	0.04	0.02	Open-cut
W-B18-5	North Carolina	Alamance	H-650 Pipeline	PFO	68.4	16	0.02	0.01	Open-cut
W-A18-67	North Carolina	Alamance	H-650 Pipeline	PFO	71.8	0	<0.01	0.00	Workspace
W-A18-67	North Carolina	Alamance	H-650 Pipeline	PFO	71.8	43	0.04	0.03	Open-cut
W-A18-208	North Carolina	Alamance	H-650 Pipeline	PEM	72.2	0	<0.01	0.00	Workspace
W-B19-151	North Carolina	Alamance	H-650 Pipeline	PEM	72.9 RR	258	0.56	0.06	Open-cut
W-A18-111	North Carolina	Alamance	H-650 Pipeline	PEM	73.0 RR	0	0.04	0.00	Workspace
W-B19-151	North Carolina	Alamance	H-650 Pipeline	PEM	73.0 RR	45	0.04	0.01	Open-cut
W-B18-36	North Carolina	Rockingham	T15 Dan River Interconnect	PEM	30.3	0	0.47	0.00	Workspace
*AW-B18-36	North Carolina	Rockingham	T15 Dan River Interconnect	PEM	30.3	0	<0.01	0.00	Workspace

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/
W-B18-36	North Carolina	Rockingham	T15 Dan River Interconnect	PEM	30.3	0	<0.01	0.00	Workspace
W-B18-36	North Carolina	Rockingham	T15 Dan River Interconnect	PEM	30.4	0	0.05	0.00	Workspace
W-B18-36	North Carolina	Rockingham	T15 Dan River Interconnect	PEM	30.4	0	0.01	0.00	Workspace
W-B18-36	North Carolina	Rockingham	T15 Dan River Interconnect	PEM	30.4	0	<0.01	0.00	Workspace
W-F18-1	Virginia	Pittsylvania	Temporary Access Roads	PSS	5.2	110	0.05	0.00	Workspace
W-F18-62	Virginia	Pittsylvania	Temporary Access Roads	PEM	14.3 RR	1	<0.01	0.00	Workspace
W-F18-62	Virginia	Pittsylvania	Temporary Access Roads	PEM	14.3 RR	16	0.01	0.00	Workspace
W-F18-54	Virginia	Pittsylvania	Temporary Access Roads	PEM	20.5	0	<0.01	0.00	Workspace
W-E18-37	Virginia	Pittsylvania	Temporary Access Roads	PFO	22.6 RR	0	<0.01	0.00	Workspace
W-E18-37	Virginia	Pittsylvania	Temporary Access Roads	PFO	22.6 RR	0	<0.01	0.00	Workspace
W-C18-87	Virginia	Pittsylvania	Temporary Access Roads	PFO	25.0	106	0.08	0.00	Workspace
W-C18-87	Virginia	Pittsylvania	Temporary Access Roads	PFO	25.0	0	<0.01	0.00	Workspace
W-A18-39	North Carolina	Rockingham	Temporary Access Roads	PEM	28.1 RR	0	<0.01	0.00	Workspace
W-B18-34	North Carolina	Rockingham	Temporary Access Roads	PFO	30.4	82	0.04	0.00	Workspace
W-B18-36	North Carolina	Rockingham	Temporary Access Roads	PFO	30.4	0	<0.01	0.00	Workspace
W-A18-39	North Carolina	Rockingham	Temporary Access Roads	PEM	27.9 RR	14	0.01	0.00	Workspace
W-B18-43	North Carolina	Rockingham	Temporary Access Roads	PEM	41.8	0	<0.01	0.00	Workspace
W-B18-43	North Carolina	Rockingham	Temporary Access Roads	PEM	41.8	0	0.01	0.00	Workspace

Appendix B.6

Wetlands Crossed by the MVP Southgate Project

Wetland ID a/	State	County	Facility	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Impacts (acres) e/	Construction Crossing f/

Note: Mileposts with an "RR" indicate locations where a re-route was incorporated into the pipeline alignment.

a/ Data is based on wetland field delineations completed through August 24, 2019 where access has been obtained, National Wetland Inventory (NWI) data, and desktop analysis of approximated resources. Wetland IDs starting with "W" have been field delineated and wetland ID starting with "AW" are approximated based on NWI data and desktop analysis. Approximated wetlands are also indicated by "*". Environmental survey is complete for the Contractor Yards (i.e., CY-01, CY- 03, CY-05, CY-08, CY-19, CY-22, CY-25A, CY-25B, CY-26A, CY-26B). Limits of disturbance for contractor yards have been adjusted to avoid impacting wetlands.

b/ Wetland Classifications PEM = palustrine emergent wetland, PSS = palustrine scrub shrub wetland, PFO = palustrine forested wetland.

c/ Crossing length is measured at the intersection of the wetland and centerline of the pipeline or center of the access road. Crossing length of "0" indicates the wetland is not crossed by the centerline of the pipeline, but is located within the construction workspace. Sums may not equal the total of addends due to rounding. Addends consist of six-decimal digits.

d/ Total construction impacts include all wetland impacts (PEM, PFO, PSS) associated with the construction workspace. Wetland impacts of "<0.01" indicates the impact is less than 0.01 acre, but the impact is included in the project totals. Sums may not equal the total of addends due to rounding. Addends consist of six- decimal digits.

e/ Total operation vegetation impacts include PEM, PSS and PFO impacts for vegetation maintenance. Operational vegetation impacts for PEM and PSS wetlands include a 10-foot-wide vegetation maintenance corridor; operational vegetation maintenance impacts for PFO wetlands include a 30-foot-wide vegetation maintenance corridor (i.e., 10-foot-wide cleared corridor and selective removal of trees within 15 feet of the pipeline). Wetland impacts of "<0.01" indicates the impact is less than 0.01 acre, but the impact is included in the project totals. Minor discrepancies in totals are due to rounding.

f/ Construction crossing method will ultimately be determined based on field conditions observed during construction. "Workspace" indicates that the wetland is not crossed by the pipeline but is located within construction workspace.

APPENDIX B.7

Residential Construction Plans

MVP SOUTHGATE PROJECT

PROPOSED H-650 PIPELINE
ENGINEERING SERVICES DESIGN; JOB NUMBERS 300423
RESIDENTIAL DRAWING NOTES

GENERAL NOTES:

SAFETY FENCE, IN CONJUNCTION WITH ANY PROPOSED EROSION AND SEDIMENTATION CONTROL DEVICES, WILL BE INSTALLED AT THE EDGE OF THE LIMIT OF DISTURBANCE (LOD) FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE OR COMMERCIAL ESTABLISHMENT. FENCING WILL BE MAINTAINED THROUGHOUT ACTIVE CONSTRUCTION IN THE AREA. WHERE NECESSARY, HARD BARRIERS SUCH AS JERSEY BARRIERS WILL BE INSTALLED TO PROVIDE A SOLID, PROTECTIVE BARRIER.

STRUCTURES WITHIN LOD WILL BE REMOVED, RELOCATED, OR PROTECTED PER LAND OWNER AGREEMENT.

PROPERTY LINES DEPICTED ON THIS PLAN ARE BASED ON GIS TAX MAP DATA AND/OR FIELD LOCATED PROPERTY EVIDENCE. THEY SHOULD NOT BE RELIED ON AS AN ACCURATE DEPICTION OF THE ACTUAL PROPERTY LINE LOCATIONS. THEY MAY NOT REPRESENT THE RESULTS OF A BOUNDARY SURVEY.

AREAS OF PERMANENT EASEMENT WILL BE PERMANENTLY MAINTAINED PER USDOT PHMSA REQUIREMENTS. TEMPORARY WORKSPACES WOULD BE ALLOWED TO REVERT BACK TO PRE-EXISTING USES. OTHER MINOR ITEMS WILL BE ADDRESSED THROUGH LANDOWNER STIPULATIONS SPECIFIC TO THE PROPERTY.

CONSTRUCTION CREWS WILL UTILIZE DUST CONTROLS MEASURES AS NEEDED, INCLUDING WETTING AND BRUSHING OF ROADS.

WORK HOURS WILL BE LIMITED TO 7 AM TO 7 PM OR SUNSET (WHICHEVER IS LATER) UNLESS OTHER ARRANGEMENTS HAVE BEEN AGREED UPON WITH LANDOWNER.

CONSTRUCTION METHODS:

THE STOVE PIPE METHOD IS A LESS EFFICIENT ALTERNATIVE TO THE MAINLINE METHOD OF CONSTRUCTION. IT IS TYPICALLY USED WHEN THE PIPELINE IS TO BE INSTALLED IN VERY CLOSE PROXIMITY TO AN EXISTING STRUCTURE OR WHEN AN OPEN DITCH WOULD ADVERSELY IMPACT A COMMERCIAL/RESIDENTIAL ESTABLISHMENT. THE TECHNIQUE INVOLVES INSTALLING PIPE ONE JOINT AT A TIME WHEREBY THE WELDING, X-RAY AND COATING ACTIVITIES ARE ALL PERFORMED IN THE OPEN TRENCH. AT THE END OF EACH DAY THE NEWLY INSTALLED PIPE IS BACKFILLED OR THE OPEN TRENCH IS COVERED WITH STEEL PLATES OR TIMBER MATS.

THE DRAG SECTION CONSTRUCTION METHOD, WHILE LESS EFFICIENT THAN MAINLINE METHODS, IS NORMALLY PREFERRED OVER THE STOVE PIPE ALTERNATIVE. THIS TECHNIQUE INVOLVES THE TRENCHING, INSTALLATION AND BACKFILL OF A PREFABRICATED LENGTH OF PIPE CONTAINING SEVERAL SEGMENTS ALL IN ONE DAY. AT THE END OF EACH DAY THE NEWLY INSTALLED PIPE IS BACKFILLED AND/OR COVERED WITH STEEL PLATES OR TIMBER MATS.

MAINLINE CONSTRUCTION IS THE MOST EFFICIENT CONSTRUCTION METHOD. THIS METHOD IS SIMILAR TO STOVE PIPE AND DRAG SECTION INSTALLATION, BUT ON A LARGER SCALE. ALL STEPS OF THE CONSTRUCTION PROCESS (CLEARING, GRADING, TRENCHING, STRINGING & BENDING, WELDING & COATING, LOWERING & BACKFILL) OCCUR OVER LARGE STRETCHES OF RIGHT-OF-WAY TO MAXIMIZE EFFICIENCY OF THE CONSTRUCTION SPREADS. MAINLINE CONSTRUCTION IS TYPICALLY UTILIZED WHERE LARGE STRETCHES OF PIPELINE ROW ARE UNINTERRUPTED. THIS METHOD MAY BE USED NEAR STRUCTURES WHERE OFFSET FROM WORKSPACES IS LARGE ENOUGH TO FACILITATE SAFE AND PRACTICAL IMPLEMENTATION

DRAWN TRC	DATE 05/01/2019
CHECKED SSL	DATE 05/01/2019
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 2
JOB NO.	
PROJECT ID:	

RESIDENTIAL NOTES

MOUNTAIN VALLEY PIPELINE
SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
RESIDENTIAL DRAWING NOTES

DRAWING NO.	REV.
RES-NOTES	P1

MVP SOUTHGATE PROJECT

PROPOSED H-650 PIPELINE
ENGINEERING SERVICES DESIGN; JOB NUMBERS 300423
RESIDENTIAL DRAWING NOTES

CLEANUP AND REVEGETATION PLANS

SUBSOIL AND TOPSOIL (UP TO 12 INCHES) IN RESIDENTIAL AREAS WILL BE SEGREGATED AND RETURNED TO PRE-CONSTRUCTION GRADE AS SHOWN ON DRAWINGS.

IF SOILS ARE REQUIRED TO BE IMPORTED (E.G. IF TOP SOILING IS NOT PRACTICAL), THEY WILL BE CERTIFIED AS FREE OF NOXIOUS WEEDS AND SOIL PESTS, UNLESS OTHERWISE APPROVED BY THE LANDOWNER. IF TREES ARE NEEDED TO BE REMOVED FROM THE LANDSCAPE FOR CONSTRUCTION, THEY WILL BE REPLACED WITH THE SAME SPECIES OR SIMILAR BASED ON LANDOWNER REQUESTS.

RESTORE ALL TURF, ORNAMENTAL SHRUBS, AND SPECIALIZED LANDSCAPING IN ACCORDANCE WITH THE LANDOWNER'S REQUEST, OR COMPENSATE THE LANDOWNER. RESTORATION WORK MUST BE PERFORMED BY PERSONNEL FAMILIAR WITH LOCAL HORTICULTURAL AND TURF ESTABLISHMENT PRACTICES.

ALL DISTURBED RESIDENTIAL UPLAND AREAS WILL BE MULCHED BEFORE SEEDING IF FINAL GRADING AND INSTALLATION OF PERMANENT EROSION CONTROL MEASURES WILL NOT BE INSTALLED WITHIN 10 DAYS OF COMPLETION.

ALL LAWN AREAS AND IMPACTED LANDSCAPING WILL BE RESTORED FOLLOWING CLEAN-UP OPERATIONS AS SOON AS REASONABLY POSSIBLE, OR AS SPECIFIED IN THE LANDOWNER AGREEMENT. IF SEASONAL OR OTHER WEATHER CONDITIONS PREVENT COMPLIANCE WITH THESE TIME FRAMES, TEMPORARY EROSION CONTROLS (SEDIMENT BARRIERS AND MULCH) WILL BE MAINTAINED UNTIL CONDITIONS ALLOW COMPLETION OF RESTORATION.

IF CRUSHED STONE ACCESS PADS ARE USED IN RESIDENTIAL AREAS THEY WILL BE INSTALLED ON TOP OF SYNTHETIC FABRIC TO FACILITATE EASY REMOVAL.

EXCESS ROCK FROM THE TOP 12 INCHES OF SOIL IN RESIDENTIAL AREAS WILL BE REMOVED UNLESS OTHER ARRANGEMENTS WITH LANDOWNER HAVE BEEN AGREED UPON.

TOPSOIL AND SUBSOIL COMPACTION WILL MEET PRECONSTRUCTION CONDITIONS AND WHERE NECESSARY, SOIL COMPACTION MITIGATION MAY BE REQUIRED TO MITIGATE FOR SEVERELY COMPACTED RESIDENTIAL AREAS.

OTHER RESTORATION DETAILS, INCLUDING REVEGETATION REQUIREMENTS RELATED TO LAWNS, MAY BE SPECIFIC TO LANDOWNER STIPULATIONS.

CONDUCT FOLLOW-UP INSPECTIONS OF ALL DISTURBED AREAS, AS NECESSARY, TO DETERMINE THE SUCCESS OF REVEGETATION AND ADDRESS LANDOWNER CONCERNS. AT A MINIMUM, CONDUCT INSPECTIONS AFTER THE FIRST AND SECOND GROWING SEASONS.

LANDOWNER COMPLAINT RESOLUTION PROCESS

IN THE EVENT OF AN ISSUE, LANDOWNERS ARE DIRECTED TO CONTACT THEIR LOCAL MVP SOUTHGATE LAND REPRESENTATIVE. LANDOWNERS CAN ALSO REACH PROJECT PERSONNEL BY CALLING 1-833-MV-SOUTH OR EMAILING MAIL@MVPSOUTHGATE.COM

AFTER WORKING WITH THE SOUTHGATE PROJECT REPRESENTATIVE AND APPROPRIATE RIGHT-OF-WAY AGENT, IF THE LANDOWNER IS STILL NOT COMPLETELY SATISFIED WITH THE RESOLUTION, THE INDIVIDUAL SHOULD CONTACT THE COMMISSION'S LANDOWNER HELPLINE AT (877) 337-2237, OR BY EMAIL, LANDOWNERHELP@FERC.GOV.

DRAWN TRC	DATE 05/08/2019
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SCALE N.T.S.	SHEET 2 OF 2
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PROJECT ID:	

RESIDENTIAL NOTES

MOUNTAIN VALLEY PIPELINE
SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
RESIDENTIAL DRAWING NOTES

DRAWING NO.	REV.
RES-NOTES CONT.	P1

B.7.2

MVP SOUTHGATE PROJECT

PROPOSED H-650 PIPELINE
ENGINEERING SERVICES DESIGN; JOB NUMBERS 300423
RESIDENTIAL DRAWING NOTES

Residential Plan Drawing	Anticipated Construction Method	Approximate Construction Duration	Additional Measures	Restoration Plans
RSS H650 001	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS H650 002	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS H650 003	NA Yard	400 Days	Install hard barriers	See General Restoration Notes
RSS H650 004	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS H650 005	Mainline	15 Days	None identified at this time.	See General Restoration Notes
~~RSS-H650-006~~	~~Mainline~~	~~15 Days~~	~~None identified at this time~~	~~See General Restoration Notes~~
RSS H650 008	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS H650 009	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS H650 015	Mainline / Drag	15 Days	None identified at this time.	See General Restoration Notes
RSS H650 016	Mainline	15 Days	None identified at this time.	See General Restoration Notes
~~RSS-H650-006~~	~~Mainline~~	~~15 Days~~	~~None identified at this time~~	~~See General Restoration Notes~~
~~RSS-H650-006~~	~~Mainline~~	~~15 Days~~	~~None identified at this time~~	~~See General Restoration Notes~~
RSS H650 024	NA Access Road	200 Days	Install hard barriers	See General Restoration Notes
RSS H650 025	NA Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS H650 026	NA Access Road	200 Days	Install hard barriers	See General Restoration Notes
RSS H650 027	NA Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS H650 028	NA Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS H650 029	NA Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS H650 030	NA Access Road	200 Days	Install hard barriers	See General Restoration Notes
RSS-H650-031	Mainline	25 Days	None identified at this time.	See General Restoration Notes
RSS-H650-032	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS-H650-033	NA - Yard	400 Days	Install hard barriers	See General Restoration Notes
RSS-H650-034	Mainline	35 Days	None identified at this time.	See General Restoration Notes
RSS-H650-035	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS-H650-036	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS-H650-037	NA - Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS-H650-038	NA - Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS-H650-039	Mainline / Road Bore	25 Days	None identified at this time.	See General Restoration Notes
RSS-H650-040	NA - Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS-H650-041	Mainline	15 Days	None identified at this time.	See General Restoration Notes
~~RSS-H650-006~~	~~Mainline~~	~~15 Days~~	~~None identified at this time~~	~~See General Restoration Notes~~
RSS-H650-043	NA - Yard	400 Days	None identified at this time.	See General Restoration Notes
RSS-H650-044	NA - Yard	400 Days	None identified at this time.	See General Restoration Notes
RSS-H650-045	NA - Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS-H650-046	NA - Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS-H650-047	Mainline	15 Days	None identified at this time.	See General Restoration Notes
RSS-H650-048	NA - Access Road	200 Days	None identified at this time.	See General Restoration Notes
RSS-H650-050	Mainline / Road Bore	25 Days	None identified at this time.	See General Restoration Notes
RSS-H650-051	Mainline	15 Days	None identified at this time.	See General Restoration Notes

NOTE:

CONSTRUCTION METHOD AND DURATION MAY CHANGE DUE TO LANDOWNER REQUESTS, FIELDS CONDITIONS, AND OTHER CONSIDERATIONS.

DRAWN TRC	DATE 05/08/2019
CHECKED SSL	DATE 05/09/2019
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 2
JOB NO.	
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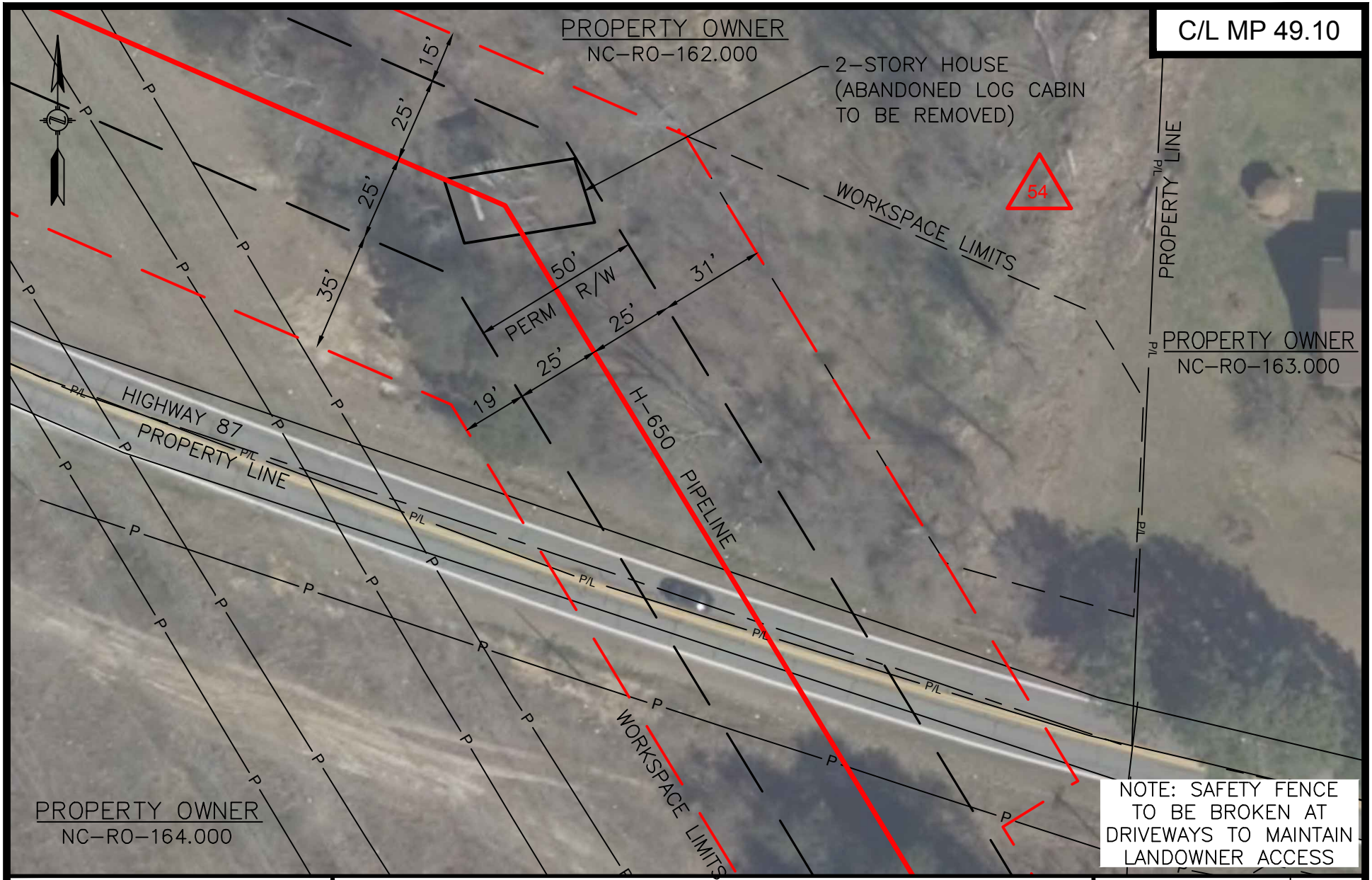
RESIDENTIAL NOTES

MOUNTAIN VALLEY PIPELINE
SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
RESIDENTIAL DRAWING NOTES

DRAWING NO.	REV.
RES-NOTES SITE SPECIFIC	P3



Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: TBH	10/05/18
DRAFTING CK: SJO	10/19/18
ENVIRONMENTAL CK:	
ENGINEERING CK: .	.
DETAIL SHEET:	
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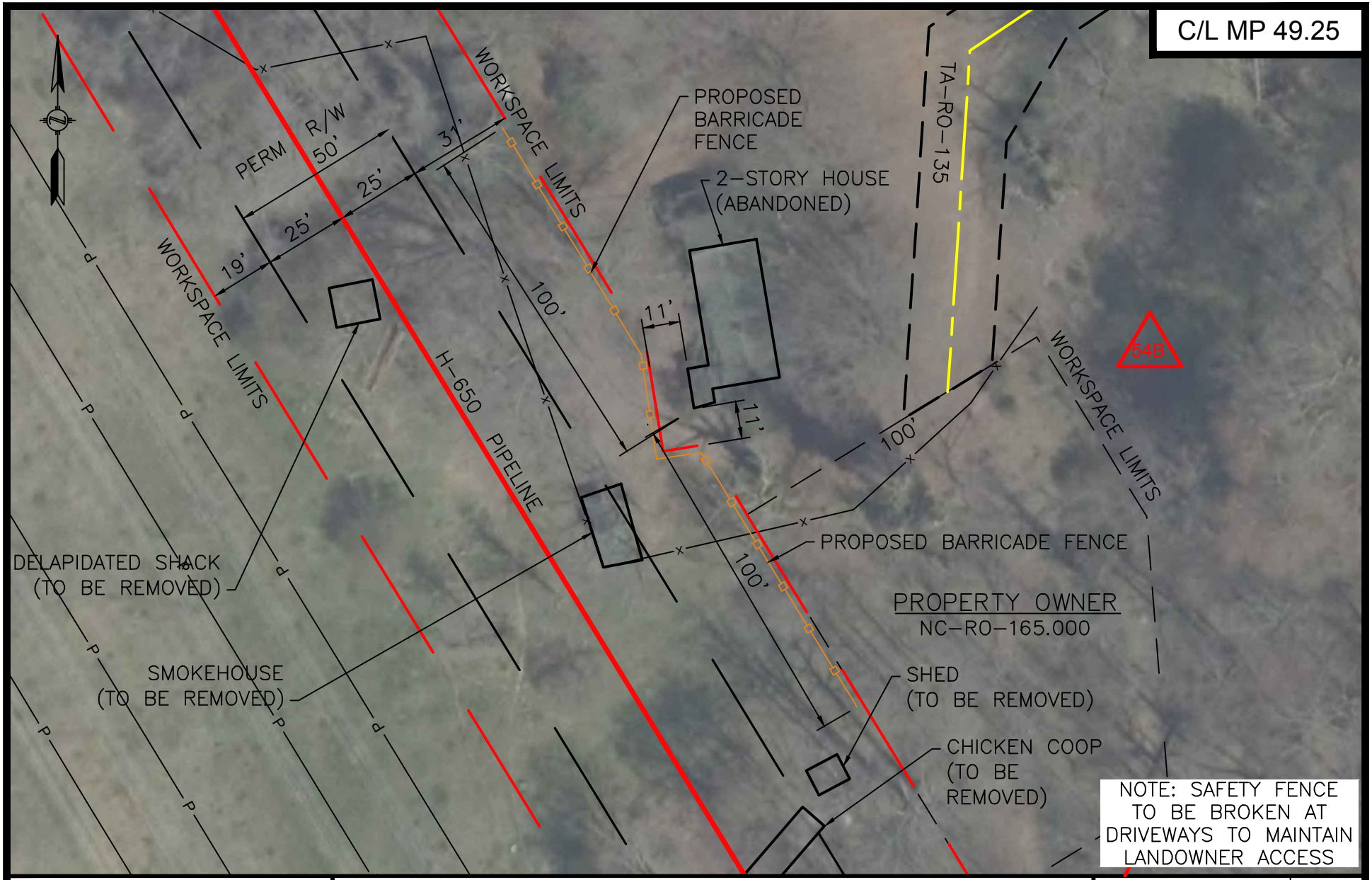

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY:	TBH	10/05/18
DRAFTING CK:	SJO	10/19/18
ENVIRONMENTAL CK:		
ENGINEERING CK:	.	.
DETAIL SHEET:		
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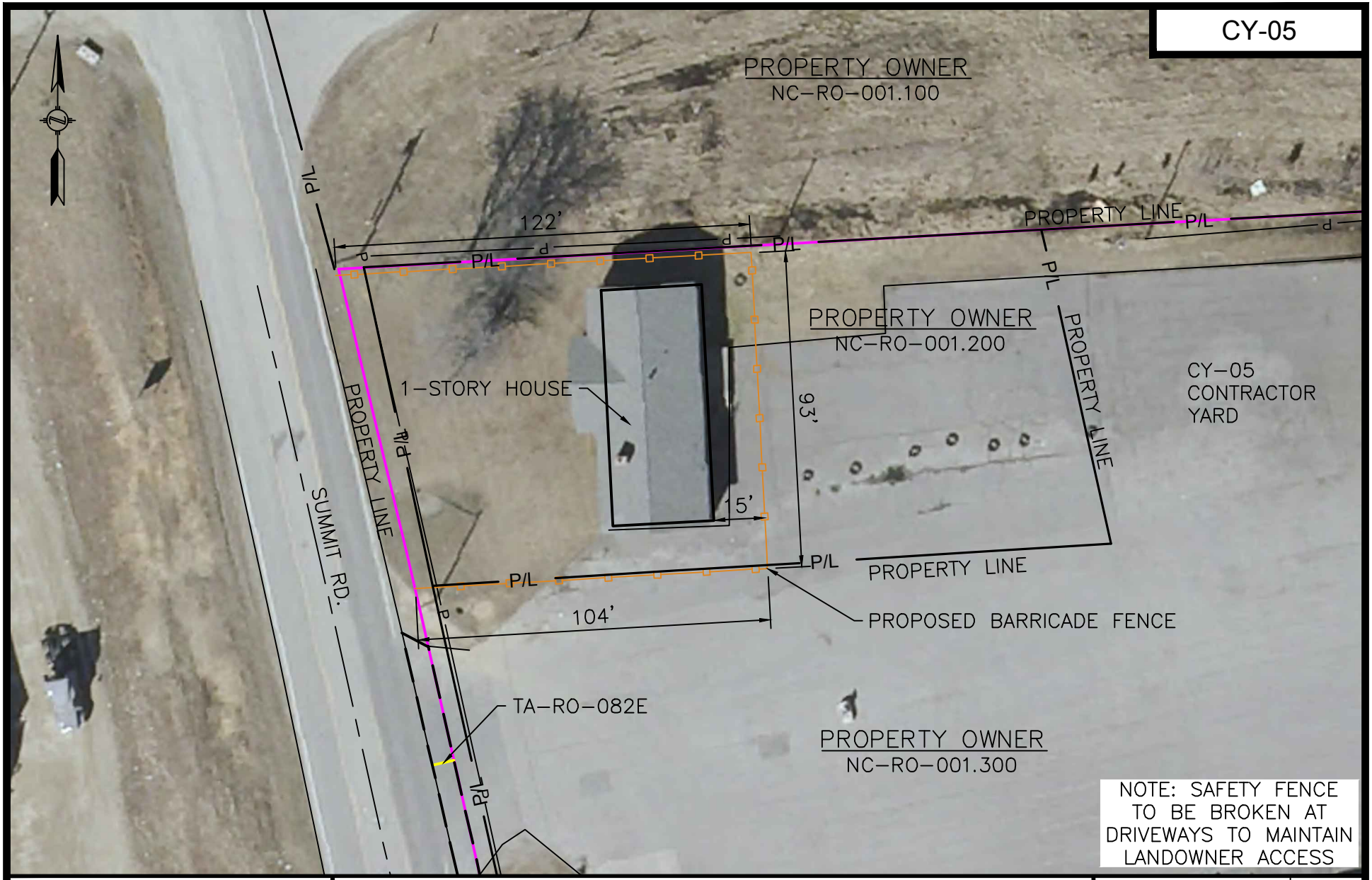

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: TBH	10/08/18
DRAFTING CK: SJO	10/19/18
ENVIRONMENTAL CK:	
ENGINEERING CK: .	.
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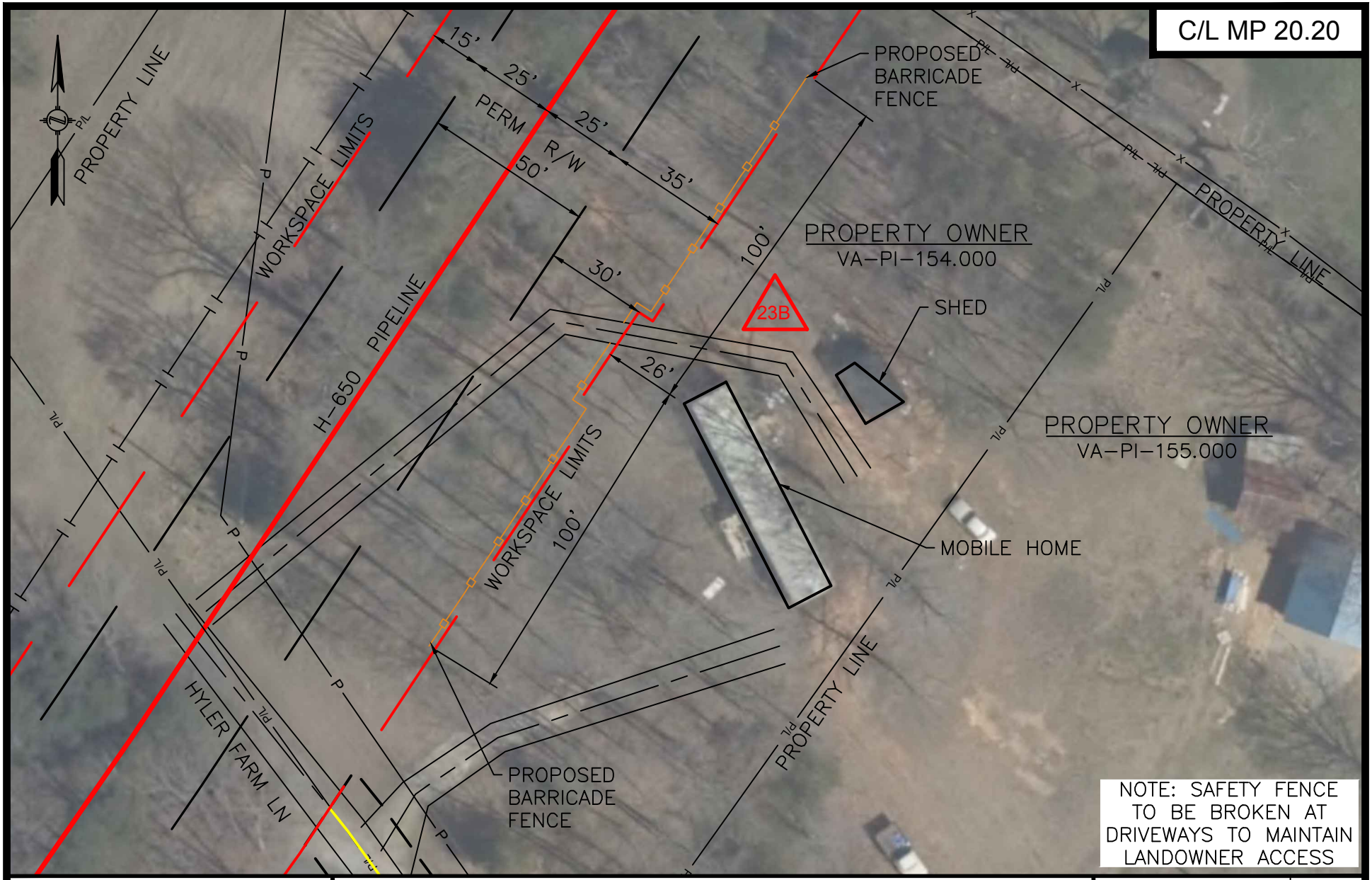

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY,VIRGINIA

SHEET 1 OF 1

DRAWN BY: TBH	10/08/18
DRAFTING CK: SJO	10/19/18
ENVIRONMENTAL CK:	
ENGINEERING CK:	
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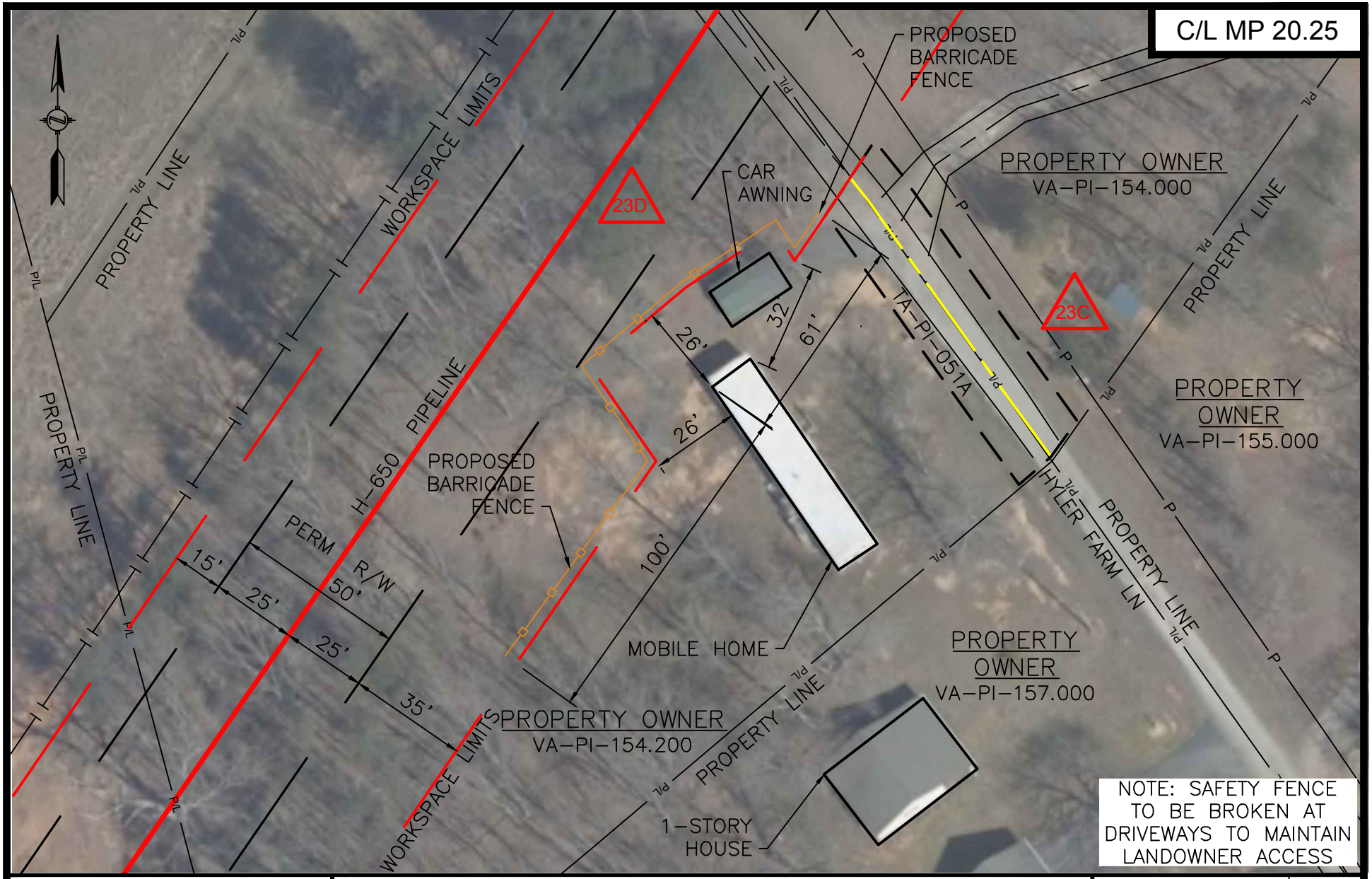

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY: TBH	10/09/18
DRAFTING CK: SJO	10/19/18
ENVIRONMENTAL CK:	
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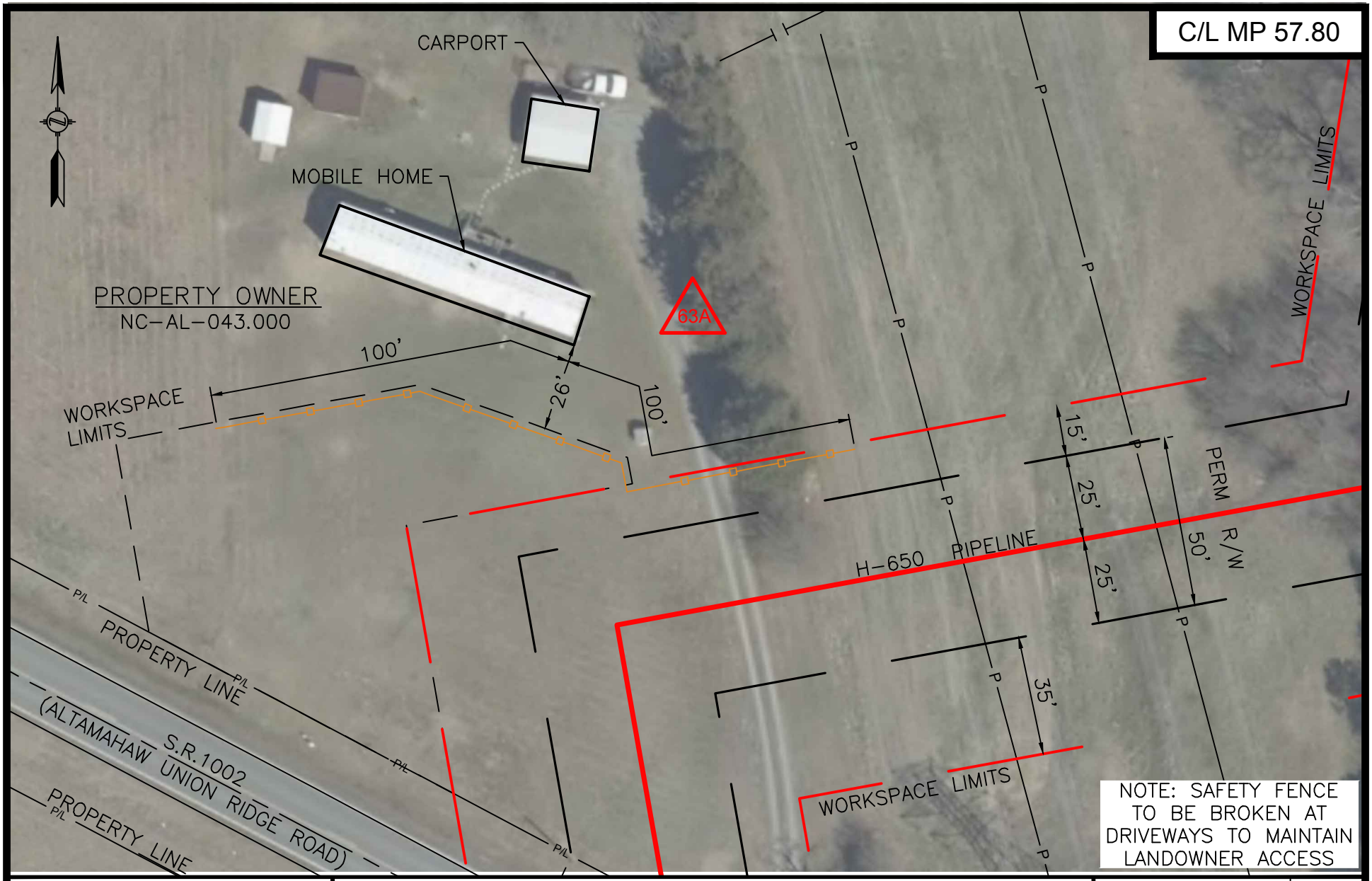

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: TBH	10/10/18
DRAFTING CK: SJO	10/19/18
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
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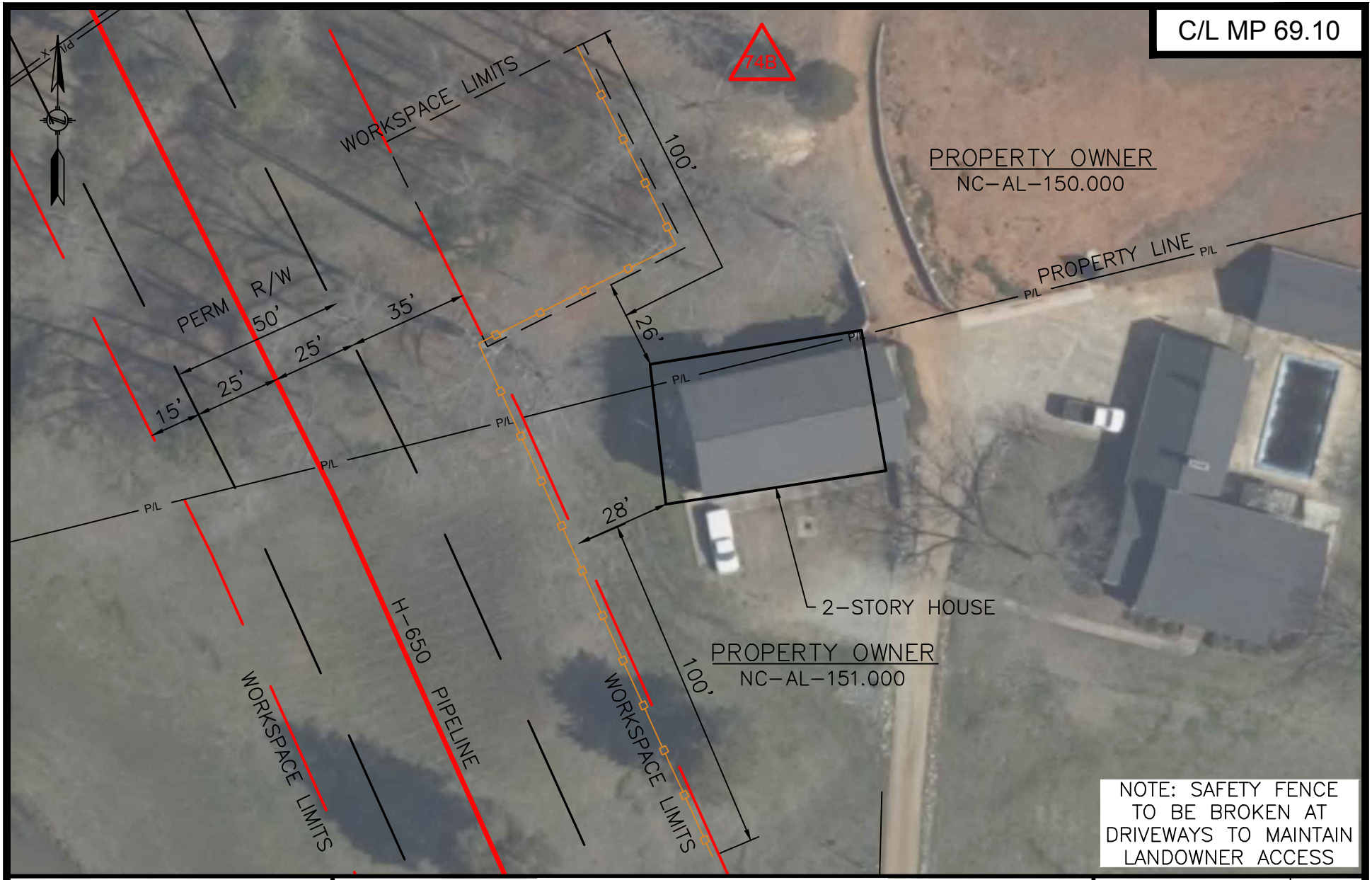
B.7-10

C/L MP 69.10



Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY:	TBH	10/10/18
DRAFTING CK:	SJO	10/19/18
ENVIRONMENTAL CK:		
ENGINEERING CK:	.	.
DETAIL SHEET:		
DRAWING NO.:	**RSS-H650-009**	
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DATE OF PLOT: 9/23/2019 12:46 PM		

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: TBH	10/17/18
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ENVIRONMENTAL CK:	
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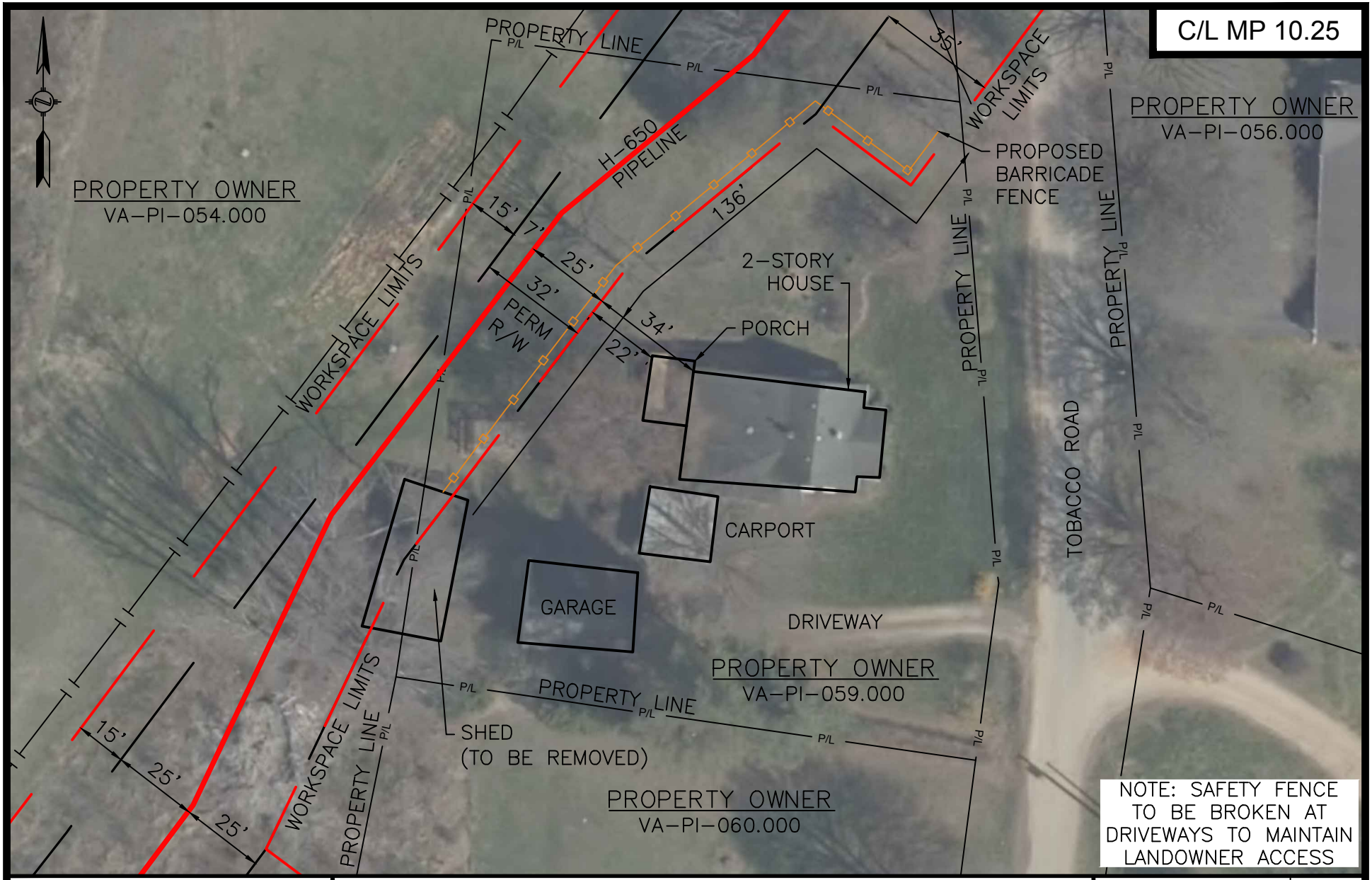

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY:	TBH	10/17/18
DRAFTING CK:	SJO	10/22/18
ENVIRONMENTAL CK:		
ENGINEERING CK:	.	.
DETAIL SHEET:		
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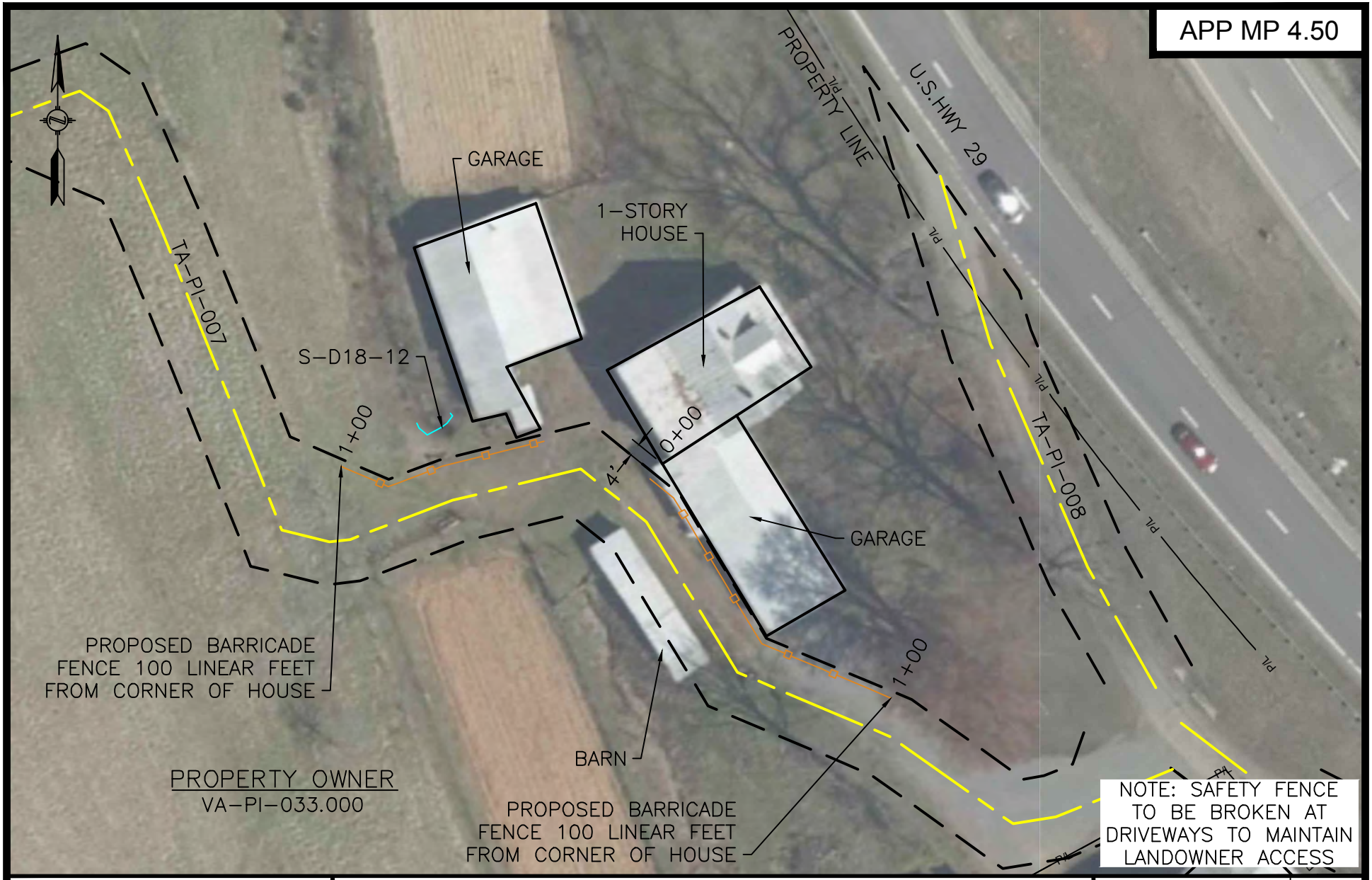

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY,VIRGINIA

SHEET 1 OF 1

DRAWN BY: SJS	03/19/19
DRAFTING CK: DEM	03/20/19
ENVIRONMENTAL CK:	
ENGINEERING CK: .	.
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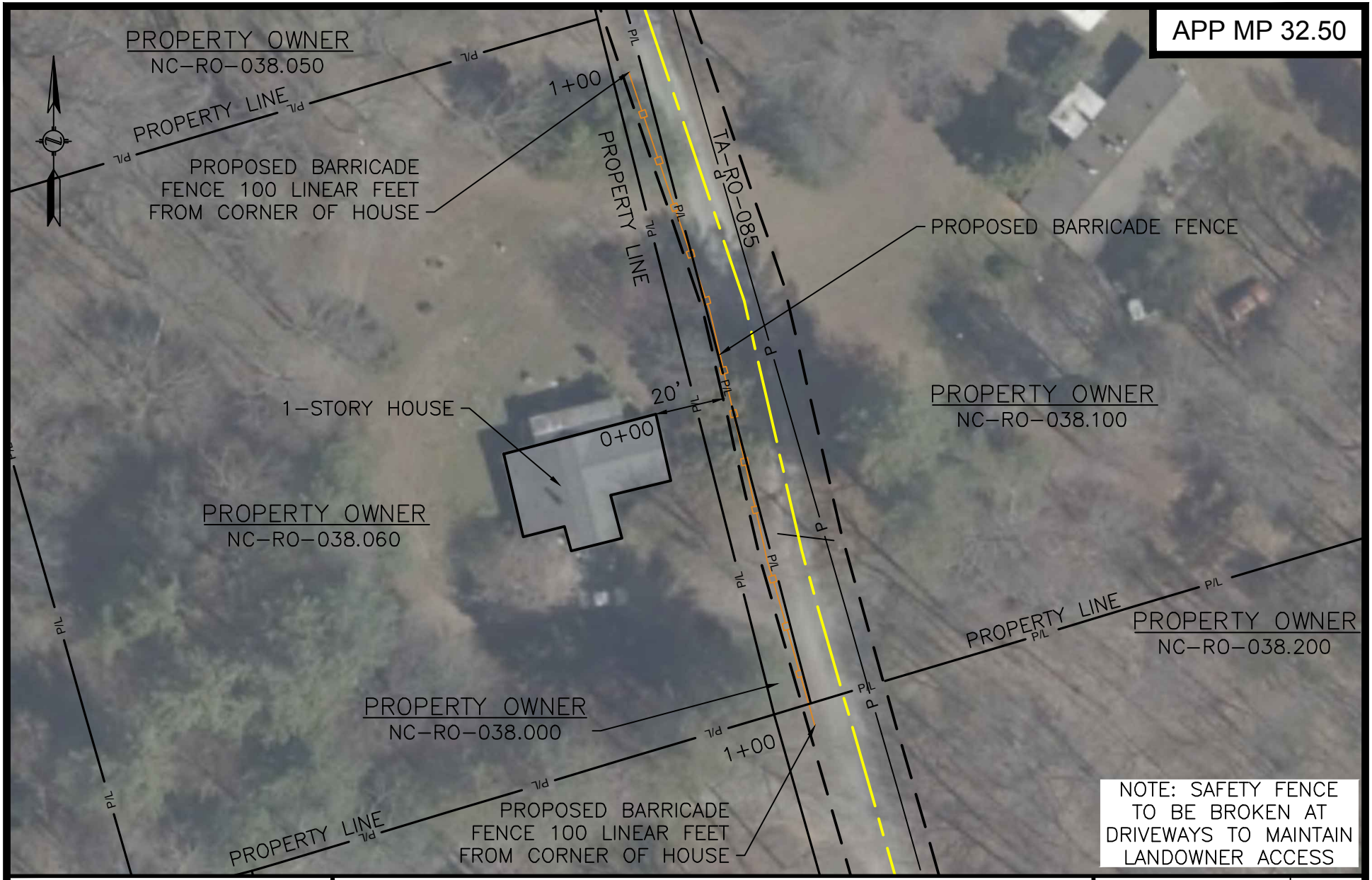

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY:	SJS	03/19/19
DRAFTING CK:	DEM	03/20/19
ENVIRONMENTAL CK:		
ENGINEERING CK:	.	.
DETAIL SHEET:		
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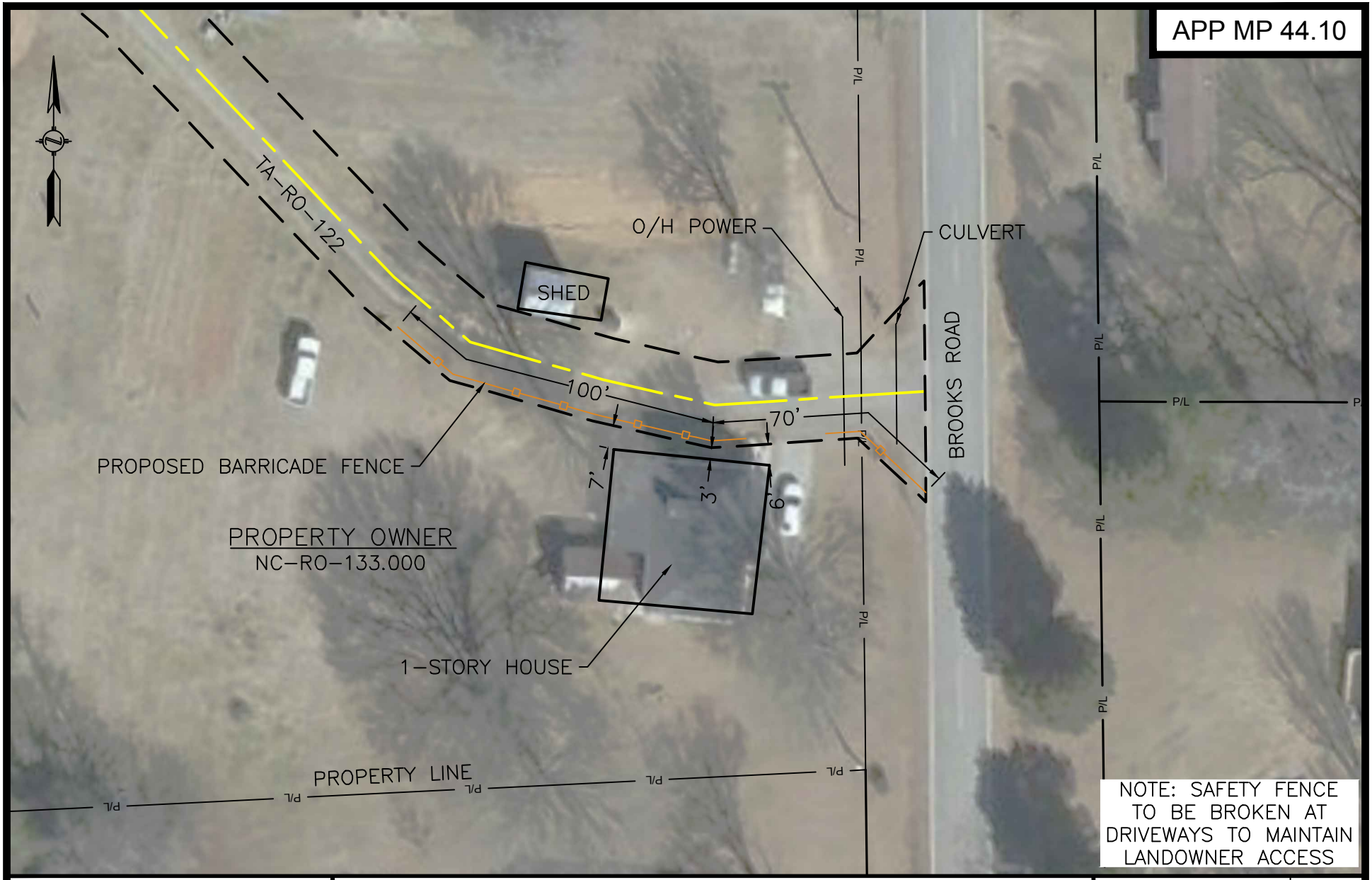

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	03/19/19
DRAFTING CK: DEM	03/20/19
ENVIRONMENTAL CK:	
ENGINEERING CK: .	.
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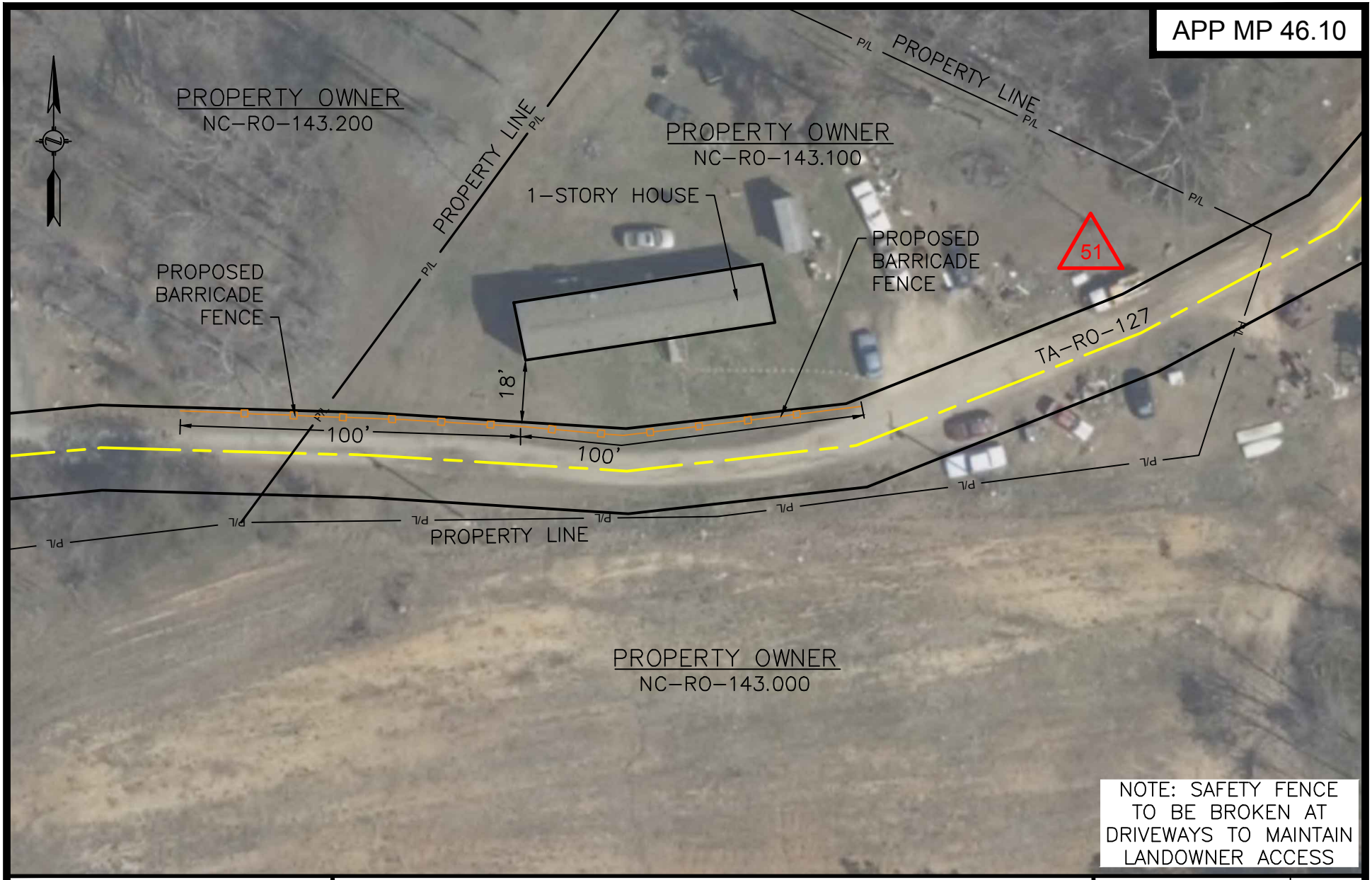

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	03/19/19
DRAFTING CK: DEM	03/20/19
ENVIRONMENTAL CK:	
ENGINEERING CK: .	.
DETAIL SHEET:	
DRAWING NO.: **RSS-H650-027**	
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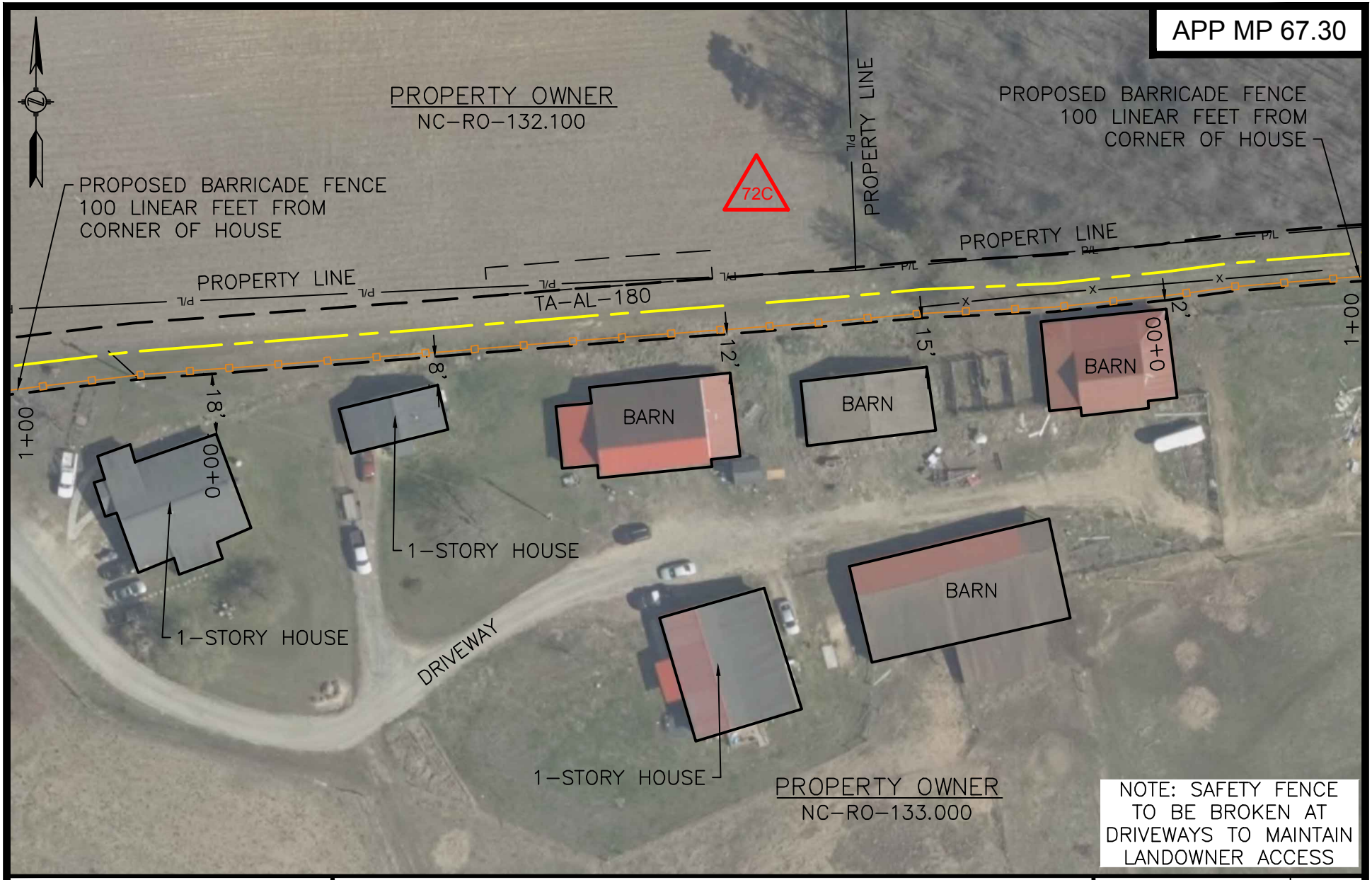

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: TBH	10/17/18
DRAFTING CK: DEM	03/20/19
ENVIRONMENTAL CK:	
ENGINEERING CK: .	.
DETAIL SHEET:	
DRAWING NO.: **RSS-H650-028**	
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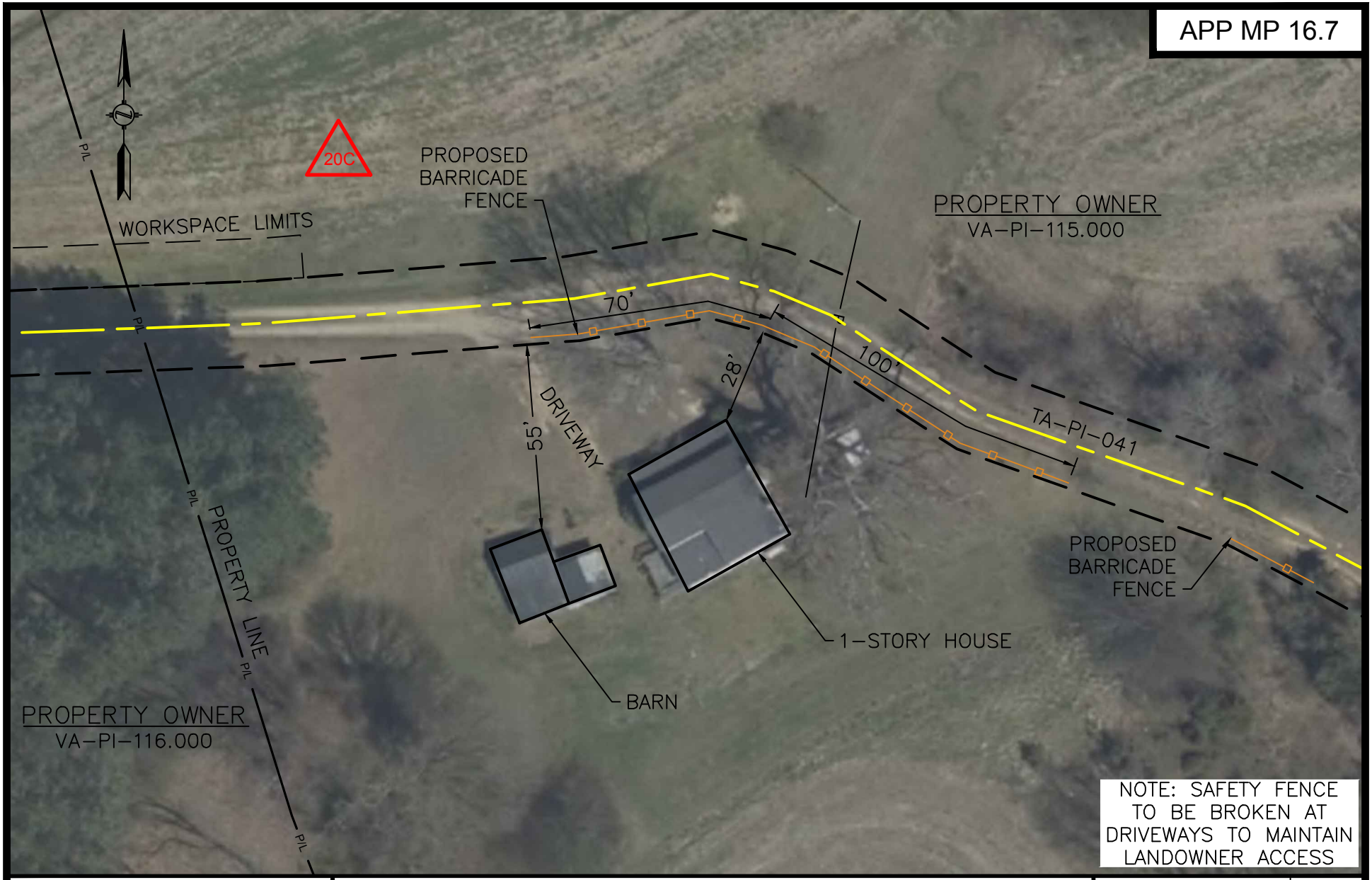

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY: KMB	05/02/19
DRAFTING CK: SSL	05/03/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
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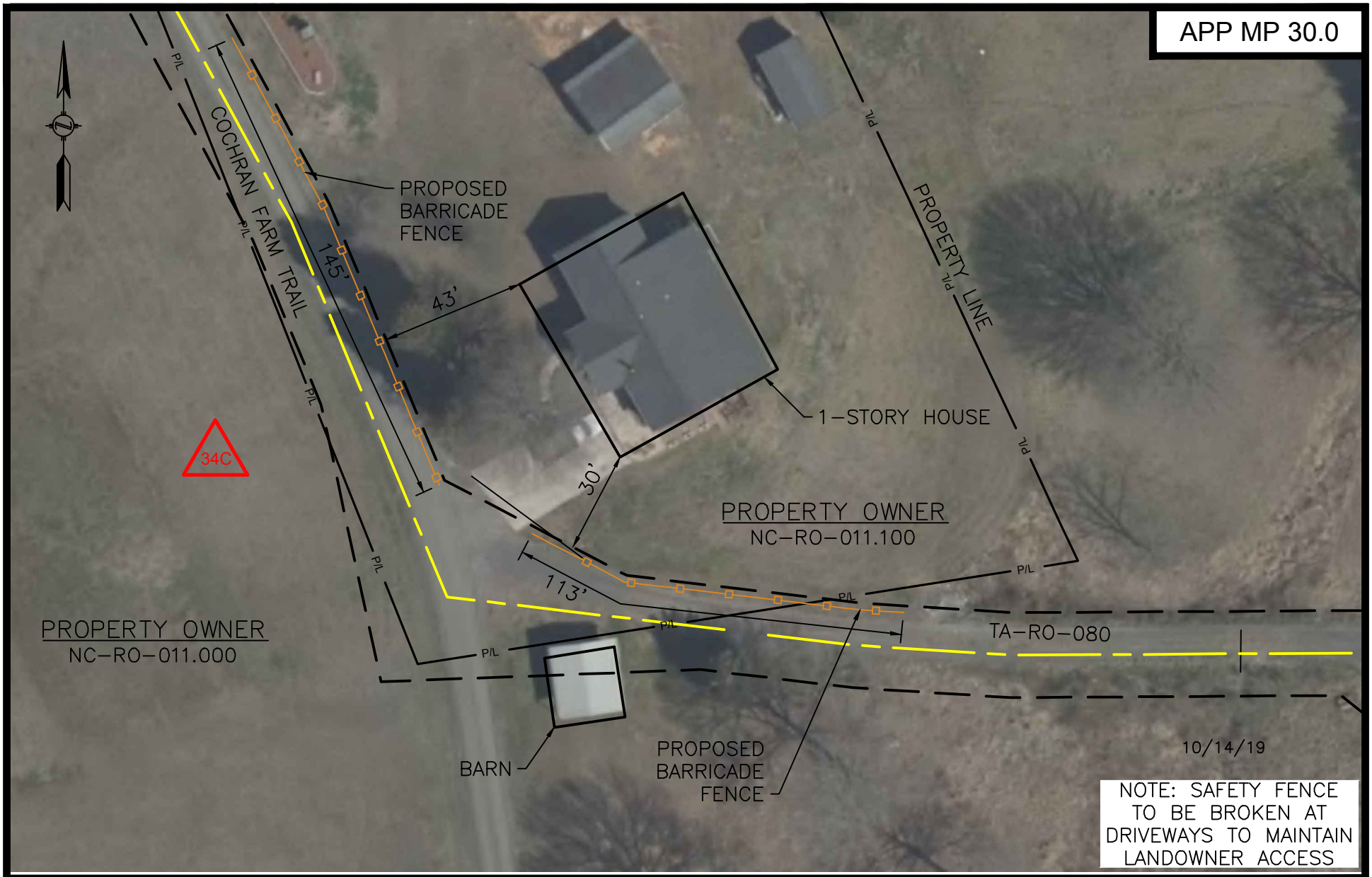

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/02/19
DRAFTING CK: SSL	05/03/19
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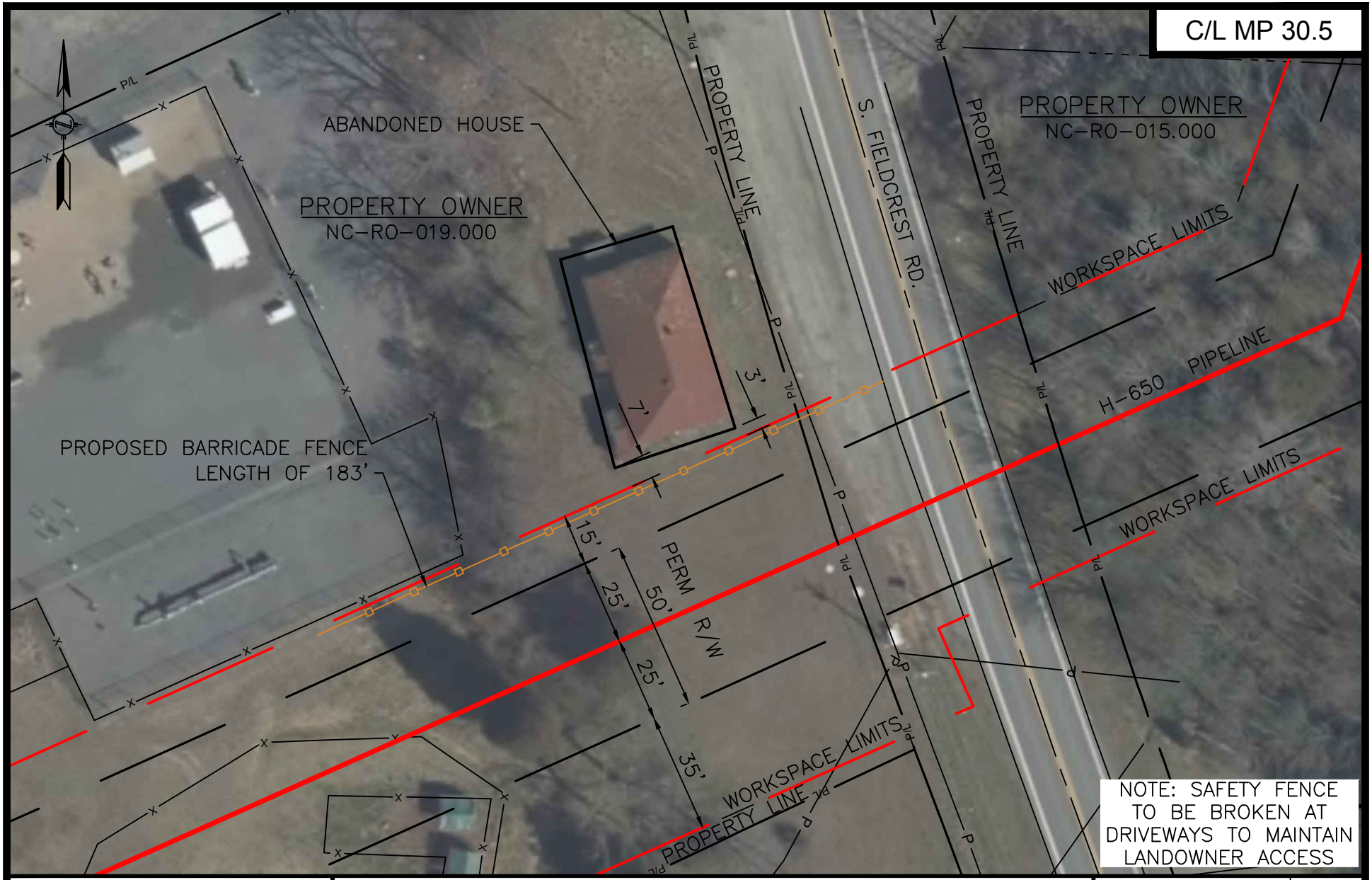

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/03/19
DRAFTING CK: SSL	05/07/19
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ENGINEERING CK:	
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Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/06/19
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ENGINEERING CK:	
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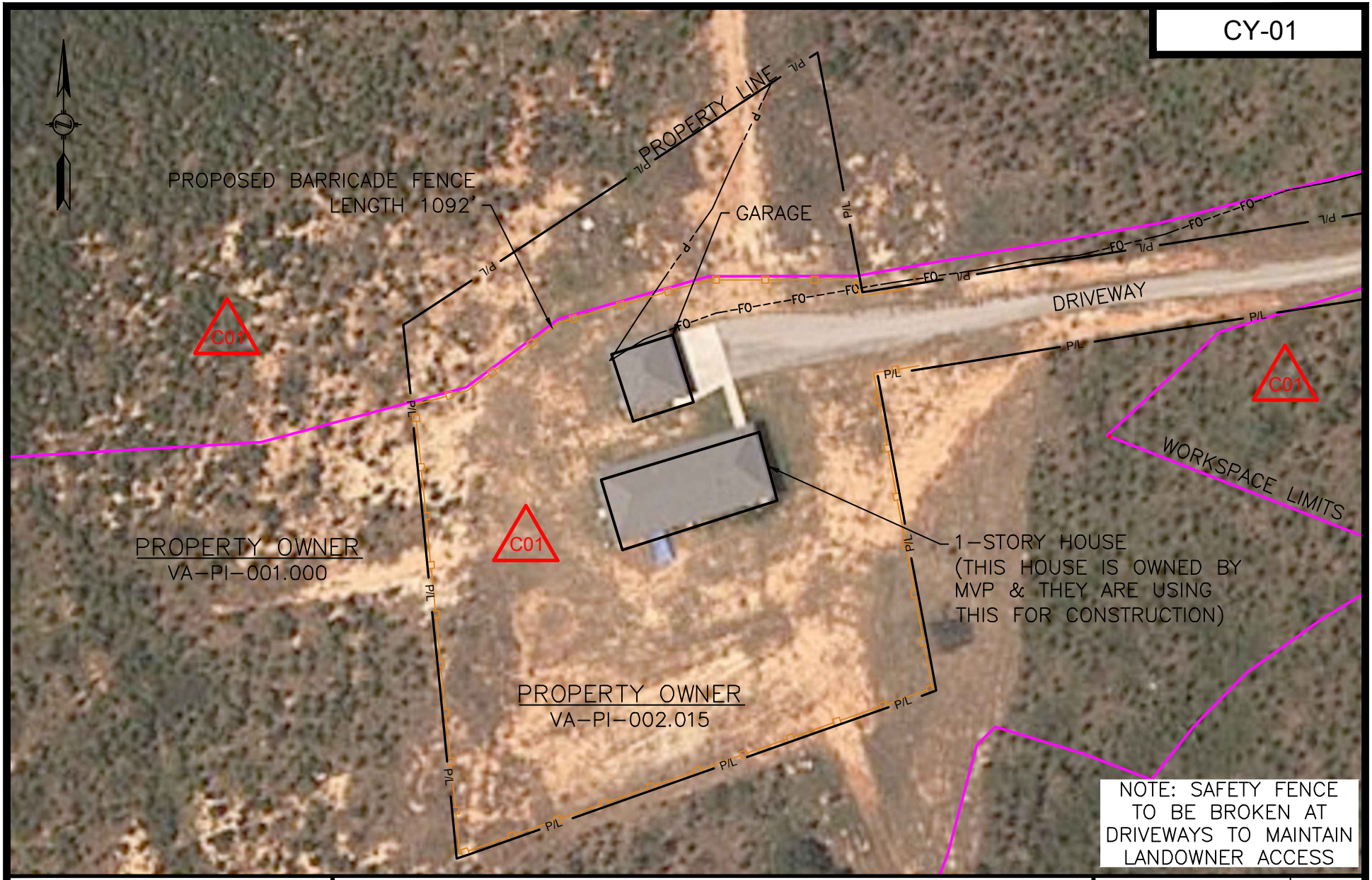

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY: KMB	05/06/19
DRAFTING CK: SSL	05/07/19
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ENGINEERING CK:	
DETAIL SHEET:	
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Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/09/19
DRAFTING CK: SSL	05/09/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
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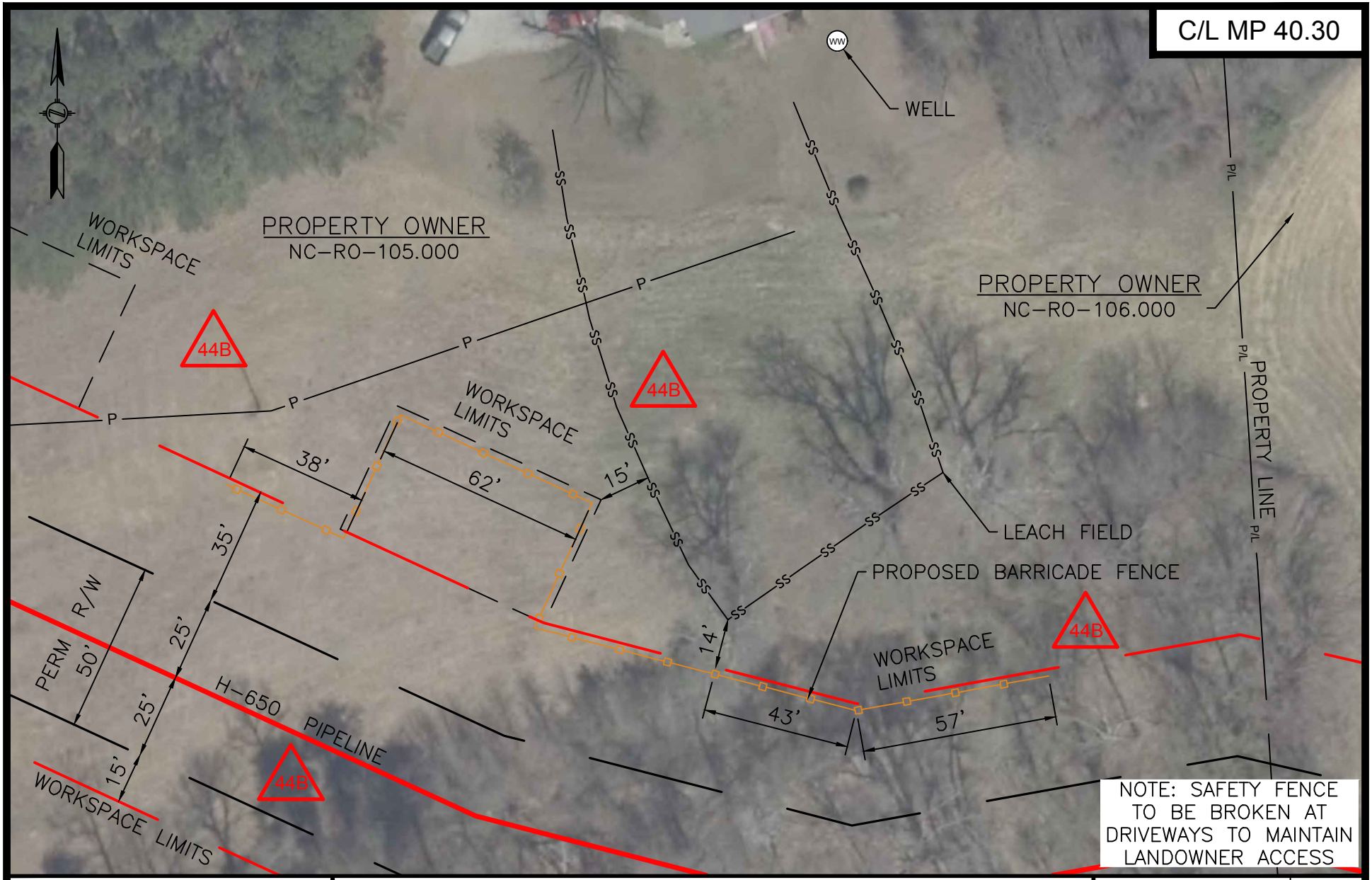

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/09/19
DRAFTING CK: SSL	05/09/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
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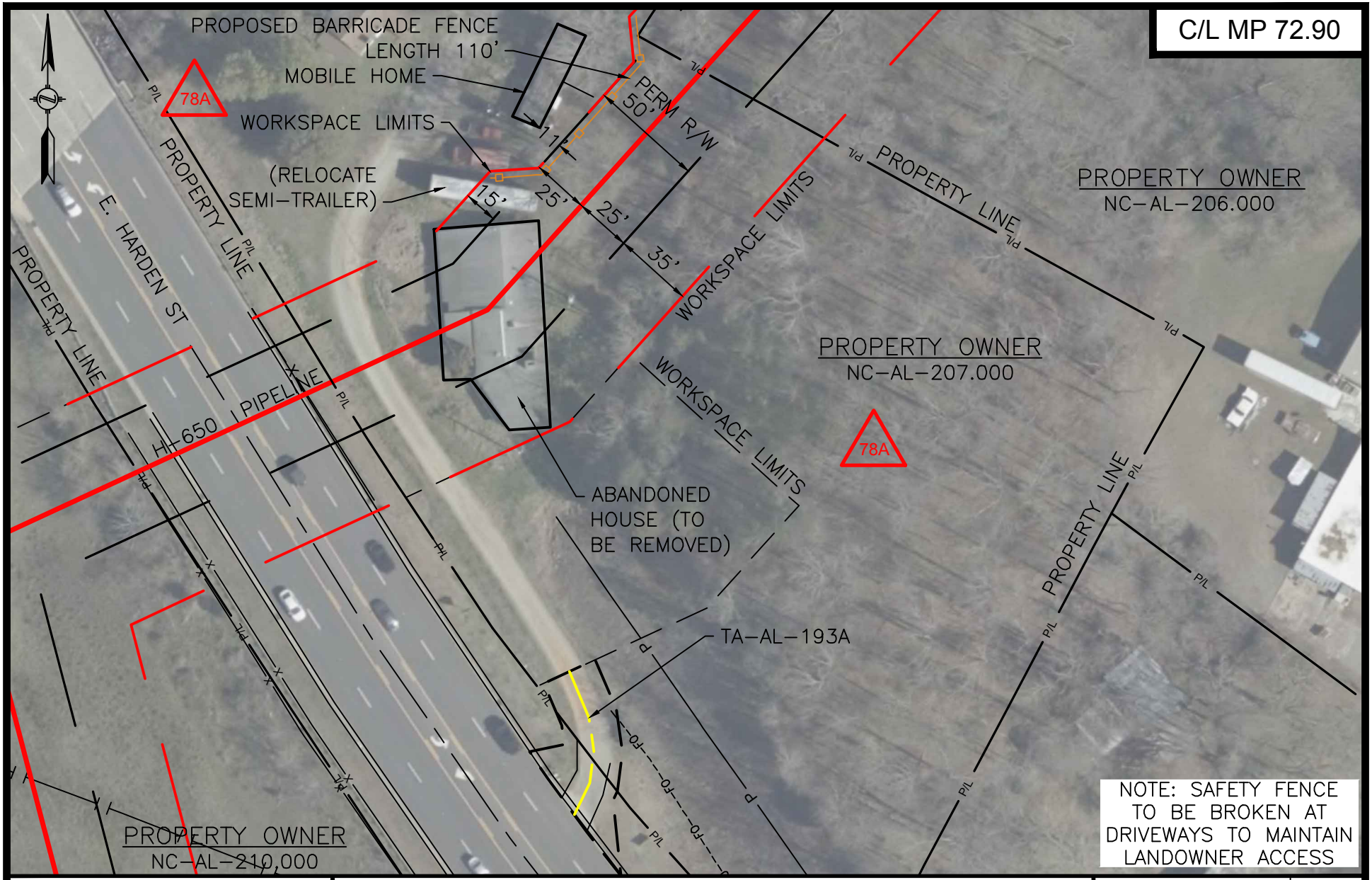

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/15/19
DRAFTING CK: SSL	05/15/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
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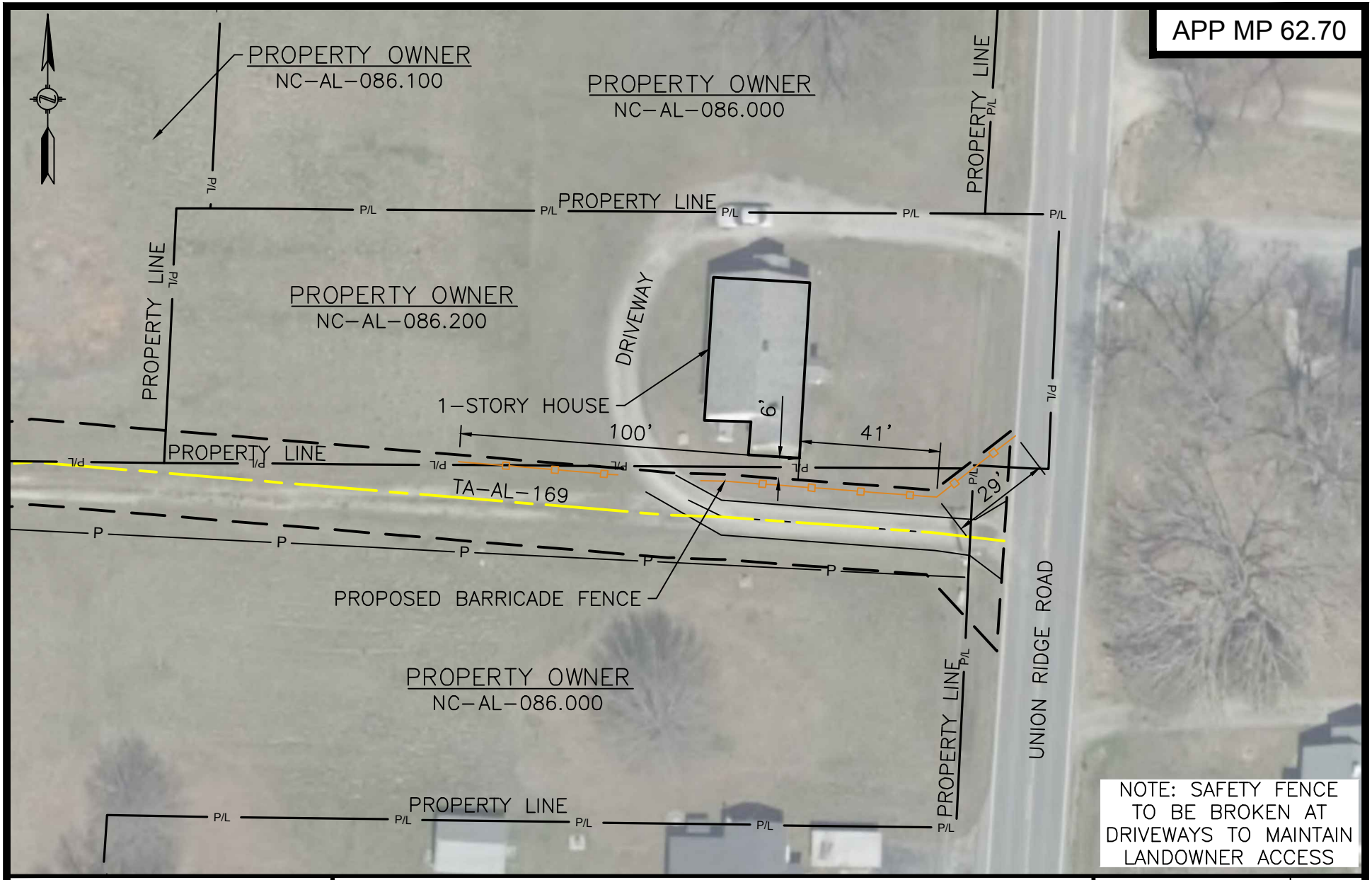

NOTE: SAFETY FENCE TO BE BROKEN AT DRIVEWAYS TO MAINTAIN LANDOWNER ACCESS

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/15/19
DRAFTING CK: DEM	09/19/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
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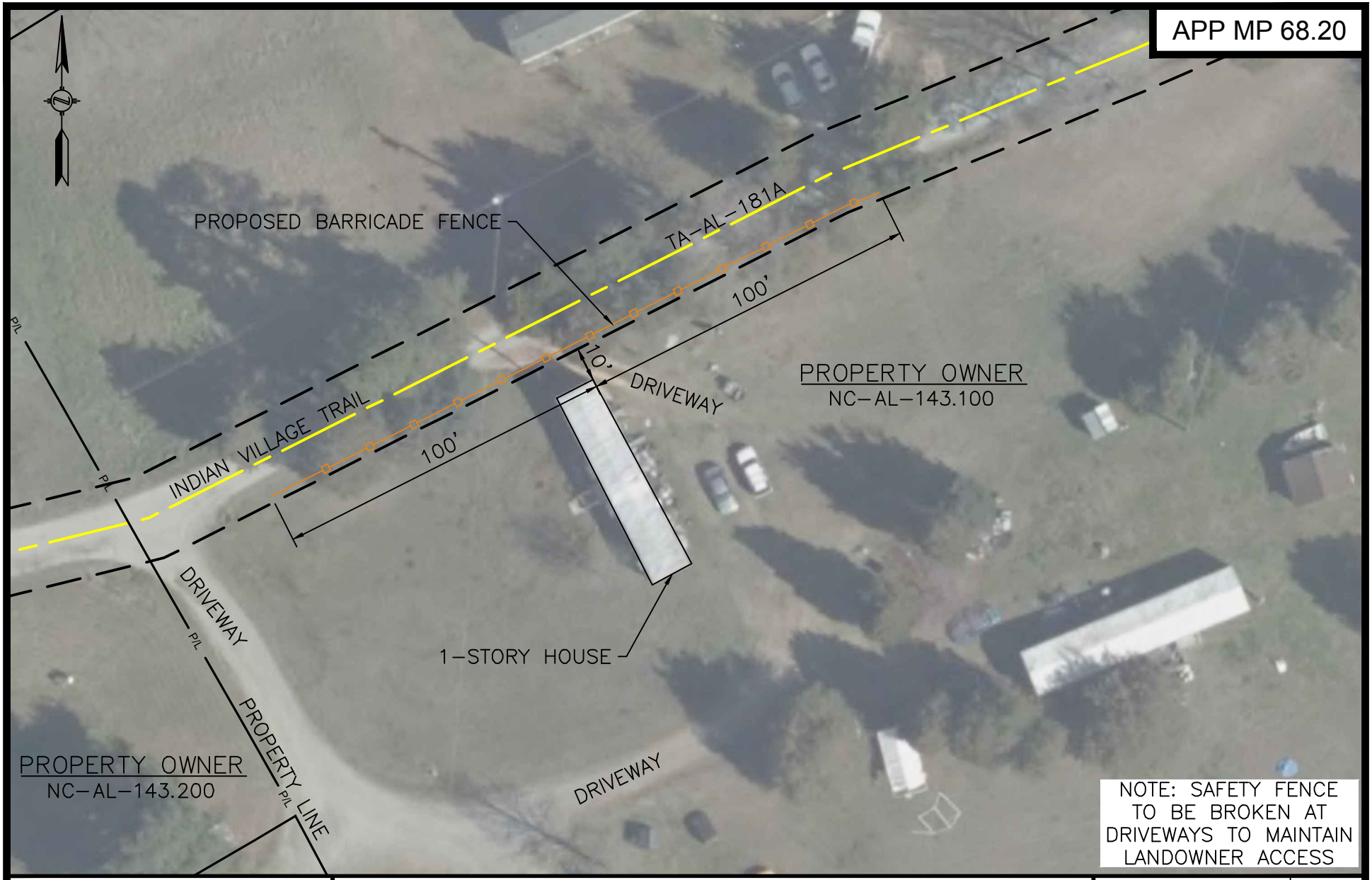

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/15/19
DRAFTING CK: SSL	05/15/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
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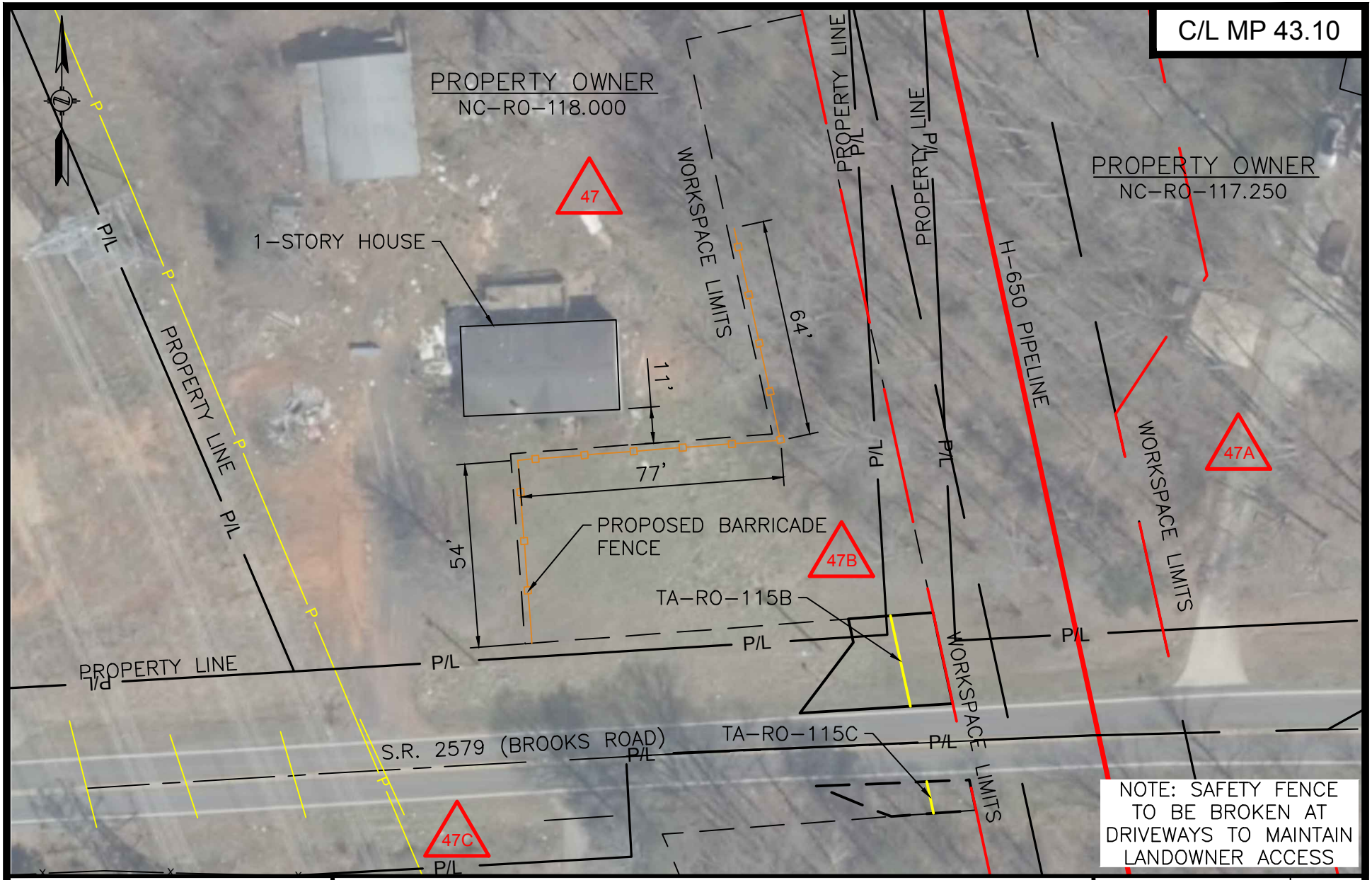

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: KMB	05/15/19
DRAFTING CK: SSL	05/15/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
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Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: CCH	05/17/19
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DETAIL SHEET:	
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Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY: CCH	06/13/19
DRAFTING CK: DEM	09/16/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
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Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY: CCH	06/13/19
DRAFTING CK: DEM	09/16/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
DRAWING NO.: **RSS-H650-043**	
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DATE OF PLOT: 9/23/2019 5:07 PM	

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY, VIRGINIA

SHEET 1 OF 1

DRAWN BY: CCH	06/13/19
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ENGINEERING CK:	
DETAIL SHEET:	
DRAWING NO.: **RSS-H650-044**	
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DATE OF PLOT: 9/23/2019 4:56 PM	

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
PITTSYLVANIA COUNTY,VIRGINIA

SHEET 1 OF 1

DRAWN BY: SJS	08/29/19
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ENGINEERING CK: .	.
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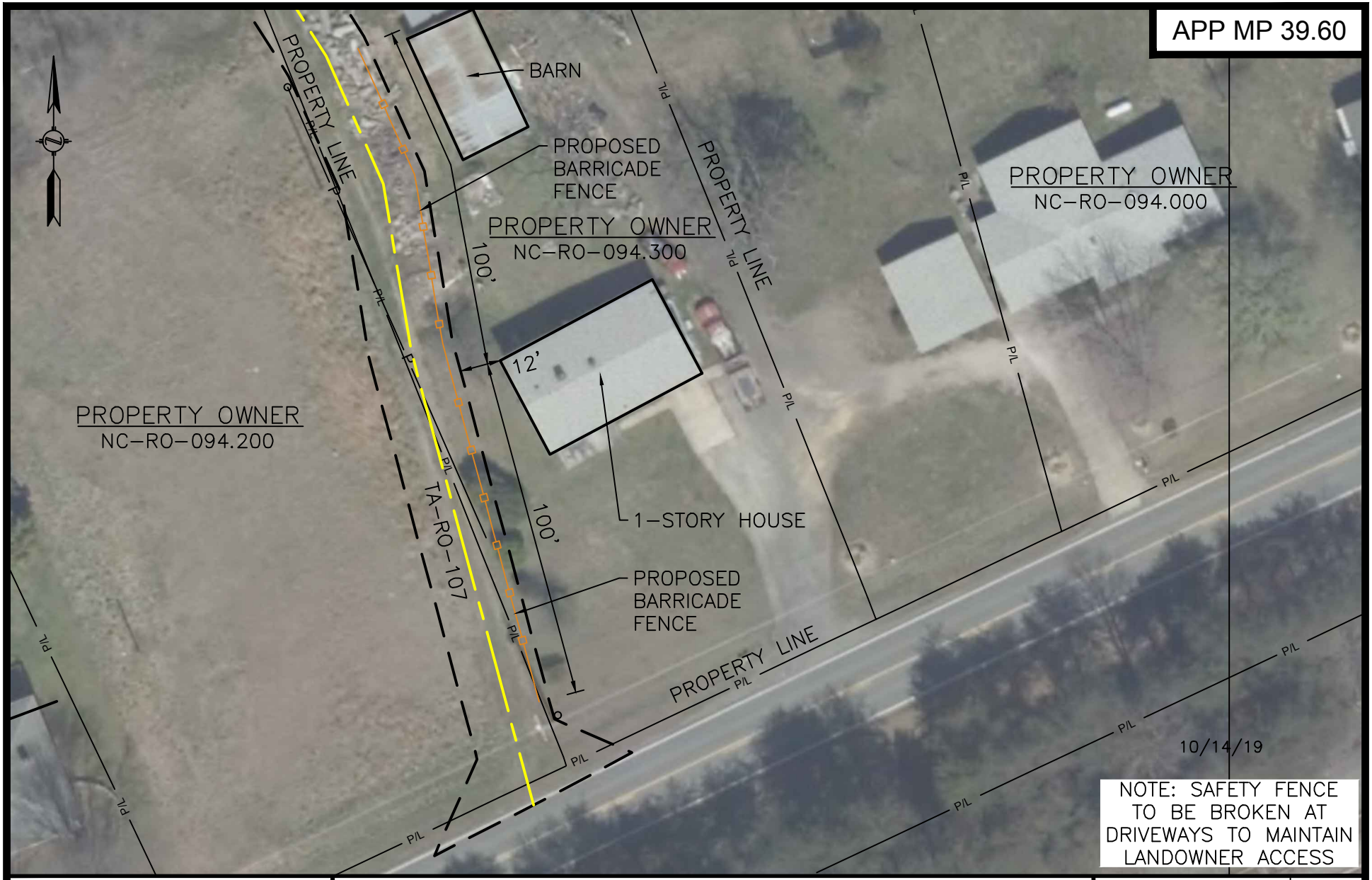

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	08/30/19
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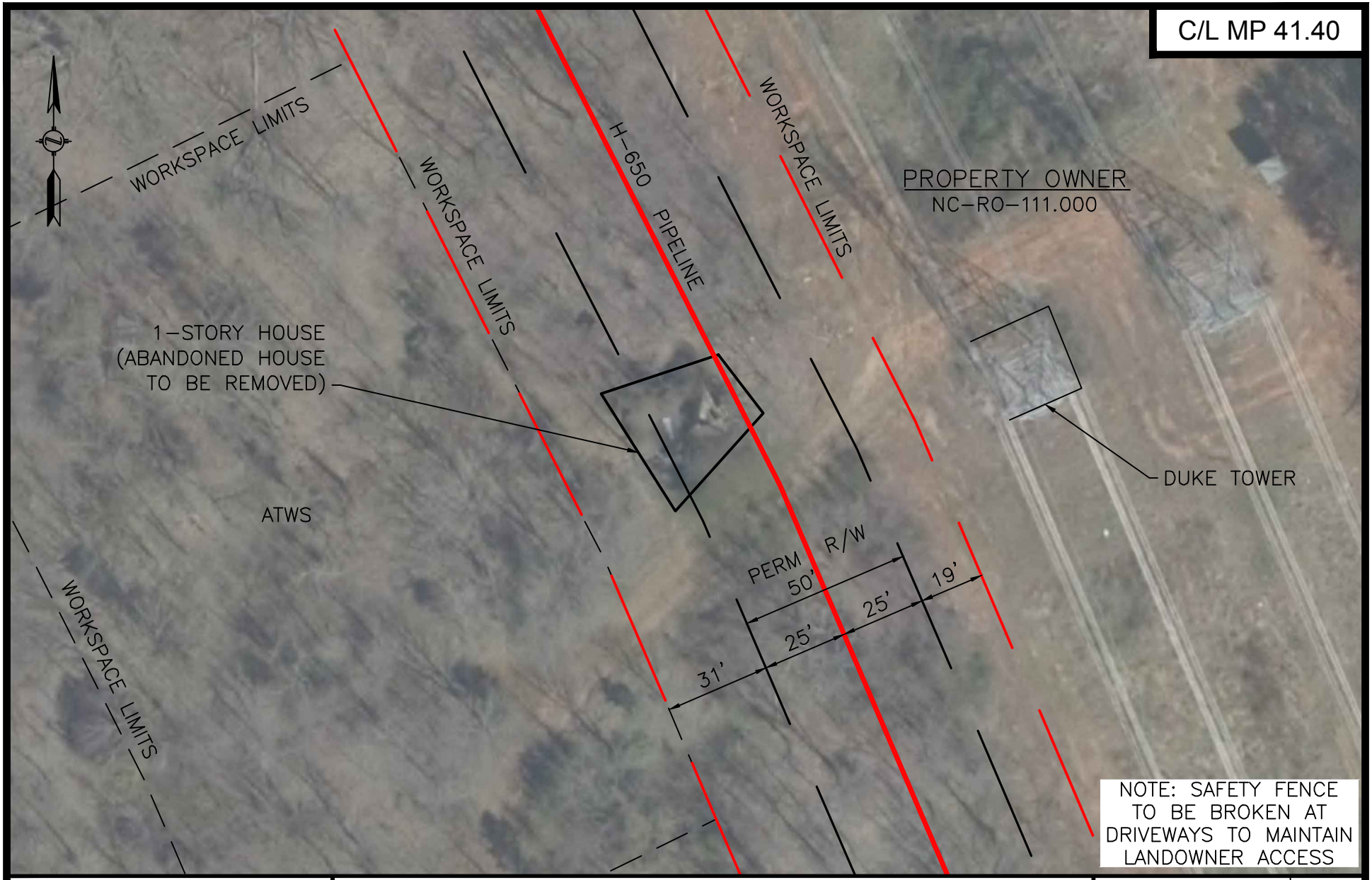

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	09/03/19
DRAFTING CK: DEM	09/16/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
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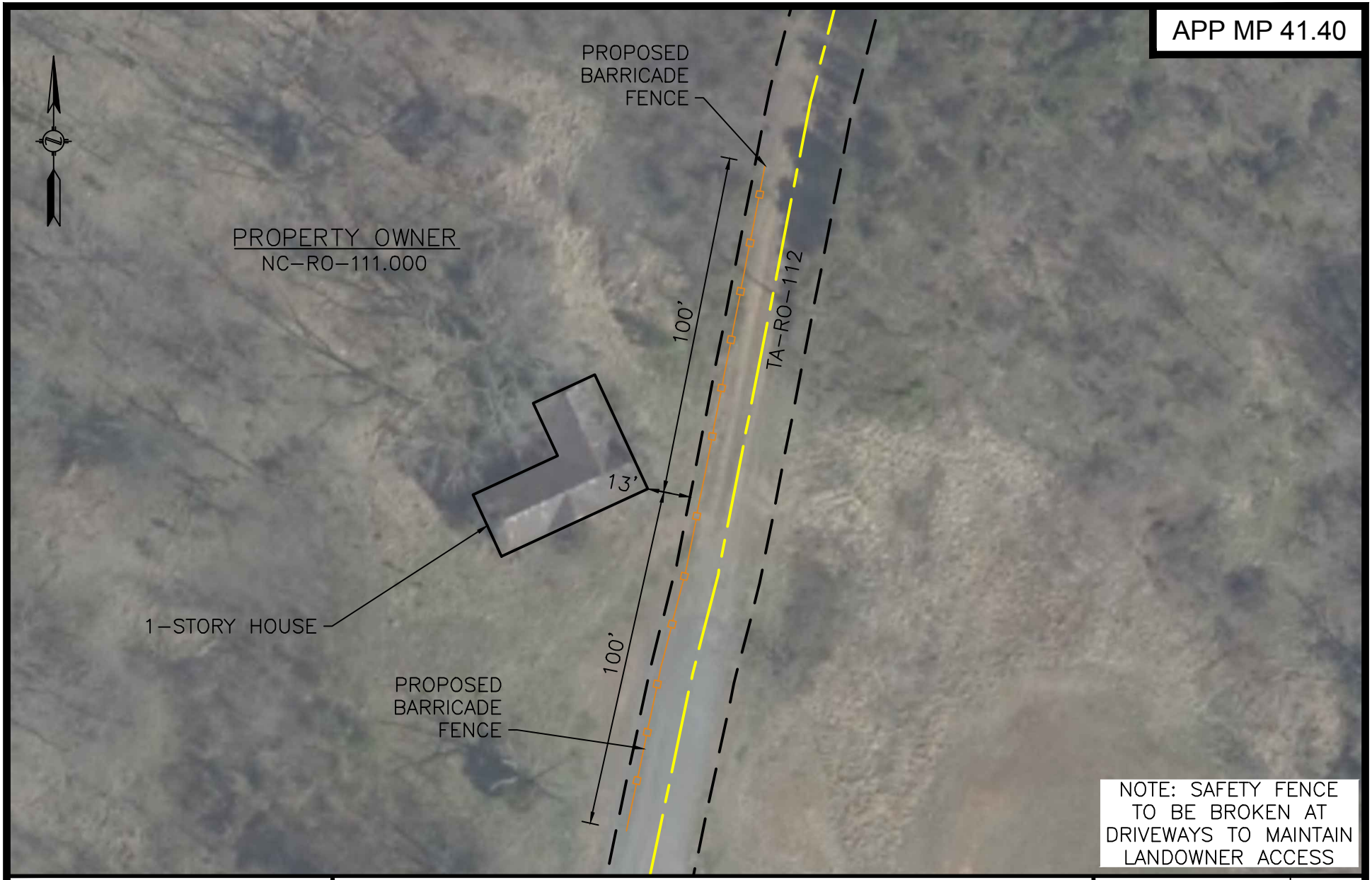

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ROCKINGHAM COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	09/03/19
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ENGINEERING CK: .	.
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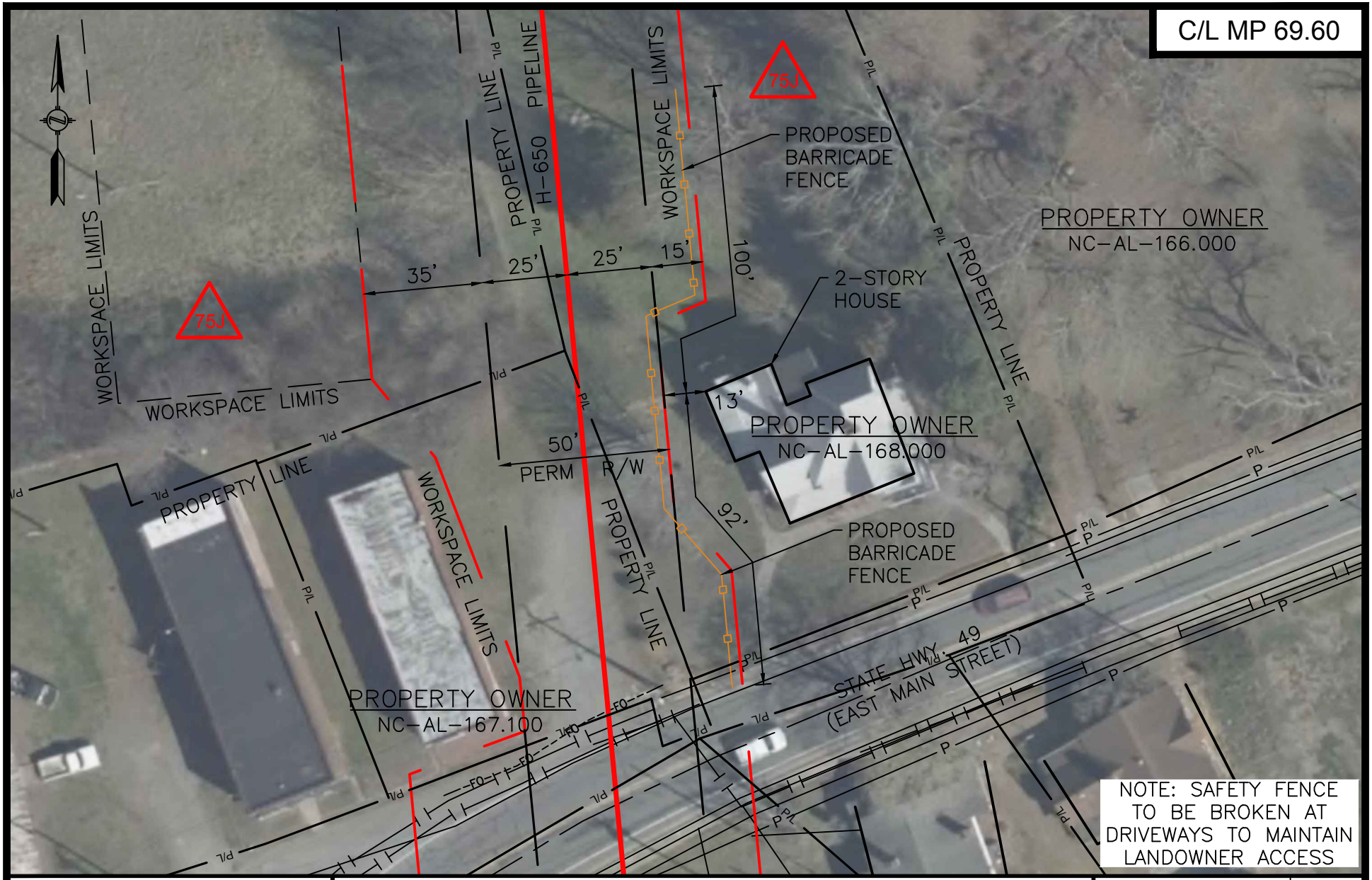

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	09/03/19
DRAFTING CK: DEM	09/16/19
ENVIRONMENTAL CK:	
ENGINEERING CK:	
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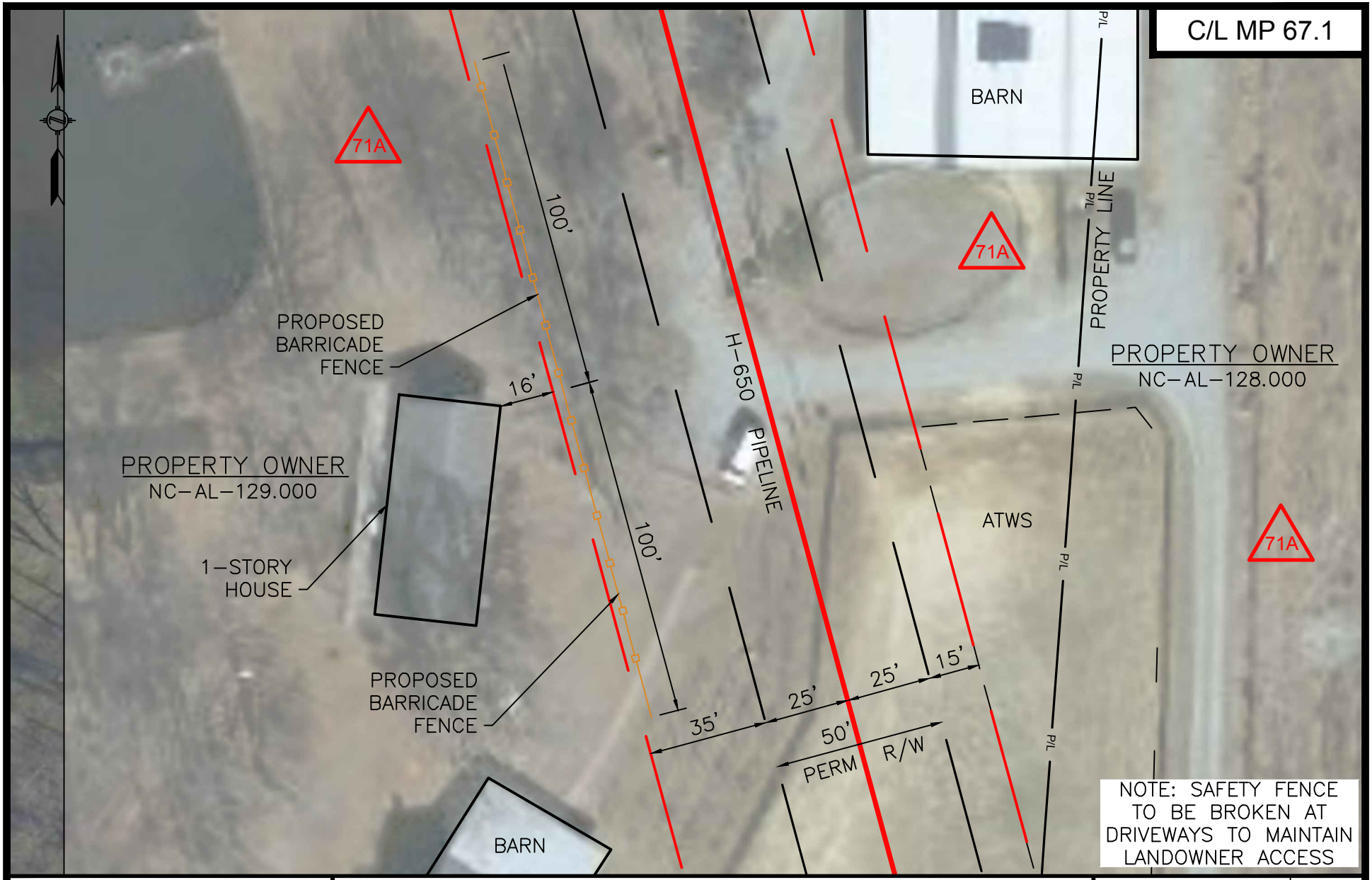

Legend

- Pipeline Centerline
- Temporary Workspace
- Permanent ROW
- Barricade Fence
- Access Road
- Contractor Yard Boundary

Mountain Valley PIPELINE LLC

CONSTRUCTION DETAILS - RESIDENTIAL SITE SPECIFIC

MVP SOUTHGATE PROJECT
PROPOSED H-650 PIPELINE
ALAMANCE COUNTY, NORTH CAROLINA

SHEET 1 OF 1

DRAWN BY: SJS	09/25/19
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ENVIRONMENTAL CK:	
ENGINEERING CK:	
DETAIL SHEET:	
DRAWING NO.: **RSS-H650-051**	
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DATE OF PLOT: 9/27/2019 11:06 AM	

APPENDIX B.8

Locations where Southgate Construction Workspace Parallel a Waterbody (or associated Wetland) within 15 feet

Appendix B-8

Locations where Southgate Construction Workspace Parallel a Waterbody (or associated Wetland) within 15 feet

Resource ID	MP	Length Parallel to Resource (feet)	Minimum Distance to Resource (feet) a/	Justification	FERC Comment
S-F18-10 / W-F18-11 (Trib. To Little Cherrystone Creek)	0.2	48 / 46	8	Collocation as route exits Lambert Compressor Station.	The request for construction workspace parallel to waterbody and wetland appears justified and minimizes impacts.
S-F18-17 (White Oak Creek)	9.9	60	0	Crossing location avoids sensitive resource site. Minimizes impact to wetlands. Constructability to avoid side slope construction.	14-18% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-F18-28 / W-F18-29 (Trib to Sandy Creek)	11.4	20/70	0	Collocation and constructability to avoid side slope construction.	30-60% side slopes present nearby. The request for construction workspace parallel to waterbody and wetland appears justified and minimizes impacts.
S-D18-37 (Trib. To Silver Creek)	15.6	60	5	Collocation and constructability to avoid side slope construction.	14-25% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
W-A18-204 / S-A16-205 (Trib. To Trotters Creek)	22.0	187	0	Collocation and constructability, to avoid residence and to support road bore.	The request for construction workspace parallel to waterbody and wetland appears justified and minimizes impacts.
S-E18-35/ W-E18-33 (Trib. To Dan River)	23.9	14 / 39	9	Collocation and constructability to avoid side slope construction.	30-50% side slopes present nearby. The request for construction workspace parallel to waterbody and wetland appears justified and minimizes impacts.
S-A18-143 (Trib. To Machine Creek)	31.9	22	11	Collocation and minimize the severity of slope construction.	50-80% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.

Appendix B-8

Locations where Southgate Construction Workspace Parallel a Waterbody (or associated Wetland) within 15 feet

Resource ID	MP	Length Parallel to Resource (feet)	Minimum Distance to Resource (feet) a/	Justification	FERC Comment
S-A18-151 (Town Creek)	32.7	90	0	Collocation and a route to the east of waterbody crossing includes side slope construction and pond.	14-50% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-A18-154 (Trib. To Town Creek)	33.0	38	0	Constructability to avoid side slope construction to the east and major utility corridor to the west.	14-18% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-A18-94 / W-A18-95 (Trib. To Wolf Island Creek)	37.0	40 / 61	0	Constructability to avoid side slope construction to the southwest and pond to the east.	14-50% side slopes present nearby. The request for construction workspace parallel to waterbody and wetland appears justified and minimizes impacts.
S-A18-4 (Trib. To Lick Fork)	38.5	180	0	Collocation to the northeast and avoids side slope construction to the southwest.	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-B18-44 (Trib. To Lick Fork)	41.6	52	0	Maintains collocation and supports space required for highway crossing	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-A18-212 (Trib. To Hogans Creek)	45.7	29	6	Maintaining collocation	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-A18-218 (Trib. To Haw River)	52.2RR	37	8	Support perpendicular stream crossing	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-A18-87 (Trib. To Haw River)	53.7	43	0	Maximize collocation	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.

Appendix B-8

Locations where Southgate Construction Workspace Parallel a Waterbody (or associated Wetland) within 15 feet

Resource ID	MP	Length Parallel to Resource (feet)	Minimum Distance to Resource (feet) a/	Justification	FERC Comment
S-B18-14 (Trib. To Stony Creek)	63.2RR	55	11	Collocation and constructability to avoid side slope construction and construct around utility towers.	30-50% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
W-B19-161 (Trib. To Boyds Creek)	65.5	81	1	Constructability to avoid residences	The request for construction workspace parallel wetland appears justified and minimizes impacts.
S-A19-353 (Trib. To Boyds Creek)	66.58RR	59	8	Supports request of landowner on route placement	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-B18-9 (Trib. To Haw River)	68.8	50	1	Route location dictated by major road bores north and south of stream and also maintains safe distance between transmission line towers for utility crossing	14-50% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-B18-11 (Trib. To Haw River)	68.9	31	9	Route location dictated by major road bores north and south of stream and maintains safe distance between transmission line towers for utility crossing.	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-A18-116 (Trib. To Haw River)	70.0RR	24	4	Route location dictated by alignment around Town of Haw River structures.	The request for construction workspace parallel to waterbody appears justified and minimizes impacts.
S-C18-82 (Trib. To Haw River)	70.4	93	0	Constructability to avoid side slope construction	30-50% side slopes present nearby. The request for construction workspace parallel to waterbody appears justified and minimizes impacts.

a/ Minimum distance from resource of 0 feet indicates that the wetland or waterbody is located within the Construction Workspace.

APPENDIX C.1

Surficial Geology Crossed by the Southgate Project

Appendix C.1

Surficial Geology Crossed by the Southgate Project

Project Facilities	County	Start MP	End MP	Surficial Geology Material
Pipeline Facilities				
Virginia				
H-605	Pittsylvania	0	0.28	Residual materials developed in sedimentary rocks, discontinuous
		0.28	0.47	Residual materials developed in bedrock, discontinuous
H-650	Pittsylvania	0	0.37	Residual materials developed in bedrock, discontinuous
		0.37	1.22	Residual materials developed in sedimentary rocks, discontinuous
		1.22	2.05	Residual materials developed in sedimentary rocks, discontinuous
		2.05	15.18	Residual materials developed in igneous and metamorphic rocks
		15.18	26.10	Residual materials developed in bedrock, discontinuous
North Carolina				
H-650	Rockingham	26.10	52.60	Residual materials developed in bedrock, discontinuous
H-650	Alamance	52.60	73.17	Residual materials developed in igneous and metamorphic rocks
Aboveground Facilities		**Area (acres)**	**Near MP**	
Lambert CS / Interconnect / MLV 1	Pittsylvania	3.2	0	Residual materials developed in bedrock, discontinuous
MLV 2		<0.1	7.4	Residual materials developed in igneous and metamorphic rocks
MLV 3		<0.1	18.3	Residual materials developed in bedrock, discontinuous
LN 3600 Interconnect	Rockingham	0.9	28.2	Residual materials developed in bedrock, discontinuous
T-15 Dan River Interconnect / MLV4		0.7	30.4	Residual materials developed in bedrock, discontinuous
MLV 5		<0.1	42.2	Residual materials developed in igneous and metamorphic rocks
MLV 6	Alamance	<0.1	55.1	Residual materials developed in igneous and metamorphic rocks
MLV 7		<0.1	68.7	Residual materials developed in igneous and metamorphic rocks
T-21 Haw River Interconnect / MLV 8		0.7	73.2RR	Residual materials developed in igneous and metamorphic rocks

Source: Soller and Reheis, 2004

APPENDIX C.2

Bedrock Geology Underlying the Southgate Project

Appendix C.2

Bedrock Geology Underlying the Southgate Project

Project Facilities	From Milepost	To Milepost	Crossing Length (Miles)	Formation Age	Primary Rock	Secondary Rock	Map Symbol
Pipeline Facilities							
H-605	0.00	0.07	0.07	Upper Triassic	sandstone	siltstone	TRss
	0.07	0.19	0.12	Upper Triassic	conglomerate		TRc
	0.19	0.47	0.28	Upper Triassic	sandstone	siltstone	Zfm
H-650	0 RR	0.39	0.41	Upper Triassic	sandstone	siltstone	lw
	0.39	0.95	0.56	Upper Triassic	conglomerate		Zfm
	0.95	1.2	0.25	Proterozoic Z-Cambrian	mica schist	gneiss	TRc
	1.2	1.86	0.68	Cambrian	granite		TRs
	1.86	14.95	13.17	Proterozoic Z-Cambrian	mica schist	gneiss	TRss
	14.95	16.19	1.24	Upper Triassic	conglomerate		TRc
	16.19	17.13	0.94	Upper Triassic	sandstone		Zau
	17.13	18.03	0.97	Upper Triassic	sandstone	siltstone	Zab
	18.03	18.7	0.67	Upper Triassic	conglomerate		my
	18.7	20.62	1.92	Proterozoic Z	biotite gneiss	amphibolite	TRss
	20.62	21.07	0.45	Proterozoic Z-Cambrian	mica schist	amphibolite	my
	21.07	22.35	1.28	Proterozoic - Paleozoic ?	mylonite	gneiss	TRss
	22.35	22.46RR	0.11	Upper Triassic	sandstone	siltstone	TRcs
	22.46 RR	22.46RR	0	Proterozoic - Paleozoic ?	mylonite	gneiss	TRdp
	22.46 RR	24.57	2.22	Upper Triassic	sandstone	siltstone	TRdc
	24.57	26.11	1.54	Triassic	sandstone	siltstone	TRdp
	26.11	28.99	2.89	Triassic	sandstone	mudstone	CZbg

Appendix C.2

Bedrock Geology Underlying the Southgate Project

Project Facilities	From Milepost	To Milepost	Crossing Length (Miles)	Formation Age	Primary Rock	Secondary Rock	Map Symbol
	28.99	29.35RR	0.36	Triassic	mudstone	sandstone	CZfg
	29.35 RR	31.11	1.78	Triassic	sandstone	mudstone	CZbg
	31.11	32.65	1.54	Cambrian/Late Proterozoic	biotite gneiss	mica schist	CZfg
	32.65	32.95	0.3	Cambrian/Late Proterozoic	felsic gneiss	mafic gneiss	CZbg
	32.95	34.12	1.17	Cambrian/Late Proterozoic	biotite gneiss	mica schist	CZfg
	34.12	34.93	0.82	Cambrian/Late Proterozoic	felsic gneiss	mafic gneiss	CZbg
	34.93	39.31	4.39	Cambrian/Late Proterozoic	biotite gneiss	mica schist	PPg
	39.31	41.28	2.02	Cambrian/Late Proterozoic	felsic gneiss	mafic gneiss	CZbg
	41.28	46.1RR	4.82	Cambrian/Late Proterozoic	biotite gneiss	mica schist	PPg
	46.1 RR	47.56	1.45	Permian/Pennsylvanian	granite		CZmv
	47.56	48.35	0.8	Cambrian/Late Proterozoic	biotite gneiss	mica schist	CZph
	48.35	49.29	0.94	Permian/Pennsylvanian	granite		CZmv
	49.29	50.57RR	1.28	Cambrian/Late Proterozoic	mafic metavolcanic rock	felsic metavolcanic rock	CZfv
	50.57 RR	50.63RR	0.05	Cambrian/Late Proterozoic	phyllite	schist	CZg
	50.63 RR	54.77	4.24	Cambrian/Late Proterozoic	mafic metavolcanic rock	felsic metavolcanic rock	PzZg
	54.77	55.37RR	0.6	Cambrian/Late Proterozoic	felsic metavolcanic rock	mafic metavolcanic rock	CZg

Appendix C.2

Bedrock Geology Underlying the Southgate Project

Project Facilities	From Milepost	To Milepost	Crossing Length (Miles)	Formation Age	Primary Rock	Secondary Rock	Map Symbol
	55.37 RR	58.32	3.23	Cambrian/Late Proterozoic	metamorphic rock		PzZg
	58.32	59.2RR	0.93	Paleozoic/Late Proterozoic	metamorphic rock		CZg
	59.2 RR	59.4RR	0.2	Cambrian/Late Proterozoic	metamorphic rock		PzZg
	59.4 RR	59.63	0.21	Paleozoic/Late Proterozoic	metamorphic rock		CZg
	59.63	60.55	0.92	Cambrian/Late Proterozoic	metamorphic rock		PzZg
	60.55	61.32	0.8	Paleozoic/Late Proterozoic	metamorphic rock		CZg
	61.32	61.54	0.22	Cambrian/Late Proterozoic	metamorphic rock		PzZg
	61.54	61.59	0.05	Paleozoic/Late Proterozoic	metamorphic rock		CZg
	61.59	61.86	0.27	Cambrian/Late Proterozoic	metamorphic rock		PzZg
	61.86	62.26RR	0.4	Paleozoic/Late Proterozoic	metamorphic rock		CZg
	62.26 RR	63.28RR	1.11	Cambrian/Late Proterozoic	metamorphic rock		CZmv
	63.28 RR	64.52	1.41	Paleozoic/Late Proterozoic	metamorphic rock		PzZg
	64.52	69.4	5.12	Cambrian/Late Proterozoic	metamorphic rock		CZmv
	69.4	72.89RR	3.59	Cambrian/Late Proterozoic	mafic metavolcanic rock	felsic metavolcanic rock	TRss

Appendix C.2

Bedrock Geology Underlying the Southgate Project

Project Facilities	From Milepost	To Milepost	Crossing Length (Miles)	Formation Age	Primary Rock	Secondary Rock	Map Symbol
	72.89 RR	73.16RR	0.29	Paleozoic/Late Proterozoic	metamorphic rock		TRc
	73.16 RR	73.17RR	0.01	Cambrian/Late Proterozoic	mafic metavolcanic rock	felsic metavolcanic rock	Zfm
Aboveground Facilities							
	Area (acres)	**Nearest Mile Post**					
Lambert Compressor Station/ Interconnect/ MLV 1	8.6	0		Upper Triassic	sandstone	siltstone	TRss
MLV 2	<0.01	7.4		Proterozoic Z-Cambrian	mica schist	gneiss	Zfm
MLV 3	<0.01	18.3		Upper Triassic	conglomerate		TRc
LN 3600 Interconnect	0.9	28.2		Triassic	sandstone	mudstone	TRdp
T-15 Dan River Interconnect/ MLV 4	0.8	30.4		Triassic	sandstone	mudstone	TRdp
MLV 5	<0.01	42.2		Cambrian/Late Proterozoic	biotite gneiss	mica schist	CZbg
MLV 6	<0.01	55.1		Cambrian/Late Proterozoic	felsic metavolcanic rock	mafic metavolcanic rock	CZfv
MLV 7	<0.01	68.2		Cambrian/Late Proterozoic	metamorphic rock		CZg
T-21 Haw River Interconnect/MLV8	0.06	73.2RR		Cambrian/Late Proterozoic	mafic metamorphic rock	felsic metavolcanic rock	CZmv

Source: USGS, 2018a

APPENDIX C.3

Potential Areas of Steep Slopes and Side Slopes Crossed by the Southgate Project

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Lateral (H-605 Pipeline)	30 to 50	0.12 RR	0.13 RR	25
Southgate Mainline (H-650 Pipeline)	30 to 50	3.94 RR	3.94 RR	26
Southgate Mainline (H-650 Pipeline)	30 to 50	4.12	4.12	27
Southgate Mainline (H-650 Pipeline)	30 to 50	4.84	4.85	25
Southgate Mainline (H-650 Pipeline)	50 to 66	5.11	5.12	21
Southgate Mainline (H-650 Pipeline)	50 to 66	5.24	5.25	28
Southgate Mainline (H-650 Pipeline)	30 to 50	5.25	5.25	28
Southgate Mainline (H-650 Pipeline)	30 to 50	5.65	5.66	24
Southgate Mainline (H-650 Pipeline)	50 to 66	6.99	6.99	29
Southgate Mainline (H-650 Pipeline)	30 to 50	7.60	7.61	25
Southgate Mainline (H-650 Pipeline)	30 to 50	7.98	7.99	75
Southgate Mainline (H-650 Pipeline)	30 to 50	8.58	8.58	29
Southgate Mainline (H-650 Pipeline)	50 to 66	8.58	8.59	29
Southgate Mainline (H-650 Pipeline)	30 to 50	8.59	8.59	34
Southgate Mainline (H-650 Pipeline)	66 to 80	9.95	9.95	30
Southgate Mainline (H-650 Pipeline)	50 to 66	9.95	9.96	24
Southgate Mainline (H-650 Pipeline)	30 to 50	9.96	9.96	18
Southgate Mainline (H-650 Pipeline)	30 to 50	10.08	10.09	44
Southgate Mainline (H-650 Pipeline)	30 to 50	10.29	10.30	25
Southgate Mainline (H-650 Pipeline)	30 to 50	11.04	11.06	76
Southgate Mainline (H-650 Pipeline)	50 to 66	11.83	11.84	24
Southgate Mainline (H-650 Pipeline)	30 to 50	12.78	12.79	52
Southgate Mainline (H-650 Pipeline)	66 to 80	13.47 RR	13.47 RR	35
Southgate Mainline (H-650 Pipeline)	30 to 50	13.47 RR	13.48 RR	33
Southgate Mainline (H-650 Pipeline)	30 to 50	17.27	17.28	51
Southgate Mainline (H-650 Pipeline)	50 to 66	17.29	17.30	31
Southgate Mainline (H-650 Pipeline)	30 to 50	17.30	17.31	49
Southgate Mainline (H-650 Pipeline)	30 to 50	17.63 RR	17.63 RR	21
Southgate Mainline (H-650 Pipeline)	50 to 66	17.70 RR	17.71 RR	53
Southgate Mainline (H-650 Pipeline)	30 to 50	17.71 RR	17.72 RR	45
Southgate Mainline (H-650 Pipeline)	30 to 50	17.81 RR	17.72 RR	36
Southgate Mainline (H-650 Pipeline)	30 to 50	17.92	17.93	50
Southgate Mainline (H-650 Pipeline)	30 to 50	18.01	18.02	94
Southgate Mainline (H-650 Pipeline)	30 to 50	20.39	20.41	118
Southgate Mainline (H-650 Pipeline)	30 to 50	20.63	20.64	72
Southgate Mainline (H-650 Pipeline)	30 to 50	21.52	21.54	73
Southgate Mainline (H-650 Pipeline)	30 to 50	21.54	21.55	42
Southgate Mainline (H-650 Pipeline)	30 to 50	22.00	22.01	27

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	30 to 50	22.35	22.36	32
Southgate Mainline (H-650 Pipeline)	30 to 50	22.50 RR	22.51 RR	32
Southgate Mainline (H-650 Pipeline)	30 to 50	22.71 RR	22.74 RR	120
Southgate Mainline (H-650 Pipeline)	30 to 50	22.83 RR	22.87 RR	193
Southgate Mainline (H-650 Pipeline)	30 to 50	22.90 RR	22.91 RR	26
Southgate Mainline (H-650 Pipeline)	30 to 50	22.95 RR	22.95 RR	32
Southgate Mainline (H-650 Pipeline)	30 to 50	23.20 RR	23.21 RR	22
Southgate Mainline (H-650 Pipeline)	50 to 66	23.21 RR	23.21 RR	20
Southgate Mainline (H-650 Pipeline)	30 to 50	23.21 RR	23.21 RR	20
Southgate Mainline (H-650 Pipeline)	30 to 50	23.24 RR	23.25 RR	90
Southgate Mainline (H-650 Pipeline)	30 to 50	24.37	24.37	31
Southgate Mainline (H-650 Pipeline)	30 to 50	24.78	24.79	77
Southgate Mainline (H-650 Pipeline)	30 to 50	24.99	25.00	56
Southgate Mainline (H-650 Pipeline)	30 to 50	25.16	25.17	45
Southgate Mainline (H-650 Pipeline)	30 to 50	26.19	26.20	21
Southgate Mainline (H-650 Pipeline)	30 to 50	27.49	27.50	22
Southgate Mainline (H-650 Pipeline)	66 to 80	27.52	27.52	16
Southgate Mainline (H-650 Pipeline)	30 to 50	27.52	27.52	10
Southgate Mainline (H-650 Pipeline)	30 to 50	28.82	28.85	142
Southgate Mainline (H-650 Pipeline)	30 to 50	28.95	28.96	63
Southgate Mainline (H-650 Pipeline)	30 to 50	29.28 RR	29.28 RR	39
Southgate Mainline (H-650 Pipeline)	30 to 50	29.34 RR	29.36 RR	124
Southgate Mainline (H-650 Pipeline)	30 to 50	29.41 RR	29.43 RR	133
Southgate Mainline (H-650 Pipeline)	30 to 50	29.52 RR	29.53 RR	23
Southgate Mainline (H-650 Pipeline)	50 to 66	29.53 RR	29.53 RR	9
Southgate Mainline (H-650 Pipeline)	50 to 66	30.05	30.06	31
Southgate Mainline (H-650 Pipeline)	30 to 50	31.06	31.06	22
Southgate Mainline (H-650 Pipeline)	30 to 50	31.06	31.07	36
Southgate Mainline (H-650 Pipeline)	30 to 50	31.09	31.12	139
Southgate Mainline (H-650 Pipeline)	30 to 50	31.28	31.29	68
Southgate Mainline (H-650 Pipeline)	30 to 50	31.30	31.31	57
Southgate Mainline (H-650 Pipeline)	30 to 50	31.31	31.32	31
Southgate Mainline (H-650 Pipeline)	30 to 50	31.67	31.68	97
Southgate Mainline (H-650 Pipeline)	30 to 50	31.70	31.70	34
Southgate Mainline (H-650 Pipeline)	30 to 50	31.72	31.73	66
Southgate Mainline (H-650 Pipeline)	30 to 50	31.86	31.87	51
Southgate Mainline (H-650 Pipeline)	30 to 50	31.87	31.88	40
Southgate Mainline (H-650 Pipeline)	66 to 80	31.88	31.89	54

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	30 to 50	31.89	31.89	10
Southgate Mainline (H-650 Pipeline)	66 to 80	31.93	31.93	29
Southgate Mainline (H-650 Pipeline)	50 to 66	31.93	31.94	32
Southgate Mainline (H-650 Pipeline)	50 to 66	32.02	32.03	28
Southgate Mainline (H-650 Pipeline)	30 to 50	32.04	32.04	40
Southgate Mainline (H-650 Pipeline)	30 to 50	32.27	32.27	31
Southgate Mainline (H-650 Pipeline)	30 to 50	32.46	32.47	60
Southgate Mainline (H-650 Pipeline)	30 to 50	32.47	32.48	26
Southgate Mainline (H-650 Pipeline)	30 to 50	32.50	32.52	80
Southgate Mainline (H-650 Pipeline)	30 to 50	32.55	32.56	40
Southgate Mainline (H-650 Pipeline)	50 to 66	32.56	32.57	20
Southgate Mainline (H-650 Pipeline)	30 to 50	32.57	32.57	36
Southgate Mainline (H-650 Pipeline)	30 to 50	32.59	32.60	92
Southgate Mainline (H-650 Pipeline)	30 to 50	32.66	32.67	26
Southgate Mainline (H-650 Pipeline)	30 to 50	32.75	32.76	25
Southgate Mainline (H-650 Pipeline)	30 to 50	33.12	33.13	40
Southgate Mainline (H-650 Pipeline)	66 to 80	33.13	33.14	75
Southgate Mainline (H-650 Pipeline)	30 to 50	33.14	33.15	21
Southgate Mainline (H-650 Pipeline)	30 to 50	33.16	33.17	34
Southgate Mainline (H-650 Pipeline)	30 to 50	33.25	33.26	23
Southgate Mainline (H-650 Pipeline)	30 to 50	33.27	33.28	30
Southgate Mainline (H-650 Pipeline)	30 to 50	33.30	33.32	64
Southgate Mainline (H-650 Pipeline)	30 to 50	33.33	33.34	89
Southgate Mainline (H-650 Pipeline)	30 to 50	33.38	33.39	47
Southgate Mainline (H-650 Pipeline)	30 to 50	33.68	33.69	56
Southgate Mainline (H-650 Pipeline)	30 to 50	33.70	33.70	41
Southgate Mainline (H-650 Pipeline)	50 to 66	33.73	33.73	23
Southgate Mainline (H-650 Pipeline)	50 to 66	33.74	33.75	47
Southgate Mainline (H-650 Pipeline)	30 to 50	33.75	33.77	103
Southgate Mainline (H-650 Pipeline)	30 to 50	33.79	33.80	28
Southgate Mainline (H-650 Pipeline)	30 to 50	33.81	33.82	42
Southgate Mainline (H-650 Pipeline)	30 to 50	33.82	33.83	47
Southgate Mainline (H-650 Pipeline)	30 to 50	33.88	33.89	52
Southgate Mainline (H-650 Pipeline)	30 to 50	33.92	33.94	94
Southgate Mainline (H-650 Pipeline)	30 to 50	33.99	34.00	23
Southgate Mainline (H-650 Pipeline)	30 to 50	34.15	34.16	23
Southgate Mainline (H-650 Pipeline)	50 to 66	34.21 RR	34.21 RR	4
Southgate Mainline (H-650 Pipeline)	> 80+	34.21 RR	34.22 RR	8

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	50 to 66	34.22 RR	34.22 RR	4
Southgate Mainline (H-650 Pipeline)	30 to 50	34.22 RR	34.23 RR	60
Southgate Mainline (H-650 Pipeline)	30 to 50	34.29	34.30	42
Southgate Mainline (H-650 Pipeline)	50 to 66	34.30	34.31	42
Southgate Mainline (H-650 Pipeline)	30 to 50	34.51	34.52	21
Southgate Mainline (H-650 Pipeline)	30 to 50	34.52	34.53	50
Southgate Mainline (H-650 Pipeline)	30 to 50	34.55	34.56	20
Southgate Mainline (H-650 Pipeline)	30 to 50	34.59	34.60	27
Southgate Mainline (H-650 Pipeline)	30 to 50	34.85	34.86	52
Southgate Mainline (H-650 Pipeline)	30 to 50	35.07	35.08	21
Southgate Mainline (H-650 Pipeline)	30 to 50	35.14	35.14	31
Southgate Mainline (H-650 Pipeline)	30 to 50	35.36	35.36	24
Southgate Mainline (H-650 Pipeline)	30 to 50	35.57	35.57	20
Southgate Mainline (H-650 Pipeline)	30 to 50	35.92	35.93	25
Southgate Mainline (H-650 Pipeline)	66 to 80	35.98	35.99	54
Southgate Mainline (H-650 Pipeline)	30 to 50	37.01	37.02	21
Southgate Mainline (H-650 Pipeline)	30 to 50	37.03	37.05	94
Southgate Mainline (H-650 Pipeline)	30 to 50	37.16	37.16	22
Southgate Mainline (H-650 Pipeline)	30 to 50	37.18	37.19	22
Southgate Mainline (H-650 Pipeline)	30 to 50	37.27	37.28	43
Southgate Mainline (H-650 Pipeline)	30 to 50	37.29	37.29	22
Southgate Mainline (H-650 Pipeline)	30 to 50	37.30	37.30	29
Southgate Mainline (H-650 Pipeline)	30 to 50	37.35	37.36	38
Southgate Mainline (H-650 Pipeline)	30 to 50	37.58	37.59	24
Southgate Mainline (H-650 Pipeline)	30 to 50	37.72	37.72	31
Southgate Mainline (H-650 Pipeline)	30 to 50	38.24	38.25	23
Southgate Mainline (H-650 Pipeline)	66 to 80	38.54	38.55	76
Southgate Mainline (H-650 Pipeline)	30 to 50	38.60	38.61	28
Southgate Mainline (H-650 Pipeline)	30 to 50	38.76	38.76	35
Southgate Mainline (H-650 Pipeline)	30 to 50	38.78	38.80	93
Southgate Mainline (H-650 Pipeline)	30 to 50	39.03	39.04	39
Southgate Mainline (H-650 Pipeline)	30 to 50	39.05	39.06	45
Southgate Mainline (H-650 Pipeline)	30 to 50	39.06	39.07	24
Southgate Mainline (H-650 Pipeline)	30 to 50	39.10	39.10	28
Southgate Mainline (H-650 Pipeline)	50 to 66	39.67	39.68	26
Southgate Mainline (H-650 Pipeline)	50 to 66	39.69	39.70	27
Southgate Mainline (H-650 Pipeline)	30 to 50	40.54	40.55	44
Southgate Mainline (H-650 Pipeline)	30 to 50	40.56	40.56	36

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	66 to 80	40.57	40.57	24
Southgate Mainline (H-650 Pipeline)	30 to 50	40.64	40.64	25
Southgate Mainline (H-650 Pipeline)	30 to 50	40.74	40.74	23
Southgate Mainline (H-650 Pipeline)	30 to 50	40.75	40.75	41
Southgate Mainline (H-650 Pipeline)	30 to 50	40.88	40.89	40
Southgate Mainline (H-650 Pipeline)	30 to 50	41.11	41.11	39
Southgate Mainline (H-650 Pipeline)	30 to 50	41.56	41.57	23
Southgate Mainline (H-650 Pipeline)	30 to 50	41.57	41.58	25
Southgate Mainline (H-650 Pipeline)	50 to 66	41.67	41.67	20
Southgate Mainline (H-650 Pipeline)	30 to 50	41.67	41.68	32
Southgate Mainline (H-650 Pipeline)	30 to 50	42.25	42.26	44
Southgate Mainline (H-650 Pipeline)	30 to 50	43.69	43.69	28
Southgate Mainline (H-650 Pipeline)	30 to 50	43.70	43.71	31
Southgate Mainline (H-650 Pipeline)	30 to 50	43.81	43.82	23
Southgate Mainline (H-650 Pipeline)	30 to 50	43.93	43.93	36
Southgate Mainline (H-650 Pipeline)	50 to 66	43.98	43.99	53
Southgate Mainline (H-650 Pipeline)	30 to 50	44.02	44.03	32
Southgate Mainline (H-650 Pipeline)	50 to 66	44.03	44.03	24
Southgate Mainline (H-650 Pipeline)	30 to 50	44.03	44.03	9
Southgate Mainline (H-650 Pipeline)	50 to 66	44.06	44.06	20
Southgate Mainline (H-650 Pipeline)	30 to 50	44.14	44.14	26
Southgate Mainline (H-650 Pipeline)	30 to 50	44.15	44.19	169
Southgate Mainline (H-650 Pipeline)	30 to 50	44.56	44.57	22
Southgate Mainline (H-650 Pipeline)	30 to 50	45.72	45.73	45
Southgate Mainline (H-650 Pipeline)	30 to 50	45.83	45.85	134
Southgate Mainline (H-650 Pipeline)	30 to 50	46.01 RR	46.01 RR	22
Southgate Mainline (H-650 Pipeline)	30 to 50	46.02 RR	46.03 RR	56
Southgate Mainline (H-650 Pipeline)	30 to 50	46.03 RR	46.04 RR	47
Southgate Mainline (H-650 Pipeline)	30 to 50	46.08 RR	46.11 RR	131
Southgate Mainline (H-650 Pipeline)	30 to 50	46.20 RR	46.21 RR	24
Southgate Mainline (H-650 Pipeline)	30 to 50	46.22 RR	46.23 RR	33
Southgate Mainline (H-650 Pipeline)	30 to 50	46.48	46.49	37
Southgate Mainline (H-650 Pipeline)	50 to 66	46.50	46.50	39
Southgate Mainline (H-650 Pipeline)	30 to 50	46.53	46.54	29
Southgate Mainline (H-650 Pipeline)	30 to 50	46.89	46.91	78
Southgate Mainline (H-650 Pipeline)	50 to 66	47.01	47.02	26
Southgate Mainline (H-650 Pipeline)	30 to 50	47.35	47.36	27
Southgate Mainline (H-650 Pipeline)	30 to 50	47.37	47.39	142

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	30 to 50	47.42	47.44	125
Southgate Mainline (H-650 Pipeline)	50 to 66	47.44	47.45	39
Southgate Mainline (H-650 Pipeline)	30 to 50	47.45	47.46	36
Southgate Mainline (H-650 Pipeline)	30 to 50	47.46	47.47	50
Southgate Mainline (H-650 Pipeline)	30 to 50	47.54	47.56	107
Southgate Mainline (H-650 Pipeline)	30 to 50	47.57	47.57	31
Southgate Mainline (H-650 Pipeline)	30 to 50	47.58	47.59	83
Southgate Mainline (H-650 Pipeline)	30 to 50	47.60	47.61	55
Southgate Mainline (H-650 Pipeline)	30 to 50	47.61	47.62	26
Southgate Mainline (H-650 Pipeline)	30 to 50	47.65	47.66	33
Southgate Mainline (H-650 Pipeline)	30 to 50	47.66	47.66	23
Southgate Mainline (H-650 Pipeline)	30 to 50	47.67	47.67	23
Southgate Mainline (H-650 Pipeline)	30 to 50	47.67	47.68	26
Southgate Mainline (H-650 Pipeline)	30 to 50	47.76	47.77	58
Southgate Mainline (H-650 Pipeline)	30 to 50	47.78	47.79	55
Southgate Mainline (H-650 Pipeline)	30 to 50	50.80 RR	50.81 RR	52
Southgate Mainline (H-650 Pipeline)	30 to 50	50.82 RR	50.83 RR	47
Southgate Mainline (H-650 Pipeline)	30 to 50	51.35 RR	51.36 RR	28
Southgate Mainline (H-650 Pipeline)	30 to 50	58.91	58.91	31
Southgate Mainline (H-650 Pipeline)	30 to 50	63.21 RR	63.21 RR	40
Southgate Mainline (H-650 Pipeline)	30 to 50	63.58	63.58	40
Southgate Mainline (H-650 Pipeline)	30 to 50	63.65	63.65	24
Southgate Mainline (H-650 Pipeline)	30 to 50	64.47	64.48	20
Southgate Mainline (H-650 Pipeline)	30 to 50	64.07 RR	64.08 RR	27
Southgate Mainline (H-650 Pipeline)	30 to 50	64.08 RR	64.08 RR	30
Southgate Mainline (H-650 Pipeline)	30 to 50	68.74	68.74	20
Southgate Mainline (H-650 Pipeline)	30 to 50	68.79	68.80	20
Southgate Mainline (H-650 Pipeline)	30 to 50	69.10	69.11	60
Southgate Mainline (H-650 Pipeline)	30 to 50	69.37	69.38	23
Southgate Mainline (H-650 Pipeline)	30 to 50	69.39	69.40	30
Southgate Mainline (H-650 Pipeline)	30 to 50	69.65 RR	69.65 RR	20
Southgate Mainline (H-650 Pipeline)	66 to 80	69.70 RR	69.71 RR	36
Southgate Mainline (H-650 Pipeline)	50 to 66	69.71 RR	69.72 RR	40
Southgate Mainline (H-650 Pipeline)	50 to 66	69.72 RR	69.72 RR	36
Southgate Mainline (H-650 Pipeline)	30 to 50	69.80 RR	69.81 RR	70
Southgate Mainline (H-650 Pipeline)	30 to 50	69.93 RR	69.94 RR	68
Southgate Mainline (H-650 Pipeline)	30 to 50	69.96 RR	69.97 RR	20
Southgate Mainline (H-650 Pipeline)	30 to 50	70.02	70.03	21

Appendix C.3-1

Potential Areas of Steep Slopes Crossed by the MVP Southgate Project

Route	Steep Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	30 to 50	70.50	70.51	23
Southgate Mainline (H-650 Pipeline)	30 to 50	70.61	70.62	33
Southgate Mainline (H-650 Pipeline)	50 to 66	70.75	70.76	47
Southgate Mainline (H-650 Pipeline)	30 to 50	70.76	70.77	21
Southgate Mainline (H-650 Pipeline)	30 to 50	71.13	71.13	20
Southgate Mainline (H-650 Pipeline)	30 to 50	71.19	71.20	28
Southgate Mainline (H-650 Pipeline)	30 to 50	71.21	71.22	78
Southgate Mainline (H-650 Pipeline)	30 to 50	71.25	71.26	54
Southgate Mainline (H-650 Pipeline)	30 to 50	71.31	71.32	28
Southgate Mainline (H-650 Pipeline)	30 to 50	71.49	71.49	33
Southgate Mainline (H-650 Pipeline)	30 to 50	71.62	71.63	37
Southgate Mainline (H-650 Pipeline)	30 to 50	71.82	71.83	70
Southgate Mainline (H-650 Pipeline)	30 to 50	71.90	71.92	103
Southgate Mainline (H-650 Pipeline)	30 to 50	72.19	72.20	24
Southgate Mainline (H-650 Pipeline)	30 to 50	72.71	72.72	30
Southgate Mainline (H-650 Pipeline)	50 to 66	72.72	72.72	40
Southgate Mainline (H-650 Pipeline)	30 to 50	72.72	72.73	25
Southgate Mainline (H-650 Pipeline)	30 to 50	72.79 RR	72.79 RR	29
Southgate Mainline (H-650 Pipeline)	30 to 50	72.80 RR	72.80 RR	21
Southgate Mainline (H-650 Pipeline)	50 to 66	72.91 RR	72.92 RR	25

Methodology:

1. Steep Slope percentages are grouped as follows:
   30-50%
   50-66%
   66-80%
   80%+
2. Only crossings that are longer than 20 feet are considered. Some locations may seem smaller but they are still considered if they are a continuation of another slope group.
3. For crossings that have multiple variations of slope group within small lengths, an average slope group is assigned.
4. The length of slope crossed might be slightly shorter than actual mile post lengths because of small stretches of data that are not in slope groups.

Notes: Results based on desktop analysis. Data to be verified in field.

Appendix C.3-2

Potential Areas of Side Slopes Crossed by the MVP Southgate Project H-650

Route	Side Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	18 to 25	3.82 RR	3.83 RR	56
Southgate Mainline (H-650 Pipeline)	14 to 18	3.90 RR	3.91 RR	27
Southgate Mainline (H-650 Pipeline)	18 to 25	3.91 RR	3.92 RR	86
Southgate Mainline (H-650 Pipeline)	25+	3.92 RR	3.94 RR	111
Southgate Mainline (H-650 Pipeline)	18 to 25	3.94 RR	3.96 RR	59
Southgate Mainline (H-650 Pipeline)	14 to 18	8.63	8.71	298
Southgate Mainline (H-650 Pipeline)	14 to 18	9	9.02	70
Southgate Mainline (H-650 Pipeline)	14 to 18	9.97	10.03	283
Southgate Mainline (H-650 Pipeline)	14 to 18	13.68 RR	13.69 RR	86
Southgate Mainline (H-650 Pipeline)	18 to 25	13.78 RR	13.80 RR	60
Southgate Mainline (H-650 Pipeline)	25+	13.80 RR	13.81 RR	66
Southgate Mainline (H-650 Pipeline)	14 to 18	15.51	15.58	244
Southgate Mainline (H-650 Pipeline)	18 to 25	16.01	16.02	40
Southgate Mainline (H-650 Pipeline)	14 to 18	16.55	16.58	98
Southgate Mainline (H-650 Pipeline)	14 to 18	16.59	16.6	43
Southgate Mainline (H-650 Pipeline)	18 to 25	17.49 RR	17.49 RR	37
Southgate Mainline (H-650 Pipeline)	14 to 18	17.49 RR	17.53 RR	178
Southgate Mainline (H-650 Pipeline)	18 to 25	17.53 RR	17.54 RR	46
Southgate Mainline (H-650 Pipeline)	14 to 18	17.54 RR	17.55 RR	46
Southgate Mainline (H-650 Pipeline)	18 to 25	17.98	18.01	157
Southgate Mainline (H-650 Pipeline)	18 to 25	18.04	18.05	52
Southgate Mainline (H-650 Pipeline)	14 to 18	19.49	19.5	62
Southgate Mainline (H-650 Pipeline)	18 to 25	19.54	19.6	233
Southgate Mainline (H-650 Pipeline)	14 to 18	19.63	19.64	40
Southgate Mainline (H-650 Pipeline)	18 to 25	21.58	21.6	87
Southgate Mainline (H-650 Pipeline)	18 to 25	21.74	21.78	155
Southgate Mainline (H-650 Pipeline)	14 to 18	22	22.04	134
Southgate Mainline (H-650 Pipeline)	14 to 18	22.36	22.38	87
Southgate Mainline (H-650 Pipeline)	25+	22.72 RR	22.76 RR	186
Southgate Mainline (H-650 Pipeline)	18 to 25	22.76 RR	22.78 RR	97
Southgate Mainline (H-650 Pipeline)	14 to 18	22.78 RR	22.79 RR	53
Southgate Mainline (H-650 Pipeline)	18 to 25	22.98 RR	22.99 RR	63
Southgate Mainline (H-650 Pipeline)	18 to 25	25.15	25.22	216
Southgate Mainline (H-650 Pipeline)	14 to 18	28.71	28.74	70
Southgate Mainline (H-650 Pipeline)	14 to 18	29.01	29.06	177
Southgate Mainline (H-650 Pipeline)	25+	29.1	29.14	100
Southgate Mainline (H-650 Pipeline)	14 to 18	29.29 RR	29.30 RR	60
Southgate Mainline (H-650 Pipeline)	18 to 25	31.34	31.37	86

Appendix C.3-2

Potential Areas of Side Slopes Crossed by the MVP Southgate Project H-650

Route	Side Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	18 to 25	31.67	31.69	56
Southgate Mainline (H-650 Pipeline)	18 to 25	31.88	31.95	236
Southgate Mainline (H-650 Pipeline)	25+	32.18	32.2	46
Southgate Mainline (H-650 Pipeline)	18 to 25	32.55	32.59	75
Southgate Mainline (H-650 Pipeline)	14 to 18	32.78	32.89	355
Southgate Mainline (H-650 Pipeline)	18 to 25	33.28	33.3	89
Southgate Mainline (H-650 Pipeline)	18 to 25	33.35	33.41	217
Southgate Mainline (H-650 Pipeline)	14 to 18	33.45	33.47	47
Southgate Mainline (H-650 Pipeline)	18 to 25	33.64	33.67	146
Southgate Mainline (H-650 Pipeline)	18 to 25	33.7	33.73	104
Southgate Mainline (H-650 Pipeline)	18 to 25	33.88	33.92	110
Southgate Mainline (H-650 Pipeline)	18 to 25	33.95	34.01	280
Southgate Mainline (H-650 Pipeline)	18 to 25	34.33	34.35	93
Southgate Mainline (H-650 Pipeline)	18 to 25	34.56	34.6	171
Southgate Mainline (H-650 Pipeline)	18 to 25	35.03	35.11	283
Southgate Mainline (H-650 Pipeline)	14 to 18	35.21	35.26	160
Southgate Mainline (H-650 Pipeline)	18 to 25	35.3	35.34	190
Southgate Mainline (H-650 Pipeline)	14 to 18	35.52	35.53	48
Southgate Mainline (H-650 Pipeline)	18 to 25	35.55	35.56	56
Southgate Mainline (H-650 Pipeline)	18 to 25	35.93	35.95	57
Southgate Mainline (H-650 Pipeline)	14 to 18	36.18	36.22	85
Southgate Mainline (H-650 Pipeline)	18 to 25	36.67	36.74	252
Southgate Mainline (H-650 Pipeline)	18 to 25	36.9	36.93	135
Southgate Mainline (H-650 Pipeline)	14 to 18	36.96	36.98	93
Southgate Mainline (H-650 Pipeline)	14 to 18	37.05	37.09	158
Southgate Mainline (H-650 Pipeline)	14 to 18	37.21	37.22	40
Southgate Mainline (H-650 Pipeline)	18 to 25	37.53	37.55	74
Southgate Mainline (H-650 Pipeline)	14 to 18	37.63	37.66	122
Southgate Mainline (H-650 Pipeline)	14 to 18	37.78	37.81	122
Southgate Mainline (H-650 Pipeline)	14 to 18	37.84	37.86	74
Southgate Mainline (H-650 Pipeline)	14 to 18	37.9	37.92	77
Southgate Mainline (H-650 Pipeline)	14 to 18	38.02	38.05	117
Southgate Mainline (H-650 Pipeline)	18 to 25	39.05	39.09	136
Southgate Mainline (H-650 Pipeline)	14 to 18	39.37	39.45	291
Southgate Mainline (H-650 Pipeline)	14 to 18	39.48	39.49	71
Southgate Mainline (H-650 Pipeline)	14 to 18	40.40 RR	40.41 RR	51
Southgate Mainline (H-650 Pipeline)	18 to 25	40.41 RR	40.43 RR	65
Southgate Mainline (H-650 Pipeline)	18 to 25	40.49 RR	40.50 RR	61

Appendix C.3-2

Potential Areas of Side Slopes Crossed by the MVP Southgate Project H-650

Route	Side Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	14 to 18	40.64	40.66	63
Southgate Mainline (H-650 Pipeline)	18 to 25	41.42	41.5	423
Southgate Mainline (H-650 Pipeline)	18 to 25	41.58	41.59	78
Southgate Mainline (H-650 Pipeline)	18 to 25	41.69	41.77	384
Southgate Mainline (H-650 Pipeline)	18 to 25	41.97	41.99	85
Southgate Mainline (H-650 Pipeline)	18 to 25	42.13	42.16	99
Southgate Mainline (H-650 Pipeline)	18 to 25	42.35	42.42	309
Southgate Mainline (H-650 Pipeline)	14 to 18	42.46	42.48	113
Southgate Mainline (H-650 Pipeline)	18 to 25	42.84	42.85	41
Southgate Mainline (H-650 Pipeline)	18 to 25	43.8	43.82	48
Southgate Mainline (H-650 Pipeline)	25+	43.86	43.88	78
Southgate Mainline (H-650 Pipeline)	18 to 25	43.99	44.02	102
Southgate Mainline (H-650 Pipeline)	18 to 25	44.07	44.1	132
Southgate Mainline (H-650 Pipeline)	14 to 18	45.06	45.09	108
Southgate Mainline (H-650 Pipeline)	14 to 18	45.86	45.91	221
Southgate Mainline (H-650 Pipeline)	14 to 18	45.95	45.98	85
Southgate Mainline (H-650 Pipeline)	18 to 25	46.12 RR	46.13 RR	61
Southgate Mainline (H-650 Pipeline)	14 to 18	46.16 RR	46.17 RR	67
Southgate Mainline (H-650 Pipeline)	25+	47.47	47.5	131
Southgate Mainline (H-650 Pipeline)	14 to 18	47.99	48.02	97
Southgate Mainline (H-650 Pipeline)	18 to 25	49.64	49.68	173
Southgate Mainline (H-650 Pipeline)	18 to 25	49.75 RR	49.76 RR	42
Southgate Mainline (H-650 Pipeline)	14 to 18	50.12 RR	50.13 RR	42
Southgate Mainline (H-650 Pipeline)	18 to 25	50.74 RR	50.76 RR	90
Southgate Mainline (H-650 Pipeline)	14 to 18	50.78 RR	50.80 RR	56
Southgate Mainline (H-650 Pipeline)	25+	50.80 RR	50.81 RR	61
Southgate Mainline (H-650 Pipeline)	18 to 25	50.81 RR	50.83 RR	99
Southgate Mainline (H-650 Pipeline)	18 to 25	52.04 RR	52.08 RR	224
Southgate Mainline (H-650 Pipeline)	18 to 25	52.19	52.24	213
Southgate Mainline (H-650 Pipeline)	14 to 18	54.36	54.38	64
Southgate Mainline (H-650 Pipeline)	18 to 25	54.47	54.49	75
Southgate Mainline (H-650 Pipeline)	25+	54.51	54.54	131
Southgate Mainline (H-650 Pipeline)	18 to 25	63.5	63.52	130
Southgate Mainline (H-650 Pipeline)	14 to 18	65.10 RR	65.12 RR	93
Southgate Mainline (H-650 Pipeline)	18 to 25	65.12 RR	65.12 RR	31
Southgate Mainline (H-650 Pipeline)	14 to 18	65.12 RR	65.13 RR	41
Southgate Mainline (H-650 Pipeline)	14 to 18	65.18 RR	65.19 RR	58
Southgate Mainline (H-650 Pipeline)	14 to 18	66.97 RR	66.98 RR	69

Appendix C.3-2

Potential Areas of Side Slopes Crossed by the MVP Southgate Project H-650

Route	Side Slope Group	Milepost Begin	Milepost End	Length of slope crossed (feet)
Southgate Mainline (H-650 Pipeline)	18 to 25	68.28	68.31	149
Southgate Mainline (H-650 Pipeline)	14 to 18	68.47	68.48	41
Southgate Mainline (H-650 Pipeline)	14 to 18	68.48	68.49	48
Southgate Mainline (H-650 Pipeline)	14 to 18	68.55	68.56	51
Southgate Mainline (H-650 Pipeline)	14 to 18	68.67	68.68	44
Southgate Mainline (H-650 Pipeline)	18 to 25	69.08	69.11	124
Southgate Mainline (H-650 Pipeline)	18 to 25	69.24	69.25	48
Southgate Mainline (H-650 Pipeline)	18 to 25	69.33	69.45	445
Southgate Mainline (H-650 Pipeline)	14 to 18	69.56 RR	69.58 RR	65
Southgate Mainline (H-650 Pipeline)	18 to 25	69.58 RR	69.58 RR	40
Southgate Mainline (H-650 Pipeline)	25+	69.70 RR	69.72 RR	112
Southgate Mainline (H-650 Pipeline)	25+	69.80 RR	69.82 RR	109
Southgate Mainline (H-650 Pipeline)	18 to 25	69.83 RR	69.84 RR	40
Southgate Mainline (H-650 Pipeline)	14 to 18	69.84 RR	69.85 RR	48
Southgate Mainline (H-650 Pipeline)	14 to 18	69.85 RR	69.86 RR	36
Southgate Mainline (H-650 Pipeline)	14 to 18	70.58	70.59	47
Southgate Mainline (H-650 Pipeline)	18 to 25	70.6	70.63	96
Southgate Mainline (H-650 Pipeline)	18 to 25	71.09	71.27	616
Southgate Mainline (H-650 Pipeline)	14 to 18	71.78	71.8	78
Southgate Mainline (H-650 Pipeline)	18 to 25	71.85	71.88	144
Southgate Mainline (H-650 Pipeline)	18 to 25	71.98 RR	71.99 RR	72
Southgate Mainline (H-650 Pipeline)	14 to 18	71.99 RR	72.00 RR	50
Southgate Mainline (H-650 Pipeline)	18 to 25	72.01 RR	72.03 RR	138
Southgate Mainline (H-650 Pipeline)	18 to 25	72.16	72.21	180
Southgate Mainline (H-650 Pipeline)	18 to 25	72.73 RR	72.74 RR	50
Southgate Mainline (H-650 Pipeline)	14 to 18	72.74 RR	72.75 RR	69
Southgate Mainline (H-650 Pipeline)	18 to 25	72.81 RR	72.82 RR	65
Southgate Mainline (H-650 Pipeline)	18 to 25	72.84 RR	72.86 RR	116
Southgate Mainline (H-650 Pipeline)	25+	72.86 RR	72.87 RR	54

Methodology:

1. Side Slope percentages are grouped as follows:
   14-18%
   18-25%
   25%+
2. Only crossings that are longer than 40 feet are considered. Some locations may seem smaller but they are still considered if they are a continuation of another slope group.
3. For crossings that have multiple variations of slope group within small lengths, an average slope group is assigned.
4. The length of slope crossed might be slightly shorter than actual mile post lengths because of small stretches of data that are not in slope groups.

Notes: Results based on desktop analysis. Data to be verified in field.

APPENDIX C.4

Areas of Landslide Concern

Appendix C.4

Areas of Landslide Concern along the Southgate Project

Line Name	MP	Downslope Resource	Distance from Downslope Resource	Percent Slope	Assigned Mitigation/Stabilization Control Measures
H-650	5.11	Wetland	0	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	7.99	Stream	9	49	Trench Breaker Daylight Drain
H-650	8.59	Wetland	0	47	Trench Breaker Daylight Drain
H-650	9.97	Wetland	10	58	Trench Breaker Daylight Drain
H-650	9.99	Wetland	94.7	17.6 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	10.09	Wetland	10	34	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	12.79	Stream	57	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	13.48RR	Wetland	0	49	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	17.3	Stream	0	47	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	17.7RR	Wetland	12	49	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	17.75RR	Stream	78	19.4 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	17.81 RR	Stream	5	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	18.03	Wetland	27	36	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	20.61	Stream	96	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	21.55	Wetland	1100	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	22.7RR	Stream	1500	17.6 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	22.85RR	Stream	792	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain

Appendix C.4

Areas of Landslide Concern along the Southgate Project

Line Name	MP	Downslope Resource	Distance from Downslope Resource	Percent Slope	Assigned Mitigation/Stabilization Control Measures
H-650	23.21RR	Stream	160	34	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	23.21	Stream	160	34	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	25	Stream	675	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	28.81	Stream	29	38	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	29.37RR	Stream	400	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	29.4RR	Stream	334	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	31.08	Stream	0	36	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	31.1	Stream	5	38	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	31.1	Stream	14.5	38	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	31.3	Stream	5	N/A	Trench Breaker Daylight Drain
H-650	31.3	Stream	20	42	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	31.7	Stream	175	17.6 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	32.5	Stream	68.2	34	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	32.6	Wetland	39	36	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	32.8	Stream	290.6	19.4 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	33.15	Wetland	18.5	61	Trench Breaker Daylight Drain
H-650	33.3	Stream	36.5	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain

Appendix C.4

Areas of Landslide Concern along the Southgate Project

Line Name	MP	Downslope Resource	Distance from Downslope Resource	Percent Slope	Assigned Mitigation/Stabilization Control Measures
H-650	33.35	Stream	50	60	Trench Breaker Daylight Drain
H-650	33.35	Wetland	234	21 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	33.68	Wetland	212	19.4 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	33.69	Wetland	0	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	33.7	Wetland	5	42	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	33.75	Stream	16.7	47	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	33.82	Stream	600	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	33.9	Stream	291	21 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	34.05	Stream	336	23 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	34.2	Stream	16	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	34.5	Stream	83	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	34.5	Stream	45	32	
H-650	35.05	Stream	122	17.6 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	35.3	Stream	149	17.6 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	36	Stream	0	51	Trench Breaker Daylight Drain
H-650	36.7	Stream	88	23 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	38.55	Wetland	10	76	Steep Slope Revetment, Trench Breaker Daylight Drain
H-650	38.8	Wetland	16	42	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	39.08	Stream	56	23 - Side Slope	Transverse Trench Drain, Cutoff Drain

Appendix C.4

Areas of Landslide Concern along the Southgate Project

Line Name	MP	Downslope Resource	Distance from Downslope Resource	Percent Slope	Assigned Mitigation/Stabilization Control Measures
H-650	40.58	Stream	0	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	40.58	Stream	0	34	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	40.75	Stream	34	40	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	41.1	Wetland	0	38	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	41.54	Stream	375	19.4 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	41.69	Stream	45	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	42.25	Stream	16	34	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	42.37	Home	150	17.6 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	44.1	Stream	148	21 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	44.15	Stream	81	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	45.7	Stream	72.8	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	45.88	Stream	89	51	Trench Breaker Daylight Drain
H-650	46.01RR	Stream	29	18	Trench Breaker Daylight Drain
H-650	46.1RR	Stream	201	21 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	47.03	Wetland	0	36	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	47.4	Stream	45	32	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	47.45	Stream	183	21 - Side Slope	Transverse Trench Drain, Cutoff Drain

Appendix C.4

Areas of Landslide Concern along the Southgate Project

Line Name	MP	Downslope Resource	Distance from Downslope Resource	Percent Slope	Assigned Mitigation/Stabilization Control Measures
H-650	47.6	Stream	10	38	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	49.75	Home	411	21 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	69.4	Stream	87.9	23 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	69.7RR	Stream	61	49	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	69.85RR	Stream	260	21 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	70.6	Stream	360	19.4 - Side Slope	Transverse Trench Drain, Cutoff Drain
H-650	70.75	Stream	122	49	Trench Breaker Daylight Drain
H-650	71.2	River	186	27	Transverse Trench Drain, Cutoff Drain
H-650	71.8	Stream	20	36	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	71.9	River	326	38	Trench Breaker Daylight Drain, Trench Breaker Pass-through Drain
H-650	72.72	River	52.4	47	Trench Breaker Daylight Drain
H-650	72.85RR	Stream	50	19.4 - Side Slope	Transverse Trench Drain, Cutoff Drain

APPENDIX C.5

Areas of Shallow Bedrock That May Require Blasting Along the Southgate Project

Appendix C.5-1

Areas of Shallow Bedrock That May Require Blasting Along the Southgate Project Pipeline

Pipeline	Start MP	End MP	Approximate Bedrock Depth (inches)	Formation Age	Primary Bedrock Rock Type	Crossing Length (miles)
H-650	21.6	21.8	18.1	Proterozoic - Paleozoic	mylonite	0.2
H-650	22.2	22.3	18.1	Proterozoic - Paleozoic	mylonite	0.05
H-650	22.6 RR	22.9 RR	18.1	Upper Triassic	sandstone	0.33
H-650	23.0 RR	23.1 RR	29.1	Upper Triassic	sandstone	0.08
H-650	24.3	24.4	18.1	Upper Triassic	sandstone	0.09
H-650	24.6	24.8	29.1	Triassic	sandstone	0.23
H-650	24.9	25	18.1	Triassic	sandstone	0.06
H-650	25.5	25.7	18.1	Triassic	sandstone	0.22
H-650	32.5	32.6	15	Cambrian/Late Proterozoic	biotite gneiss	0.14
H-650	33.7	33.8	25.2	Cambrian/Late Proterozoic	biotite gneiss	0.05
H-650	33.8	33.9	25.2	Cambrian/Late Proterozoic	biotite gneiss	0.06
H-650	34.5	34.5	15	Cambrian/Late Proterozoic	felsic gneiss	0.07
H-650	38.8	39.1	15	Cambrian/Late Proterozoic	biotite gneiss	0.22
H-650	39.2	39.3	15	Cambrian/Late Proterozoic	biotite gneiss	0.08
H-650	39.3	39.3	25.2	Cambrian/Late Proterozoic	biotite gneiss	0.06
H-650	39.3	39.4	25.2	Cambrian/Late Proterozoic	felsic gneiss	0.05
H-650	40.3 RR	40.5	15	Cambrian/Late Proterozoic	felsic gneiss	0.21
H-650	40.5	40.7	15	Cambrian/Late Proterozoic	felsic gneiss	0.19
H-650	40.7	40.8	15	Cambrian/Late Proterozoic	felsic gneiss	0.12
H-650	41.2	41.3	15	Cambrian/Late Proterozoic	felsic gneiss	0.1
H-650	41.3	41.3	15	Cambrian/Late Proterozoic	biotite gneiss	0.04
H-650	42.5	42.6	15	Cambrian/Late Proterozoic	biotite gneiss	0.14
H-650	42.9	42.9	15	Cambrian/Late Proterozoic	biotite gneiss	0.05
H-650	43.8	44.2	15	Cambrian/Late Proterozoic	biotite gneiss	0.46
H-650	45.6	46.3 RR	15	Cambrian/Late Proterozoic	biotite gneiss	0.73
H-650	46.3 RR	46.5	15	Permian/Pennsylvanian	granite	0.22
H-650	47	47.6	15	Permian/Pennsylvanian	granite	0.55
H-650	47.6	47.7	15	Cambrian/Late Proterozoic	biotite gneiss	0.17
H-650	53.7	53.8	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0.02
H-650	67.6	67.7	29.9	Cambrian/Late Proterozoic	metamorphic rock	0.07

Appendix C.5-1

Areas of Shallow Bedrock That May Require Blasting Along the Southgate Project Pipeline

Pipeline	Start MP	End MP	Approximate Bedrock Depth (inches)	Formation Age	Primary Bedrock Rock Type	Crossing Length (miles)
H-650	67.9	68	29.9	Cambrian/Late Proterozoic	metamorphic rock	0.04
H-650	68.1	68.1	29.9	Cambrian/Late Proterozoic	metamorphic rock	0.06
H-650	68.9	68.9	29.9	Cambrian/Late Proterozoic	metamorphic rock	0.04
H-650	69.7 RR	69.7 RR	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0.07
H-650	69.9 RR	69.9 RR	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0
H-650	71	71	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0.06
H-650	72.6	72.6	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0.04
H-650	72.7	72.7	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0
H-650	72.7	72.8 RR	29.9	Cambrian/Late Proterozoic	mafic metavolcanic rock	0.17
H-650	72.8 RR	72.8 RR	29.9	Paleozoic/Late Proterozoic	Metagabbro rock	0
					Total	**5.54**

Notes:
Sums may not equal addends due to rounding. Addends consist of three decimal digits.

Appendix C.5-2

Areas of Potential FAE
for Right of Way Grade and Pipeline Trench Excavation

From Milepost	To Milepost	Need for FAE			FAE Potential
		Slope	Depth to Bedrock	Rock Type	
0	0.95	X			Low
1.2	1.85			X	Low
17.28	33.89	X	X	X	High
34.5	48.23	X	X	X	High
49.29	68.05	X	X	X	High
70.94	72.81 RR	X			Low
Lambert Interconnect and Main Valve		X	X		Low
LN 3600 Interconnect		X	X		Low
T-15 Dan River Interconnect					None
T-21 Haw River Interconnect					None
Mainline Valves		Included within Mainline FAE Potential			

(1) United States Geological Survey (USGS) Geographic Area. Pittsylvania County, Virginia and Rockingham and Alamance Counties, North Carolina.

(2) United States Department of Agricultural, Natural Resources Conservation Service (USDA/NRCS), 2018 Custom Soil Resources Report for Pittsylvania County, Virginia and Rockingham and Alamance Counties, North Carolina.

(3) "Low" - The potential for FAE is possible within this section depending on depth of and location of planned pipeline and related facilities. The potential of FAE to achieve grade exists but has low probability.

(4) "High" - FAE will be needed within these sections to achieve grade. FAE will not be continuous.

(5) Possibility of FAE based on Notes 1 and 2 for this Table and Table 6-F MVP Southgate Project Resource Report 6 - Geologic Resources. FAE based on slope locations where thickness of overlaying soil may be less than trench depth due to erosion and gravitational influences on the soil.

Appendix C.5-3

Area of Potential FAE for Waterbody Crossings

State/County	Milepost	Waterbody Name	Need for FAE			FAE Potential	Projected Depth to Bedrock (Inches)
			Slope	Depth to Bedrock	Rock Type		
Virginia							
Pittsylvania	23.0RR	Tributary to Trotters Creek		X	X	High	24 to 31
	23.2RR	Trotters Creek	X	X	X	High	16 to 20
	24.4	Tributary to Dan River	X	X	X	High	16 to 20
	24.8	Tributary to Dan River	X	X	X	High	24 to 31
North Carolina							
Rockingham	32.5	Tributary to Town Creek	X	X	X	High	10 to 20
	33.7	Tributary to Town Creek		X	X	High	20 to 40
	34.7	Tributary to Town Creek	X	X	X	High	10 to 20
	39	Tributary to Wolf Island Creek		X	X	High	10 to 20
	40.5RR	Tributary to Lick Fork	X	X	X	High	10 to 20
	40.6	Tributary to Lick Fork	X	X	X	High	10 to 20
	40.7	Tributary to Lick Fork	X	X	X	High	10 to 20
	42.9	Tributary to Jones Creek	X	X	X	High	10 to 20
	44.1	Tributary to Jones Creek		X	X	High	10 to 20
	44.1	Tributary to Jones Creek		X	X	High	10 to 20
	45.8	Tributary to Hogans Creek		X	X	High	10 to 20
	45.9	Tributary to Hogans Creek	X	X	X	High	10 to 20
	46.5	Tributary to Hogans Creek	X	X	X	High	10 to 20
	46.5	Tributary to Hogans Creek	X	X	X	High	10 to 20
	47.4	Tributary to Hogans Creek		X	X	High	10 to 20
	47.6	Tributary to Hogans Creek		X	X	High	10 to 20
Alamance	68.1	Tributary to Boyds Creek	X	X	X	Low	>80
	68.9	Tributary to Haw River	X	X	X	Low	>80
	71	Tributary to Haw River	X	X	X	Low	>80
	72.6	Tributary to Haw River	X	X	X	Low	>80

APPENDIX D

Soil Types Crossed by the Southgate Project

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
H-605 Pipeline													
Pittsylvania County, Virginia													
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	0	0.08	446	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	0.08	0.1	58	Yes	3	0.2	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	0.1	0.17	374	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	0.17	0.47	1,609	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
H-650 Pipeline i/													
Pittsylvania County, Virginia													
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	0 RR	0.13	802	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	0.13	0.3	928	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	0.3	0.4	495	No	5	0.38	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
9C	Creedmoor fine sandy loam, 7 to 15 percent slopes	0.4	0.45	251	Yes	3	0.2	Predominantly Non-Hydric	Low	>60	No	No	Moderately well drained
22B	Mattaponi sandy loam, 2 to 7 percent slopes	0.45	0.53	444	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Moderately well drained
9C	Creedmoor fine sandy loam, 7 to 15 percent slopes	0.53	0.61	412	Yes	3	0.2	Predominantly Non-Hydric	Low	>60	No	No	Moderately well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	0.61	0.63	132	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	0.63	0.77	732	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	0.77	0.89	616	Yes	3	0.2	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	0.89	0.93	232	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	0.93	1.06	691	Yes	3	0.2	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
9C	Creedmoor fine sandy loam, 7 to 15 percent slopes	1.06	1.15	468	Yes	3	0.2	Predominantly Non-Hydric	Low	>60	No	No	Moderately well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	1.15	1.25 RR	541	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
9C	Creedmoor fine sandy loam, 7 to 15 percent slopes	1.25 RR	1.35 RR	490	Yes	3	0.2	Predominantly Non-Hydric	Low	>60	No	No	Moderately well drained
7A	Chenneby loam, 0 to 2 percent slopes, occasionally flooded	1.35 RR	1.86	2,872	Yes	5	0.44	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
41A	Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded	1.86	2.16	1,589	No	6	0.41	Predominantly Hydric	High	>60	No	Yes	Poorly drained
7A	Chenneby loam, 0 to 2 percent slopes, occasionally flooded	2.16	2.19	152	Yes	5	0.44	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	2.19	2.28	475	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	2.28	2.95	3,536	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	2.95	3.16	1,076	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	3.16	3.18	129	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	3.18	3.29	585	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	3.29	3.41	634	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	3.41	3.64	1,182	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	3.64	3.89 RR	1,337	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	3.89 RR	4.15	1,440	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	4.15	4.31	862	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	4.31	4.44	686	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	4.44	4.81	1,958	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	4.81	4.83	69	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	4.83	5.22	2,073	No	5	0.38	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
1C	Appling sandy loam, 7 to 15 percent slopes	5.22	5.47	1,320	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
1B	Appling sandy loam, 2 to 7 percent slopes	5.47	5.64	910	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
1C	Appling sandy loam, 7 to 15 percent slopes	5.64	5.7	306	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	5.7	6.03	1,747	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	6.03	6.08	284	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
1B	Appling sandy loam, 2 to 7 percent slopes	6.08	6.13	272	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	6.13	6.25	590	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
39	Udorthents, loamy	6.25	6.32	366	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	6.32	6.57	1,347	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	6.57	6.59	104	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	6.59	6.74	814	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	6.74	6.86	617	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	6.86	6.95	486	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	6.95	6.99	218	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	6.99	7.09	523	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	7.09	7.25	835	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	7.25	7.29	183	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	7.29	7.33	213	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	7.33	7.38	261	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	7.38	7.5	636	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	7.5	7.55	303	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21E	Madison fine sandy loam, 25 to 45 percent slopes	7.55	7.61	276	No	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	7.61	7.71	563	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	7.71	7.78	350	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	7.78	7.84	334	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	7.84	7.97	657	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	7.97	8.02	279	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	8.02	8.12	516	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	8.12	8.2	457	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	8.2	8.33	644	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	8.33	8.46	715	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	8.46	8.5	190	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	8.5	8.53	149	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	8.53	8.58	292	No	5	0.38	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
21E	Madison fine sandy loam, 25 to 45 percent slopes	8.58	8.65	358	No	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	8.65	8.76	586	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	8.76	8.84	421	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	8.84	8.87	166	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	8.87	8.92	265	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4C	Cecil sandy loam, 7 to 15 percent slopes	8.92	9.04	644	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	9.04	9.08	207	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	9.08	9.12	180	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	9.12	9.31	1,017	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	9.31	9.37	318	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	9.37	9.41	229	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	9.41	9.47	289	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	9.47	9.52	299	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	9.52	9.61	440	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	9.61	9.76	807	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
11B3	Cullen clay loam, 2 to 7 percent slopes, severely eroded	9.76	9.83	371	No	6	0.27	Non-Hydric	High	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	9.83	9.89	314	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
11C3	Cullen clay loam, 7 to 15 percent slopes, severely eroded	9.89	9.91	89	No	6	0.27	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
21D	Madison fine sandy loam, 15 to 25 percent slopes	9.91	10.02	598	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4C	Cecil sandy loam, 7 to 15 percent slopes	10.02	10.05	167	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	10.05	10.12	385	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	10.12	10.27	757	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	10.27	10.32	290	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	10.32	10.72	2,113	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	10.72	10.93	1,105	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	10.93	11.26	1,711	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	11.26	11.43	933	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	11.43	11.54	589	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	11.54	11.66	589	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	11.66	11.8	742	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	11.8	11.86	351	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	11.86	11.96	503	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	11.96	12.03	388	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	12.03	12.12	485	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	12.12	12.34	1,159	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	12.34	12.37	156	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	12.37	12.49	620	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	12.49	12.75	1,381	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	12.75	12.8	257	No	5	0.38	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	12.8	12.86	286	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	12.86	13.05	1,045	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
17B	Hiwassee loam, 2 to 7 percent slopes	13.05	13.21	810	Yes	6	0.21	Non-Hydric	High	>60	No	No	Well drained
18C3	Hiwassee clay loam, 7 to 15 percent slopes, severely eroded	13.21	13.42 RR	1,106	No	6	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	13.42 RR	13.47 RR	276	No	5	0.38	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	13.47 RR	13.51 RR	207	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	13.51 RR	13.54 RR	186	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	13.54 RR	13.6 RR	296	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	13.6 RR	13.73 RR	700	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	13.73 RR	13.9 RR	901	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	13.9 RR	13.99 RR	465	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	13.99 RR	14.04 RR	289	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	14.04 RR	14.14 RR	481	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	14.14 RR	14.22 RR	464	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	14.22 RR	14.35 RR	688	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	14.35 RR	14.39 RR	185	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	14.39 RR	14.42 RR	175	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
11C3	Cullen clay loam, 7 to 15 percent slopes, severely eroded	14.42 RR	14.51 RR	481	No	6	0.27	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	14.51 RR	14.63 RR	635	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	14.63 RR	14.69 RR	293	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
11B3	Cullen clay loam, 2 to 7 percent slopes, severely eroded	14.69 RR	14.73 RR	212	No	6	0.27	Non-Hydric	High	>60	No	No	Well drained
4C	Cecil sandy loam, 7 to 15 percent slopes	14.73 RR	14.69	167	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	14.69	14.72	169	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
9C	Creedmoor fine sandy loam, 7 to 15 percent slopes	14.72	14.78	302	Yes	3	0.2	Predominantly Non-Hydric	Low	>60	No	No	Moderately well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	14.78	14.94	847	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	14.94	15.45	2720	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	15.45	15.49	178	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	15.49	15.88	2049	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	15.88	15.95	391	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	15.95	16.02	381	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	16.02	16.06	219	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	16.06	16.22	821	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	16.22	16.48	1,388	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	16.48	16.98	2,601	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	16.98	17.25	1439	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	17.25	17.32	390	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	17.32	17.4	397	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	17.4	17.65 RR	1324	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
W	Water	17.65 RR	17.67 RR	120	No	Unknown	Unknown	Non-Hydric	Unknown	>60	Unknown	Unknown	Unknown
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	17.67 RR	17.82 RR	788	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	17.82 RR	17.85 RR	187	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	17.85 RR	17.89 RR	200	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	17.89 RR	17.95 RR	287	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	17.95 RR	18.01	686	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	18.01	18.4	2095	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	18.4	18.45	228	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	18.45	18.82	1990	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	18.82	18.88	294	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	18.88	18.99	585	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	18.99	19.05	340	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	19.05	19.12	327	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	19.12	19.22	519	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	19.22	19.3	442	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	19.3	19.35	268	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	19.35	19.59	1259	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	19.59	19.64	295	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4C	Cecil sandy loam, 7 to 15 percent slopes	19.64	19.68	174	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	19.68	19.77	480	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
4C	Cecil sandy loam, 7 to 15 percent slopes	19.77	19.89	656	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	19.89	19.99	496	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	19.99	20.01	142	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	20.01	20.04	135	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	20.04	20.09	251	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	20.09	20.18	521	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	20.18	20.32	735	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	20.32	20.41	448	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	20.41	20.46	288	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	20.46	20.52	297	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	20.52	20.57	294	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	20.57	20.66	429	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	20.66	20.71	291	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	20.71	20.75	200	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	20.75	21	1345	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	21	21.05	250	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	21.05	21.15	502	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	21.15	21.28	703	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	21.28	21.34	302	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	21.34	21.48	753	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	21.48	21.56	404	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
29C	Pinkston-Mayodan complex, 7 to 15 percent slopes, very stony	21.56	21.72	866	No	5	0.27	Non-Hydric	Low	18.1	Yes	No	Excessively drained
29D	Pinkston-Mayodan complex, 15 to 35 percent slopes, very stony	21.72	21.76	214	No	5	0.28	Non-Hydric	Low	18.1	Yes	No	Excessively drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	21.76	22.02	1393	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	22.02	22.07	252	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	22.07	22.15	412	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	22.15	22.2	267	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
28C	Pinkston cobbly sandy loam, 7 to 15 percent slopes	22.2	22.25	284	No	5	0.3	Non-Hydric	Low	18.1	Yes	No	Excessively drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	22.25	22.28	140	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	22.28	22.32	184	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	22.32	22.33	98	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	22.33	22.47 RR	720	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	22.47 RR	22.49 RR	100	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	22.49 RR	22.59 RR	555	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
29C	Pinkston-Mayodan complex, 7 to 15 percent slopes, very stony	22.59 RR	22.66 RR	349	No	5	0.27	Non-Hydric	Low	18.1	Yes	No	Excessively drained
29D	Pinkston-Mayodan complex, 15 to 35 percent slopes, very stony	22.66 RR	22.77 RR	603	No	5	0.28	Non-Hydric	Low	18.1	Yes	No	Excessively drained
29C	Pinkston-Mayodan complex, 7 to 15 percent slopes, very stony	22.77 RR	22.83 RR	302	No	5	0.27	Non-Hydric	Low	18.1	Yes	No	Excessively drained
29E	Pinkston-Mayodan complex, 35 to 50 percent slopes, very stony	22.83 RR	22.93 RR	500	No	5	0.28	Non-Hydric	Low	18.1	Yes	No	Excessively drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	22.93 RR	23 RR	398	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
34B	Sheva fine sandy loam, 2 to 7 percent slopes	23 RR	23.08 RR	432	No	3	0.35	Non-Hydric	Moderate	29.1	Yes	No	Moderately well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	23.08 RR	23.2 RR	589	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	23.2 RR	23.27 RR	397	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	23.27 RR	23.36 RR	470	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	23.36 RR	23.7 RR	1816	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	23.7 RR	23.78 RR	424	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	23.78 RR	23.91 RR	677	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	23.91 RR	23.89	497	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	23.89	24.01	617	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	24.01	24.3	1,563	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
29C	Pinkston-Mayodan complex, 7 to 15 percent slopes, very stony	24.3	24.39	482	No	5	0.27	Non-Hydric	Low	18.1	Yes	No	Excessively drained
17B	Hiwassee loam, 2 to 7 percent slopes	24.39	24.59	1023	Yes	6	0.21	Non-Hydric	High	>60	No	No	Well drained
34B	Sheva fine sandy loam, 2 to 7 percent slopes	24.59	24.82	1212	No	3	0.35	Non-Hydric	Moderate	29.1	Yes	No	Moderately well drained
18C3	Hiwassee clay loam, 7 to 15 percent slopes, severely eroded	24.82	24.83	53	No	6	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
17B	Hiwassee loam, 2 to 7 percent slopes	24.83	24.91	454	Yes	6	0.21	Non-Hydric	High	>60	No	No	Well drained
18C3	Hiwassee clay loam, 7 to 15 percent slopes, severely eroded	24.91	24.94	170	No	6	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
28C	Pinkston cobbly sandy loam, 7 to 15 percent slopes	24.94	25	313	No	5	0.3	Non-Hydric	Low	18.1	Yes	No	Excessively drained
17B	Hiwassee loam, 2 to 7 percent slopes	25	25.08	386	Yes	6	0.21	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	25.08	25.26	955	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
17B	Hiwassee loam, 2 to 7 percent slopes	25.26	25.46	1067	Yes	6	0.21	Non-Hydric	High	>60	No	No	Well drained
28C	Pinkston cobbly sandy loam, 7 to 15 percent slopes	25.46	25.68	1137	No	5	0.3	Non-Hydric	Low	18.1	Yes	No	Excessively drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	25.68	25.77	480	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	25.77	25.82	295	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	25.82	26.04	1164	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	26.04	26.08	218	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
Rockingham County, North Carolina													
CmB	Clover sandy loam, 2 to 8 percent slopes	26.08	26.43	1,834	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	26.43	26.61 RR	930	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmB	Clover sandy loam, 2 to 8 percent slopes	26.61 RR	26.66 RR	259	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	26.66 RR	26.76 RR	550	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Clover sandy clay loam, 2 to 8 percent slopes, moderately eroded	26.76 RR	26.84	438	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
CnE2	Clover sandy clay loam, 15 to 25 percent slopes, moderately eroded	26.84	26.97 RR	662	No	5	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	26.97 RR	27.3	1,781	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
DaA	Dan River loam, 0 to 2 percent slopes, frequently flooded	27.3	27.66 RR	1,893	No	5	0.31	Predominantly Non-Hydric	High	>60	No	No	Well drained
WhB	Wickham sandy loam, mesic, 1 to 4 percent slopes, rarely flooded	27.66 RR	27.92 RR	1,369	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	27.92 RR	28.14 RR	1,192	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CmB	Clover sandy loam, 2 to 8 percent slopes	28.14 RR	28.36 RR	1,177	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	28.36 RR	28.43 RR	343	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CmB	Clover sandy loam, 2 to 8 percent slopes	28.43 RR	28.55 RR	613	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	28.55 RR	28.77	1,214	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmE	Clover sandy loam, 15 to 25 percent slopes	28.77	28.87	482	No	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	28.87	28.96	484	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmE	Clover sandy loam, 15 to 25 percent slopes	28.96	29.02	334	No	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	29.02	29.08	304	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmE	Clover sandy loam, 15 to 25 percent slopes	29.08	29.18	552	No	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	29.18	29.25	340	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CnE2	Clover sandy clay loam, 15 to 25 percent slopes, moderately eroded	29.25	29.51	1,523	No	5	0.21	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	29.51	29.84	1,759	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
DaA	Dan River loam, 0 to 2 percent slopes, frequently flooded	29.84	30.05	1,103	No	5	0.31	Predominantly Non-Hydric	High	>60	No	No	Well drained
W	Water	30.05	30.1	226	No	Unknown	Unknown	Non-Hydric	Unknown	>60	Unknown	Unknown	Unknown
DaA	Dan River loam, 0 to 2 percent slopes, frequently flooded	30.1	30.21	606	No	5	0.31	Predominantly Non-Hydric	High	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	30.21	30.33	627	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	30.33	30.61	1,486	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	30.61	30.68	378	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	30.68	30.81	680	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	30.81	30.86	280	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CmD	Clover sandy loam, 8 to 15 percent slopes	30.86	30.89	128	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	30.89	30.97	419	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	30.97	31.03	337	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	31.03	31.11	436	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	31.11	31.14	162	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	31.14	31.18	170	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	31.18	31.23	286	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	31.23	31.33	533	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	31.33	31.53	1,040	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	31.53	31.58	263	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	31.58	31.61	171	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	31.61	31.65	188	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	31.65	31.66	88	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	31.66	31.72	311	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	31.72	31.81	447	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	31.81	32.14	1,751	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	32.14	32.23	486	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	32.23	32.3	353	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	32.3	32.33	176	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	32.33	32.44	587	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	32.44	32.48	183	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	32.48	32.5	117	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	32.5	32.56	327	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	32.56	32.61	283	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
DaA	Dan River loam, 0 to 2 percent slopes, frequently flooded	32.61	32.72	549	No	5	0.31	Predominantly Non-Hydric	High	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	32.72	32.75	147	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	32.75	32.83	436	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	32.83	32.92	468	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	32.92	32.98	349	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
HbA	Hatboro silt loam, 0 to 2 percent slopes, frequently flooded, long duration	32.98	33.01	128	No	5	0.21	Predominantly Hydric	High	>60	No	No	Poorly drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	33.01	33.08	366	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HbA	Hatboro silt loam, 0 to 2 percent slopes, frequently flooded, long duration	33.08	33.11	180	No	5	0.21	Predominantly Hydric	High	>60	No	No	Poorly drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	33.11	33.14	151	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	33.14	33.32	948	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	33.32	33.54	1,141	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
JkB	Jackland fine sandy loam, 2 to 8 percent slopes	33.54	33.59	267	Yes	3	0.3	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	33.59	33.74	800	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
DeD	Devotion fine sandy loam, 6 to 15 percent slopes	33.74	33.79	290	No	3	0.27	Non-Hydric	Moderate	25.2	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	33.79	33.83	190	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
DeD	Devotion fine sandy loam, 6 to 15 percent slopes	33.83	33.89	308	No	3	0.27	Non-Hydric	Moderate	25.2	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	33.89	33.94	257	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	33.94	33.96	133	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	33.96	33.99	137	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	33.99	34.15	843	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	34.15	34.21 RR	309	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	34.21 RR	34.32	661	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	34.32	34.34	97	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	34.34	34.45	584	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	34.45	34.53	395	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	34.53	34.77	1,274	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	34.77	34.84	382	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	34.84	34.94	500	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	34.94	35	316	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	35	35.03	170	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	35.03	35.1	400	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	35.1	35.23	673	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	35.23	35.31	420	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	35.31	35.38	379	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	35.38	35.46	406	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	35.46	35.58	641	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	35.58	35.73	796	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	35.73	35.77	175	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	35.77	35.8	170	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	35.8	35.91	612	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	35.91	36.08	854	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	36.08	36.21	727	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	36.21	36.25	172	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	36.25	36.68	2,316	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	36.68	36.79	560	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	36.79	36.86	394	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	36.86	37.06	1,036	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	37.06	37.11	239	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	37.11	37.19	415	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	37.19	37.21	129	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	37.21	37.32	562	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	37.32	37.34	131	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	37.34	37.39	253	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	37.39	37.55	846	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
PpE2	Poplar Forest sandy clay loam, 15 to 25 percent slopes, moderately eroded	37.55	37.6	257	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
Ud	Udorthents, loamy	37.6	37.67	402	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
PpE2	Poplar Forest sandy clay loam, 15 to 25 percent slopes, moderately eroded	37.67	37.72	243	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	37.72	37.77	250	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	37.77	37.98	1,143	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
CfB	Clifford sandy loam, 2 to 8 percent slopes	37.98	38.03	228	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	38.03	38.17 RR	744	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	38.17 RR	38.22	291	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
PpE2	Poplar Forest sandy clay loam, 15 to 25 percent slopes, moderately eroded	38.22	38.37	815	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	38.37	38.5	646	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	38.5	38.55	264	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
PpB2	Poplar Forest sandy clay loam, 2 to 8 percent slopes, moderately eroded	38.55	38.57	113	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	38.57	38.59	122	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	38.59	38.78	1,001	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	38.78	38.84	333	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	38.84	38.86	103	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	38.86	38.94	396	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	38.94	38.99	260	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	38.99	39.02	188	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	39.02	39.07	235	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	39.07	39.14	372	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	39.14	39.17	194	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	39.17	39.25	404	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
DeD	Devotion fine sandy loam, 6 to 15 percent slopes	39.25	39.37	616	No	3	0.27	Non-Hydric	Moderate	25.2	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	39.37	39.46	469	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	39.46	39.65	1,044	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	39.65	39.84	969	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
ChC	Clifford-Urban land complex, 2 to 10 percent slopes	39.84	39.93	466	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
Ur	Urban land	39.93	40.13	1,090	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
CaD	Casville sandy loam, 8 to 15 percent slopes	40.13	40.13	12	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	40.13	40.27 RR	708	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	40.27 RR	40.49 RR	1145	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	40.49 RR	40.51 RR	118	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	40.51 RR	40.51	343	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	40.51	40.52	19	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	40.52	40.54	101	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	40.54	40.62	452	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	40.62	40.71	461	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	40.71	40.72	51	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	40.72	40.83	608	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	40.83	41.11	1,459	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
HbA	Hatboro silt loam, 0 to 2 percent slopes, frequently flooded, long duration	41.11	41.18	374	No	5	0.21	Predominantly Hydric	High	>60	No	No	Poorly drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	41.18	41.26	402	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	41.26	41.32	323	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	41.32	41.41	456	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	41.41	41.45	247	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	41.45	41.52	374	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	41.52	41.83	1,595	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	41.83	42.08	1,348	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	42.08	42.11	144	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	42.11	42.16	293	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	42.16	42.21	225	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	42.21	42.31	553	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	42.31	42.45	719	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	42.45	42.5	260	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	42.5	42.63	713	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
PpB2	Poplar Forest sandy clay loam, 2 to 8 percent slopes, moderately eroded	42.63	42.7	385	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
PpD2	Poplar Forest sandy clay loam, 8 to 15 percent slopes, moderately eroded	42.7	42.82	623	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
PpB2	Poplar Forest sandy clay loam, 2 to 8 percent slopes, moderately eroded	42.82	42.85	144	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
PpD2	Poplar Forest sandy clay loam, 8 to 15 percent slopes, moderately eroded	42.85	42.87	125	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
PoE	Poplar Forest sandy loam, 15 to 35 percent slopes	42.87	42.88	36	No	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	42.88	42.93	281	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
PpD2	Poplar Forest sandy clay loam, 8 to 15 percent slopes, moderately eroded	42.93	43.04	545	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
PoE	Poplar Forest sandy loam, 15 to 35 percent slopes	43.04	43.13	515	No	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
PpB2	Poplar Forest sandy clay loam, 2 to 8 percent slopes, moderately eroded	43.13	43.17	206	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
PpD2	Poplar Forest sandy clay loam, 8 to 15 percent slopes, moderately eroded	43.17	43.21	213	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	43.21	43.29	395	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	43.29	43.36	378	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	43.36	43.46	553	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	43.46	43.51	243	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	43.51	43.6	473	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	43.6	43.64	187	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	43.64	43.67	182	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	43.67	43.75	398	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	43.75	43.79	237	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	43.79	43.87	418	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	43.87	43.92	291	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	43.92	43.97	216	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	43.97	44.06	512	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	44.06	44.09	168	No	3	0.22	Non-Hydric	High	15	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
SmF	Siloam sandy loam, 10 to 45 percent slopes	44.09	44.15	307	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	44.15	44.21	297	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	44.21	44.45	1,268	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	44.45	44.51	305	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	44.51	44.58	399	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	44.58	44.64	301	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	44.64	44.76	631	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	44.76	45.34	3,067	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
DcB	Davie sandy loam, 2 to 8 percent slopes	45.34	45.41	368	Yes	3	0.28	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
JkD	Jackland fine sandy loam, 8 to 15 percent slopes	45.41	45.47	325	No	3	0.3	Non-Hydric	Moderate	>60	No	Yes	Somewhat poorly drained
DcB	Davie sandy loam, 2 to 8 percent slopes	45.47	45.55	421	Yes	3	0.28	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
JkD	Jackland fine sandy loam, 8 to 15 percent slopes	45.55	45.57	123	No	3	0.3	Non-Hydric	Moderate	>60	No	Yes	Somewhat poorly drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	45.57	45.72	768	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	45.72	45.76	229	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	45.76	45.86	534	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	45.86	45.93	352	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	45.93	45.96	163	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	45.96	45.96	8	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
OkB2	Oak Level sandy clay loam, 2 to 8 percent slopes, moderately eroded	45.96	45.98 RR	84	Yes	6	0.29	Non-Hydric	High	>60	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	45.98 RR	46 RR	98	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	46 RR	46.1 RR	548	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	46.1 RR	46.16 RR	299	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	46.16 RR	46.25 RR	466	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	46.25 RR	46.3 RR	264	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	46.3 RR	46.33	148	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	46.33	46.36	147	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	46.36	46.52	869	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
OkB2	Oak Level sandy clay loam, 2 to 8 percent slopes, moderately eroded	46.52	46.63	592	Yes	6	0.29	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	46.63	46.67	187	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	46.67	46.8	721	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	46.8	46.83	158	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	46.83	46.88	259	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	46.88	46.93	225	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
HbA	Hatboro silt loam, 0 to 2 percent slopes, frequently flooded, long duration	46.93	47.01	434	No	5	0.21	Predominantly Hydric	High	>60	No	No	Poorly drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	47.01	47.08	390	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	47.08	47.33	1287	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	47.33	47.48	806	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	47.48	47.51	171	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	47.51	47.58	369	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SmC	Siloam sandy loam, 4 to 10 percent slopes	47.58	47.63	245	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	47.63	47.73	530	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	47.73	47.75	121	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	47.75	47.79	223	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	47.79	47.9	576	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	47.9	47.96	328	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	47.96	48.02	276	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	48.02	48.02	35	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	48.02	48.02	12	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	48.02	48.04	61	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	48.04	48.55	2736	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
HaB	Halifax sandy loam, 2 to 8 percent slopes	48.55	48.61	281	Yes	3	0.22	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	48.61	48.66	269	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HaB	Halifax sandy loam, 2 to 8 percent slopes	48.66	48.68	92	Yes	3	0.22	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
CaB	Casville sandy loam, 2 to 8 percent slopes	48.68	49.24	2960	Yes	3	0.26	Non-Hydric	High	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded	49.24	49.3	327	Yes	5	0.29	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	49.3	49.67	1987	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	49.67	49.84 RR	884	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 8 percent slopes	49.84 RR	49.94 RR	506	Yes	3	0.22	Non-Hydric	Moderate	>60	No	No	Moderately well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	49.94 RR	50.06 RR	652	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 8 percent slopes	50.06 RR	50.17 RR	548	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	50.17 RR	50.23 RR	357	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 8 percent slopes	50.23 RR	50.44 RR	1119	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	50.44 RR	50.52 RR	411	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 8 percent slopes	50.52 RR	50.69 RR	862	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	50.69 RR	50.76 RR	410	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CeA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	50.76 RR	50.81 RR	238	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	50.81 RR	50.98 RR	893	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	50.98 RR	51.18 RR	1070	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
MkB2	Mecklenburg sandy clay loam, 2 to 8 percent slopes, moderately eroded	51.18 RR	51.25 RR	363	Yes	6	0.29	Non-Hydric	High	>60	No	No	Well drained
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded	51.25 RR	51.3 RR	280	Yes	5	0.29	Non-Hydric	Moderate	>60	No	No	Well drained
MkB2	Mecklenburg sandy clay loam, 2 to 8 percent slopes, moderately eroded	51.3 RR	51.32 RR	119	Yes	6	0.29	Non-Hydric	High	>60	No	No	Well drained
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded	51.32 RR	51.44 RR	618	Yes	5	0.29	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	51.44 RR	51.98	3000	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	51.98	52.07 RR	456	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	52.07 RR	52.1 RR	187	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	52.1 RR	52.19 RR	460	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 8 percent slopes	52.19 RR	52.16	97	Yes	3	0.22	Non-Hydric	Moderate	>60	No	No	Moderately well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
PaD	Pacolet sandy loam, 8 to 15 percent slopes	52.16	52.17	20	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	52.17	52.36 RR	1025	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	52.36 RR	52.42 RR	314	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	52.42 RR	52.48 RR	297	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	52.48 RR	52.51	271	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	52.51	52.56	258	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded	52.56	52.59	146	Yes	5	0.29	Non-Hydric	Moderate	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	52.59	52.59	3	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded	52.59	52.63	224	Yes	5	0.29	Non-Hydric	Moderate	>60	No	No	Well drained
Alamance County, North Carolina													
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	52.63	52.68	245	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	52.68	52.74	296	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	52.74	52.77	172	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	52.77	52.83	314	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	52.83	53.07	1,262	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	53.07	53.09	118	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	53.09	53.18	483	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
EnC	Enon sandy loam, 6 to 10 percent slopes	53.18	53.21	179	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	53.21	53.31	480	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	53.31	53.34	186	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	53.34	53.51	922	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	53.51	53.53	94	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	53.53	53.6	330	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	53.6	53.63	163	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	53.63	53.64	77	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	53.64	53.68	215	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
FgC	Frogsboro sandy loam, 6 to 10 percent slopes	53.68	53.72	181	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	53.72	53.74	154	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	53.74	53.77	117	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	53.77	53.8	191	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	53.8	53.89	441	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	53.89	53.9	57	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	53.9	53.92	94	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	53.92	53.94	143	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	53.94	53.96	86	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	53.96	53.99	186	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
FgC	Frogsboro sandy loam, 6 to 10 percent slopes	53.99	54.05	297	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	54.05	54.07	115	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	54.07	54.14	369	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	54.14	54.15	23	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.15	54.16	48	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	54.16	54.18	143	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	54.18	54.21	141	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.21	54.24	170	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	54.24	54.28	231	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.28	54.3	81	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	54.3	54.33	174	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.33	54.41	386	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	54.41	54.45	248	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EsD	Enon loam, 10 to 15 percent slopes, very stony	54.45	54.47	98	No	5	0.26	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	54.47	54.51	207	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
EsD	Enon loam, 10 to 15 percent slopes, very stony	54.51	54.53	117	No	5	0.26	Non-Hydric	Moderate	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.53	54.59	316	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	54.59	54.62	157	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
EsD	Enon loam, 10 to 15 percent slopes, very stony	54.62	54.65	123	No	5	0.26	Non-Hydric	Moderate	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.65	54.66	96	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	54.66	54.79	662	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	54.79	54.85	314	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
EnD	Enon sandy loam, 10 to 15 percent slopes	54.85	54.88	168	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	54.88	54.9	97	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
VaC	Vance sandy loam, 6 to 10 percent slopes	54.9	54.93	163	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 10 to 15 percent slopes	54.93	54.97	198	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
CcC	Cecil sandy loam, 6 to 10 percent slopes	54.97	54.99	107	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	54.99	55.25 RR	1,382	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	55.25 RR	55.29 RR	193	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	55.29 RR	55.3 RR	90	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	55.3 RR	55.32 RR	85	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	55.32 RR	55.37 RR	293	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	55.37 RR	55.45 RR	422	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 6 percent slopes	55.45 RR	55.54 RR	460	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	55.54 RR	55.62 RR	404	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 6 percent slopes	55.62 RR	55.64 RR	134	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	55.64 RR	55.51	474	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	55.51	55.56	219	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	55.56	55.6	260	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	55.6	55.8	1029	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 6 percent slopes	55.8	55.8	3	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
PaE	Pacolet sandy loam, 15 to 45 percent slopes	55.8	55.82	99	No	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
LoE	Louisburg coarse sandy loam, 15 to 45 percent slopes	55.82	55.85	149	No	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	55.85	55.91	322	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	55.91	56.28	1983	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	56.28	56.32	213	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	56.32	56.42 RR	486	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	56.42 RR	56.44 RR	134	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
VaC	Vance sandy loam, 6 to 10 percent slopes	56.44 RR	56.55 RR	615	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	56.55 RR	56.69 RR	744	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	56.69 RR	56.71 RR	112	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	56.71 RR	56.73 RR	96	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	56.73 RR	56.81	709	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	56.81	57.04	1190	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	57.04	57.05	45	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	57.05	57.12	386	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	57.12	57.15	187	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	57.15	57.19	175	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	57.19	57.26	374	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	57.26	57.33	398	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	57.33	57.44	562	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	57.44	57.56	614	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	57.56	57.85	1568	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	57.85	57.88	124	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	57.88	57.91	187	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	57.91	58	458	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	58	58	26	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	58	58.03	150	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	58.03	58.04	48	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
HeB	Helena sandy loam, 2 to 6 percent slopes	58.04	58.08	183	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	58.08	58.11	195	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	58.11	58.15	225	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	58.15	58.27	611	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	58.27	58.28	43	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	58.28	58.47	1030	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	58.47	58.51	208	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	58.51	58.62 RR	542	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	58.62 RR	58.65 RR	184	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	58.65 RR	58.67 RR	123	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
EnD	Enon sandy loam, 10 to 15 percent slopes	58.67 RR	58.69 RR	108	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	58.69 RR	58.85	1052	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	58.85	59 RR	815	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	59 RR	59.35 RR	1846	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	59.35 RR	59.39 RR	201	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	59.39 RR	59.44 RR	259	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	59.44 RR	59.5 RR	341	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	59.5 RR	59.6	385	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	59.6	59.63	144	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	59.63	59.63	9	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	59.63	59.65	95	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	59.65	59.68	182	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	59.68	59.81	697	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained

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Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	59.81	60.05	1,258	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	60.05	60.22	877	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	60.22	60.67	2406	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	60.67	60.68	26	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 10 to 15 percent slopes	60.68	60.72 RR	218	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	60.72 RR	60.76 RR	232	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	60.76 RR	60.82 RR	328	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	60.82 RR	60.84 RR	100	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	60.84 RR	60.86 RR	82	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	60.86 RR	60.91	422	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	60.91	60.95	235	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	60.95	61.01	320	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	61.01	61.08	351	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	61.08	61.1	94	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	61.1	61.15	283	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
IrB	Iredell loam, 2 to 6 percent slopes	61.15	61.31	820	Yes	3	0.31	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	61.31	61.36	296	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	61.36	61.67	1605	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	61.67	61.76	492	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	61.76	61.83	352	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	61.83	61.9	405	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	61.9	61.93	141	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	61.93	61.95	82	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
IrB	Iredell loam, 2 to 6 percent slopes	61.95	61.99	224	Yes	3	0.31	Non-Hydric	Moderate	>60	No	No	Moderately well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
HeB	Helena sandy loam, 2 to 6 percent slopes	61.99	62.13	771	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	62.13	62.32 RR	1005	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	62.32 RR	62.33 RR	37	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	62.33 RR	62.38 RR	246	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	62.38 RR	62.38 RR	6	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	62.38 RR	62.39 RR	80	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	62.39 RR	62.44 RR	244	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	62.44 RR	62.52 RR	403	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	62.52 RR	62.54 RR	118	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	62.54 RR	62.56 RR	121	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	62.56 RR	62.58	518	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	62.58	62.63	306	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	62.63	62.69	312	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	62.69	62.72	147	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	62.72	63 RR	1490	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	63 RR	63.09 RR	479	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	63.09 RR	63.22 RR	681	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	63.22 RR	63.27 RR	275	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	63.27 RR	63.32 RR	247	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	63.32 RR	63.34 RR	106	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	63.34 RR	63.37 RR	139	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
LoE	Louisburg coarse sandy loam, 15 to 45 percent slopes	63.37 RR	63.44 RR	368	No	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	63.44 RR	63.35	299	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained

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Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	63.35	63.45	557	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
VaC	Vance sandy loam, 6 to 10 percent slopes	63.45	63.46	57	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	63.46	63.51	246	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	63.51	63.55	225	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	63.55	63.59	188	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
W	Water	63.59	63.64	273	No	Unknown	Unknown	Non-Hydric	Unknown	>60	Unknown	Unknown	Unknown
EnD	Enon sandy loam, 10 to 15 percent slopes	63.64	63.69	256	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	63.69	63.73	247	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	63.73	63.78	232	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	63.78	63.85	351	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	63.85	63.85	1	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	63.85	63.85	46	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	63.85	63.9	231	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	63.9	64 RR	558	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	64 RR	64.01 RR	8	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	64.01 RR	64.03 RR	110	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	64.03 RR	64.06 RR	202	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	64.06 RR	64.09 RR	141	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	64.09 RR	64.11	202	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	64.11	64.32	1115	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	64.32	64.4	395	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
VaC	Vance sandy loam, 6 to 10 percent slopes	64.4	64.42	100	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	64.42	64.52	557	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	64.52	64.58	312	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	64.58	64.67	456	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	64.67	64.7	151	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	64.7	64.95 RR	1363	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	64.95 RR	64.97 RR	66	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained

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Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
HeC	Helena sandy loam, 6 to 10 percent slopes	64.97 RR	65.03 RR	307	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	65.03 RR	65.09 RR	329	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	65.09 RR	65.1 RR	88	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	65.1 RR	65.12 RR	89	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	65.12 RR	65.16 RR	220	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	65.16 RR	65.26 RR	516	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	65.26 RR	65.3 RR	234	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
VaC	Vance sandy loam, 6 to 10 percent slopes	65.3 RR	65.41 RR	534	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	65.41 RR	65.48 RR	374	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	65.48 RR	65.51 RR	166	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	65.51 RR	65.56 RR	265	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	65.56 RR	65.52	268	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	65.52	65.53	51	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	65.53	65.58	279	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	65.58	65.64	302	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	65.64	65.64	10	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
HeC	Helena sandy loam, 6 to 10 percent slopes	65.64	65.68	229	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
IrB	Iredell loam, 2 to 6 percent slopes	65.68	65.82	746	Yes	3	0.31	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	65.82	65.86	180	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	65.86	65.96 RR	554	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	65.96 RR	65.98 RR	66	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	65.98 RR	66 RR	128	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
HeB	Helena sandy loam, 2 to 6 percent slopes	66 RR	66.02 RR	103	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	66.02 RR	66.28 RR	1396	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
VaC	Vance sandy loam, 6 to 10 percent slopes	66.28 RR	66.32 RR	214	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	66.32 RR	66.48 RR	811	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	66.48 RR	66.56 RR	429	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	66.56 RR	66.6 RR	208	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	66.6 RR	66.63 RR	186	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
W	Water	66.63 RR	66.64 RR	49	No	Unknown	Unknown	Non-Hydric	Unknown	>60	Unknown	Unknown	Unknown
VaC	Vance sandy loam, 6 to 10 percent slopes	66.64 RR	66.72 RR	403	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	66.72 RR	66.79 RR	378	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
HeB	Helena sandy loam, 2 to 6 percent slopes	66.79 RR	66.91 RR	605	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	66.91 RR	66.94 RR	209	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	66.94 RR	67.02 RR	375	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	67.02 RR	67.07 RR	310	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	67.07 RR	67.19 RR	617	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	67.19 RR	67.4 RR	1095	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	67.4 RR	67.44 RR	225	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	67.44 RR	67.47 RR	156	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
VaD	Vance sandy loam, 10 to 15 percent slopes	67.47 RR	67.51 RR	188	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Well drained
VaB	Vance sandy loam, 2 to 6 percent slopes	67.51 RR	67.55 RR	244	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
VaC	Vance sandy loam, 6 to 10 percent slopes	67.55 RR	67.6 RR	245	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 6 percent slopes	67.6 RR	67.62 RR	131	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained

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PaD	Pacolet sandy loam, 10 to 15 percent slopes	67.62 RR	67.5	139	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 6 percent slopes	67.5	67.54	237	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 10 to 15 percent slopes	67.54	67.59	269	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	67.59	67.62	124	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 10 to 15 percent slopes	67.62	67.64	121	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	67.64	67.71	370	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
PaD	Pacolet sandy loam, 10 to 15 percent slopes	67.71	67.73	122	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	67.73	67.78	255	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	67.78	67.84	326	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	67.84	67.88	176	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 10 to 15 percent slopes	67.88	67.9	137	Yes	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
PaE	Pacolet sandy loam, 15 to 45 percent slopes	67.9	67.93	134	No	3	0.33	Non-Hydric	Moderate	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	67.93	67.97	207	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	67.97	68.06	496	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.06	68.08	110	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	68.08	68.14	331	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.14	68.19	233	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	68.19	68.24	281	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.24	68.3	330	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	68.3	68.33	139	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.33	68.37	240	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	68.37	68.39	71	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.39	68.43	234	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	68.43	68.48	228	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	68.48	68.6	640	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	68.6	68.63	168	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CuC2	Cullen-Urban land complex, 6 to 10 percent slopes, moderately eroded	68.63	68.64	75	No	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	68.64	68.72	414	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.72	68.83	555	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	68.83	68.86	159	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	68.86	68.87	79	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained

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Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	68.87	68.91	187	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	68.91	68.96	260	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
Ud	Udorthents, loamy 0 to 25 percent slopes	68.96	69.03	394	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	69.03	69.14	594	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	69.14	69.17	153	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	69.17	69.22	237	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	69.22	69.5	1512	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	69.5	69.59 RR	438	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
Ur	Urban land	69.59 RR	69.65 RR	335	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	69.65 RR	69.72 RR	392	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
Ur	Urban land	69.72 RR	69.8 RR	384	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
EnD	Enon sandy loam, 10 to 15 percent slopes	69.8 RR	69.84 RR	246	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
Ur	Urban land	69.84 RR	69.92 RR	419	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
Ud	Udorthents, loamy 0 to 25 percent slopes	69.92 RR	69.95 RR	150	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	69.95 RR	69.98 RR	178	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	69.98 RR	70.03 RR	218	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.03 RR	69.99	264	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	69.99	70.04	255	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	70.04	70.08	186	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.08	70.11	198	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	70.11	70.17	279	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	70.17	70.17 RR	32	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.17 RR	70.26 RR	456	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	70.26 RR	70.28 RR	93	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	70.28 RR	70.3	147	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained

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CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.3	70.32	117	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	70.32	70.37	250	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	70.37	70.38	51	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	70.38	70.42	240	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.42	70.43	60	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	70.43	70.5	324	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.5	70.51	87	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	70.51	70.55	220	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.55	70.64	467	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	70.64	70.72	400	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	70.72	70.75	158	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	70.75	70.77	138	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.77	70.79	99	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	70.79	70.84	241	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	70.84	70.86	95	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	70.86	70.98	678	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	70.98	71.04	305	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	71.04	71.29	1288	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	71.29	71.36	362	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
Ur	Urban land	71.36	71.46	532	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	71.46	71.73	1472	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	71.73	71.77	191	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	71.77	71.93	830	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	71.93	71.96 RR	152	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	71.96 RR	72.01 RR	280	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	72.01 RR	72.07	409	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	72.07	72.09	80	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	72.09	72.12	156	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	72.12	72.24	670	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	72.24	72.28	164	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained

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EnC	Enon sandy loam, 6 to 10 percent slopes	72.28	72.3	144	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	72.3	72.34	188	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	72.34	72.41	356	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	72.41	72.44	187	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	72.44	72.57	665	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	72.57	72.6	196	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	72.6	72.67	349	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	72.67	72.67	5	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	72.67	72.69	82	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	72.69	72.88 RR	1011	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	72.88 RR	72.93 RR	289	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	72.93 RR	73.05	709	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	73.05	73.16 RR	586	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	73.16 RR	73.17 RR	70	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
Aboveground Facilities													
Pittsylvania County, Virginia													
Lambert Compressor Station / Interconnect / Mainline valve 1 (MP 0.0RR)													
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
Mainline valves 2 and 3 MP 7.4 and 18.3													
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	NA	NA	NA	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
Contractor Yards													
16B	Helena sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
16C	Helena sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
1B	Appling sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	NA	NA	NA	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
22B	Mattaponi sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Moderately well drained

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22C	Mattaponi sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Low	>60	No	No	Moderately well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
26D	Fairview fine sandy loam, 15 to 25 percent slopes	NA	NA	NA	Yes	3	0.22	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	NA	NA	NA	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	NA	NA	NA	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.2	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
Access Roads													
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	NA	NA	NA	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.2	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
39	Udorthents, loamy	NA	NA	NA	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
11B3	Cullen clay loam, 2 to 7 percent slopes, severely eroded	NA	NA	NA	No	6	0.27	Non-Hydric	High	>60	No	No	Well drained
17B	Hiwassee loam, 2 to 7 percent slopes	NA	NA	NA	Yes	6	0.21	Non-Hydric	High	>60	No	No	Well drained
18C3	Hiwassee clay loam, 7 to 15 percent slopes, severely eroded	NA	NA	NA	No	6	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
1B	Appling sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
1C	Appling sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
21D	Madison fine sandy loam, 15 to 25 percent slopes	NA	NA	NA	Yes	3	0.37	Non-Hydric	Moderate	>60	No	No	Well drained
22C	Mattaponi sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Low	>60	No	No	Moderately well drained
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
29D	Pinkston-Mayodan complex, 15 to 35 percent slopes, very stony	NA	NA	NA	No	5	0.28	Non-Hydric	Low	18.1	Yes	No	Excessively drained
29E	Pinkston-Mayodan complex, 35 to 50 percent slopes, very stony	NA	NA	NA	No	5	0.28	Non-Hydric	Low	18.1	Yes	No	Excessively drained
3B	Bolling fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.29	Non-Hydric	Moderate	>60	No	No	Moderately well drained
4B	Clifford sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
4C	Cecil sandy loam, 7 to 15 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained

Appendix D

Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	NA	NA	NA	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	NA	NA	NA	Yes	5	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
7A	Chenneby loam, 0 to 2 percent slopes, occasionally flooded	NA	NA	NA	Yes	5	0.44	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	NA	NA	NA	No	5	0.38	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	NA	NA	NA	Yes	3	0.2	Predominantly Non-Hydric	Moderate	>60	No	No	Moderately well drained
Rockingham County, North Carolina													
LN 3600 Interconnect (MP 28.2)													
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	NA	NA	NA	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CmB	Clover sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
T-15 Dan River Interconnect / Mainline Valve 4 (MP 30.4)													
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	NA	NA	NA	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	NA	NA	NA	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
Mainline valve 5 (MP 42.2)													
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	NA	NA	NA	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
Contractor Yards													
ChC	Clifford-Urban land complex, 2 to 10 percent slopes	NA	NA	NA	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
LeB	Leaksville silt loam, 0 to 4 percent slopes	NA	NA	NA	No	6	0.37	Hydric	High	24	Yes	Yes	Poorly drained
SpB	Spray loam, 0 to 5 percent slopes	NA	NA	NA	No	6	0.43	Non-Hydric	High	>60	Yes	No	Well drained
Ud	Udorthents, loamy	NA	NA	NA	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
Access Roads													
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	NA	NA	NA	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
CmB	Clover sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmE	Clover sandy loam, 15 to 25 percent slopes	NA	NA	NA	No	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
BaB	Banister loam, 0 to 4 percent slopes, rarely flooded	NA	NA	NA	Yes	5	0.26	Non-Hydric	Moderate	>60	No	No	Moderately well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
CaB	Casville sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.26	Non-Hydric	High	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.25	Non-Hydric	High	>60	No	No	Well drained
CeA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	NA	NA	NA	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CfB	Clifford sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
CgB2	Clifford sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.21	Non-Hydric	High	>60	No	No	Well drained
ChC	Clifford-Urban land complex, 2 to 10 percent slopes	NA	NA	NA	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmB	Clover sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmD	Clover sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CmE	Clover sandy loam, 15 to 25 percent slopes	NA	NA	NA	No	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CnB2	Clover sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
CnE2	Clover sandy clay loam, 15 to 25 percent slopes, moderately eroded	NA	NA	NA	No	5	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
CsA	Codorus loam, 0 to 2 percent slopes, frequently flooded	NA	NA	NA	No	6	0.41	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
DaA	Dan River loam, 0 to 2 percent slopes, frequently flooded	NA	NA	NA	No	5	0.31	Predominantly Non-Hydric	High	>60	No	No	Well drained
FpE	Fairview-Poplar Forest complex, 15 to 25 percent slopes	NA	NA	NA	No	3	0.21	Non-Hydric	Moderate	>60	No	No	Well drained
FrD2	Fairview-Poplar Forest complex, 8 to 15 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
FrE2	Fairview-Poplar Forest complex, 15 to 25 percent slopes, moderately eroded	NA	NA	NA	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
HwD	Hiwassee loam, 8 to 15 percent slopes	NA	NA	NA	Yes	6	0.18	Non-Hydric	Moderate	>60	No	No	Well drained
IrD	Iredell fine sandy loam, 8 to 15 percent slopes	NA	NA	NA	No	3	0.3	Non-Hydric	Moderate	>60	No	Yes	Somewhat poorly drained
JkB	Jackland fine sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.3	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
NaB	Nathalie sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.18	Non-Hydric	Moderate	>60	No	No	Well drained
OkB2	Oak Level sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.29	Non-Hydric	High	>60	No	No	Well drained
PaD	Pacolet sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.19	Non-Hydric	Moderate	>60	No	No	Well drained
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.29	Non-Hydric	Moderate	>60	No	No	Well drained
PpB2	Poplar Forest sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.3	Non-Hydric	High	>60	No	No	Well drained
PpE2	Poplar Forest sandy clay loam, 15 to 25 percent slopes, moderately eroded	NA	NA	NA	No	5	0.31	Non-Hydric	Moderate	>60	No	No	Well drained
RnB	Rhodhiss sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.25	Non-Hydric	High	>60	No	No	Well drained
RnD	Rhodhiss sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained
RnE	Rhodhiss sandy loam, 15 to 30 percent slopes	NA	NA	NA	No	3	0.25	Non-Hydric	Moderate	>60	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
SmC	Siloam sandy loam, 4 to 10 percent slopes	NA	NA	NA	No	3	0.22	Non-Hydric	High	15	No	No	Well drained
SmF	Siloam sandy loam, 10 to 45 percent slopes	NA	NA	NA	No	3	0.22	Non-Hydric	Moderate	15	No	No	Well drained
SpB	Spray loam, 0 to 5 percent slopes	NA	NA	NA	No	6	0.43	Non-Hydric	High	>60	Yes	No	Well drained
Ud	Udorthents, loamy	NA	NA	NA	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
W	Water	NA	NA	NA	No	Unknown	Unknown	Non-Hydric	Unknown	>60	Unknown	Unknown	Unknown
WhB	Wickham sandy loam, mesic, 1 to 4 percent slopes, rarely flooded	NA	NA	NA	Yes	3	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
Alamance County, North Carolina													
Mainline valves 6 and 7 (MP 55.1 and 68.7)													
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
T-21 Haw River Interconnect / Mainline valve 8 (MP 73.2RR)													
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
Access Roads													
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
EnB	Enon sandy loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
Ud	Udorthents, loamy 0 to 25 percent slopes	NA	NA	NA	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
CcB	Cecil sandy loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.22	Non-Hydric	High	>60	No	No	Well drained
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.28	Non-Hydric	High	>60	No	No	Well drained
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	NA	NA	NA	No	5	0.26	Predominantly Non-Hydric	High	>60	No	No	Somewhat poorly drained
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
CnE2	Cullen clay loam, 15 to 45 percent slopes, moderately eroded	NA	NA	NA	No	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
DAM	Dam	NA	NA	NA	No	Unknown	Unknown	Non-Hydric	Low	>60	Unknown	Unknown	Unknown
EnB	Enon sandy loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnC	Enon sandy loam, 6 to 10 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	High	>60	No	No	Well drained
EnD	Enon sandy loam, 10 to 15 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
EoB2	Enon clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained
EoC2	Enon clay loam, 6 to 10 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.28	Non-Hydric	High	>60	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
EsD	Enon loam, 10 to 15 percent slopes, very stony	NA	NA	NA	No	5	0.26	Non-Hydric	Moderate	>60	No	No	Well drained
FgB	Frogsboro sandy loam, 2 to 6 percent slopes	NA	NA	NA	No	3	0.26	Non-Hydric	High	>60	No	Yes	Somewhat poorly drained
HeB	Helena sandy loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
HeC	Helena sandy loam, 6 to 10 percent slopes	NA	NA	NA	Yes	3	0.27	Non-Hydric	Moderate	>60	No	No	Moderately well drained
IrB	Iredell loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.31	Non-Hydric	Moderate	>60	No	No	Moderately well drained
LoD	Louisburg coarse sandy loam, 10 to 15 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	Moderate	>60	No	No	Well drained
RvA	Riverview loam, 0 to 2 percent slopes, occasionally flooded	NA	NA	NA	Yes	5	0.39	Non-Hydric	High	>60	No	No	Well drained
RxE	Rowan-Poindexter complex, 15 to 45 percent slopes	NA	NA	NA	No	3	0.35	Non-Hydric	Moderate	29.9	No	No	Well drained
Ud	Udorthents, loamy 0 to 25 percent slopes	NA	NA	NA	No	5	0.2	Non-Hydric	Moderate	>60	No	No	Well drained
Ur	Urban land	NA	NA	NA	No	Unknown	Unknown	Non-Hydric	High	>60	Unknown	Unknown	Unknown
VaB	Vance sandy loam, 2 to 6 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	High	>60	No	No	Well drained
W	Water	NA	NA	NA	No	Unknown	Unknown	Non-Hydric	Unknown	>60	Unknown	Unknown	Unknown
WtC	Wynott-Enon complex, 6 to 10 percent slopes	NA	NA	NA	Yes	5	0.25	Non-Hydric	High	28	No	No	Well drained
Contractor Yards													
CnB2	Cullen clay loam, 2 to 6 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnC2	Cullen clay loam, 6 to 10 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	High	>60	No	No	Well drained
CnD2	Cullen clay loam, 10 to 15 percent slopes, moderately eroded	NA	NA	NA	Yes	6	0.23	Non-Hydric	Moderate	>60	No	No	Well drained
HnB	Herndon silt loam, 2 to 6 percent slopes	NA	NA	NA	Yes	6	0.36	Non-Hydric	High	>60	No	No	Well drained
HnC	Herndon silt loam, 6 to 10 percent slopes	NA	NA	NA	Yes	6	0.36	Non-Hydric	High	>60	No	No	Well drained
HnD	Herndon silt loam, 10 to 15 percent slopes	NA	NA	NA	Yes	6	0.36	Non-Hydric	Moderate	>60	No	No	Well drained
WtB	Wynott-Enon complex, 2 to 6 percent slopes	NA	NA	NA	Yes	5	0.25	Non-Hydric	High	28	No	No	Well drained
WtC	Wynott-Enon complex, 6 to 10 percent slopes	NA	NA	NA	Yes	5	0.25	Non-Hydric	High	28	No	No	Well drained
WtD	Wynott-Enon complex, 10 to 15 percent slopes	NA	NA	NA	Yes	5	0.25	Non-Hydric	Moderate	28	No	No	Well drained
Caswell County, North Carolina													
Contractor Yards													
CaB	Casville sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
FbB2	Fairview sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.23	Non-Hydric	High	>60	No	No	Well drained
HaC	Halifax sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Moderately well drained
ReC	Rasalo-Enott complex, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.28	Non-Hydric	Moderate	48	No	No	Well drained
SkE	Spriggs-Mocksville complex, 25 to 45 percent slopes	NA	NA	NA	No	3	0.3	Non-Hydric	Moderate	29.9	No	No	Well drained

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Soil Types Crossed by the MVP Southgate Project

Map Unit Symbol	Map Unit Name	Milepost Start	Milepost End	Crossing Length (feet)	Prime Farmland or Farmland of Statewide Importance a/	WEG b/	K Factor c/	Hydric Rating d/	Revegetation Potential e/	Depth to Bedrock (inches) f/	Stony/ Rocky (g)	Compaction Prone h/	Drainage Class
Access Roads													
CaB	Casville sandy loam, 2 to 8 percent slopes	NA	NA	NA	Yes	3	0.23	Non-Hydric	High	>60	No	No	Well drained
FbB2	Fairview sandy clay loam, 2 to 8 percent slopes, moderately eroded	NA	NA	NA	Yes	5	0.23	Non-Hydric	High	>60	No	No	Well drained
HaC	Halifax sandy loam, 8 to 15 percent slopes	NA	NA	NA	Yes	3	0.24	Non-Hydric	Moderate	>60	No	No	Moderately well drained

Notes:
NA = Not Applicable
a/: Prime farmland and Farmland of Statewide Importance includes soils mapped and designated as prime farmland and farmland of statewide importance by the NRCS (SSURGO reference column "farmlndcl"). Prime Farmland if drained and / or irrigated and / or reclaimed of excess salts and sodium is not included in this acreage. No areas of Farmland of local importance or unique farmland are affected by the Project.
b/: WEGs (Wind Erodibility Groups) obtained from the NRCS Soil Data Mart. WEGs range from 1 to 8, with 1 being the highest potential for wind erosion, and 8 the lowest. Highly wind erodible soils include those in wind erodibility groups 1 or 2 (SSURGO reference column "weg").
c/: Water erosion potential was determined by averaging the K factor values of horizons of each soil type. Based on the average K factor, each soil type was grouped into a water erosion class of "Low", "Moderate", and "High". Highly water erodible soils include those with a K factor greater than 0.4.
d/: "Urban Land" and "Udorthents" map units do not have a NRCS designated hydric soil status. These map units were considered to be non-hydric soils. Hydric Type is determined with Hydric Classification - Presence ("hydclprs") where if hydclprs of 0% is categorized as "Non-hydric". Values between 1% – 33% are categorized as "Predominantly Non-hydric", 34% - 66% as "Partially Hydric", 67% - 99% as "Predominantly Hydric", and 100% is categorized as "Hydric".
e/: Revegetation Potential is determined by three parameters: drainage class, K factor, and slope, each parameter assigned a value of 1, 2, or 3, then averaged. Drainage classes of excessively drained and very poorly drained are designated low (1), somewhat excessively drained and poorly drained are designated moderate (2), and well drained, moderately well drained, and somewhat poorly drained are designated high (3). Low K factor (3), Moderate (2), and High (1). Slopes of 25% or more are low (1), 8%-25% are moderate (2), and slopes of less than 8% are high (3). The average of these three scores is then taken to determine the overall low, moderate, or high revegetation potential. 1.0-1.7 = Low, 1.8-2.3 = Moderate, 2.4-3.0 = High.
f/: Depth to bedrock is not defined by the NRCS for the "Pavement and Buildings" map unit. In these cases, a depth to bedrock of >60" was assigned, which is consistent with NRCS designations for other natural and fill soils in the Project area. Shallow bedrock soils include those that have lithic or paralithic bedrock within 60 inches or less of the soil surface (SSURGO and STATGO2 reference column "rescind" and "resdept_r").
g/: Stony/Rocky soils include those with a cobbley, stony, bouldery, shaly, channery, very gravelly, or extremely gravelly modifier to the textural class of the surface layer and / or that have a surface layer that contains greater than 5 percent by weight rock fragments larger than 3 inches.

APPENDIX E.1

Railroads and Roads Crossed by the Southgate Project

Appendix E.1-1

Railroads Crossed by the Southgate Project

County , State	Milepost	Railroad	Active or Abandoned	Proposed Crossing Method
Pittsylvania, VA	5.3	Norfolk Southern Railroad	Active	Conventional Bore
Pittsylvania, VA	25.0	Norfolk Southern Railroad	Active	Conventional Bore
Rockingham, NC	39.7	Norfolk Southern	Active	Conventional Bore
Alamance, NC	69.8 RR	Norfolk Southern Railway	Active	Conventional Bore

Appendix E.1-2

Roadways Crossed by the Southgate Project

Facility, State, County	Milepost	Road Name	Surface Type	Jurisdiction	Public or Private	Crossing Method
H-605 PIPELINE						
Virginia						
Pittsylvania	N/A	N/A	N/A	N/A	N/A	N/A
H-650 PIPELINE						
Virginia						
Pittsylvania	0.7	County Road 703 / Fairview N	Asphalt	County	Public	Bore
Pittsylvania	0.9	State Route 57 / Halifax Road	Asphalt	State	Public	Bore
Pittsylvania	2.9	County Road 694 / Davis Road	Asphalt	County	Public	Bore
Pittsylvania	3.0	County Road 703 / Fairview Road	Asphalt	County	Public	Bore
Pittsylvania	4.2	County Road 1437 / Woodlawn Academy Road	Asphalt	County	Public	Bore
Pittsylvania	4.3	County Road 1437 / Woodlawn Academy Road	Asphalt	County	Public	Bore
Pittsylvania	4.3	U.S. Highway 29	Asphalt	U.S.	Public	Bore
Pittsylvania	7.2	County Road 836 / White Oak Circle	Asphalt	County	Public	Bore
Pittsylvania	7.4	County Road 718 / Dry Fork Road	Asphalt	County	Public	Bore
Pittsylvania	8.1	County Road 1099 / Hylton Lane	Asphalt	County	Public	Bore
Pittsylvania	9.4	County Road 834 / Hopewell Road	Asphalt	County	Public	Bore
Pittsylvania	10.2	County Road 1071 / Tobacco Road	Gravel	County	Public	Open Cut
Pittsylvania	10.8	State Route 41 / Franklin Turnpike	Asphalt	State	Public	Bore
Pittsylvania	12.4	County Road 865 / Hutson Road	Asphalt	County	Public	Bore
Pittsylvania	13.4	County Road 866 / Sandy Creek Road	Asphalt	County	Public	Bore
Pittsylvania	14.9	County Road 750 / Whitmell School Road	Asphalt	County	Public	Bore
Pittsylvania	15.9	County Road 844 / Mount Cross Road	Asphalt	County	Public	Bore
Pittsylvania	16.5	County Road 868 / Silver Creek Road	Asphalt	County	Public	Bore
Pittsylvania	18.3	County Road 878 / Pine Lake Road	Asphalt	County	Public	Bore
Pittsylvania	19.0	County Road 876 / Cedar Spring Road	Asphalt	County	Public	Bore

Appendix E.1-2

Roadways Crossed by the Southgate Project

Facility, State, County	Milepost	Road Name	Surface Type	Jurisdiction	Public or Private	Crossing Method
Pittsylvania	19.3	County Road 869 / Stony Mill Road	Asphalt	County	Public	Bore
Pittsylvania	20.0	U.S. Highway 58 / Martinsville Highway	Asphalt	U.S.	Public	Bore
Pittsylvania	22.1	County Road 875 / Horseshoe Road	Asphalt	County	Public	Bore
Pittsylvania	23.7 RR	County Road 862 / Oak Hill Road	Asphalt	County	Public	Bore
North Carolina						
Rockingham	26.2	State Road 1745 / Buffalo Road	Asphalt	State	Public	Bore
Rockingham	26.6	U.S HWY 311 / Hwy770	Asphalt	State	Public	Bore
Rockingham	30.5	State Hwy 700 / S Fieldcrest Road	Asphalt	State	Public	Bore
Rockingham	30.7	State Road 1951 / Quesinberry Road	Asphalt	State	Public	Bore
Rockingham	31.6	State Road 1951 / Quesinberry Road	Asphalt	State	Public	Bore
Rockingham	33.2	State Road 1945 / Moir Mill Road	Asphalt	State	Public	Bore
Rockingham	36.3	State Road 1980 / Mount Carmel Church Road	Asphalt	State	Public	Bore
Rockingham	36.6	State Road 1982 / Wolf Island Road	Asphalt	State	Public	Bore
Rockingham	38.8	State Road 1941 / Crutchfield Road	Asphalt	State	Public	Bore
Rockingham	39.7	U.S. Highway 29	Asphalt	U.S.	Public	Bore
Rockingham	40.4	State Road 2552 / Narrow Gauge Road	Asphalt	State	Public	Bore
Rockingham	41.6	U.S. Highway 29	Asphalt	U.S.	Public	Bore
Rockingham	42.2	U.S. Highway 158	Asphalt	U.S.	Public	Bore
Rockingham	43.2	State Road 2579 / Brooks Road	Asphalt	State	Public	Bore
Rockingham	43.4	State Road 2588 / Knowles Road	Asphalt	State	Public	Bore
Rockingham	44.9	State Road 2571 / Grooms Road	Asphalt	State	Public	Bore
Rockingham	48.4	State Road 150 / State Highway 150	Asphalt	State	Public	Bore
Rockingham	49.1	State Road 87 / State Highway 87	Asphalt	State	Public	Bore
Rockingham	49.5	State Road 2614 / High Rock Road	Asphalt	State	Public	Bore
Rockingham	51.6 RR	State Road 2619 / Kernodle Road	Asphalt	State	Public	Bore

Appendix E.1-2

Roadways Crossed by the Southgate Project

Facility, State, County	Milepost	Road Name	Surface Type	Jurisdiction	Public or Private	Crossing Method
Rockingham	52.0	State Road 2658 / Parkdale Road	Asphalt	State	Public	Bore
Rockingham	52.6	Tri County Drive	Gravel	Private	Private	Open Cut
Alamance	53.1	State Road 2903 / Troxler Mill Road	Asphalt	State	Public	Bore
Alamance	53.3	State Road 1577 / Lee Lewis Road	Asphalt	State	Public	Bore
Alamance	54.1	State Road 1576 / Jug House Road	Asphalt	State	Public	Bore
Alamance	55.1	State Road 1576 / Gilliam Church Road	Asphalt	State	Public	Bore
Alamance	55.8	State Highway 87	Asphalt	State	Public	Bore
Alamance	56.4	State Road 1571 / Altamahaw Race Track Road	Asphalt	State	Public	Bore
Alamance	56.5	State Road 1649 / Lonzie Foster Trail	Gravel	State	Public	Open Cut
Alamance	57.3	State Route 1591 / Hollyfield Road”	Gravel	State	Public	Open Cut
Alamance	57.5	State Road 1565 / Dodd Road	Asphalt	State	Public	Bore
Alamance	57.8	State Road 1002 / Altamahaw Union Ridge Rd	Asphalt	State	Public	Bore
Alamance	57.9	State Road 1561 / Hub Mill Road	Asphalt	State	Public	Bore
Alamance	59.3 RR	State Road 1595 / Danieley Water Wheel Road	Asphalt	State	Public	Bore
Alamance	60.0	State Road 1593 / Burch Bridge Road	Asphalt	State	Public	Bore
Alamance	60.3	State Road 1598 / Isley School Road	Asphalt	State	Public	Bore
Alamance	61.4	State Road 1601 / Huffines Drive	Asphalt	State	Public	Bore
Alamance	62.8	State Road 1001 / Union Ridge Road	Asphalt	State	Public	Bore
Alamance	63.1 RR	State Highway 62	Asphalt	State	Public	Bore
Alamance	64.8	State Route 1750 / Faucette Lane	Asphalt	State	Public	Bore
Alamance	65.3 RR	State Road 1729 / Deep Creek Church Road	Asphalt	State	Public	Bore
Alamance	66.1 RR	State Road 1735 / N. Fonville Rd	Asphalt	State	Public	Bore

Appendix E.1-2

Roadways Crossed by the Southgate Project

Facility, State, County	Milepost	Road Name	Surface Type	Jurisdiction	Public or Private	Crossing Method
Alamance	66.4 RR	State Road 1752 / Sandy Cross Road	Asphalt	State	Public	Bore
Alamance	68.2	Indian Village Trail	Gravel	County	Public	Open Cut
Alamance	68.7	State Road 1737 / Haw River Hopedale Road	Asphalt	State	Public	Bore
Alamance	69.0	U.S. Highway 70 / Haw River Bypass	Asphalt	U.S.	Public	Bore
Alamance	69.6 RR	State Highway 49 / W. Main Street	Asphalt	State	Public	Bore
Alamance	69.7 RR	State Road 1935 / Stone St	Asphalt	State	Public	Bore
Alamance	71.3	Interstate 40 / Interstate 85	Asphalt	U.S.	Public	Bore
Alamance	72.9 RR	State Highway 54 / E Harden Street	Asphalt	State	Public	Bore

Notes:
N/A = Not Applicable
Mileposts with an “RR” indicate locations where a re-route was incorporated into the pipeline alignment.

APPENDIX E.2

Structures within 50 Feet of the Construction Work Area

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Virginia								
Pittsylvania	0.0	House	Yes	North	22	2,563	RSS-H650-045	Stay within access road PA-PI-001C limits. Proposed barricade fence 100 linear feet from house.
Pittsylvania	0.1	House	No	South	27	911	N/A	Protect
Pittsylvania	0.1	Barn	No	South	42	1,037	N/A	Protect
Pittsylvania	2.3	Shed	No	East	50	1,278	N/A	Stay within access road TA-PI-005 limits.
Pittsylvania	2.3	Shed	No	East	7	1,720	N/A	Stay within access road TA-PI-005 limits.
Pittsylvania	2.3	Shed	No	East	35	1,828	N/A	Stay within access road TA-PI-005 limits.
Pittsylvania	2.3	Shed	No	East	4	1,871	N/A	Stay within access road TA-PI-005 limits.
Pittsylvania	2.3	Shed	No	East	0	1,821	N/A	Protect
Pittsylvania	2.3	Shed	No	East	20	1,967	N/A	Stay within access road TA-PI-005 limits.
Pittsylvania	2.3	Shed	No	East	0	2,012	N/A	Protect
Pittsylvania	4.5	House	No	East	4	735	RSS-H650-024	Use existing driveway (TA-PI-007) to pass by residences. Post both enter and exit caution/slow signage to alert contractors. Proposed Barricade Fence 100 linear feet from corner of house.
Pittsylvania	4.5	Garage	No	East	0	663	RSS-H650-024	Protect
Pittsylvania	4.5	Garage	No	East	0	748	RSS-H650-024	Protect

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Pittsylvania	4.5	Farm Stalls	No	East	10	880	N/A	Stay within access road TA-PI-007 limits.
Pittsylvania	4.5	Barn	No	East	0	930	RSS-H650-024	Protect
Pittsylvania	4.5	Well Pump House	No	East	17	921	N/A	Stay within access road TA-PI-007 limits.
Pittsylvania	5.1	House	Yes	East	48	2,886	N/A	Stay within access road TA-PI-011 limits.
Pittsylvania	6.5	Office	Yes	West	28	1,283	N/A	Stay within access road TA-PI-016 limits.
Pittsylvania	8.5	Shed	No	East	25	930	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	8.5	Shed	No	East	47	923	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	8.5	House	Yes	East	46	862	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	8.5	Shed	No	East	0	917	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	8.5	Shed	No	East	6	943	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	8.5	Shed	No	East	7	877	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	8.5	Shed	No	East	5	935	N/A	Stay within access road TA-PI-022 limits.
Pittsylvania	9.0	Barn	No	West	10	1,445	N/A	Stay within access road TA-PI-023 limits.
Pittsylvania	9.0	Barn	No	West	13	1,482	N/A	Stay within access road TA-PI-023 limits.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Pittsylvania	9.0	Tobacco Shed	No	West	5	1,642	N/A	Stay within access road TA-PI-023 limits.
Pittsylvania	10.3	House	Yes	East	34	59	RSS-H650-016	Protect – Proposed barricade fence.
Pittsylvania	10.3	Porch	Yes	East	22	46	RSS-H650-016	Protect – Proposed barricade fence.
Pittsylvania	10.3	Garage	No	East	29	54	RSS-H650-016	Protect
Pittsylvania	10.3	Shed	No	East	0	10	RSS-H650-016	To be removed
Pittsylvania	10.6	Shed	No	East	49	110	N/A	Protect
Pittsylvania	10.7	House	Yes	East	28	88	N/A	Protect
Pittsylvania	10.8	Mailbox stone column	No	West	0	14	N/A	Remove
Pittsylvania	10.8	Stone entry wall	No	West	0	0	N/A	Remove
Pittsylvania	10.8	Stone entry wall	No	East	0	14	N/A	Remove
Pittsylvania	13.1	Shed	No	East	11	205	N/A	Stay within access road TA-PI-032 limits.
Pittsylvania	14.9	House	Yes	East	46	152	N/A	Protect
Pittsylvania	15.9	Garage	No	East	5	55	N/A	Protect
Pittsylvania	16.0	Shed	No	East	0	164	N/A	Protect
Pittsylvania	16.3	Mobile home - single wide	Yes	East	28	86	N/A	Protect
Pittsylvania	16.3	Garage	No	East	28	133	N/A	Protect

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Pittsylvania	16.7	House	Yes	West	28	282	RSS-H650-029	Use existing driveway (TA-PI-041) to pass by residences. Post both enter and exit caution/slow signage to alert contractors.
Pittsylvania	17.2	Barn	No	East	0	1,718	N/A	Protect
Pittsylvania	17.2	House	Yes	East	31	1,857	N/A	Stay within access road TA-PI-043 limits.
Pittsylvania	18.4	Tobacco Shed	No	West	5	29	N/A	Protect
Pittsylvania	18.4	Tobacco Shed	No	West	10	34	N/A	Protect
Pittsylvania	19.1	Garage	No	East	46	108	N/A	Protect
Pittsylvania	19.6	Shed	No	West	34	93	N/A	Protect
Pittsylvania	19.9	Business - auto sales	No	West	35	288	N/A	Stay within access road TA-PI-050 limits.
Pittsylvania	20.2	Garage	No	East	18	35	N/A	Protect
Pittsylvania	20.2	Mobile home	Yes	East	26	81	RSS-H650-004	Install safety fence at limit of workspace extending 100 feet from house.
Pittsylvania	20.3	Car awning	No	East	5	44	RSS-H650-005	Proposed barricade fence. Protect
Pittsylvania	20.3	Mobile home	Yes	East	26	61	RSS-H650-005	The workspace has been adjusted in this location. Proposed barricade fence. Protect
Pittsylvania	22.0	House	Yes	East	45	133	N/A	Protect

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Pittsylvania	22.2	House - fallen down	No	East	0	79	RSS-H650-041	Protect if possible or Remove
North Carolina								
Rockingham	28.1	Shed	No	West	33	3,678	N/A	Protect
Rockingham	29.2	Shed	No	West	37	1,331	N/A	Protect
Rockingham	29.2	Shed	No	West	23	1,217	N/A	Protect
Rockingham	29.2	Shed	No	West	26	1,185	N/A	Protect
Rockingham	29.6	Mobile home	Yes	West	43	1,680	N/A	Protect
Rockingham	30.0	Barn	No	West	0	1,397	RSS-H650-030	Protect
Rockingham	30.0	House	Yes	West	30	1,422	RSS-H650-030	Stay within access road TA-RO-080 limits.
Rockingham	30.5	House - abandoned	No	North	3	43	RSS-H650-031	Protect
Rockingham	30.5	House	Yes	South	29	122	N/A	Protect
Rockingham	30.7	House	Yes	East	40	100	N/A	Protect
Rockingham	31.7	House	Yes	North	46	86	N/A	Protect
Rockingham	32.4	Shed	No	East	4	1,467	N/A	Stay within access road TA-RO-085 limits.
Rockingham	32.5	House	Yes	East	20	1,430	RSS-H650-025	Stay within limits of access road TA- RO-085. Proposed barricade fence 100 linear feet from corner of house.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Rockingham	32.8	Barn	No	West	4	959	N/A	Stay within limits of access road TA-RO-087.
Rockingham	32.8	Barn	No	West	4	1551	N/A	Stay within limits of access road TA- RO-087.
Rockingham	35.4	Shed - abandoned	No	North	0	232	N/A	Protect if possible or remove
Rockingham	35.4	Mobile home	Yes	North	32	512	N/A	Stay within limits of access road TA- RO-092.
Rockingham	35.4	House	Yes	North	27	560	N/A	Stay within limits of access road TA- RO-092.
Rockingham	36.4	Abandoned cabin	No	North	37	97	N/A	Protect
Rockingham	36.5	Abandoned cabin	No	North	32	91	N/A	Protect
Rockingham	36.5	Abandoned cabin	No	North	30	90	N/A	Protect
Rockingham	36.5	Abandoned cabin	No	North	30	93	N/A	Protect
Rockingham	36.6	Barn	No	South	25	64	N/A	Protect
Rockingham	36.6	Garage	No	South	35	150	N/A	Protect
Rockingham	36.6	House	No	South	36	151	N/A	Protect
Rockingham	37.1	House - abandoned	No	East	0	48	RSS-H650-032	Protect if possible or remove.
Rockingham	37.70	House	Yes	West	45	1,365	N/A	Stay within limits of access road TA- RO-102.
Rockingham	39.60	Barn	No	West	12	493	N/A	Stay within limits of access road TA- RO-107.
Rockingham	39.60	Barn	No	West	14	502	RSS-H650-046	Stay within limits of access road TA- RO-107.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Rockingham	39.60	House	Yes	West	12	490	RSS-H650-046	Stay within limits of access road TA- RO-107.
Rockingham	40.3	House	Yes	East	26	65	RSS-H650-034	The workspace has been adjusted in this location. Proposed barricade fence. Protect
Rockingham	40.9	Shed	No	West	44	1,229	N/A	Stay within limits of access road TA- RO-111.
Rockingham	40.9	House	Yes	West	50	1,304	N/A	Stay within limits of access road TA- RO-111.
Rockingham	40.9	Shed	No	West	22	1,313	N/A	Stay within limits of access road TA- RO-111.
Rockingham	41.4	Abandoned Old House	No	West	0	0	RSS-H650-047	Remove
Rockingham	41.4	House	No	West	13	1,514	RSS-H650-048	Stay within limits of access road TA- RO-112.
Rockingham	41.4	House	Yes	West	50	1,697	N/A	Stay within limits of access road TA- RO-112.
Rockingham	41.8	Barn	No	North	23	804	N/A	Stay within limits of access road TA- RO-113A.
Rockingham	42.4	Shed	No	West	9	47	N/A	Protect
Rockingham	43.1	Garage	No	East	5	46	N/A	Protect
Rockingham	43.1	House	No	West	11	114	RSS-H650-039	Protect
Rockingham	43.9	Shed, abandoned	No	East	2	886	N/A	Stay within limits of access road TA- RO-119.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Rockingham	44.1	Shed	No	East	5	1,328	N/A	Stay within limits of access road TA- RO-122.
Rockingham	44.1	Shed	No	East	0	1,615	RSS-H650-026	Protect
Rockingham	44.1	House	Yes	East	3	1,612	RSS-H650-026	Stay within limits of access road TA- RO-122. Proposed barricade fence.
Rockingham	45.0	House - abandoned	No	West	26	110	N/A	Stay within limits of access road TA- RO-125.
Rockingham	46.1	Storage building	No	West	24	718	N/A	Protect
Rockingham	46.1	Shed	No	West	47	750	N/A	Stay within limits of access road TA- RO-127.
Rockingham	46.1	Shed	No	West	0	884	N/A	Stay within limits of access road TA- RO-127.
Rockingham	46.1	Shed	No	West	21	928	N/A	Stay within limits of access road TA- RO-127.
Rockingham	46.1	Mobile home	Yes	North	32	925	N/A	Stay within limits of access road TA- RO-127.
Rockingham	46.1	House	Yes	West	18	1,058	RSS-H650-027	Stay within limits of access road TA-RO-127. Proposed barricade fence.
Rockingham	46.1	House	Yes	West	35	2,205	N/A	Stay within limits of access road TA- RO-127.
Rockingham	49.1	House log cabin, abandoned	No	Crosses	0	0	RSS-H650-001	To be removed
Rockingham	49.2	Dilapidated shack	No	West	0	3	RSS-H650-002	To be removed
Rockingham	49.2	Smoke House	No	East	0	10	RSS-H650-002	To be removed

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Rockingham	49.3	Chicken coop	No	Crosses	0	0	RSS-H650-002	To be removed
Rockingham	49.3	Shed	No	East	0	31	RSS-H650-002	To be removed
Rockingham	49.3	House abandoned	No	East	11	59	RSS-H650-002	The workspace has been adjusted in this location Protect
Rockingham	49.3	Shed	No	East	0	62	N/A	Relocate if possible, or remove.
Rockingham	49.8	Car awning	No	West	44	635	N/A	Stay within limits of access road TA- RO-138.
Rockingham	52.6	Tractor awning	No	North	21	153	N/A	Protect
Alamance	52.9	House	Yes	East	32	125	N/A	Protect
Alamance	53.0	Barn, abandoned	No	East	7	154	N/A	Protect
Alamance	53.0	Barn, abandoned	No	East	20	155	N/A	Protect
Alamance	53.0	Shed	No	East	0	33	N/A	Relocate if possible, or remove.
Alamance	53.0	Falling down wood building	No	East	0	57	N/A	Remove
Alamance	54.7	Barn	No	West	10	1,907	N/A	Stay within limits of access road TA- AL-155.
Alamance	54.7	Barn	No	West	18	1,962	N/A	Stay within limits of access road TA- AL-155.
Alamance	54.7	Barn	No	West	5	1,976	N/A	Stay within limits of access road TA- AL-155.
Alamance	54.7	Barn	No	West	15	2,071	N/A	Stay within limits of access road TA- AL-155.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Alamance	54.7	Barn	No	West	0	2,058	N/A	Protect
Alamance	54.7	Barn	No	West	0	2,210	N/A	Protect
Alamance	54.7	Garage	No	West	21	2,256	N/A	Stay within limits of access road TA- AL-155.
Alamance	54.7	House	No	West	29 b/	2,100	RSS-H650-040	Protect
Alamance	55.1	Shed	No	East	21	126	N/A	Protect
Alamance	56.5 RR	Garage	No	East	35	193	N/A	Protect
Alamance	56.8	Shed	No	West	10	219	N/A	Protect
Alamance	57.3	Shed	No	East	17	73	N/A	Protect
Alamance	57.3	Garage	No	East	15	106	N/A	Protect
Alamance	57.8	Barn, abandoned	No	East	6	120	N/A	Protect
Alamance	57.8	Mobile home	Yes	North	26	83	RSS-H650-008	The workspace has been adjusted in this location. Proposed barricade fence.
Alamance	57.8	Barn	No	East	12	256	N/A	Protect Stay within limits of access road TA- AL-161.
Alamance	58.0	Barn	No	East	18	434	N/A	Stay within limits of access road TA- AL-162.
Alamance	59.1	House	Yes	South	43	115	N/A	Protect
Alamance	59.1	Shed	No	South	0	91	N/A	Protect
Alamance	59.2	House	Yes	South	44	84	N/A	Protect

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Alamance	59.2 RR	Shed	No	North	8	75	N/A	Protect
Alamance	59.2 RR	Shed	No	North	10	106	N/A	Protect
Alamance	59.4 RR	House	Yes	North	47	82	N/A	Protect
Alamance	61.5	Shed	No	East	26	180	N/A	Stay within limits of access road TA- AL-168.
Alamance	61.5	Shed	No	East	38	175	N/A	Stay within limits of access road TA- AL-168.
Alamance	62.5	Shed	No	North	0	327	N/A	Protect
Alamance	62.7	House	No	North	6	515	RSS-H650-037	Protect
Alamance	62.5	Barn	No	North	0	62	N/A	To be removed
Alamance	65.0 RR	Shed	No	Crosses	0	0	N/A	To be removed
Alamance	66.4 RR	Barn	No	Crosses	0	0	N/A	To be removed
Alamance	66.9 RR	Shed	No	West	0	31	N/A	To be removed
Alamance	67.0 RR	Shed	No	East	26	167	N/A	Protect
Alamance	67.0 RR	Barn	No	East	3	43	N/A	Protect
Alamance	67.1 RR	House	Yes	West	16	76	RSS-H650-051	Protect
Alamance	67.1 RR	Barn	No	West	22	82	N/A	Protect
Alamance	67.3 RR	House	Yes	West	18	1,013	RSS-H650-028	Stay within limits of access road TA- AL-180. Proposed barricade fence 100 linear feet from corner of house.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Alamance	67.3 RR	House	Yes	West	8	921	RSS-H650-028	Stay within limits of access road TA- AL-180. Proposed barricade fence 100 linear feet from corner of house.
Alamance	67.3 RR	Barn	Yes	West	12	795	RSS-H650-028	Stay within limits of access road TA-AL-180. Proposed barricade fence 100 linear feet from corner of house.
Alamance	67.3 RR	Barn	Yes	West	15	708	RSS-H650-028	Stay within limits of access road TA- AL-180. Proposed barricade fence 100 linear feet from corner of house.
Alamance	67.3 RR	Barn	Yes	West	2	600	RSS-H650-028	Stay within limits of access road TA- AL-180. Proposed barricade fence 100 linear feet from corner of house.
Alamance	67.9	Barn	No	East	6	1,146	N/A	Stay within limits of access road TA- AL-181.
Alamance	68.2	House	No	West	28	1,203	N/A	Stay within limits of access road TA- AL-181A.
Alamance	68.2	Mobile home	No	West	28	1,143	N/A	Stay within limits of access road TA- AL-181A.
Alamance	68.2	House	Yes	West	43	1,055	N/A	Stay within limits of access road TA- AL-181A.
Alamance	68.2	House	No	West	10	863	RSS-H650-038	Protect
Alamance	68.2	Car port	No	West	34	655	N/A	Stay within limits of access road TA- AL-181A.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Alamance	68.2	Garage	No	West	36	479	N/A	Stay within limits of access road TA- AL-181A.
Alamance	68.6	Barn	No	North	5	76	N/A	Protect
Alamance	69.1	House	Yes	East	26	88	RSS-H650-009	Install safety fence at limit of workspace extending 100 feet from house.
Alamance	69.3	Shed	No	North	7	66	N/A	Protect
Alamance	69.3	Chicken / rabbit coop	No	Crosses	0	0	N/A	Remove or Relocate
Alamance	69.3	Shed	No	North	0	4	N/A	Remove or Relocate
Alamance	69.4	Shed	No	North	31	117	N/A	Protect
Alamance	69.4	Portable building	No	North	32	116	N/A	Protect
Alamance	69.4	Shed in concrete	No	North	28	87	N/A	Protect
Alamance	69.4	Shed	No	North	43	104	N/A	Protect
Alamance	69.5	Shed	No	East	48	117	N/A	Protect
Alamance	69.6 RR	House	Yes	East	13	35	RSS-H650-050	Protect
Alamance	69.6 RR	Store	No	West	2	27	N/A	Protect
Alamance	69.6 RR	Store	No	West	16	76	N/A	Protect
Alamance	69.6 RR	House	Yes	East	31	71	N/A	Protect
Alamance	69.7 RR	House	Yes	West	26	77	N/A	Protect
Alamance	69.7 RR	House	Yes	West	26	98	N/A	Protect

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Alamance	69.7 RR	Abandoned clothing factory	No	East	5	48	N/A	Protect
Alamance	69.9 RR	Abandoned clothing factory	No	East	5	47	N/A	Protect
Alamance	69.9 RR	Commercial building	No	East	0	32	N/A	To be removed
Alamance	70.7	Shed, fallen down	No	West	35	76	N/A	Protect
Alamance	71.4	Green House	No	East	48	107	N/A	Protect
Alamance	71.4	Green House	No	East	38	100	N/A	Protect
Alamance	72.2	Shed	No	East	48	174	N/A	Protect
Alamance	72.7	Garage	No	East	38	97	N/A	Protect
Alamance	72.8 RR	Shed	No	East	16	64	N/A	Protect
Alamance	72.8 RR	Garage	No	West	48	56	RSS-H650-015	N/A
Alamance	72.8 RR	Garage	No	Crosses	0	0	RSS-H650-015	To be removed
Alamance	72.8 RR	Camper	No	Crosses	0	0	RSS-H650-015	To be removed
Alamance	72.8 RR	Shed	No	East	45	182	N/A	Protect
Alamance	72.9 RR	Mobile home	No	West	11	37	RSS-H650-036	Protect
Alamance	72.9 RR	House - Abandoned	No	Crosses	0	0	RSS-H650-036	To be removed
Pittsylvania	CY-01	House	No	North	0	1,511	RSS-H650-033	Install safety fence around the house at a 1-foot off-set from the property line.

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/
Pittsylvania	CY-01	Garage	No	North	0	1,586	RSS-H650-033	Install safety fence around the house at a 1-foot off-set from the property line.
Pittsylvania	CY-03	Warehouse	No	East	0	58,418	N/A	N/A
Rockingham	CY-05	House	No	West	0	15,620	RSS-H650-003	Available for CY office space as offered by the Landowner. Install safety fence around the house at a 1- foot off-set from the property line and 15-foot offset from the house.
Rockingham	CY-05	Fuel bays	No	West	0	15,418	N/A	N/A
Rockingham	CY-05	Truck stop	No	West	0	15,368	N/A	N/A
Rockingham	CY-05	Garage bays	No	West	0	15,325	N/A	N/A
Rockingham	CY-05	Warehouse	No	West	0	14,825	N/A	N/A
Rockingham	CY-05	Garage	No	West	0	14,725	N/A	N/A
Pittsylvania	CY-19	House	Yes	West	26	10,188	RSS-H650-043	The limit of disturbance for the contractor yard will be trimmed to allow 26 feet between the limit of the yard and the residence
Pittsylvania	CY-22	House – Fallen Down	No	West	26	11,527	RSS-H650-044	The limit of disturbance for the contractor yard will be trimmed to allow 26 feet between the limit of the yard and the residence

Appendix E.2

Structures within 50 Feet of the Southgate Project

State, County	Approximate Milepost	Building Type (House, Shed, Garage, etc.)	Occupied (yes/no)	Direction from centerline of easement (North, East, South, West)	Distance from Edge of closest workspace limit (feet)	Distance From Centerline of easement (feet)	Residential Construction Plan Number a/	Mountain Valley Proposed Action a/

a/ See Appendix B-7.
b/ Pending civil survey, approximate distance based on aerial photography.

N/A = Not Applicable.

APPENDIX E.3

Cultural Resources Tables

TABLE 4.10-1

Communications between Mountain Valley and the Virginia and North Carolina SHPOs for the Southgate Project

Date	Type/Author (Affiliation)	Recipient (Affiliation)	Subject
VIRGINIA DEPARTMENT OF HISTORIC RESOURCES			
4/27/2018	Letter – Alex Miller (MV) a/	Roger Kirchen (VADHR)	Project introduction package and request for comment
5/17/2018	Presentation – Alex Miller (MV)	VADHR staff	PowerPoint presentation on Project
6/4/2018	Letter – Alex Miller (MV)	Roger Kirchen (VADHR)	Historic structures work plan, shapefile submittal
7/2/1018	Email – Alex Miller (MV)	Roger Kirchen (VADHR)	Work plans follow up
8/3/2018	Email – Paul Web (TRC)	Roger Kirchen (VADHR)	Plans to file Resource Report (RR) 4 including Unanticipated Discovery Plan (UDP); invitation to site visits
9/14/2018	Roger Kirchen (VADHR)	Alex Miller (MV)	RR 4 review, acceptance of UDP
11/6/2018	Letter – Tracy Millis (TRC)	Roger Kirchen (VADHR)	Submittal of first draft Phase I archaeological survey report and first draft historic architectural survey report
2/13/2019	Letter - Roger Kirchen (VADHR)	Paul Web (TRC)	VA SHPO comments on first draft Phase I archaeological survey report and first draft historic architectural survey report
2/22/2019	Letter – Tracy Millis (TRC)	Roger Kirchen (VADHR)	Submittal of final first Phase I archaeological survey report
2/22/2019	Letter - Tracy Millis (TRC)	Roger Kirchen (VADHR)	Submittal of first draft report on Phase II testing at archaeological sites 44PY271, PY445, and PY451
3/25/2019	Letter – Tracy Millis (TRC)	Roger Kirchen (VADHR)	Submittal of second draft report on Phase II testing at archaeological sites 44PY375, PY449, and PY455
5/3/2019	Email – Paul Webb (TRC)	Rodger Kirchen (VADHR)	Attached PowerPoint slides of 4/25/19 visit to site 31RK217

TABLE 4.10-1

Communications between Mountain Valley and the Virginia and North Carolina SHPOs for the Southgate Project

Date	Type/Author (Affiliation)	Recipient (Affiliation)	Subject
5/10/2019	Letter – Roger Kirchen (VADHR)	Paul Web (TRC)	VA SHPO comments on first draft Phase II testing report
5/16/2019	Letter – Roger Kirchen (VADHR)	Paul Webb (TRC)	VA SHPO comments on report of Supplemental Phase II Testing at sites 44PY375, 44PY449, and 44PY55
10/14/2019	Letter – Tracy Millis (TRC)	Roger Kirchen (VADHR)	Submission of draft preservation and avoidance documentation
11/8/2019	Letter – Roger Kirchen (VADHR)	Paul Webb (TRC)	VA SHPO review of Addendum I Historic Architectural Survey Report
NORTH CAROLINA DEPARTMENT OF NATURAL AND CULTURAL RESOURCES			
4/27/2018	Letter – Alex Miller (MV)	Renee Gledhill-Earley (NCDNCR)	Project introduction package and request for comment
5/10/2018	Presentation – Alex Miller (MV)	NCDNRCR staff	PowerPoint presentation on Project
5/10/2018	Email – Susan Myers (NCDNRCR)	Paul Webb (TRC)	List of historical museums
5/17/2018	Email – Susan Myers (NCDNRCR)	Paul Webb (TRC)	Information on other cultural resources contacts
5/17/2018	Email – Alex Miller (MV)	Renee Gledhill-Earley (NCDNCR)	Project meeting
5/21/2018	Letter – Renee Gledhill-Earley (NCDNRCR)	Alex Miller (MV)	Comments on Project introduction package
5/21/2018	Letter – Ramona Bartos (NCDNCR)	Alex Miller (MV)	Survey recommendation
5/22/2018	Email – Susan Meyers (NCDNCR)	Paul Webb (TRC)	Information on other cultural resources contacts; Alamance and Rockingham listings
5/22/2018	Email – Renee Gledhill-Earley (NCDNCR)	Alex Miller (MV)	Request for map and consultation with federally-recognized tribes, state-recognized tribes, and NC Commission on Indian Affairs
5/29/2018	Email – Renee Gledhill-Earley (NCDNRCR)	Alex Miller (MV)	Request for map; no additional meeting needed

TABLE 4.10-1

Communications between Mountain Valley and the Virginia and North Carolina SHPOs for the Southgate Project

Date	Type/Author (Affiliation)	Recipient (Affiliation)	Subject
5/29/2018	Email – Alex Miller (MV)	Renee Gledhill-Earley (NCDNCR)	Approval to submit shapefiles
6/4/2018	Email – Alex Miller (MV)	Renee Gledhill-Earley (NCDNCR)	Work plans and shapefile submittal
6/12/2018	Telephone call – Paul Webb (TRC)	Susan Myers (NCDNRCR)	Project update; transition to Rosie Blewitt-Golsch
7/3/2018	Email – Paul Webb (TRC)	Rosie Blewitt-Golsch (NCDNCR)	Site number request
7/3/2018	Email – Alex Miller (MV)	NCDNCR	Request for 50 site numbers
7/5/2018	Letter – Renee Gledhill-Earley (NCDNCR)	Alex Miller (MV)	Comments on work plans, shape file; two historic properties may be affected (31AM867 and AM1516)
7/6/2018	Email – Rosie Blewitt-Golsch (NCDNRCR)	Paul Webb (TRC)	Site numbers
7/24/2018	Telephone call – Paul Webb (TRC)	John Mintz (NCDNCR)	Project website inquiry, site visit discussion
7/24/2018	Email – Paul Webb (TRC)	John Mintz (NCDNCR)	Scheduling site visit
7/24/2018	Email – John Mintz (NCDNCR)	Paul Webb (TRC)	Scheduling site visit
7/27/2018	Email – Lindsay Ferrante (NCDNCR)	Paul Webb (TRC)	Scheduling site visit
7/27/2018	Email – Paul Webb (TRC)	Lindsay Ferrante (NCDNCR)	Scheduling site visit
7/27/2018	Email – Lindsay Ferrante (NCDNCR)	Paul Webb (TRC)	Scheduling site visit
8/3/2018	Email – Paul Webb (TRC)	Renee Gledhill-Earley, John Mintz, Lindsay Ferrante, Rose Blewitt-Golsch (NCDNCR)	Site visits; upcoming RR 4 and UDP submittal
8/13/2018	Telephone call – Katie Harville (NCDNRCR)	Alex Miller (MV)	Landowner contact concerning Kerr Scott Farm
8/13/2018	Email – Paul Webb (TRC)	Renee Gledhill-Earley (NCDNCR)	Public version of RR4, privileged Figure 4-5.1
8/13/2018	ftp – Paul Webb (TRC)	Renee Gledhill-Earley (NCDNCR)	Sending privileged version of SHPO correspondence

TABLE 4.10-1

Communications between Mountain Valley and the Virginia and North Carolina SHPOs for the Southgate Project

Date	Type/Author (Affiliation)	Recipient (Affiliation)	Subject
8/13/2018	Email – Paul Webb (TRC)	Renee Gledhill-Earley (NCDNCR)	Revision of Archaeological Survey-Testing-Deep Testing Plan addressing 7/5/18 NCDNCR comments
8/21/2018	Meeting – Alex Miller (MV), Paul Webb, Tracy Milliis (TRC)	Lindsay Ferrante, Rosie Blewitt-Golsch, Kim Urban, Katie Harville (NCDNCR)	Field visit
9/6/2018	Letter - Ramona Bartos (NCDNCR)	Paul Webb (TRC)	Acknowledging receipt of draft survey reports, amended work plans for survey and testing, and approval of the UDP
9/6/2018	Email – Renee Gledhill-Earley (NCDNCR)	Alex Miller (MV)	Comments on revised work plan, RR4, and UDP
9/11/2018	Email – Paul Webb (TRC)	Rosie Blewitt-Golsch (NCDNRCR)	Site numbers requested
9/12/2018	Email – Paul Webb (TRC)	Rosie Blewitt-Golsch (NCDNCR)	Requested information on 31AM431
9/12/2018	Email – Rosie Blewitt-Golsch (NCDNCR)	Email – Paul Webb (TRC)	Site numbers, AM431 site form
9/26/2018	Email – Tracy Millis (TRC)	Rosie Blewitt-Golsch (NCDNCR)	Site numbers request
9/26/2018	Email – Rosie Blewitt-Golsch (NCDNCR)	Email – Tracy Millis (TRC)	Site numbers
10/2/2018	Email – Paul Webb (TRC)	Lindsay Ferrante (NCDNCR)	Setting up October meeting
10/2/2018	Email – Lindsay Ferrante (NCDNCR)	Paul Webb (TRC)	Setting up October meeting
11/6/2018	Letter - Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Submittal of draft Phase I Archaeological Survey reports and draft Historic Architecture Survey reports for NC
12/20/2018	Letter - Renee Gledhill-Earley (NCDNCR)	Tracy Millis (TRC)	NC SHPO comments on draft Phase I Archaeological Survey report and draft Historic Architecture Survey Report for NC
1/14/2019	Telephone call - John Mintz (NCDNCR)	Paul Webb (TRC)	Setting up a site visit

TABLE 4.10-1

Communications between Mountain Valley and the Virginia and North Carolina SHPOs for the Southgate Project

Date	Type/Author (Affiliation)	Recipient (Affiliation)	Subject
1/25/2019	Site Visit Meeting – Paul Webb, Jeff Johnson, Missy Emery, John Haefner, Chandra Wilson (TRC), Rich Estabrook (NextEra)	David Cranfored, Cassandra Pardo (NCDNCR)	Visit to archaeological field work in Alamance County, NC
3/13/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copy of draft Phase II Testing Report for two sites in NC
3/28/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copy of draft Phase I Archaeological Survey Addendum report for NC
4/15/2019	Letter – Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO comments on first draft Phase II Testing Report
4/24/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copy of draft Phase II Testing Report for sites 31RK222, RK259, and RK261
4/29/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copy of final Historic Architectural Survey report
5/3/2019	Email – Paul Webb (TRC)	John Mintz and Rosemarie Blewitt (NCDNCR)	Attached PowerPoint slides of 4/25/19 visit to site 31RK217
5/7/2019	Letter – Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO comments on first draft Phase I Archaeological Survey Addendum I Report
5/13/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copy of draft Addendum Report 1 of the Historic Architectural Survey
5/20/2019	Email –Paul Webb (TRC)	John Mintz and Rosemarie Blewitt (NCDNCR)	Work plan for sites 31AM442 and AM447
5/24/2019	Letter – Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO comments on Phase II Archaeological Testing Report
6/18/2019	Letter – Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO comments on Revised Historic Architectural Survey Report

TABLE 4.10-1

Communications between Mountain Valley and the Virginia and North Carolina SHPOs for the Southgate Project

Date	Type/Author (Affiliation)	Recipient (Affiliation)	Subject
7/1/2019	Letter – Renee Gledhill-Early (NCDNCR)	Tracy Millis (TRC)	NC SHPO comments on Revised Historic Architectural Survey Report
7/22/2019	Letter – Ramona Bartos (NCDNCR)	Ted Karpynec (TRC)	NC SHPO comments on Draft Addendum Historic Architectural Survey Report
7/30/2019	Letter – Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO review of Final Addendum Report
9/19/2019	Letter – Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO review of draft Addendum 2 Archaeological Survey Report
10/2/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copies of draft Treatment Plan for Site 31RK259 and Avoidance Plans for Sites 31RK216, 31RK228, 31RK230, 31RK237, 31RK239, and 31RK261
10/14/2019	Letter – Tracy Millis (TRC)	Renee Gledhill-Earley (NCDNCR)	Conveyed copies of draft Avoidance Plans for Sites 31AM441 and 31AM443
11/18/2019	Letter - Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO review of Final Archaeological Addendum 3 Survey Report
11/18/2019	Letter - Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO review of draft Treatment Plan for 31RK259 and Protection Plans for 31RK216, 31RK228, 31RK230, 31RK237, 31RK239, 31RK261, 31AM441, and 31AM443
12/3/2019	Letter - Ramona Bartos (NCDNCR)	Tracy Millis (TRC)	NC SHPO review of Phase II Archaeological Testing Report

a/ MV = Mountain Valley

TABLE 4.10-2

Indian Tribes and Native American Organizations Contacted by the FERC for the Southgate Project

Indian Tribes or Native American Organizations (contacts)	Sent the FERC's 8/9/18 NOI	Sent Letter from FERC on 10/16/18	Responses to FERC Contacts
FEDERALLY-RECOGNIZED TRIBES			
Absentee Shawnee Tribe of Oklahoma (c/o Edwina Butler-Wolfe, Governor; and Erin Thompson, THPO **a/**)	Yes	Yes	11/1/18 letter to FERC from Devon Frazier THPO conveyed a finding of "no adverse effects" and stated that the Tribe has no objections to the Project. The Tribe remains interested and should be contacted in the event of a discovery during construction
Catawba Indian Nation of South Carolina (c/o William Harris, Chief; and Wenonah Haire, THPO)	Yes	Yes	8/15/19 filing with FERC Caitlin Rodgers stated that Catawba Tribe has no concerns about impacts on traditional cultural properties, sacred sites, or Native American archaeological sites
Cayuga Nation of New York c/o Clint Halftown, Representative	Yes	Yes	None filed to date
Cherokee Nation of Oklahoma (c/o Bill John Baker, Chief; and Elizabeth Toombs, THPO)	Yes	Yes	1/8/19 email to FERC staff from Elizabeth Toombs THPO stating that Pittsylvania County, VA is outside the AOI for the Cherokee Nation of Oklahoma
Chickahominy Indian Tribe of Virginia (c/o Stephen Adkins, Chief)	Yes	No	None filed to date
Chickasaw Nation of Oklahoma c/o Bill Anoatubby, Governor	Yes	No	9/7/18 letter to FERC from Lisa John of Tribal Culture and Humanities Department stated that Virginia and North Carolina are outside of the homeland for the Chickasaw Nation

TABLE 4.10-2

Indian Tribes and Native American Organizations Contacted by the FERC for the Southgate Project

Indian Tribes or Native American Organizations (contacts)	Sent the FERC's 8/9/18 NOI	Sent Letter from FERC on 10/16/18	Responses to FERC Contacts
Choctaw Nation of Oklahoma (c/o Gary Batton, Chief)	Yes	Yes	9/7/18 letter to FERC stated that both Virginia and North Carolina are outside of the Tribe's homeland area. 1/24/19 letter to FERC from Lindsey Bilyeu, Senior Compliance Review Officer, stated that the Project area is outside the area of historic interest for the Choctaw Nation of Oklahoma. 9/18/19 letter to FERC from Lindsey Bilyeu, Senior Compliance Review Officer, stated that the Project is outside of the Tribe's area of historic interest.
Delaware Nation of Oklahoma (c/o Deborah Dotson, President; and Darren Hill, Cultural Preservation)	Yes	Yes	None filed to date
Delaware Tribe of Oklahoma (c/o Chester Brooks, Chief; and Susan Bachor, Historic Preservation)	Yes	Yes	None filed to date
Eastern Band of Cherokee Indians in North Carolina (c/o Richard Sneed, Chief; and Russell Townsend, THPO)	Yes	Yes	None filed to date
Eastern Division of Chickahominy Indian in Virginia (c/o Gerald Stewart)	Yes	Yes	None filed to date
Eastern Shawnee Tribe of Oklahoma (c/o Glenna Wallace, Chief; and Brett Barnes, THPO)	Yes	Yes	None filed to date
Jena Band of Choctaw Indians in Louisiana (c/o Cheryl Smith, Chief; and Alina Shively, THPO)	Yes	Yes	None filed to date

TABLE 4.10-2

Indian Tribes and Native American Organizations Contacted by the FERC for the Southgate Project

Indian Tribes or Native American Organizations (contacts)	Sent the FERC's 8/9/18 NOI	Sent Letter from FERC on 10/16/18	Responses to FERC Contacts
Mattaponi Tribe in Virginia (c/o Mark Custalow, Chief)	Yes	No	None filed to date
Mississippi Band of Choctaw Indians (c/o Phyliss Anderson, Chief)	Yes	Yes	None filed to date
Monacan Indian Nation in Virginia (c/o Dean Branham, Chief)	Yes	Yes	8/3/18 letter to FERC stated that Project would cross Tribe's ancestral lands and may affect properties of cultural significance to the Tribe. Requested meeting with FERC staff 11/16/18 letter to FERC requested Tribal attendance at all planning meetings, and requested copies of all cultural resources investigation reports for Tribal review. 12/31/18 motion to intervene 2/20/19 letter to FERC reiterating previous requests 7/1/19 letter to FERC commenting on cultural resources reports 9/16/19 letter to FERC commented on DEIS 11/11/19 letter to FERC with additional comments on DEIS
Muscogee (Creek) Nation of Oklahoma (c/o Raelynn Butler, Preservation Office)	Yes	Yes	None filed to date
Nansemond Indian Tribe in Virginia (c/o Lee Lockamy, Chief)	Yes	Yes	12/9/18 letter to FERC from Chief Samuel Bass requested meeting with FERC staff

TABLE 4.10-2

Indian Tribes and Native American Organizations Contacted by the FERC for the Southgate Project

Indian Tribes or Native American Organizations (contacts)	Sent the FERC's 8/9/18 NOI	Sent Letter from FERC on 10/16/18	Responses to FERC Contacts
Oneida Indian Nation of New York (c/o Raymond Halbritter, Representative; and Jessie Bergevin, Historian)	Yes	Yes	None filed to date
Oneida Nation of Wisconsin (c/o Tehassi Hill Chair; and Corina Williams, THPO)	Yes	Yes	None filed to date
Onondaga Nation of New York (c/o Sidney Hill, Chief; and Tony Gonyea, Faithkeeper)	Yes	Yes	None filed to date
Ottawa Tribe of Oklahoma (c/o Ethel Cook, Chief)	Yes	No	None filed to date
Pamunkey Indian Tribe in Virginia (c/o Robert Gray, Chief)	Yes	Yes	None filed to date
Poarch Band of Creek Indians in Alabama (c/o Stephanie Bryan, Chair; and Carolyn White, THPO)	Yes	Yes	None filed to date
Rappahannock Tribe in Virginia (c/o Ann Richardson, Chief	Yes	Yes	None filed to date
Saint Regis Mohawk Tribe of New York (Beverly Cook, Chief; and Arnold Printup, THPO)	Yes	Yes	None filed to date
Seneca Nation of New York (c/o Todd Gates, President; and Morris Abrams, THPO)	Yes	Yes	None filed to date
Seneca-Cayuga Nation of Oklahoma (c/o William Fisher, Chief; and William Tarrant, THPO)	Yes	Yes	None filed to date
Shawnee Tribe of Oklahoma (c/o Ron Sparkman, Chief; and Kim Jumper, Preservation Office)	Yes	Yes	None filed to date
Stockbridge-Munsee Community of Wisconsin (c/o Shannon Holsey, President; and Bonney Hartley, THPO)	Yes	No	None filed to date

TABLE 4.10-2

Indian Tribes and Native American Organizations Contacted by the FERC for the Southgate Project

Indian Tribes or Native American Organizations (contacts)	Sent the FERC's 8/9/18 NOI	Sent Letter from FERC on 10/16/18	Responses to FERC Contacts
Tonawanda Band of Seneca in New York (c/o Rodger Hill, Chief; and Kevin Jonathan, NAGPRA Contact)	Yes	Yes	None filed to date
Tuscarora Nation of New York (c/o Leo Henry, Chief; and Neil Patterson, Environmental Program)	Yes	Yes	None filed to date
United Keetoowah Band of Cherokee Indians (c/o Joe Bunch, Chief; and Lisa Stopp, THPO)	Yes	Yes	None filed to date
Upper Mattaponi Tribe in Virginia (c/o Frank Adams, Chief)	Yes	Yes	12/7/18 letter to FERC from Chief Frank Adams requested meeting with FERC staff
STATE-RECOGNIZED NATIVE AMERICAN ORGANIZATIONS			
Cheroenhaka-Nottoway Tribe in Virginia (c/o Walt Brown, Chief)	Yes	No	None filed to date
Cohaire Tribe in North Carolina (c/o Freddie Carter, Chief; and Greg Jacobs, Executive Director)	Yes	No	None filed to date
Haliwa-Saponi Tribe in North Carolina (c/o Ogletree Richardson, Chief; and Michael Richardson, Chair)	Yes	No	None filed to date
Lumbee Tribe of North Carolina (c/o Harvey Godwin, Chair; and Dock Locklear, Administrator)	Yes	No	None filed to date
Meherrin Indian Tribe in North Carolina (c/o Wayne Brown, Chief; and Jonathan Caudill, Chair)	Yes	No	None filed to date
Nottoway Indian Tribe in Virginia (c/o Lynette Allston, Chief)	Yes	No	4/11/19 letter to FERC requesting consultations
Occaneechi Band of the Saponi Nation (c/o W.A. Hayes, Chair; and Vicki Jeffries, Administrator)	Yes	No	10/15/18 letter to FERC requested meeting with FERC staff

TABLE 4.10-2

Indian Tribes and Native American Organizations Contacted by the FERC for the Southgate Project

Indian Tribes or Native American Organizations (contacts)	Sent the FERC's 8/9/18 NOI	Sent Letter from FERC on 10/16/18	Responses to FERC Contacts
Patawomeck Indians of Virginia (c/o John Lightner, Chief)	Yes	No	None filed to date
Sappony Tribe in North Carolina (c/o Otis Martin, Chief; and Dante Desiderio, Executive Director)	Yes	No	8/2/18, 11/16/18, and 2/25/19 letters to FERC requested meeting with FERC staff 7/1/19 letter to FERC commenting on cultural resources reports 9/16/19 letter to FERC commented on DEIS 12/12/19 letter to FERC with additional comments on DEIS
Waccamaw Tribe in North Carolina (c/o Lacy Freeman, Chief; and Brenda Moore, Coordinator)	Yes	No	None filed to date

a/ THPO = Tribal Historic Preservation Officer

TABLE 4.10-3

Indian Tribes and Native American Organizations Contacted by Mountain Valley for the Southgate Project

Indian Tribes and Native American Organizations	Dates Contacted by Mountain Valley	Responses Back to Mountain Valley
FEDERALLY-RECOGNIZED TRIBES		
Absentee Shawnee Tribe of Oklahoma	11/2/18	None filed to date
Catawba Indian Nation in South Carolina	5/31/18, 6/1/18, 6/28/18, 7/11/18, 8/31/18, 9/5/18, 9/28/18, 11/2/18; 2/6/19, 2/27/19, 8/7/19	9/28/18 letter to Mountain Valley from Wenonah Haire, THPO, stated that the Tribe has no concerns about the Project's potential impacts on traditional cultural properties, sacred sites, or Native American archaeological sites 9/5/19 letter to Mountain Valley from Wenonah Haire, THPO, stated that the Tribe has no concerns about the Project's potential impacts on traditional cultural properties, sacred sites, or Native American archaeological sites
Cherokee Nation of Oklahoma	8/31/18, 11/2/18	None filed to date
Cheyenne River Sioux Tribe in South Dakota	6/6/18, 7/11/18, 8/31/18	None filed to date
Chickahominy Tribe in Virginia	5/31/18, 6/1/18, 6/12/18, 6/14/18,6/25/18 6/29/18, 7/11/18, 8/31/18, 9/6/18, 11/2/18; 2/6/19, 2/10/19, 2/27/19, 2/28/19, 8/7/19	5/1/19 meeting between Mountain Valley and Stephen Adkins and Ruth Hennamen regarding investigations
Choctaw Nation of Oklahoma	11/2/18	None filed to date
Delaware Nation of Oklahoma	6/6/18, 7/11/18, 8/31/18, 11/2/18	None filed to date
Delaware Tribe of Oklahoma	6/6/18, 7/11/18, 11/2/18	6/7/18 email to Mountain Valley from Brice Obermeyer stating that the Project is outside the Tribe's AOI
Eastern Band of Cherokee Indians in North Carolina	5/31/18, 6/1/18; 6/11/18, 6/29/18, 7/11/18, 8/31/18, 11/2/18; 2/6/19; 2/27/19, 2/28/19	6/29/18 email to Mountain Valley from Stephen Yerka requesting GIS shapefiles. 10/15/18 email to Mountain Valley from Stephen Yerka, Historic Preservation Specialist, stated that the Project is outside the designated traditional territory of the Tribe
Eastern Division of the Chickahominy Tribe in Virginia	5/31/18, 6/1/18, 6/12/18, 6/14/18, 8/21/18, 8/31/18, 9/6/18, 2/20/19, 2/27/19, 2/28/19, 4/16/19, 8/7/19	None filed to date
Eastern Shawnee Tribe of Oklahoma	6/6/18, 7/11/18, 8/31/18, 11/2/18	None filed to date

TABLE 4.10-3

Indian Tribes and Native American Organizations Contacted by Mountain Valley for the Southgate Project

Indian Tribes and Native American Organizations	Dates Contacted by Mountain Valley	Responses Back to Mountain Valley
Jena Band of Choctaw Indians in Louisiana	11/2/18	None filed to date
Mattaponi Tribe in Virginia	11/2/18	None filed to date
Monacan Indian Nation in Virginia	5/31/18, 6/1/18; 6/12/18, 6/27/18, 7/11/18, 8/9/18, 8/15/18, 8/31/18, 10/9/18, 11/2/18, 2/6/19, 2/21/19, 2/26/19, 2/28/18, 3/29/19, 4/16/19	8/7/18 email from Marion Werkheiser (Cultural Heritage Partners) stating that her law firm represents Monacan Nation 10/9/18 telephone call to Mountain Valley from Marion Werkheiser (Cultural Heritage Partners) requesting updated maps 2/21/19 two emails to Mountain Valley from Ellen Chapman (Cultural Heritage Partners) regarding ftp site access 2/21/19 email to Mountain Valley from Ellen Chapman (Cultural Heritage Partners) acknowledging receipt of survey reports through ftp online site 2/25/19 email from Ellen Chapman (Cultural Heritage Partners) to Mountain Valley regarding confidential report sharing 2/26/19 email from Ellen Chapman (Cultural Heritage Partners) to Mountain Valley regarding confidential report sharing 2/27/19 email from Ellen Chapman (Cultural Heritage Partners) to Mountain Valley regarding project information 4/18/19 telephone call between Mountain Valley and Ellen Chapman (Cultural Heritage Partners) regarding tribal site visit
Muscogee (Creek) Nation of Oklahoma	6/6/18, 7/11/18, 8/31/18, 11/2/18	6/8/18 email to Mountain Valley from LeeAnne Wendt stating that the Project is outside the Tribe's AOI

TABLE 4.10-3

Indian Tribes and Native American Organizations Contacted by Mountain Valley for the Southgate Project

Indian Tribes and Native American Organizations	Dates Contacted by Mountain Valley	Responses Back to Mountain Valley
Nansemond Tribe in Virginia	5/31/18, 6/1/18, 6/11/18, 6/26/18, 7/11/18, 8/31/18, 9/6/18, 11/2/18, 2/6/19, 2/10/19, 2/18/19, 2/27/19, 2/28/19, 4/16/19, 8/7/19	6/11/18 email to Mountain Valley from Lee Lockamy with questions about the Project 4/29/19 telephone call between Mountain Valley and Sam Bass regarding meeting 5/1/19 meeting between Mountain Valley and Barry Bass in which he stated the tribe has no concerns at this point
Oneida Nation of Wisconsin	11/2/18	None filed to date
Ottawa Tribe of Oklahoma	11/2/18	None filed to date
Pamunkey Tribe in Virginia	5/31/18, 8/31/18, 11/2/18 2/6/19, 2/27/19, 2/28/19, 4/16/19	None filed to date
Poarch Band of Creek Indians in Alabama	11/2/18	None filed to date
Rappahannock Tribe in Virginia	5/31/18, 6/5/18, 7/11/18, 8/31/18, 9/6/18, 11/2/18, 2/6/19, 2/10/19, 2/27/19, 2/28/19, 4/16/19	9/6/18 5/10/2019 telephone call between Mountain Valley and Chief Anne Richardson regarding project
Rosebud Sioux Tribe in South Dakota	6/6/18, 6/7/18, 7/11/18, 8/31/18	None filed to date
Saint Regis Mohawk Tribe of New York	11/2/18	None filed to date
Seneca-Cayuga Nation of Oklahoma	11/2/18	None filed to date
Seneca Nation of Indians in New York	11/2/18	None filed to date
Shawnee Tribe of Oklahoma	11/2/18	None filed to date
Stockbridge-Munsee Community of Wisconsin	11/2/18	None filed to date
Tonawanda Band of Seneca in New York	11/218	None filed to date
Tuscarora Nation of New York	6/6/18, 7/11/18, 8/31/18	None filed to date
United Keetoowah Band of Cherokee Indians in Oklahoma	11/2/18	None filed to date
Upper Mattaponi Tribe in Virginia	5/30/18, 6/12/18, 6/25/18, 7/11/18, 8/31/18, 9/6/18, 11/2/18, 2/6/19, 2/27/19, 2/28/19, 4/16/19, 5/1/19, 8/7/19	5/1/19 telephone call between Mountain Valley and Chief Adams regarding reports

TABLE 4.10-3

Indian Tribes and Native American Organizations Contacted by Mountain Valley for the Southgate Project

Indian Tribes and Native American Organizations	Dates Contacted by Mountain Valley	Responses Back to Mountain Valley
STATE-RECOGNIZED NATIVE AMERICANS ORGANIZATIONS		
Cheroenhaka (Nottoway) Tribe in Virginia	8/3/18, 8/31/18, 11/2/18	None filed to date
Cohare Tribe in North Carolina	8/3/18, 8/31/18, 11/2/18	None filed to date
Haliwa-Saponi Indian Tribe in North Carolina	8/3/18, 8/31/18, 11/2/18	None filed to date
Lumbee Tribe in North Carolina	8/3/18, 8/31/18, 11/2/18	None filed to date
Meherrin Indian Tribe in North Carolina	8/3/18, 8/31/18, 11/2/18	None filed to date
Nottoway Tribe in Virginia	8/3/18, 8/31/18, 11/2/18, 4/23/19	4/23/19 email to Mountain Valley from Leroy Hardy confirming email received
Occaneechi Band of the Saponi Nation in North Carolina	8/3/18, 8/6/18, 8/14/18, 8/20/18, 8/31/18, 10/2/18, 10/4/18, 11/2/18, 2/6/19, 2/21/19, 2/25/19, 4/15/19, 5/17/19, 8/7/19, 10/4/19	8/17/18 email to Mountain Valley from Tony Hayes with copy of letter Tribe sent to Alamance County 8/24/18 telephone call to Mountain Valley from Tony Hayes with invitation for company to speak to the Band 10/5/18 email to Mountain Valley from Tony Hayes regarding company presentation to Band 4/15/19 email from Tony Hayes confirming attendance at site visit 5/15/19 telephone call between Mountain Valley and Tony Hayes regarding delivery of reports
Patawomeck Tribe in Virginia	8/3/18, 8/31/18, 11/2/18	None filed to date
Sappony Tribe in North Carolina	8/3/18, 8/9/18, 8/15/18, 8/31/18, 10/9/18, 11/2/18, 2/6/19, 2/21/19, 2/26/19, 2/28/18, 3/29/19	8/7/18 email from Marion Werkheiser (Cultural Heritage Partners) stating that her law firm represents Sappony 10/9/18 telephone call to Mountain Valley from Marion Werkheiser, (Cultural Heritage Partners) requesting updated maps of Project 2/10/19 email to Mountain Valley from Charlene Martin of Sappony stating intention to attend 3/14/19 meeting and site visit 2/21/19 two emails to Mountain Valley from Ellen Chapman (Cultural Heritage Partners) regarding FTP site access

TABLE 4.10-3

Indian Tribes and Native American Organizations Contacted by Mountain Valley for the Southgate Project

Indian Tribes and Native American Organizations	Dates Contacted by Mountain Valley	Responses Back to Mountain Valley
		2/25/19 email from Ellen Chapman (Cultural Heritage Partners) to Mountain Valley regarding confidential report sharing 2/26/19 email from Ellen Chapman (Cultural Heritage Partners) to Mountain Valley regarding confidential report sharing 2/27/19 email from Ellen Chapman (Cultural Heritage Partners) to Mountain Valley regarding project information
Waccamaw Siouan Tribe in North Carolina	8/3/18, 8/31/18, 11/2/18	None filed to date

TABLE 4.10-6

Cultural Resources Issues Raised to the FERC from Citizens During Scoping, and Public Sessions for Comments on the DEIS for the Southgate Project.

Name	Date/Session	Accession No.	Comments
LETTERS FILED WITH THE FERC DURING THE SCOPING PERIOD			
Mel Aldridge and Angela Hinton	August 30, 2018	20180830-0008	Their property has two buildings listed on the Alamance County Architectural Inventory as Historic Places and two family cemeteries dating before 1835
William Fonville	September 5, 2018	200180905-0027	Home was built in late eighteen hundreds
Bruce and Susan Taylor	September 6, 2018	20180906-0014	Historic site (Burlington-Hillsborough Stage Coach Trail) on property
Abigayle Faulkner	September 10, 2018	20180910-5050	Archaeological site 31AM431 on property
Kate Buble	September 10, 2018	20180910-5120	Concerned about impacts on Haw River Trail, Glencoe Mill Village, and Arches Grove United Church of Christ
Susan Moore	September 12, 2018	20180912-0008	Farm dates back to 1810 and includes family cemetery and Native American archaeological site
STATEMENTS MADE AT PUBLIC SCOPING MEETINGS			
Susan Moore	August 20, 2018 Reidsville, NC	20181004-4006; 20180921-4000	Farm dates back to 1810. There is a family cemetery on the property
William Hunt	August 20, 2018 Reidsville, NC	20181004-4006	He is Native American (Lumberton). The Haliwa Tribe is in the area. Project should not interfere with the use of sacred burial grounds. There is a native graveyard on land of neighbor Slate Stones
Jake Helms	August 20, 2018 Reidsville, NC	20180921-4000	Home sits within Car Scott Farm dating to 1760s, listed on state historic register and federal NRHP
Michelle Morris	August 23, 2018 Haw River, NC	20180921-4000	Home of Governor Scott, designed and built by Jessie Ray – Car Scott Farm (AM641) on NRHP
Patsy Madrin	August 23, 2018 Haw River, NC	20180921-4000	Family has been on land since 1819. Sissiphaw Indians on land, found Native American artifacts
LETTERS FILED WITH THE FERC COMMENTING ON THE DEIS			
Robert Wiltaskins	August 19, 2019	20190906-3055	Indian mound would be in the way of the pipeline route
Crystal Chandler	August 22, 2019	20190906-3055	Avoid Deep Creek Church and Cemetery

TABLE 4.10-6

Cultural Resources Issues Raised to the FERC from Citizens During Scoping, and Public Sessions for Comments on the DEIS for the Southgate Project.

Name	Date/Session	Accession No.	Comments
Jeannie Ambrose	September 16, 2019	20190917-0006	Damages to potential archaeological sites and historic structures could occur. What are the mitigation measures that would be taken and when.
Blue Ridge Environmental Defense League	September 16, 2019	20190916-5106	More input from tribes is needed.
Ann Rodgers	September 16, 2019	20190916-5178	Avoid Little Cherrystone historic site
STATEMENTS MADE AT PUBLIC SESSIONS TO TAKE COMMENTS ON THE DEIS			
Amiee Tilley	August 19, 2019 Wentworth, NC	201990923-4000	Church and cemetery near her land
Dr. Walker	August 19, 2019 Wentworth, NC	201990923-4000	Old homeplace built in 1857
Ann Rodgers	August 20, 2019 Chatham, VA	201990923-4001	Interested in FOIA request about cultural resources
Mark Joyner	August 20, 2019 Chatham, VA	201990923-4001	Contact Danville Historical Society. Project may affect Mountain View historical site
Sonja Ingram	August 20, 2019 Chatham, VA	201990923-4001	Send copies of survey reports to Preservation Virginia. Avoid Little Cherrystone historical site and cemetery
Carolyn Hansely-Mece	August 22, 2019 Haw River, NC	201990923-4002	Archaeological surveys not completed
Crystal Cavalier	August 22, 2019 Haw River, NC	201990923-4002	Member of Occaneechi Band of Saponi Nation. There are undocumented graves where the pipeline is going. Clams are culturally utilized
Jason Crazy Bear Tircuit Keck	August 22, 2019 Haw River, NC	201990923-4002	Married into Occaneechi Saponi Tribe. Found where the burial grounds are. Haw River is sacred.

TABLE 4.10-8

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
44PY261 a/	Historic artifact scatter	Not eligible	Not eligible (2/13/19)	None
44PY270 a/	Prehistoric camp with Early and Late Woodland occupations	After testing – Eligible	Potentially eligible (2/13/19)	No additional work in APE - fence and avoid
44PY271 a/	Prehistoric lithic scatter	After testing – Not eligible	Not eligible (5/10/19)	None
44PY281 a/	Prehistoric lithic scatter	Unassessed	Potentially eligible (2/13/19)	Avoid
44PY358 a/	Multi-component: Prehistoric lithic scatter; and Historic isolated find	Unassessed	Unevaluated (2/13/19)	Avoid
44PY375 a/	Multi-component: Prehistoric lithic scatter; and Historic farmstead	After testing – Not eligible	Portion in APE not significant (5/16/19)	None
44PY442 a/	Historic farmstead	Not eligible	Not eligible (2/13/19)	None
44PY445 b/	Historic farmstead	After testing – Not eligible	Portion in APE not significant (5/10/19)	None
44PY446 b/	Prehistoric lithic scatter with an Early Woodland occupation	Not eligible	Not eligible (2/13/19)	None
44PY447 b/	Prehistoric lithic scatter with an Late Archaic and Woodland occupations	Unassessed	Potentially eligible (2/13/19)	Avoid
44PY448 b/	Prehistoric lithic scatter	Not eligible	Not eligible (2/13/19)	None
44PY449 b/	Multi-component: Prehistoric lithic scatter with Woodland occupation; and Historic isolated find	After testing - Eligible	Potentially eligible (2/13/19)	Avoid
44PY450 b/	Prehistoric lithic scatter	Not eligible	Not eligible (2/13/19)	None

TABLE 4.10-8

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
44PY451 b/	Multi-component: Prehistoric lithic scatter; and Historic farmstead	After testing – Not eligible	Portion in APE not significant (5/10/19)	None
44PY452 b/	Prehistoric lithic scatter with Woodland occupation	Unassessed	Unevaluated (2/13/19)	Avoid
44PY453 b/	Multi-component: Prehistoric lithic scatter; and Historic isolated find	Not eligible	Not eligible (2/13/19)	None
44PY454 b/	Historic structural ruins	Unassessed	Potentially eligible (2/13/19)	Avoid
44PY455 b/	Historic structural ruins	After testing – Not eligible	Portion in APE not significant (5/16/19)	None
44PY456 b/	Multi-component: Prehistoric lithic scatter with Woodland occupation; and Historic artifact scatter	Not eligible	Not eligible (2/13/19)	None
44PY457 b/	Prehistoric lithic scatter	Not eligible	Not eligible (2/13/19)	None
44PY458 b/	Prehistoric lithic scatter	Not eligible	Not eligible (2/13/19)	None
44PY459 b/	Prehistoric camp with Early Archaic occupation	Not eligible	Not eligible (2/13/19)	None
44PY460 b/	Prehistoric camp with Early Archaic occupation	Not eligible	Not eligible (2/13/19)	None
44PY473	Prehistoric lithic scatter	Not eligible	Not eligible (11/8/19)	None
44PY474	Prehistoric lithic scatter	Not eligible	Not eligible (11/8/19)	None
44PY475	Prehistoric lithic scatter	Not eligible	Not eligible (11/8/19)	None
44PY476	Multicomponent: Prehistoric lithic	Portion in APE- Not eligible	Unevaluated (11/8/19)	None

TABLE 4.10-8

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
	scatter and Historic artifact scatter			
44PY477/71-5732	Historic farmstead	Potentially eligible	Potentially eligible (11/8/19)	Avoid
44PY478	Historic house	Not eligible	Not eligible (11/8/19)	None
44PY479 c/	Prehistoric camp with Late Archaic, and Middle and Late Woodland occupations	After testing – Eligible	Unknown	Avoid or mitigate

a/ Previously recorded site relocated by Mountain Valley
b/ Site newly recorded by Mountain Valley during 2018 surveys
c/ Site newly recorded by Mountain Valley during 2018-2019 surveys

TABLE 4.10-9

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
ALONG PIPELINE ROUTE					
71-4 Belle Grove Manor a/	House (1796) and cemetery	VADHR (2014) TRC (2019)	Potentially eligible	Unknown	Avoid
b/ 25 Mountain View Manor a/	House (1840) and cemetery	VHLC (1979) TRC (2019)	Listed in NRHP	Unknown	Avoid
36 Little Cherrystone Manor/Wooding Cemetery a/	House (1800) and cemetery	(1969) TRC (2018)	Listed in NRHP	2/13/19 Listed in NRHP	Avoid
5033 Belle Grove Church a/	Church and cemetery (1940)	VDOT (1997) TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5208 a/	House (1946)	Berger (2005) TRC (2018)	Not eligible	2/13/19 Not eligible	None
5209 a/	House (1945)	Berger (2005) TRC (2018)	Not eligible	2/13/19 Not eligible	None
5210 a/	House (1935)	Berger (2005) TRC (2018)	Not eligible	2/13/19 Not eligible	None
5211 a/	Farm with house (1880)	Berger (2005) TRC (2018)	Not eligible	2/13/19 Not eligible	None
5212 a/	Farm with house (1923)	Berger (2006) TRC (2018)	Not eligible	2/13/19 Eligible	Avoid
5218 a/	House (1900)	Berger (2006) TRC (2018)	Not eligible	2/13/19 Not eligible	None
5219 a/	Log tobacco barn (1900)	VADHR (2006) TRC (2019)	Not eligible	Unknown	None
5225 (44PY284) Wells Cemetery a/	Cemetery (1910-1940)	Berger (2005) TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5226 (44PY272) a/	Cemetery	Berger (2006) TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5227 (44PY273) Wallor Family Cemetery a/	Cemetery (1812-1894)	Berger (2005) TRC (2018)	Eligible	2/13/19 Treat as eligible	Avoid
5228 a/	House foundations	Berger (2016) TRC (2019)	Not eligible	2016 Unevaluated	None
5333	House (1900)	TRC (2019)	Not eligible	Unknown	None

TABLE 4.10-9

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
5566	Tobacco barn	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5567 Lowe Residence	Farm with house (1952)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5585	House (1965)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5586	House (1965)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5588	House (1950)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5594	House (1936)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5595 Perkins Cemetery	Farm with houses (1900, 1960) and cemetery	TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5597	House (1940)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5598 Norfolk Southern Railroad	Active railroad (1894)	TRC (2018)	Potentially eligible	2/13/19 Treat as eligible	Avoid or research
5599	House (1964)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5600	Tobacco barn	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5601	Storage shed associated with mobile home	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5602	House (1888)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5604	House (1964)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5615	House (1960)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5622	Cemetery (1918)	TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5623	Cemetery	TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5723	House (1960)	TRC (2019)	Not eligible	Unknown	None
5724	House (1961)	TRC (2019)	Not eligible	Unknown	None

TABLE 4.10-9

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
5728	Log house and tobacco barn	TRC (2019)	Not eligible	Unknown	None
WITHIN YARDS AND STAGING AREAS					
5525 a/ Gafford Cemetery	Cemetery associated with Gafford house	New South Associates (2017) TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5526 Gafford House a/	House (1850)	New South Associates (2017) TRC (2018)	Not eligible	6/27/17 Not eligible 2/13/19 Not eligible	None
5727 Norfolk Southern Railroad	Active railroad (1929)	TRC (2019)	Potentially eligible	Unknown	Avoid or mitigate
5730	House (1963)	TRC (2019)	Not eligible	Unknown	None
5731 Cascade Primitive Baptist Church	Church (1920) and cemetery	TRC (2019)	Not eligible	Unknown	Avoid
5732 (44PY477)	Houses (1900) and cemetery	TRC (2019)	Potentially eligible	Unknown	Avoid or mitigate
5733	House (1900)	TRC (2019)	Not eligible	Unknown	None
5734	House (1940)	TRC (2019)	Not eligible	Unknown	None
5735	Cemetery	TRC (2019)	Not eligible	Unknown	Avoid
5736	Farm with two houses (1900 and 1944)	TRC (2019)	Not eligible	Unknown	None
5737	Building ruins	TRC (2019)	Not eligible	Unknown	None
5738	Commercial building	TRC (2019)	Not eligible	Unknown	None
5739	House (1969)	TRC (2019)	Not eligible	Unknown	None
5740	House (1969)	TRC (2019)	Not eligible	Unknown	None
5741	House (1973)	TRC (2019)	Not eligible	Unknown	None
5742	Tobacco barn	TRC (2019)	Not eligible	Unknown	None
ALONG ACCESS ROADS					
71-5219 a/	Tobacco barn (1900)	Berger (2006) TRC (2019)	Not eligible	Unknown	None

TABLE 4.10-9

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
5222 Giles Log House a/	House (1930)	Berger (2006) TRC (2018)	Potentially eligible	2/13/19 Potentially eligible	Avoid
5521 a/	Farm with house (1900)	Berger (2006) TRC (2018)	Not eligible	2/13/19 Not eligible	None
5524 Transco Compressor Station 165 a/	Industrial facility (1949)	New South (2015) TRC (2019)	Not eligible	Unknown	None
5545 a/	House (1958)	Cardno (2018) TRC (2019)	Not eligible	Unknown	None
5570	Farm with house (1920)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5571 Batterman Family Farm	Farm with house (1923)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5572	House (1939)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5581	Farm with house (1935)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5582	Farm with house (1950)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5583	Farm with house (1870)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5584	Farm with house (1940)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5592	Tobacco barn (1870)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5593	House, tobacco barn, and cemetery	TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5596 Green Cemetery	Cemetery	TRC (2018)	Not eligible	2/13/19 Not eligible	Avoid
5606 Keatts Farm	Farm with houses (1880, 1970)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5607	Farm with house (1920)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5608	House (1950)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5609	Farm with house (1900)	TRC (2018)	Not eligible	2/13/19 Not eligible	None

TABLE 4.10-9

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in Virginia

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
5612	Farm with house (1870)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5614	House (1880)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5618	House (1966)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5619	Tobacco barn (1881)	TRC (2018)	Not eligible	2/13/19 Not eligible	None
5620	Cemetery	TRC (2019)	Not eligible	Unknown	Avoid
5712	House (1880)	TRC (2019)	Not eligible	Unknown	None

a/ Previously recorded site relocated by Mountain Valley

b/ All site numbers for historic architectural sites recorded in Pittsylvania County, Virginia have the prefix "71" – which is deleted from this table because it is redundant

TABLE 4.10-10

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
ALAMANCE COUNTY				
31AM414	Multi-component: Prehistoric lithic scatter with Early and Late Archaic occupations; and Historic artifact scatter	Not eligible in APE	Unassessed (12/20/18) Not eligible in APE (12/3/19)	Fence and avoid
31AM416	Prehistoric lithic scatter	Not eligible	Not eligible (12/29/18)	None
31AM424	Prehistoric lithic scatter	Not eligible	Not eligible (12/29/18)	None
31AM425	Prehistoric lithic scatter with a Middle Archaic occupation	Not eligible	Not eligible (12/29/18)	None
31AM426	Multi-component: Prehistoric lithic scatter and Historic artifact scatter	Not eligible	Not eligible (12/29/18)	None
31AM427	Historic springhouse	Not eligible	Not eligible (12/29/18)	None
31AM428	Multi-component: Prehistoric lithic scatter with a Woodland occupation; and Historic artifact scatter	Not eligible	Not eligible (12/29/18)	None
31AM432	Prehistoric lithic scatter with a Woodland occupation;	Not eligible	Not eligible (12/29/18)	None
31AM435	Prehistoric lithic scatter with Middle and Late Archaic occupations	Not eligible	Not eligible in direct APE; unassessed outside (12/20/18)	None
31AM437	Prehistoric lithic scatter	Not eligible	Not eligible (12/29/18)	None
31AM438	Multi-component: Prehistoric lithic scatter; and Historic artifact scatter	Not eligible	Not eligible in APE (5/7/19)	None
31AM439	Historic structure and artifact scatter	Not eligible	Not eligible in APE (5/7/19)	None

TABLE 4.10-10

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
31AM440	Prehistoric lithic scatter	Not eligible	Not eligible (5/7/19)	None
31AM441	Prehistoric lithic scatter with Woodland occupation	Unassessed	Needs additional investigations (5/7/19)	Avoid
31AM442	Prehistoric lithic scatter with Middle to Late Woodland occupations	Not eligible in APE	Unassessed (5/7/19) Not eligible in APE (12/3/19)	Fence and avoid
31AM443 Deep Creek Primitive Baptist Church	Historic church (1890) and cemetery	Not eligible	Not eligible (5/7/19)	Avoid
31AM445	Multi-component: Prehistoric isolated artifact and Historic artifact scatter	Not eligible in APE	Not eligible (9/19/19)	None
31AM447	Prehistoric lithic scatter with a Woodland occupation	Not eligible in APE	Unassessed (9/19/19) Not eligible in APE (12/3/19)	None
31AM451	Prehistoric lithic scatter with Woodland occupation	Unassessed	Unassessed Avoid (11/18/19)	Avoid
31AM452	Prehistoric lithic scatter	Unassessed	Potentially eligible (11/18/19)	Avoid or test
31AM454	Prehistoric lithic scatter with Middle Archaic occupation	Not eligible	Not eligible (11/18/19)	None
31AM455	Prehistoric lithic scatter	Not eligible	Not eligible (11/18/19)	None
ROCKINGHAM COUNTY				
31RK44 a/	Multi-component: Prehistoric lithic scatter with Woodland occupation; and Historic artifact scatter	Unassessed	Unassessed (12/20/18)	Avoid
31RK97 a/	Prehistoric lithic scatter with Middle Archaic and Late Woodland occupations	Unevaluated	Needs additional investigations (5/7/19)	Test

TABLE 4.10-10

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
31RK216	Historic cemetery	Not eligible	Unassessed (12/20/18)	Avoid
31RK217	Prehistoric lithic scatter with Late Woodland occupation	Not eligible in APE	Unassessed (12/20/18) Not eligible in APE (12/3/19)	Avoid with HDD
31RK220	Historic ruins and artifact scatter	Not eligible	Not eligible (12/29/18)	None
31RK221	Historic ruins and artifact scatter	After testing – Not eligible	Unassessed (12/20/18) Not eligible in APE (4/15/19)	None
31RK222	Prehistoric lithic scatter with a Woodland occupation	After testing - Eligible	Eligible (5/24/19)	Avoid
31RK225	Prehistoric lithic scatter with a Woodland occupation	Not eligible	Not eligible (12/29/18)	None
31RK226	Prehistoric lithic scatter	Not eligible	Not eligible (12/29/18)	None
31RK228	Historic cemetery	Not eligible	Unassessed (12/20/18)	Avoid
31RK229	Historic ruins and artifact scatter	Unassessed	Unassessed (12/20/18)	Test
31RK230	Historic ruins and artifact scatter	Unassessed	Unassessed (12/20/18)	Avoid
31RK234 Settle Cemetery RK1531	Historic cemetery (1829 – 1900)	Unassessed	Unassessed (12/20/18)	Fence and avoid
31RK235	Multi-component: Prehistoric lithic scatter with Early Archaic and Woodland occupations; and Historic artifacts	After testing Not eligible in APE	Not eligible in APE (12/3/19)	Avoid
31RK236	Historic cemetery	Not eligible	Not eligible	Avoid
31RK237	Historic cemetery	Not eligible	Unassessed (12/20/18)	Avoid
31RK238	Prehistoric lithic scatter	After testing Not eligible	Not eligible in APE (4/15/19)	None
31RK239	Prehistoric lithic scatter	Unassessed	Unassessed (12/20/18)	Avoid

TABLE 4.10-10

Archaeological Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Cultural Type	TRC Evaluation	SHPO Evaluation (Date)	Future Work
31RK242	Prehistoric lithic scatter	Not eligible	Not eligible (12/20/18)	None
31RK243	Prehistoric lithic scatter with Late Archaic occupation	Not eligible	Unknown	None
31RK244	Historic ruins and artifact scatter	Not eligible	Not eligible in direct APE; unassessed outside (12/20/18)	None
31RK245	Multi-component: Prehistoric lithic scatter; and Historic ruins and artifact scatter	After testing – Not eligible	Not eligible (12/20/18)	None
31RK247	Multi-component: Prehistoric lithic scatter; and Historic artifact scatter	After testing Not eligible	Unassessed (12/20/18) Not eligible in APE (12/3/19)	Fence and avoid
31RK249	Prehistoric lithic scatter	Not eligible	Not eligible (12/20/18)	None
31RK259	Prehistoric lithic scatter with a Late Woodland occupation	After testing - Eligible	Eligible (5/24/19) Accepted Treatment Plan (11/18/19)	Mitigate
31RK261	Prehistoric lithic scatter with a Late Woodland occupation	After testing -- Eligible – non-contributing in APE	Eligible (5/24/19)	Avoid
31RK262	Prehistoric lithic scatter	Not eligible	Not eligible (5/7/19)	None
31RK266	Prehistoric lithic scatter	Not eligible	Not eligible in APE (5/7/19)	None
31RK268	Prehistoric lithic scatter	Not eligible	Not eligible in APE (5/7/19)	None

a/ Previously recorded site relocated by Mountain Valley

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
ALONG PIPELINE ROUTE					
Alamance County					
AM203/1516 a/ T.M. Holt Mfg	Textile mill (1844)	NCDAH (1978) TRC (2018) (April 2019)	Not eligible	12/20/18 Likely eligible 7/1/19 Not eligible	None
AM209 John Ruffines House	House	Lounsbury 1978 TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM225 a/ Triple A Mill House	House (1890)	Alamance County (1978) TRC (2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM266 a/ Jim McClure House	House (1897)	Alamance County (1978) TRC (2018) (April 2019)	Potentially eligible – No effect	12/20/18 May be eligible 7/1/19 No effect	None
AM350 a/ Robertson House	House (1890)	Alamance County (1978) TRC (2018) (April 2019)	Potentially eligible – No effect	12/20/18 May be eligible 7/1/19 No effect	None
AM360 a/ Chesley Roney House	House (1890)	ACHPC (2014) TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM447 a/ Captain Sam Vest House	House (1896)	Alamance County (1978) TRC (2018) (April 2019) (December 2019)	Eligible – No effect	12/20/18 May be eligible 7/1/19 No effect	None
AM867 a/ Granite Mill	Textile mill (1844)	Fearnbach (2017) TRC (2018) (April 2019)	Listed in NRHP – No effect	12/20/18 Listed in NRHP	Avoid
AM1520 a/ J.M. Jordan House	House (1915)	Briggs (2002) TRC (November 2018) (April 2019)	Not eligible	12/20/18 Assessment incomplete 6/18/19 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM1522 a/ G.L. Lewis Farmstead	House (1910)	Bakau et al. (2001) TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM1603 a/ Deep Creek Primitive Baptist Church	Church (1890) & cemetery	ACHPC (2014) TRC (May 2019)	Not eligible	7/22/19 Not eligible	Avoid
AM2407/2408 a/ Cora Mill/ Tabardrey Mill Warehouse	Textile mill (1895)	Kim et al. (2002) TRC (November 2018) (April 2019)	Not eligible	12/20/18 Assessment incomplete 7/18/19 Not eligible	None
AM2506 Ace Speedway	Automobile race track (1956)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2538	House (1939)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2539	House (1915)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2544	House (1950)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2557	House (1950)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2558	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2559	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2560	House (1957)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM2561	House (1952)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2562	House (1956)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2563	House (1956)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2565	House (1957)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2566	House (1954)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2567	House (1954)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2568	House (1954)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2569	House (1960)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2570	House (1958)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2571	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2572	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2573	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2574	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM2575	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2576	House (1954)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2577	House (1958)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2578	House (1956)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2579	House (1956)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2580	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2581	House (1958)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2582	House (1958)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2583	House (1958)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2584	House (1920)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2585 First Baptist Church of Haw River	Church (1960)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2586 Remnants & Textiles Decorative Fabrics	Commercial structure (1956)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM2587	House (1961)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2588 Edwards Automotive Products and Childrey House WWII Home Front Museum	Commercial buildings (1947 & 1950)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2589	House (1917)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2590 R. Flynt Building	Commercial structure (1920)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2592	Commercial structure (1903)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2593	House (1924)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2594	House (1929)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2595	Warehouse (1968)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2597	Commercial structure (1901)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2598	Culvert (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2600	House (1920)	TRC (November 2018) (April 2019)	Not eligible	6/18/19 Not eligible	None
AM2601	House (1912)	TRC (November 2018) (April 2019)	Not eligible	6/18/19 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM2602	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2603 North Carolina Railroad	Two-sets active railroad tracks (1894)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2610	House (1954)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2611	Commercial structure (1960)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2613	Commercial structure (1966)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2617	House (1973)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2618	House (1973)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2619	House (1964)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2620	House (1955)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2621	House (1935)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2622	House (1900)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2625	House (1971)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2626	House (1971)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2627	House (1974)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2629	Houses (1952 - 1969)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2630	House (1971)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2631	House (1893)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM2632	House (1900)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2635	House (1910)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2636	House (1972)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2648	House (1952)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2649	House (1940)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2650	House (1928)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2652	House (1962)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2653	House (1936)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2655	House (1950)	TRC (October 2019)	Not eligible	Unknown	None
AM2656	House (1938)	TRC (October 2019)	Not eligible	Unknown	None
Rockingham County					
RK1661	House (1947)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1664 Abandoned former bus station	Commercial structure (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1668 RK1792	Outbuilding	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1676	Tobacco barn (1930)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1681	Tobacco barn (1920)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
RK1682	Farmstead with house (1932)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1685	House (1930)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1689	Tobacco barn (1920)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1696	House (1962)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1699	House (1947)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1701	House (1906)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1702	Commercial structure (1932)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1704 American Tobacco Company Plant	Commercial structure (1920)	TRC (November 2018) (April 2019)	Not eligible	6/18/19 Not eligible	None
RK1705	House (1949)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1706	House (1947)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1707	House (1925)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1708	House (1929)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1711	House (1950)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
RK1717	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1718	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1719	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1720	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1721	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1722	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1723	House (1940)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1745	House (1955)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1758	Farm with house (1926)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1760	Tobacco barn (1930) and shed	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1768	House (1900)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1790	House (1924)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1791	House (1947)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1792	Farm with house (1921)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
RK1793	House (1955)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1794	House (1970)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1796	House (1915)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1798	House (1911)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1799	House (1956)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1800	House (1920)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1801	House (1962)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1818	Farm with house (1958)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1819	Farm outbuildings (1945)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
RK1820	Log house (1940)	TRC (May 2019)	Not eligible	7/22/18 Not eligible	None
WITHIN YARDS AND STAGING AREAS					
Guilford County					
GF1536 Shopping Strip	Commercial structures (1972)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
GF9109	House (1927)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
GF9110	House (1970)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
GF9111	House (1969)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
GF9114	House (1957)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
GF9115	Commercial structure (1960)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
GF9116 Norfolk Southern Railroad	Two sets active railroad tracks (1894/1939)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
Rockingham County					
RK1769 Norfolk Southern	Two active sets of railroad tracks (1894)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1770 First Baptist Church of Draper	Church (1962)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1802 Norfolk Southern	One set of active railroad tracks (1894)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1803	Commercial plant (1967)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1804	Commercial (1973)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1808	House (1932)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1811	Commercial (1922)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1812	House (1945)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
ALONG ACCESS ROADS					
Alamance County					
AM2527	House (1942)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2564	House (1954)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
AM2623	House (1955)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2624	House (1969)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
AM2634	House (1960)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2644	House (1961)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2645	House (1930)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2646	House (1963)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2647	House (1950)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
AM2654	House (1972)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
Rockingham County					
RK1086 a/ part of Willow Oak Plantation	Barn (1890)	Butler et al. (1975) TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1396 a/	House (1900)	Woodward (2002) TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1672	Hunting cabin (1970)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1738	Farmstead with house (1900)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1753	House (1967)	TRC (November 2018) (April 2019)	Not eligible	12/20/18 Not eligible	None
RK1784	House (1946)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1787	Farm with house (1959)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1789	House (1936)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1795	House (1971)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None

TABLE 4.10-11

Historic Architectural Sites Identified by Mountain Valley in the Direct APE of the Southgate Project in North Carolina

Site Number (Name)	Type (Year Built)	Recorder (Year)	TRC Evaluation	SHPO Evaluation	Future Work
RK1797	House (1965)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1821	House (1950)	TRC (May 2019)	Not eligible	7/22/19 Not eligible	None
RK1822	House (1930)	TRC (December 2019)	Not eligible	Unknown	None

a/ Previously recorded site

APPENDIX F.1

Figures of Projects Contributing to Cumulative Impacts

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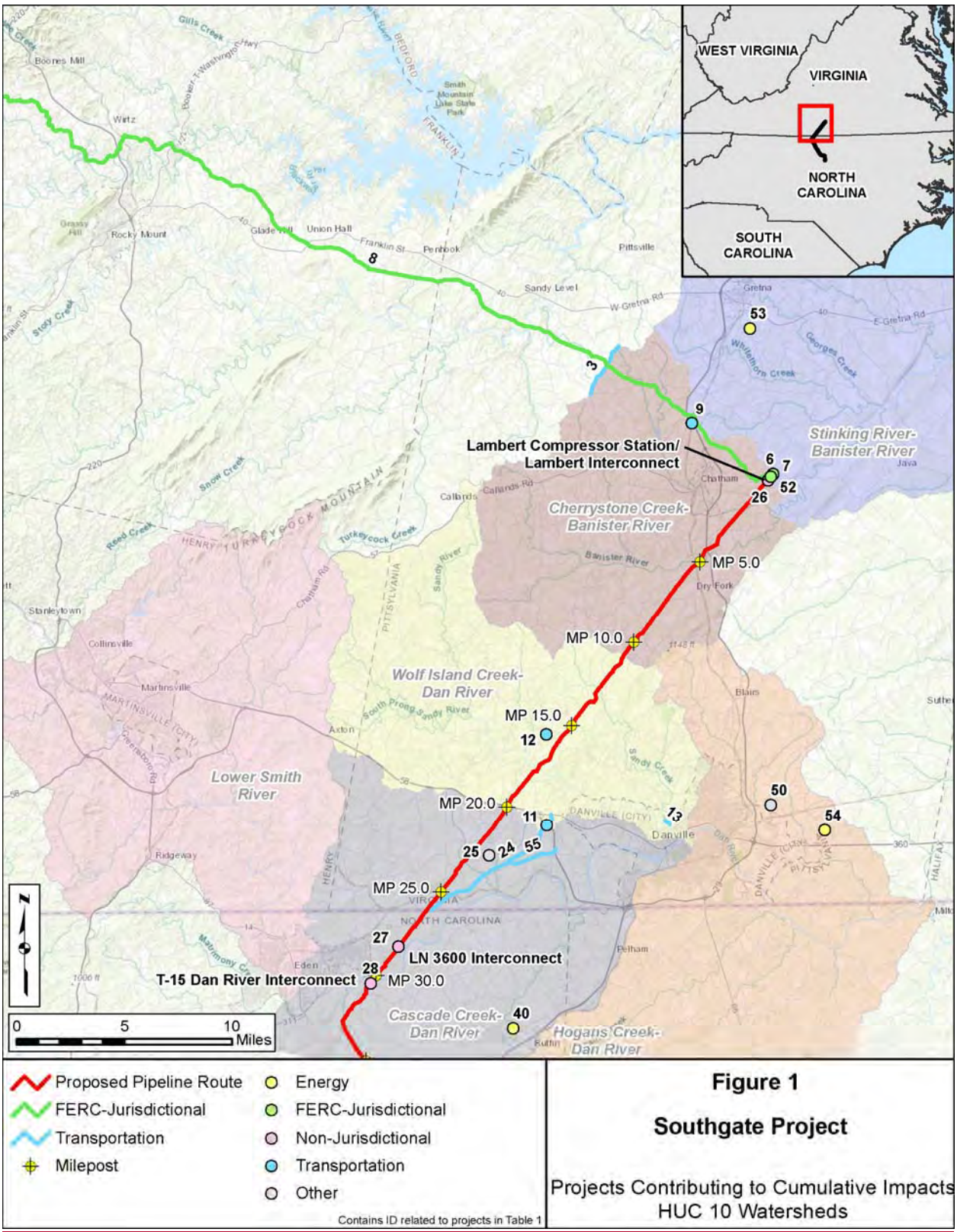
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
Lambert Compressor Station/
Lambert Interconnect
MP 5.0
MP 10.0
MP 15.0
MP 20.0
MP 25.0
MP 30.0
LN 3600 Interconnect
T-15 Dan River Interconnect
Stinking River-Banister River
Cherrystone Creek-Banister River
Wolf Island Creek-Dan River
Lower Smith River
Cascade Creek-Dan River
Hogans Creek-Dan River
0 5 10 Miles
Proposed Pipeline Route
FERC-Jurisdictional
Transportation
Milepost
Energy
FERC-Jurisdictional
Non-Jurisdictional
Transportation
Other
Contains ID related to projects in Table 1
Figure 1
Southgate Project
Projects Contributing to Cumulative Impacts
HUC 10 Watersheds

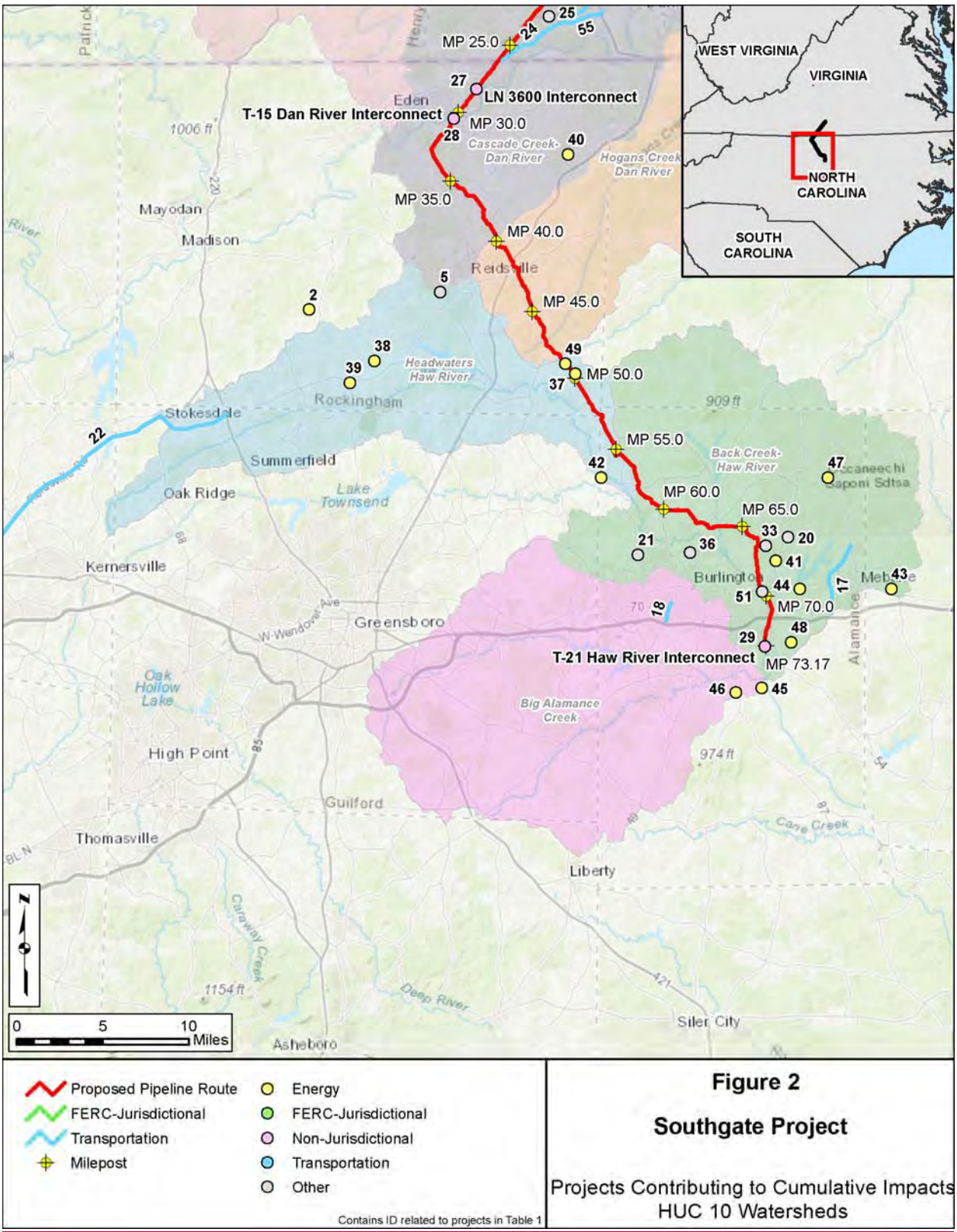

Figure 2

Southgate Project

Projects Contributing to Cumulative Impacts
HUC 10 Watersheds

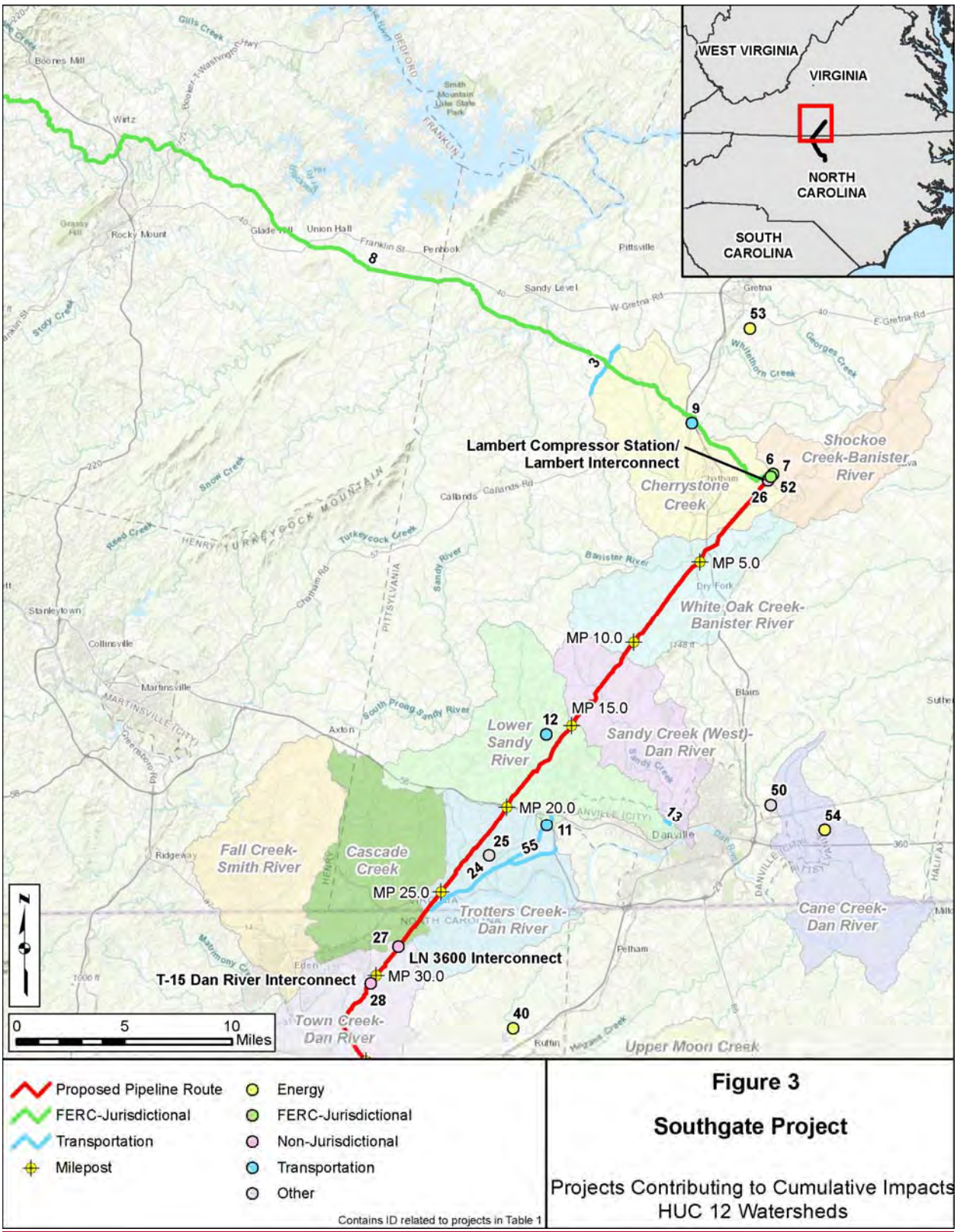

Figure 3

Southgate Project

Projects Contributing to Cumulative Impacts
HUC 12 Watersheds

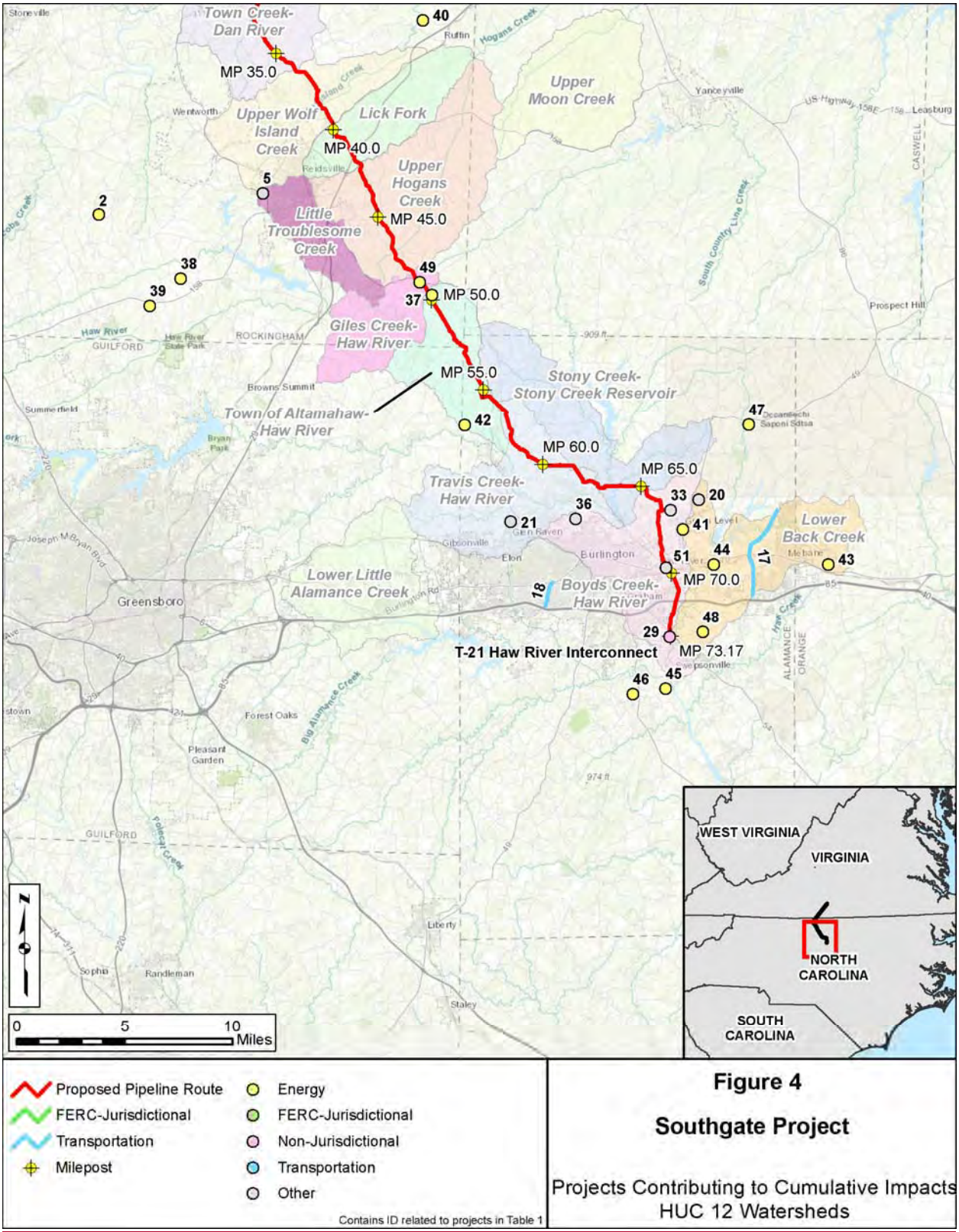

Figure 4

Southgate Project

Projects Contributing to Cumulative Impacts
HUC 12 Watersheds

APPENDIX F.2

Table of Other Projects in the Geographic Scope of Analysis Considered for Cumulative Impacts

APPENDIX F.2

Other Projects in the Geographic Scope of Analysis Considered for Cumulative Impacts

Project Type	Project ID / Project Facility a/	Description of Facilities	Temporal Status	Acres Affected b/	Approximate Distance from Southgate Project d/	Shared Watershed (Level HUC-12)	Socioeconomics/ Environmental Justice	Water Resources and Wetlands	Vegetation, Wildlife and Fisheries	Land Use, Recreation, and Visual Resources	Cultural Resources	Air Quality and Noise
[No Shared HUC 10 watershed] (Rockingham County, NC) c/												
Energy Projects	(2) Reidsville Energy Center	500 MW natural gas electric generating facility owned by NTE Energy in Rockingham County, North Carolina.	Construction to start Summer 2019, pending financing	20 acres	12 miles	No shared HUC 12 watershed	X					
Stinking River – Banister River HUC 10 Watershed (Pittsylvania County, VA) c/												
Energy Projects	(53) Whitehorn Solar, LLC	50 MW Solar PV System will deliver power to the existing high-voltage transmission line in the area owned by VA Electric Power Company.	Application for Special Use Permit approved by Pittsylvania County June 4, 2019. NOI submitted June 5, 2019.	700 acres	8 miles	No shared HUC 12 watershed	X	X				X
Cherrystone Creek-Banister River HUC 10 Watershed (Pittsylvania County, VA) c/												
FERC-jurisdictional Natural Gas Interstate Transportation Projects	(6) Virginia Southside Expansion	Also shares Stinking River-Banister River HUC 10 watershed. Approximately 10 miles (out of 100 miles total) of new 24-inch diameter pipeline from Transco mainline in Pittsylvania County, Virginia and into Halifax, Charlotte, and Mecklenburg. Terminates in Brunswick County, Virginia. Construction of CS 166 in Pittsylvania County, Virginia. Operated by Transco.	In-service	1,454.3 acres for construction 119.0 acres for operation	0.4 miles	Cherrystone Creek Shockoe Creek-Banister River	X	X	X	X	X	X
FERC-jurisdictional Natural Gas Interstate Transportation Projects	(52) Virginia Southside Expansion II	Also shares Stinking River-Banister River HUC 10 watershed. Upgrades to CS 166 in Pittsylvania County, Virginia. Modifications to 19 existing facilities in North Carolina and Virginia. Construction activities in Brunswick and Greensville County, Virginia. New CS in Prince William County, Virginia	In-service	180.1 acres for construction 29.3 acres for operation	0 miles	Cherrystone Creek Shockoe Creek-Banister River	X	X	X	X	X	X
FERC-jurisdictional Natural Gas Interstate Transportation Projects	(8) Mountain Valley Pipeline	Also shares Stinking River-Banister River HUC 10 watershed. Approximately 303 miles of 42-inch pipeline and 3 new compressor stations from northwestern West Virginia to southern Virginia. Operated by Mountain Valley Pipeline, LLC and Equitrans, LP	Under Construction.	6,363.4 acres for construction 2,117.8 acres for operation	0 miles	Cherrystone Creek Shockoe Creek-Banister River	X	X	X	X	X	X
FERC-jurisdictional Natural Gas Interstate Transportation Projects	(7) Southeastern Trail	Also shares Stinking River-Banister River HUC 10 watershed Approximately 7.7 miles of 42-in. pipeline looping facilities in Virginia, horsepower additions at existing compressor stations in Virginia, and piping and valve modifications on other existing facilities in South Carolina, Georgia, and Louisiana Compressor Station 165 upgrade in Chatham, VA within Pittsylvania County, VA. Operated by Transco.	Application Filed April 2018. Construction to begin Q3 of 2019. Planned in-service November 2020	466 acres construction 42.6 acres for operation	0.4 miles	Cherrystone Creek	X	X	X	X	X	X
Non-Jurisdictional Facilities associated with Southgate	(26) Lambert interconnect and MLV 1	New interconnecting facility to the Mountain Valley Pipeline system via the H-605 pipeline	Will be reviewed by local agencies prior to construction	20.5 acres construction 11.7 acres operation	0 miles	Cherrystone Creek7	X	X	X	X	X	X

APPENDIX F.2

Other Projects in the Geographic Scope of Analysis Considered for Cumulative Impacts

Project Type	Project ID / Project Facility a/	Description of Facilities	Temporal Status	Acres Affected b/	Approximate Distance from Southgate Project d/	Shared Watershed (Level HUC-12)	Socioeconomics/ Environmental Justice	Water Resources and Wetlands	Vegetation, Wildlife and Fisheries	Land Use, Recreation, and Visual Resources	Cultural Resources	Air Quality and Noise
Transportation/ Roadway Projects	(3) Climax Road Widening	Road widening to a minimum of 20 feet to accommodate traffic	Planning	Not Available	8.9 miles	Cherrystone Creek						
Transportation/ Roadway Projects	(9) U.S. Route 29 South over Norfolk Southern Railroad / VADOT	Replacement of the bridge on U.S. Route 29 South over Norfolk Southern Railroad with approaches on this Principal Rural Arterial roadway in Pittsylvania County	Complete 2017	0.4 acres	4.4 miles	Cherrystone Creek	X	X	X			X
Wolf Island Creek-Dan River HUC 10 Watershed (Henry/**Pittsylvania Counties, VA) c/**												
Transportation/ Roadway Projects	(11) Route 58 over Route 311 / VADOT	About 3.3 million in upgrades to the intersection of Berry Hill Road and U.S. 58 West of Danville to accommodate traffic for the nearby Berry Hill Road industrial Park	Planning	8 acres	2.0 miles	Lower Sandy River						
Transportation/ Roadway Projects	(12) Stony Mill Road / VADOT	The construction of a single lane roundabout at the intersection of Stony Mill Road and Tunstall High Road- 2.2 million	Planning	0.4 acres	0.5 miles	Lower Sandy River						
Transportation/ Roadway Projects	(13) Mount Cross Road / VADOT	A two-phase plan to widen Mount Cross Road to the city limits, making the road a five-lane section with a two-way center turn lane with a new park and ride lot and sidewalk -17 million	Planning	3.3 acres	6.1 miles	Sandy Creek (West) –Dan River						
Cascade Creek-Dan River HUC 10 Watershed (Caswell/**Rockingham Counties, NC and** Henry/**Pittsylvania Counties, VA) c/**												
Non-Jurisdictional Facilities associated with Southgate	(27) LN 3600 Interconnect and Receipt Meter Station	New interconnect to the East Tennessee pipeline system near MP 28.2	Will be reviewed by local agencies prior to construction	4.8 acres construction 0.7 acres operation	0 miles	Cascade Creek	X	X	X	X	X	X
Energy Projects	(40) Old Road Solar	5 MW facility. CPCN issued January 10, 2017	Projected in-service date was October 2016. No construction to-date	18 acres	5.8 miles	No shared HUC 12 watershed	X	X				
Non-Jurisdictional Facilities associated with Southgate	(28) T-15 Dan River Interconnect and MLV 4	New interconnect to the PSNC distribution system near MP 30.4	Will be reviewed by local agencies prior to construction	5.2 acres construction 0.8 acres operation	0 miles	Town Creek – Dan River	X	X	X	X	X	X
Commercial/Industrial Projects	(25) Berry Hill Industrial Park	A 3,500 acres mega-park open for potential development owned by City of Danville and Pittsylvania County. 133 acres of site preparation occurred in March 2017. No further development has occurred at the site	Planning. No construction to-date.	133 acres	1.3 miles	Trotters Creek – Dan River						
Transportation/ Roadway Projects	(24) Berry Hill Road / VADOT	Also crossed Wolf Island Creek – Dan River HUC 10 watershed. Reconstruction of Berry Hill Road in order to accommodate more traffic- 23.7 million	Planning	Not Available	2 miles	Trotters Creek - Dan River						
Transportation/ Roadway Projects	(55) Route 311 Connector Road	Construction of a connector road from the existing interchange of State Route 1260 and US Route 58	Planning – Construction to begin Sept 2022- May 2025	Not Available	3.5 miles	Trotters Creek - Dan River	X	X	X			X
Hogans Creek-Dan River HUC 10 Watershed (Caswell/**Rockingham Counties, NC and Pittsylvania County, VA) c/**												

APPENDIX F.2

Other Projects in the Geographic Scope of Analysis Considered for Cumulative Impacts

Project Type	Project ID / Project Facility a/	Description of Facilities	Temporal Status	Acres Affected b/	Approximate Distance from Southgate Project d/	Shared Watershed (Level HUC-12)	Socioeconomics/ Environmental Justice	Water Resources and Wetlands	Vegetation, Wildlife and Fisheries	Land Use, Recreation, and Visual Resources	Cultural Resources	Air Quality and Noise
Commercial/Industrial Projects	(50) Panaceutics Research and Development Facility / Panaceutics, Inc.	Panaceutics, a manufacturer of personalized medicine and nutrition solutions, will invest $5.8 million to establish a research and development and high-tech manufacturing facility in the Ringgold East Industrial Park in Pittsylvania County, Virginia.	Under Construction	112 acres	10 miles	No shared HUC 12 watershed	X	X				
Energy Projects	(54) Danville Farm Solar	12 MW facility to be developed by Strata Solar Services, LLC on land previously used as a golf course.	Planning. Small Renewable Energy Project Permit received by VADEQ July 10, 2019	185 acres	13 miles	Cane Creek – Dan River	X	X	X			X
Headwaters Haw River HUC 10 Watershed (Guilford/Caswell/**Rockingham/Alamance Counties, NC) c/**												
Residential Projects	(5) Carter Ridge / Keystone Homes	Carter Ridge new construction homes, Carter Ridge Drive, Reidsville, NC	Under Construction	30 acres	5 miles	Little Troublesome Creek	X	X	X			
Energy Projects	(38) Gallant Solar Farm	45 MW facility, CPCN issued March 27, 3018	Projected online June 1, 2019	276 acres	10 miles	No shared HUC 12 watershed	X	X				
Energy Projects	(49) Husky Solar, LLC	7.02 megawatt DC solar photovoltaic facility located on both sides of NC Highway 87 adjacent to Project at MP 49	In operation; Permitted prior to 2015	29 acres	0 miles	Giles Creek-Haw River	X	X	X	X	X	X
Energy Projects	(42) Osceola Solar Project	5 MW facility.	Permitted 2016. Projected in-service September 1, 2017	70 acres	1.8 miles	Town of Altamahaw – Haw River	X	X	X			
Transportation/ Roadway Projects	(22) U.S. 158 (Reidsville Road) Improvements / NCDOT	Proposed 18.8-mile widening of U.S. 158 from U.S. 421/Business 40 in Winston-Salem to U.S. 220 in Guilford County	In Development	71 acres	18.6 miles	No shared HUC 12 watershed						
Energy Projects	(39) Washington Solar Farm	5 MW solar facility. CPCN issued September 9, 2015	Projected online December 2016	30 acres	13 miles	No shared HUC 12 watershed	X	X				
Energy Projects	(37) Cypress Creek Renewables Solar Farm	174,000 MW 600 acre solar farm. Adjacent to Southgate Project at MP 50	Permitted; Construction to begin in 2019	341 acres	0 miles	Giles Creek - Haw River	X	X	X	X	X	X
Back Creek-Haw River HUC 10 Watershed (Guilford/Caswell/**Alamance Counties, NC) c/**												
Non-Jurisdictional Facilities associated with Southgate	(29) T-21 Haw River Interconnect and MLV 8	New interconnect to the PSNC distribution system and the terminus for the Southgate project	Will be reviewed by local agencies prior to construction	1.4 acres construction 0.6 acres operation	0 miles	Boyds Creek – Haw River	X	X	X	X	X	X
Energy Projects	(48) Kimery Road Solar Farm	2 MW Solar Facility	Planning	Not available	1.5 miles	Lower Back Creek	X	X	X			
Energy Projects	(43) Bakatsias Solar Farm	5 MW facility. CPCN issued November 6, 2017.	Expected in-service December 20, 2017	24 acres	7.0 miles	Lower Back Creek	X	X	X			
Residential Projects	(36) Brassfield Meadows	New construction housing development; 18 units	Under Construction	5 acres	1.7 miles	Boyds Creek – Haw River	X	X	X			
Transportation/ Roadway Projects	(17) NC 119 Relocation / NCDOT	Proposed relocation of a portion of N.C. 119 in Mebane – from I-85 to existing the N.C. 119 near Mrs. White Lane	In Development	12 acres	5 miles	Lower Back Creek						
Energy Projects	(41) Green Level-Charles Drew Solar Farm	5 MW solar energy facility	Projected online March 30, 2019	5 acres	0.9 miles	Boyds Creek – Haw River	X	X	X	X	X	X

APPENDIX F.2

Other Projects in the Geographic Scope of Analysis Considered for Cumulative Impacts

Project Type	Project ID / Project Facility a/	Description of Facilities	Temporal Status	Acres Affected b/	Approximate Distance from Southgate Project d/	Shared Watershed (Level HUC-12)	Socioeconomics/ Environmental Justice	Water Resources and Wetlands	Vegetation, Wildlife and Fisheries	Land Use, Recreation, and Visual Resources	Cultural Resources	Air Quality and Noise
Residential Projects	(20) LGI Homes- Bedford Hills	New construction housing development single family homes near 111 Pillow Ln., Burlington, NC	Under Construction	95 acres	1.5 miles	Lower Back Creek	X	X	X			
Residential Projects	(21) Forest Creek / True Homes	New construction housing development 5 new homes in development	Under Construction	40 acres	3.5 miles	Travis Creek – Haw River	X	X	X			
Energy Projects	(47) Necal Solar Farm	5 MW solar facility. CPCN issued November 28, 2017	Planning	42 acres	5.3 miles	No shared HUC 12 watershed	X	X	X			
Energy Projects	(44) Norris Solar Farm	5 MW solar facility. Application September 9, 2016. Projected in-service December 31, 2017	In service	24 acres	1.9 miles	Lower Back Creek	X	X	X			
Resource Extraction	(33) East Alamance Quarry	Gravel, sand, crushed stone aggregates operation. Owned and operated by Martin Marietta Materials, Inc.	In operation	240 acres for operation.	0.1 miles	Boyds Creek – Haw River	X	X	X	X	X	X
Residential Projects	(51) Granite Mill	Development of 176 apartments and 15,000 sq. ft. of commercial space in an abandoned mill.	Planning	6 acres	0 miles	Boyds Creek – Haw River	X	X	X	X	X	X
Big Alamance Creek HUC 10 Watershed (Guilford/**Alamance Counties, NC) c/**												
Energy Projects	(46) Woodgriff Solar	3 MW solar facility	Intent to construct permit expires June, 2019	38 acres	3.2 miles	No shared HUC 12 watershed	X	X	X			
Transportation/ Roadway Projects	(18) N.C. 62 Widening - Ramada Road to U.S. 70 / NCDOT	Proposed widening an approximately 1-mile stretch of N.C. 62 to improve traffic flow and safety	In Development	9 acres	4 miles	No shared HUC 12 watershed						
Energy Projects	(45) Southwick Solar Farm, LLC	3 MW solar facility	Application filed 2017; pending site review	26 acres	2.5 miles	No shared HUC 12 watershed	X	X				

a/ Contains ID related to projects illustrated on Figures 1 through 4.

b/ Acres affected includes the acreage of project that occurs within the watershed and not just the county shared with the Southgate Project. Acreages are estimated based on information available from various sources including the FERC eLibrary, the North Carolina Utilities Commission Website, the Virginia and North Carolina Department of Transportation websites, County websites, Bing aerials, and Google Earth imagery. Estimated acres affected are not based on final engineered project designs, as that level of detail is not available for all other projects. With the exception of the Virginia Southside Expansion project, the Transco Southeastern Trail project, and the MVP Pipeline project, acres affected by construction and operation are assumed to be the same.

c/ HUC-10 Watersheds/counties/states identified in bold indicate watersheds and counties that the Southgate Project would cross. County names that are not bolded are located within a shared HUC-10 watershed, but are not crossed by the Southgate Project.

d/ Distance estimate from Southgate Project centerline.

APPENDIX G

List of Preparers

LIST OF PREPARERS

Federal Energy Regulatory Commission

Mardiney, Amanda – Project Manager
M.A., Environmental Resource Policy, George Washington University, 2012
B.S., Biology, University of Maryland, College Park, 2009

Peconom, John – Deputy Project Manager
B.S., Environmental Biology and Management, University of California at Davis, 2000

Fink, Jennifer – Water Resources
M.A. Environmental Policy, George Washington University, 2016
B.S., Environmental Science, University of Delaware, 2010

Fox-Fernandez, Nancy – Vegetation, Wildlife, T&E
M.S., Natural Resources: Wildlife, Humboldt State University, 2006
B.A., Psychology, Skidmore College, 1993

Friedman, Paul – Cultural Resources
M.A. History, University of California at Santa Barbara, 1980
B.A., Anthropology and History, University of California at Santa Barbara, 1976

Griffin, Robin – Land Use
M.S., Environmental Management, Illinois Institute of Technology, 1999
B.A., English Composition, DePauw University, 1992

Jensen, Andrea – Soils, Geology
B.S., Environmental Geology, College of William and Mary, 2012

Jeudy, Harry – Environmental Engineer – Air Quality, Noise, and Reliability & Safety
B.S., Mechanical Engineering, Pennsylvania State University, 2000

Munoz, Kelley – Socioeconomics, Land Use
B.S., Environmental Science, Lubbock Christian University, 1997

Cardno, Inc.

Jacks, Allen – Project Manager, Biological Resources Task Lead, Project Description,
M.S., Ecology, Coastal Zone Studies, University of West Florida, 1997
B.S., Biology, Georgia College and State University, 1994

Brena, Jeanette– Air and Noise
M.S., Environmental Engineering, Washington State University, 1997
B.S., Civil Engineering, Seattle University, 1996

Brewer, John – Wildlife, Threatened and Endangered Species, Aquatics
M.S., Marine Biology, University of Alaska, Fairbanks, 2007
B.S., Wildlife Ecology and Conservation, Animal Science, University of Florida, 1997

Briggs, Stephanie – Vegetation, Wetlands
B.S., Biological Sciences, Marine Biology, University of Maryland, 1998

Ferris, Jennifer – Cultural Resources
M.A., Anthropology, Washington State University, 2008
B.A., Anthropology, University of Washington, 2001

Marsey, Peter – GIS Figures
M.A., Geography, University of Toronto, 2004
B.A., Geography, University of Delaware, 2001

Moreira, Bruce– Water Resources
M.S., Forest Resources, University of Minnesota, 2001
B.A., Biology, Reed College, 1996

Peters, Duane – Physical Resources Task Lead, Safety and Alternatives
B.S., Environmental Science, Slippery Rock University, 1997

Sechrist, Kim – Social Science Task Lead, Land Use, Socioeconomics
M.S., Environmental Science, Towson University, 2006
B.A., Biology, McDaniel College, 2004

Wallace, Jennifer – Project Scope Task Lead, Cumulative Impacts
M.S., Marine Policy, University of Delaware, 2003
B.S., Oceanography / Environmental Science, Florida Institute of Technology, 2000

Yates, Josh – Geology, Soils
M.S., Geology, University of South Florida, 2013
B.S., Natural Resources Management and Engineering, University of Connecticut, 2005

Cardno, Inc. is a third party contractor assisting the Commission staff in reviewing the environmental aspects of the project application and preparing the environmental documents required by NEPA. Third party contractors are selected by Commission staff and funded by project applicants. Per the procedures in 40 CFR 1506.5(c), third party contractors execute a disclosure statement specifying that they have no financial or other conflicting interest in the outcome of the project. Third party contractors are required to self-report any changes in financial situation and to refresh their disclosure statements annually. The Commission staff solely directs the scope, content, quality, and schedule of the contractor's work. The Commission staff independently evaluates the results of the third-party contractor's work and the Commission, through its staff, bears ultimate responsibility for full compliance with the requirements of NEPA.

APPENDIX H

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APPENDIX I.1

Comments on the Draft EIS and Responses

Southgate Project
Comments on the Draft EIS and Responses

INTRODUCTION

Between the issuance of the Notice of Availability (NOA) for the draft Environmental Impact Statement (EIS) on July 26, 2019, and the close of the comment period on September 16, 2019, the Federal Energy Regulatory Commission (FERC) received approximately 98 individual written letters commenting on the draft EIS, including 3 letters from federal agencies, 3 letters from state agencies; 1 letter from state representatives; 2 letters from a local government agencies and officials; 5 letters from Native American tribes; 33 letters from companies and organizations (including submittals that combined letters from different organizations/individuals under one accession number); and 51 letters from individuals. In addition, we held 3 public comment sessions during the draft EIS comment period, which provided interested parties with an opportunity to present verbal comments on our analysis of the environmental impacts of the Project as described in the draft EIS. A total of 49 verbal comments and 16 written comments were provide at the sessions. We also received several (14) comment letters filed after the close of the official comment period, which we have considered and included in the analysis to the extent possible1.

This appendix presents our responses to relevant comments provided on the draft EIS. Comments are classified as follows:

- FA: Federal agencies and elected officials
- NAT: Native American Tribes
- EO: Elected Officials
- SA: State/Commonwealth agencies
- TA: Town/City agencies
- CO: Companies and Organizations
- IND: Individuals

Appendix I.1 includes an index of comments on the draft EIS, including the FERC accession number, agency/organization/name of the commenter, date the comments were filed, and a comment code. Appendix I.2 provides our responses to the majority of comments that were filed utilizing general comment codes, which are defined as follows:

- GEN: General comments
- ALT: Alternatives

[1] Note that our response to comment includes some comments filed after the end of the official comment period.

- GEO: Geology
- SOIL: Soils
- GW: Groundwater
- SURF: Surface Waters
- WET: Wetlands
- WILD: Wildlife
- AQU: Aquatic Resources
- SOCIO: Socioeconomics
- CULT: Cultural Resources
- AIR: Air Quality
- NOISE: Noise
- SAFE: Reliability and Safety
- CI: Cumulative Impacts
- T&E: Threatened, Endangered, and Other Special Status Species
- LU: Land Use, Recreation, Special Interest Areas, and Visual Resources

Some comments were addressed via a "side-by-side" approach due to the complexity or scope of the comments, or for which our responses in appendix I.2 did not apply. These additional comments are addressed individually in appendix I.3. Most of the comment letters addressed via the side-by-side approach also contained attachments and appendices that were not direct comments on the draft EIS or the Project. These attachments have not been included in this final EIS appendix, but can be found on the FERC eLibrary filed under the applicable accession numbers.

Appendix I.1
Index of Commenters on the Southgate Draft EIS

Letter Code	Commenter Name/Affiliation	Accession Number	Comment Code(s)
Federal Agencies			
FA-1	U.S. Environmental Protection Agency	20190913-5090	Appendix I.3 Side by Side Responses
FA-2	U.S. Fish and Wildlife Service	20190916-5160	Appendix I.3 Side by Side Responses
Elected Officials			
EO-1	State Rep. Riddell and Ross	20190916-5090	Appendix I.3 Side by Side Responses
State Agencies			
SA-1	NC Economic Development Association	20190826-0031	GEN-3
SA-2	Virginia DEQ	20190911-5102	Appendix I.3 Side by Side Responses
SA-4	North Carolina DEQ	20190916-5167	Appendix I.3 Side by Side Responses
SA-5	NC Wildlife Resource Commission	20190916-5189	Appendix I.3 Side by Side Responses
SA-6	NC Dept. of Natural and Cultural Resources	20190930-0238	Appendix I.3 Side by Side Responses
Town/City Agencies and Elected Officials			
TA-1	Town of Carrboro of Alderman	20190916-5034	GEN-6, CI-2, SURF-1, SOCIO-1, GEN-2
TA-2	City of Burlington	20190916-5076	Appendix I.3 Side by Side Responses
Native American Tribes			
NAT-1	Catawba Tribe - Caitlin Rogers	20190815-5093	CULT-8
NAT-2	Sappony Tribe	20190917-5006	Appendix I.3 Side by Side Responses
NAT-3	Sappony Tribe	20190917-5009	Same letter as NAT-2
NAT-4	Monacan Indian Nation	20190917-5014	Appendix I.3 Side by Side Responses
NAT-5	Sappony Tribe	20190917-5018	Same letter as NAT-2
NAT-6	Choctaw Nation of Oklahoma	20190918-5064	CULT-6
NAT-7	Monacan Indian Nation	20191112-5077	Appendix I.3 Side by Side Responses

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Letter Code	Commenter Name/Affiliation	Accession Number	Comment Code(s)
NAT-8	Sappony Tribe	20191212-5122	Appendix I.3 Side by Side Responses
Companies and Organizations			
CO-1	Virginia Petroleum Council	20190821-5131	GEN-3
CO-2	Virginia Foundation for Research and Economic Education	20190904-0100	GEN-3
CO-3	VA Oil and Gas Association	20190906-0006	GEN-3
CO-4	Teamsters National Pipeline Labor Management Trust	20190909-0027	GEN-3
CO-5	NC Chamber	20190910-0025	GEN-3
CO-6	Mountain Valley Pipeline	20190913-5134	Appendix I.3 Side by Side Responses
CO-7	Blue Ridge Environmental Defense League	20190916-5022	Appendix I.3 Side by Side Responses
CO-8	Friends of the Shenandoah	20190916-5024	Appendix I.3 Side by Side Responses
CO-9	Good Stewards of Rockingham	20190916-5030	Appendix I.3 Side by Side Responses
CO-10	Dan River Basin Association	20190916-5035	ALT-2, GEN-2, GEN-6
CO-11	Food & Water Watch	20190916-5043	CI-1
CO-12	Sierra Club	20190916-5054	GEN-1, GEN-6, SAFE-1, GEN-2, CI-1, GW-1
CO-13	VA chamber of commerce	20190916-5069	GEN-3
CO-14	Southern Environmental Law Center	20190916-5074	Appendix I.3 Side by Side Responses
CO-15	Sierra Club	20190916-5084	GW-1, GEN-1, GEN-4, GEN-6, CI-1
CO-16	Food & Water Watch	20190916-5105	GEN-1, SURF-1, GEN-6
CO-17	Blue Ridge Environmental Defense League	20190916-5106	Appendix I.3 Side by Side Responses
CO-18	Consumer Energy Alliance	20190916-5128, 20190923-0030	GEN-3
CO-19	Pipeliner's Union	20190916-0010	GEN-3
CO-20	Protect Our Water Heritage Rights	20190916-5143	GEN-6
CO-21	Chesapeake Climate Action Network	20190916-5147	GEN-2, GEN-4, GEN-6, CI-1

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CO-22	Haw River Assembly	20190916-5155	Appendix I.3 Side by Side Responses
CO-23	Institute for Policy Integrity - NYU	20190916-5158	CI-1
CO-24	Appalachian Mountain Advocates	20190916-5161	Appendix I.3 Side by Side Responses
CO-25	Blue Ridge Environmental Defense League	20190917-5178	Appendix I.3 Side by Side Responses
CO-26	Appalachian Voices	20190917-5007	Appendix I.3 Side by Side Responses
CO-27	Atlantic Coast Pipeline	20190916-5191	Appendix I.3 Side by Side Responses
CO-28	Appalachian Voices	20190917-5010	Appendix I.3 Side by Side Responses
CO-29	Transcontinental Gas Pipe Line Corporation	20190918-5032	Appendix I.3 Side by Side Responses
CO-30	VA Forest Conservation Partnership	20190809-5084	Appendix I.3 Side by Side Responses
CO-31	Blue Ridge Environmental Defense League	20191016-5100	GEN-8
CO-32	Consumer Energy Alliance	20190916-5128, 20190923-0030	GEN-3
CO-33	Eden Chamber of Commerce	20190906-3055	GEN-3
CO-34	Jorge Aguilar - Food & Water Watch	20190923-4001	CI-1, CI-3, GEN-4
CO-35	Chatham Resident	20190906-3055	GEN-2, SOCIO-1
CO-36	Rachel Velez: Clean Water for NC	20190923-4002	GW-1, SURF-1, GEN-6
CO-37	Mr. Joyner: Danville Historical Society	20190923-4001	Appendix I.3 Side by Side Responses
CO-38	Sonja Ingram: Preservation Virginia	20190923-4001	Appendix I.3 Side by Side Responses
CO-39	Deep Creek Church & Cemetery	20190906-3055	Appendix I.3 Side by Side Responses
CO-40	NC Economic Development Association	20190826-0031	GEN-3
CO-41	Public Service Company of North Carolina	20191017-5115	GEN-3

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Individuals			
IND-1	Katie Whitehead	20190808-5029	GEN-5
IND-2	Mark Stevens	20190812-5003	ALT-1
IND-3	Janak Patel	20190814-5005	Appendix I.3 Side by Side Responses
IND-4	David Hill	20190816-5054	Appendix I.3 Side by Side Responses
IND-5	Mary E D Ryan	20190820-5065	GEN-1
IND-6	Denise DerGarabedian	20190821-5035	GEN-2, GEN-1, CULT-1, GEO-2, GEO-3
IND-7	Cheryl Garrity	20190821-5041	GEN-1, GW-1, ALT-1, SOCIO-2, LU-2
IND-8	Eleanor M Amidon	20190823-5141	Appendix I.3 Side by Side Responses
IND-9	Eleanor M Amidon	20190823-5142	GEN-6, CI-1, ALT-2, SURF-2
IND-10	Joshua Lobe	20190826-5001	GEN-1, AIR-1, GEN-7
IND-11	Angela Herbin	20190826-5003	GEN-2, LU-1, LU-5, SAFE-1
IND-12	Jeanne Eichinger	20190826-5025	SURF-7, SAFE-1, SURF-2
IND-13	Lori Thorn	20190826-0032	GEN-6, GEN-7, SAFE-2, SOCIO-1, GEN-2
IND-14	John Runkle	20190828-5094	GEN-2
IND-15	David Naylor	20190827-0013	SAFE-1, SAFE-2, GEN-2, SOCIO-1, LU-1
IND-16	John Heise & Lori Dyer	20190830-5013	Appendix I.3 Side by Side Responses
IND-17	Lewise Busch	20190904-0099	CI-2
IND-18	Wayne Kirkpatrick	20190910-5005	GEN-1, GEN-7, GEN-2
IND-19	Katie Whitehead	20190910-5007	Appendix I.3 Side by Side Responses
IND-20	Beth Kreydatus	20190912-5000	GEN-1, GEN-6
IND-21	Larry Shambley	20190912-5090	ALT-3
IND-21a	Larry Shambley	20190912-5100	ALT-3
IND-22	Jean Robinson	20190912-5093	GEN-1, GEN-2, GEN-4, GEN-6

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IND-23	Perry Slade	20190912-0017	GEN-1, LU-1, GEN-7, ALT-4, SAFE-1, GW-1, SURF-1
IND-24	DeNeika Barnard	20190916-5000	GEN-1
IND-25	Pamela Taylor Turner	20190916-5003	GEN-1, SOCIO-3
IND-26	Karen Bearden	20190916-5004	CI-1, ALT-2
IND-27	Patsy Madren	20190916-5007	ALT-2, LU-1, GW-1, LU-4, GEN-1, GEN-2, GEN-6, SOCIO-1
IND-28	Maury Johnson	20190916-5031	Appendix I.3 Side by Side Responses
IND-29	Robert Pollok	20190916-5038	LU-1, LU-5
IND-30	Christopher Lish	20190916-5029	Appendix I.3 Side by Side Responses
IND-31	Richie & Penny Richmond	20190916-5108	GEN-2, GEN-4, GEN-6
IND-32	Fred Lehman	20190916-5130	GEN-2
IND-33	Thelma Sharon Garbutt	20190916-5174	GEN-2, SURF-1, SOCIO-2, GW-1, GEN-6, GEO-2
IND-34	Lisa Glassco	20190917-5000	GEN-1
IND-35	Sandra Cook	20190917-5004	GEN-1, GEN-2, SURF-1
IND-36	Katie Whitehead	20190916-5190	Appendix I.3 Side by Side Responses
IND-37	Jeannie Ambrose	20190917-0006	Appendix I.3 Side by Side Responses
IND-38	Joseph Brancoti	20190919-0007	GEN-1, GEN-2, GEN-6
IND-39	Jesse Epperson	20190910-5132	GEN-2, CI-1
IND-41	Katie Whitehead	20191118-5029	Appendix I.3 Side by Side Responses
IND-42	T Butler	20190906-3055	GEN-6
IND-43	Andrea Cook	20190906-3055	WET-1, GEN-1
IND-44	Randy & Lisa Hall	20190906-3055	GEN-2, GEN-6, SAFE-1, SURF-1, GW-1, SAFE-2, SOCIO-1
IND-45	Herman Johnson	20190906-3055	GEN-7
IND-46	Carroll Lassiter	20190906-3055	CI-1, GEN-1
IND-47	Owen Ray McKenzie Jr	20190906-3055	LU-1

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IND-48	Deborah Smith	20190906-3055	AIR-2, GEN-1
IND-49	Dr, J William & Kenan Walker	20190923-4000	GEN-7, GEN-1, LU-1, SAFE-1
IND-50	Mr. Hughes	20190923-4000	GEN-2, GEN-6, ALT-4
IND-51	Ms. Hutchby	20190923-4000	SURF-1, SURF-6, SAFE-1, SURF-7, GEN-1, GEN-6, CULT-1, GEO-2, GEO-3
IND-52	Ann Rogers	20190923-4001	GEN-12
IND-53	Joan Hendricks	20190923-4001	GEN-1, SAFE-1, SURF-7
IND-54	Pamela Taylor Turner	20190923-4001	GEN-1, SOCIO-3, GEN-2
IND-55	Richard G Motley	20190923-4001	GEN-7, SURF-1, SOIL-1, SAFE-1
IND-56	Susan Virginia Mead	20190923-4001	SAFE-3, GEN-6, GEN-4
IND-57	Maury Johnson	20190923-4001	GEN-6, GEN-1
IND-58	Jessica Sims	20190923-4001	GEO-1, GEN-1, GEN-6, GEN-WET-1, AIR-2, GEN-8
IND-59	Graham Rex	20190906-3055	GEN-1
IND-60	Stacy Lovelace	20190923-4001	GEN-6, AIR-2, SURF-1, SAFE-1, CI-1, GEN-2, SAFE-4
IND-61	Irene Leech	20190923-4001	GEN-1, GEN-7, SAFE-1, AIR-1, GEN-2, SAFE-4
IND-62	William Davies	20190923-4001	GEN-9, SOCIO-1, SOCIO-2, GEN-2, GEN-1, CI-1
IND-63	Eric Anspaugh	20190923-4001	GEN-1, GEN-6, GEN-10, GEN-9
IND-64	Lee Williams	20190923-4001	CI-1, GEN-1, SAFE-3
IND-65	Freeda Cathcart	20190923-4001	GEN-6, GEN-10, GEN-2
IND-66	Douglas Lee Bryan	20190923-4001	SURF-2, GW-1, LU-1, GEN-1, GEN-7, NOISE-1
IND-67	Tina Badger	20190923-4001	SURF-2, T&E-3, GEO-6, GEN-6, GEN-1
IND-68	Eric Stamps	20190923-4001	GEN-6, SAFE-1, GEN-2, ALT-4, ALT-2, CI-4
IND-69	Penina Harte	20190923-4001	GEN-1, GEN-2, CI-1
IND-70	Robert Pollok	20190923-4001	LU-5

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IND-71	Emily Keel	20190923-4002	GEN-1, GW-1, GEN-6, CI-2, SAFE-1
IND-72	Margaret Herring	20190923-4002	SAFE-1, GEN-1, SOCIO-1, SOIL-2, SURF-1, CI-2, ALT-2, SOCIO-4
IND-73	Harry Phillips	20190923-4002	SURF-1, SOCIO-1, AIR-2, GEN-1, SURF-2, GEO-5, GEN-2, GEN-6, GEN-1
IND-74	Suzanne Smith	20190923-4002	GEN-1, GEN-4, GW-1, ALT-3, SAFE-1
IND-75	Wayne Apple	20190923-4002	ALT-3, GEN-1, WILD-1, GW-1, SAFE-1
IND-76	Patsy Madren	20190923-4002	GEN-1, ALT-3, SAFE-1, GEN-6, SURF-2
IND-77	Mark & Lisa Hill	20190923-4002	GEN-2, ALT-4, ALT-1, GEN-6, SOCIO-1, GEN-7
IND-78	Carolyn Hansley-Mece	20190923-4002	GEN-1, GEN-2, GEN-4, GEN-6, GEN-9, SURF-6, CULT-1, CI-1, SAFE-1
IND-79	Herman Johnson	20190923-4002	GEN-1, GEN-7, ALT-4, SOCIO-1
IND-80	Ruth Zalph	20190923-4002	GEN-1, GEN-2, GEN-6, SOCIO-1, NOISE-1
IND-81	Carroll Lassiter	20190923-4002	ALT-1, GEN-1, GEN-2
IND-82	Joan Hendrix	20190906-3055	GEN-1, SURF-7
IND-83	Sandra Cook	20190923-4002	GEN-1, GEN-2, SURF-1
IND-84	Anne Casselbaum	20190923-4002	ALT-1, GEN-4, GEN-6, GEN-7, SURF-1
IND-85	Carleton Bass	20190923-4002	ALT-3, LU-1, GEN-7
IND-86	Jason Crazy Bear	20190923-4002	GEN-4, SOCIO-5, GEN-7, GEN-1, SOCIO-2
IND-87	Daniel & Kelly Bollinger	20190906-3055	GEN-7, GEN-9, SAFE-1
IND-88	John Heise & Lori Dyer	20190906-3055	Appendix I.3 Side by Side Responses
IND-89	Aimee Tilley	20190923-4000	GEN-1, SURF-1, GEN-6, SAFE-1, CULT-4, SOIL-1, SOCIO-2, GEN-7

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IND-90	Patricia Taylor	20190923-4001	SURF-1, ALT-3, GEN-2, GEN-14
IND-91	Deborah Smith	20190923-4002	AIR-1, AIR-2, GEN-1, SURF-1, SOCIO-4
IND-92	Robert W. Haskins	20190906-3055	ALT-3, CULT-1, SURF-1
IND-93	Michael & Pamela Wallace	20190923-4002	ALT-3, LU-3
IND-94	John Heise & Lori Dyer	20190923-4002	GEN-2, LU-5, ALT-3, ALT-4
IND-95	Robert & Margaret Smith	20190923-4002	ALT-3, GEN-7, SOCIO-1, LU-14
IND-96	Nancy Rosborough	20190923-4002	GEN-1, GEN-2, GEN-7, LU-1, SAFE-2, SAFE-4, ALT-2
IND-97	Crystal Cavalier	20190923-4002	CUL-1, CULT-7, SAFE-1, WET-1, LU-5, GEN-2, SOCIO-5
IND-98	Donna & Larry Shambley	20190923-4002	ALT-3, SAFE-1
IND-99	Patricia Taylor	20190906-3055	GEN-2, GEN-6, ALT-2, ALT-4, GEN-10

APPENDIX I.2

General Comments on the Draft EIS and Responses

Appendix I.2

General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
General Comments		
GEN-1	Comments expressing general opposition to the Project and non-specific concerns about environmental impacts (e.g., statements of general concern for impacts on wetlands or wildlife; air quality impacts; safety; statements that quoted text from the draft EIS but provided no additional comments).	The draft and final EISs describe the potential impacts on environmental resources resulting from construction and operation of the Project. Staff considered measures to avoid, reduce, and mitigate impacts on the environment, and as appropriate, are including recommendations in the final EIS. As discussed throughout the environmental analysis section of the EIS, the staff concludes that with implementation of Mountain Valley's impact avoidance, minimization, and mitigation measures, as well as their adherence to our recommendations, Project impacts would not be significant.
GEN-2	Comments that the need of the Project has not been established and that the Project would not benefit local areas crossed by the route. Additionally, commenters contend that the Project would not be consistent with North Carolina's renewable energy initiative.	The Commission will consider the need for the Project and may address these comments in any Order it issues. FERC environmental staff reviews applications for interstate natural gas pipeline projects in accordance with an applicant's stated objective(s) to disclose the environmental impacts of a proposal, to inform the decision makers, and, in accordance with NEPA, evaluate reasonable alternatives to a project.
GEN-3	Comments in support of the Project, including comments related to the need for the Project, economic benefits, the proposed route, and the potential for the Project to meet regional energy goals.	Comments noted.

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Comment Code	Comment Summary	Response
GEN-4	Numerous comments concerning the adequacy of the draft EIS; the EIS was "flawed" and "inadequate", our conclusions in the EIS are not appropriate or correct, and the scope of the environmental analysis was too limited. Commenters contend that our analysis and conclusions in the draft EIS are not adequate because Mountain Valley has not yet provided certain environmental data and due to lack of information, the Mountain Valley Pipeline Southgate project does not comply with NEPA.	The EIS discloses the potential impacts on environmental resources resulting from construction and operation of the Project. The EIS was prepared in accordance with NEPA, CEQ guidelines, and other applicable requirements. The EIS includes sufficient detail to enable FERC staff to conclude the significance of the full range of possible impacts on the environment. Duration and significance of impacts are discussed throughout the various EIS resource sections. The EIS identifies and evaluates feasible mitigation measures to reduce those effects whenever possible. Mountain Valley's construction and restoration plans contain numerous mitigation measures to avoid or reduce Project-related impacts. The EIS addresses stakeholder comments and incorporates information as applicable.
GEN-5	Comments that there was insufficient time to review the draft EIS and associated information and requests to extend the draft EIS comment period. Commenters noted that there was a substantial amount of information missing from the EIS that the public did not have a chance to comment on.	A 45-day comment period was opened with the issuance of the draft EIS. The Commission's standard draft EIS comment period is 45 days, which is consistent with the Council for Environmental Quality's (CEQ) regulations implementing NEPA. NEPA does not require every study or aspect of an analysis to be completed before an agency can issue a draft EIS. The public docket for the Project was open for review and comment by stakeholders on all supplemental materials provided after issuance of the draft EIS.
GEN-6	Comments related to the performance of erosion control devices and Mountain Valley contractors during the construction of the Mountain Valley Pipeline Project. We also received comments stating that the draft EIS fails to adequately analyze impacts because it unreasonably relies on minimization and mitigation measures that have previously been ineffective.	Each proposal reviewed by the Commission is considered on its own merits irrespective of other projects. FERC's professional judgement, based on decades of experiences on hundreds of projects is that the Plan and Procedures are sufficient to minimize impacts to resources. See revised section 1.3 of the EIS for a more detailed response to these concerns.

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Comment Code	Comment Summary	Response
GEN-7	Many commenters provided general comments regarding their opposition to the use of eminent domain for the Project and Mountain Valleys land acquisition methods.	As discussed in section 4.8.2, if an easement cannot be negotiated with a landowner and the project has been certificated by the FERC, the company may use the right of eminent domain granted to it under Section 7(h) of the NGA and the procedures set forth under the Federal Rules of Civil Procedure (Rule 71A) to obtain the right-of-way and extra workspace areas.
GEN-8	Comments that Project has been segmented from the environmental review of the Mountain Valley Pipeline Project.	Although the Project would be owned and operated by Mountain Valley, it is a separate project from the Mountain Valley Pipeline Project due to the fact that Southgate Project has a different stated purpose and anchor shipper and the Project would have separate facilities. Therefore, the Project requires its own Environmental Analysis.
GEN-9	Commenters stated that the reliance on mitigation measures to conclude that the project will cause no significant impacts is inadequate because many of the mitigation measures proposed are unspecified. Commenters noted that in many instances in the draft EIS we instruct Mountain Valley to come up with mitigation measures that are currently not defined; and that mitigation cannot prevent significant impacts on environmental resources.	Mitigation measures related to the reduction of impacts on specific resources are provided throughout the EIS. To determine the significance of an impact, we consider the duration of the impact; the geographic, biological, and/or social context in which the impact would occur; and the magnitude and intensity of the impact. We also consider the measures that would be implemented by the applicant to avoid, reduce, and mitigate impacts. For most impacts analyzed, Mountain Valley has provided final or draft mitigation measures.
GEN-10	One commenter noted that there was a lack of government oversight, allowing pipelines to be installed without permits and a disregard to Endangered Species Act.	Applicants cannot begin construction of the Project until all state, federal, and local permits are received including completion of consultation under Section 7 of the Endangered Species Act. Federal agency compliance for the Endangered Species Act (ESA) Section 7 is described in section 4.7.1 of the EIS.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
GEN-11	Commenters suggested that state permit requirements and recommendations should be adhered to by the applicant and included in the EIS.	The Commission encourages cooperation between pipelines and local authorities. However, this does not mean that state and local agencies, through application of state or local laws, may prohibit or unreasonably delay the construction and operation of facilities if approved by the Commission. The applicant would be required to comply with all federal and federally-delegated permits. These permits along with other state and local permits are identified in table 1.4-1 of the EIS.
GEN-12	One commenter voiced concerns that the description of the project in Mountain Valley's application does not match the description provided in the draft EIS.	Comment Noted. The current project description as proposed by Mountain Valley in its application and supplemental filings is provided in section 2.1 of the EIS.
Alternatives		
ALT-1	Comments regarding the inadequacy of the alternatives analysis, the limited range of alternatives considered, and a lack of analysis of the No Action Alternative.	As required by NEPA, we have identified and evaluated reasonable alternatives to the Project to determine whether the implementation of an alternative would be environmentally preferable to the proposed action. The EIS also evaluates the No Action Alternative. See section 3.0 of the EIS.
ALT-2	Commenters stated that the alternatives analysis in the EIS needs to consider renewable energy options and an assessment of non-gas energy alternatives and/or energy conservation or efficiency.	The Project would transport natural gas. As explained in the introduction to section 3.0, because renewable energy sources and energy conservation alternatives are alternatives to natural gas consumption, but not natural gas transportation, they do not meet the Project purpose and were not analyzed in our alternatives analysis.

Appendix I.2

General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
ALT-3	Several landowners affected by the Project requested alternative routes to avoid their properties and expressed concerns regarding the alignment of the route and access roads on their property.	Section 3.4.3 of the EIS provides an analysis of minor route variations developed based on landowner input and requests. FERC staff asked Mountain Valley to evaluate specific properties based on comments received not only during the draft EIS comment period, but also throughout the entire environmental review process. All alternatives and variations requested by landowners were considered by FERC staff. Not all variations considered were discussed in detail in the draft EIS due to staff determinations that the alternative was not feasible or did not provide a significant environmental advantage. Mountain Valley made several changes to the route in response to landowner concerns and continues to work with landowners to reduce impacts on their property.
ALT-4	Some commenters expressed concerns that Mountain Valley did not fully consider the co-location of the alignment with Transco and other public rights-of-way or transportation corridors.	Mountain Valley has collocated the route with other utility and transportation rights-of-way for about 49 percent of the route. We evaluated alternatives in section 3.0 to evaluate other options to increase collocation; however, these routes did not offer a significant environmental advantage over the proposed route. See section 3.3.2.1 of the EIS for an analysis of the Transco Alternative.
Geology		
GEO-1	Comments concerning the potential of the construction of the pipeline to encounter and disturb uranium deposits.	Section 4.1.4.8 of the EIS has been updated, and includes a more detailed discussion on the geologic setting and potential for uranium occurrence and mobilization in Pittsylvania County, Virginia.
GEO-2	We received comments that blasting of bedrock increases danger of landslides. Commenters requested a landslide mitigation plan.	See section 4.1.4.6 of the EIS for updated information regarding blasting. Blasting would follow the procedures in Mountain Valley's General Blasting Plan, and would be limited in depth, width, and length to minimize disturbances. Mountain Valley would additionally implement control measures within their Landslide Mitigation Report during construction and operation to minimize landslides and potential associated impacts.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
GEO-3	Commenters expressed concern regarding the presence of caves and sinkholes that the pipeline would cross and the potential for blasting to cause sinkhole formation.	As described in section 4.1.4.5 of the EIS, Mountain Valley completed desktop and targeted field assessment of the proposed alignment and no karst features (e.g., caves, sinkholes) were identified.
Soils		
SOIL-1	Commenters expressed concern regarding dust control during construction.	As described in section 4.2.2 of the EIS, Mountain Valley would implement dust suppression measures.
SOIL-2	A few commenters expressed concern about how soil compaction would be abated.	Section 4.2.4 of the EIS discusses measures Mountain Valley would implement to decompact soils and ensure all disturbed areas are returned to pre-construction conditions.
Groundwater		
GW-1	Comments related to groundwater impacts and impacts on private wells. Commenters expressed concerns that the locations of wells are unknown and that blasting and heavy equipment can damage infrastructure, such as wells, underground utilities, and septic systems.	Section 4.3.1 of the EIS includes a detailed discussion of the potential impacts that construction and operation of the Project could have on groundwater resources, including water supply wells, and describes the measures that Mountain Valley would implement to avoid or minimize these impacts. In section 4.3.1.2 of the EIS, we recommend that any Order that may be issued by the Commission require Mountain Valley to file a final table identifying field-verified wells and springs within 150 feet of the Project prior to construction.
Surface Water		
SURF-1	Comments regarding impacts of the project on surface waters, including concerns regarding impacts on water quality.	Section 4.3.2 of the EIS discusses the Project's impacts on surface water resources and describes measures that Mountain Valley would implement to reduce potential impacts.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
SURF-2	Commenters expressed concerns regarding the increase of erosion and transport of sediment into streams from the removal of vegetation and disturbance of stream banks.	Impacts on surface waters and erosion control measures are discussed in sections 2.4, 2.7, and 4.3.2 of the EIS. Mountain Valley would adhere to its Plan and Procedures, and E&SCP to minimize the amount of sediment leaving the immediate area affected by construction. The Plan and Procedures contain requirements for erosion and sediment control during the construction and restoration of the Project. The Plan and Procedures also contain performance based standards that seek to contain soils within the limits of disturbance. As a standard construction practice, the Project would establish a 50-foot-wide wetland and waterbody buffer with erosion and sediment control devices. The buffer would not be grubbed during the initial right-of-way clearing and grubbing sequence. These buffers would remain undisturbed (aside from hand felling trees) until the pipeline crossing is ready to be installed. See also response GEN-6.
SURF-3	Commenters expressed concern about impacts on the Jordan Lake Watershed and that the Project is not adhering to Jordan Lake Rules.	Section 4.3.2.4 of the EIS discusses the Jordan Lake Riparian Buffer.
SURF-4	Several commenters argued that the draft EIS did not appropriately assess the full scope of downstream impacts. Some commenters contend that the three-mile downstream distance used in the draft EIS does not adequately access water quality impacts since many contaminants can travel longer distances.	We analyzed potential impacts to waterbodies crossed by the Project within the HUC-10 watershed geographic scope, as described in section 4.13 of the EIS. Section 4.3.2.7 of the EIS discusses impacts on surface waters, including downstream impacts. We identified 3 streams that are considered impaired for the presence of *Escherichia coli*. No contaminants were identified in streams crossed by the Project. Therefore, we would not expect the introduction of contaminants to occur as a result of in-stream construction. The Project would implement an SPCC Plan and follow measures contained in Mountain Valley's Plan and Procedures to avoid the introduction of contaminants by construction equipment.
SURF-5	Commenters expressed concerns regarding the impact of hydrostatic test water discharges on surface waters	Measures regarding hydrostatic test water discharge are provided in section 4.3.2.7 of the EIS and VII.D.1 of Mountain Valley's Procedures.

Appendix I.2

General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
SURF-6	Several commenters contend that Mountain Valley has not fully identified sources of water for use during construction.	Water sources are addressed in section 4.3.2.6 of the EIS. Since the issuance of the draft EIS, Mountain Valley has proposed to use the Dan River as the primary source of water for construction, and water from municipalities as the secondary source.
SURF-7	Commenters expressed concern regarding construction in floodplains, including the safety of the public and workers during flood events that could occur during construction. In addition, commenters expressed concerns that the volume and velocity of water from flooding will increase with less buffer protection due to un-vegetated riparian areas and compacted soils from heavy machinery.	During construction, Mountain Valley would monitor weather conditions. Sections 4.1.4.7 and 4.3.2.7 of the EIS have been updated to include measures Mountain Valley would implement during construction in the event of seasonal or flash flooding. Section 4.3.1.5 discusses the restoration of floodplains and waterbodies to pre-construction contours, Section 4.3.2.2 has been updated to include a discussion of a 50-ft-wide wetland and waterbody buffer, when applicable.
SURF-8	Commenters contend that Mountain Valley has not provided the feasibility studies for trenchless crossings of waterways, such as Deep Creek.	Mountain Valley completed geotechnical investigations and provided crossing plans for each waterbody that would be crossed by HDD or conventional bore. We have updated section 4.3.2.2 of the EIS with this information.
SURF-9	Commenters noted the potential for spills and leaks to occur, and that Mountain Valley should employ measures to prevent spills of fuels or lubricants into state waters.	Section 4.3.2 of the EIS discusses the Project's impacts on surface water resources and measures that Mountain Valley would implement to avoid or reduce potential impacts, including potential impacts from spills and leaks.
Wetland		
WET-1	A commenter expressed concerns regarding impacts on wetlands, specifically noting some proposed workspaces were located within 50 feet of a wetland.	As described in section 4.4.3 of the EIS, Mountain Valley's Procedures specify that all areas of additional temporary workspaces (ATWS) should be set back at least 50 feet from wetlands. Mountain Valley has requested modifications to their Procedures at specific locations within 50 feet of a wetland boundary. Appendix B.3 provides the locations where Mountain Valley proposes less than a 50-foot setback from a wetland and the site-specific rationale for the requested modification from Mountain Valley's Procedures. We have reviewed these ATWS locations and find them acceptable. Mountain Valley has reduced the number of ATWS location within 50 feet of a wetland from 23 to 15 locations.

Appendix I.2

General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
Vegetation		
VEG-1	Many commenters expressed concern about deforestation and forest fragmentation, including permanent loss of forested areas.	See section 4.5.4 for a discussion of impacts on vegetation communities, including interior forested areas and forest fragmentation in section 4.5.4.3.
VEG-2	Commenters expressed concerns about the Project potentially causing the spread of invasive species.	Potential impacts related to invasive species are discussed in section 4.5.4.1 of the EIS.
Wildlife		
WILD-1	Commenters expressed concerns regarding temporal and direct impacts on wildlife and habitat.	Section 4.6 of the EIS discusses impacts on wildlife and habitat.
WILD-2	Commenters expressed concerns regarding impacts on migratory birds and avoidance of clearing and construction activities within migratory bird nesting season.	Section 4.6.3.2 of the EIS discuss impacts on migratory birds.
WILD-3	Commenters expressed concern about how the draft EIS characterized downstream impacts on aquatic species. Commenters did not agree with the draft EIS analysis, which mentioned species may migrate away from wildlife-threatening impacts caused by the construction.	Aquatic species immediately downstream of disturbed areas may experience increased rates of stress, injury, and mortality. Impacts on aquatic species with less mobility are discussed in section 4.6.5 of the EIS.
Threatened and Endangered Species		
T&E-1	We received comments that observed bald eagles within the Project area were not noted in the draft EIS.	As noted in section 4.6.3.3 of the EIS, there are no currently documented bald eagle nests within 0.5 mile of the Project footprint, Section 4.6.3.4 discusses the measures that Mountain Valley would follow if bald eagles are observed. Section 4.7 of the EIS notes waterbodies and lands where protected species are known to occur.
T&E-2	Commenters stated that FERC has not provided sufficient information in the draft EIS for the public to assess the actual impacts to listed species, or to assess the *not likely to adversely affect* determination that was made for these species.	Section 4.7 of the EIS discusses impacts on listed species. Federal agency compliance with Section 7 of the ESA is described in section 4.7.1 of the EIS.
T&E-3	Commenters expressed concerns that pipeline construction would harm numerous species and their habitats, including the Roanoke logperch, James spineymussel, Atlantic pigtoe and smooth coneflower.	Sections 4.7.3, 4.7.4, and 4.7.5 of the EIS discusses impacts on listed fish, mussels, and plants.
Land use		

Appendix I.2

General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
LU-1	Commenters expressed concerns regarding the pipeline easement and its impact on current land use and future residential development. Commenters are concerned that construction will render land unusable for farming, habitation, or other uses. Several landowners expressed concern about not being able to cross the pipeline easement, which would cutoff usable land. Some landowners are also concerned that Mountain Valley will not replace fences removed for construction.	Impacts on land use are discussed in section 4.8 of the EIS. Most commonly, cultivated properties go back into cultivation following construction and so, the easement does not affect the resumption of farming. A 50-foot-wide permanent right-of-way would be maintained by Mountain Valley. While structures would not be permitted within the permanent right-of-way, they would be permitted in all areas used for the temporary construction workspace. Mountain Valley stated that they would work with landowners to maintain access to cultivated agricultural portions of their property and would provide access across the right-of-way at the request of the landowner. Mountain Valley would work with landowners to replace and return features of their property that needed to be removed for construction, including fences for livestock.
LU-2	Commenters expressed concern about impacts on public use of recreational parks, trails, and rivers, including the Mountains-to-Sea Trail and a proposed trail in Alamance County.	Impacts on recreational and special use lands are discussed in section 4.8.4 of the EIS.
LU-3	General comments regarding the visual impact of the newly cleared sections of the easement on the public and landowners.	Visual impacts from right-of-way clearing are discussed in section 4.8.6.1 of the EIS.
LU-4	Landowners commented that the pipeline would impact residential septic systems.	Section 4.8.3 of the EIS for analyzes impacts on septic systems.
LU-5	Comments regarding the impact of the pipeline easement on agricultural production during and after construction. Landowner commented on the short-term and long-term impacts of easements within traditional and other unique (truffle farm and seed farm) agricultural crops. Some landowners believe that installation of the pipeline will change the composition of the soil, which will impact crops.	Section 4.8.1.1 of the EIS discusses impacts and mitigation measures regarding agricultural land use affected by the Project.
Socioeconomics		
SOCIO-1	Several commenters expressed concern that the pipeline would lead to decreased property values, which would have a negative economic effect on their futures.	As discussed in section 4.9.5 of the EIS, based on our review of numerous studies, there is no conclusive evidence that indicates that the presence of a pipeline would significantly impact the value of a property.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
SOCIO-2	Commenters expressed concerns that the pipeline would impact tourism in the region.	Impacts to tourism are discussed in section 4.9.6 of the EIS.
SOCIO-3	Commenters expressed concerns regarding mental health impacts of the Project, as well as eco-psychology, eco-therapy, and terra-psychology not being considered in the draft EIS.	Impacts on affected resources including public health, and the associated mitigation measures, are discussed throughout the EIS. An individual's response to the short-term and/or long-term changes to their surrounding environments due to construction of the project would vary significantly depending on a variety of factors. Consequently, assessing those responses, which could include no response at all, is not be feasible.
SOCIO-4	Commenters expressed that there was a lack of analysis regarding impacts to environmental justice communities, particularly those located near the Lambert Compressor Station.	Potential impacts (such as air quality, noise, water resources, etc.) on the human environment including environmental justice communities are discussed throughout the EIS. As discussed in section 4.9.8, while there are several low income and minority populations crossed by the pipeline route, we conclude that they would not be disproportionately affected by the pipeline or the compressor station. Section 4.9.8 has also been updated to include a map of the Project and all census blocks crossed by the pipeline route, including those that contain Environmental Justice communities.
SOCIO-5	Commenters expressed concern regarding impacts of pipeline construction on personal safety. Commenters would like to see a plan from local law enforcement to defuse situations that may occur, including protests.	As noted in section 4.9.3 of the EIS, each county within the Project area has numerous police and fire departments. Mountain Valley would work with local police departments, fire departments, and emergency first responders to address any Project safety concerns.
SOCIO-6	To pay for cleanup of spills or accidents along the pipeline, commenters believe that utility rates will increase, which will have a greater impact on low income populations.	Mountain Valley is responsible for the cleanup of spills and accidents during pipeline construction and operation.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
SOCIO-7	Several commenters mentioned that the draft EIS did not account for social services that will be provided to out of town workers and did not account for non-standard socioeconomic effects, such as the loss in ecosystem services that is currently provided by air, water, forest, and other natural resources.	Socioeconomic impacts are addressed in section 4.9 of the EIS. While we are not aware of a standard for assessing quantifiable impacts resulting from loss of ecosystem services, we note that the project impact on the HUC-10 watersheds crossed by the Project is only about 0.1 percent of the area within these watersheds. Consequently, although we did not assess ecosystem services, it would be difficult to conclude that the loss would be discernable.
SOCIO-8	Commenters contend that the draft EIS inflates economic benefits and understates its adverse impacts. They further state that the EIS analysis uses the entire states of North Carolina and Virginia as its impact area, instead of a more appropriate region. Commenters disagreed with the use of INPLAN.	As discussed in sections 4.9.7 and 4.9.9, benefits to the local economy from payroll expenditures, local purchases of consumables Project-specific materials, room rentals, and sales tax would be short-term and minor. Section 4.9.3 discusses impacts of the Project on public services. |
Cultural		
CULT-1	Several commenters stated that the surveys are not yet complete; and that contend not all resources have been identified, and impacts to cultural resources have not been adequately addressed. Commenters also stated that the draft EIS does not provide information on the findings of the archeological sites identified and note that there are sites that have been previously identified but were not included in the draft EIS. Some commenters contend that the impacts to tribes were not considered, and FERC as the federal lead should have reached out to the tribes, not Mountain Valley. Some commenters believe Section 106 has not been completed properly	In section 4.10.4 of the draft EIS, we acknowledge that the entire pipeline route has not yet been completely inventoried for cultural resources, and recommend that the Commission Order authorizing the Project contain an environmental condition that construction may not begin until after all archaeological surveys have been completed and reviewed, and we have completed the process of compliance with the NHPA.
CULT-2	A letter was received from North Carolina SHPO stating the draft EIS has been reviewed and addresses previous comments. They concur with the revised Plan for Unanticipated Discoveries of Historic Properties and Human Remains. Changes in the revised archeological report and addendum will need to be reflected in Table 4.10-11.	The EIS was revised to reflect comments on reports we received from the NCSHPO, in letters dated July 1 and 22, 2019.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
CULT-3	One commenter requested realignment to avoid impacts to Little Cherrystone Property. This site includes a Native American burial ground. The commenter stated that since it is within the LOD, the public will not be able to monitor the site to make sure access is restricted.	Little Cherrystone Manor/Wooding Cemetery/Site 71-36 is mentioned on page 4-166 of the draft EIS as a NRHP-listed property and listed on table 4.10-9, with the recommendation to "avoid or mitigate." In an environmental information request issued by the FERC on October 3, 2019 we asked Mountain Valley to file either an avoidance plan or a treatment plan for Little Cherrystone Manor. In an October 18, 2019 filing, Mountain Valley stated it would be filing an avoidance plan for Little Cherrystone Manor.
CULT-4	A comment was received noting that the Deep Creek Church and Cemetery is located close to the proposed route. They requested avoidance, compensation for impacts, and to return the site to preconstruction conditions	Our EIR #4 requested an avoidance plan for the church/cemetery. An avoidance plan for the Deep Creek Primitive Baptist Church and Cemetery was filed by Mountain Valley on October 23, 2019.
CULT-5	Commenters noted the Mountain View historic 1890s home, located in the Chatham Historic District on Route 20 is located within the proposed route. It is within the proposed route and will be impacted by the project	Historical architectural site 71-25 (Mountain View Manor) was recorded during surveys conducted by TRC for Mountain Valley between September 2018 and June 2019 (Karpynec, September 2019). It was noted as listed on the NRHP. We have revised the EIS to reflect this new information.
CULT-6	The Choctaw Nation of Oklahoma stated the project is outside of their area of interest. Comments are deferred to other Tribes that have been contacted.	Comment noted.
CULT-7	A commenter stated there are undocumented graves in Ossipee in Altamahaw. Locations passed down through oral tradition of Occaneechi Band of the Saponi Nation.	We asked Mountain Valley about these graves in EIR#4. The company responded in an October 18, 2019 filing Mountain Valley indicated that the Chair of the Occaneechi Band of the Saponi Nation had no knowledge of graves in this area.
CULT-8	The Catawba requested to be notified if Native American artifacts and/or human remains are located during the ground disturbance phase of this project.	Comment noted.
Air		
AIR-1	Commenters expressed concerns regarding the Project-related emissions impact on the region's air quality.	Air emission impacts and mitigation measures are discussed in section 4.11.1.7.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
AIR-2	Commenters were concerned regarding impacts on health resulting from operation of the Lambert Compressor Station. Some commenters requested we study the impacts on more vulnerable populations (environmental justice populations) that are near the Lambert Compressor Station.	Air quality impacts on public health are discussed in detail in section 4.11.1.7. Additionally, potential air quality impacts on vulnerable populations are discussed in section 4.9.8 of the EIS.
Noise		
NOISE – 1	Comments regarding noise and light impacts on humans and wildlife resulting from construction and operation of the pipeline and compressor station.	As described in Section 4.11.2.3, noise from construction and operation of the project, including the Lambert Compressor Station would meet FERC requirements. Effects from chronic noise may vary by species as described in section 4.6.1.1. Mountain Valley would employ noise mitigation measures at the Lambert Compressor Station and the noise levels that wildlife would be exposed to beyond the compressor station property boundary would vary based on the distance from the facility. See section 4.6.1.1 for a discussion of lighting techniques to minimize impacts to wildlife. Lighting impacts on people are discussed in section 4.8.6.2, the Lambert Compressor Station would be surrounded by trees on three sides, shielding it from public view. The vegetative screening would also shield the Lambert Compressor Station from nearby residences, thereby minimizing effects from light.
Safety		
SAFE-1	Commenters expressed concern regarding potential incidents along the pipeline and compressor station facilities, including impacts of natural gas leaks. Commenters also expressed concern regarding the potential for leaks to ignite and subsequent impacts on nearby residences, communities, and the environment.	Section 4.12.1 states that the DOT requires operators to develop and follow a written Integrity Management Program that address the risks on each transmission pipeline segment. In addition, sections 4.12 and 4.9.3 discuss elements of Mountain Valley's emergency response plan and coordination with local first responders in the event of an emergency.
SAFE-2	Concerns were expressed from commenters about how local resources and communities are not equipped to handle an emergency response.	Section 4.9.3 describes the effects that the Project could have to local services (including emergency services). DOT regulations regarding emergency response are described in section 4.12.1

Appendix I.2

General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
SAFE-3	Commenters expressed concerned about public safety during construction. Including safety of construction workers. Several commenters mentioned equipment turnovers from past projects.	Sections 4.12 and 4.9.3 of the EIS discuss elements of Mountain Valley's emergency response plan and coordination with local first responders in the event of an emergency.
SAFE-4	A commenter expressed concern regarding possible accidents in less densely populated areas due to thinner pipeline walls.	As described in section 4.12.1, the DOT regulates pipeline safety under 49 U.S.C. 601. Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Class locations for the Project have been determined based on the relationship of the pipeline centerline to other nearby structures and manmade features.
Cumulative Impacts		
CI-1	Commenters expressed concerns related to climate change, including contentions that the Project will contribute to climate change, sea level rise, and extreme weather events, and subsequently impact other environmental resources, commercial economies, climate refugees, etc. Commenters stated that the EIS failed to adequately utilize available methodologies (Social Cost of Carbon) to assess the Project's climate impact and expressed concern that our failure to address the importance and consequences of GHG emissions undermined several aspects of the overall Project environmental analysis. In addition, commenters contend we did not adequately estimate upstream and downstream GHG emissions that would result from the Project. Commenters also contend that the climate change analysis in the EIS should include GHG emissions from loss of trees and vegetation and burning of brush associated with the Project.	An analysis of the Project's impacts on climate change is discussed in section 4.13.2.9. The social cost of carbon tool is intended for estimating the climate costs and benefits of rulemakings and policy alternatives. The tool cannot predict the actual environmental impacts of a project on climate change. It can only present a monetized global value for the economic costs of climate change and was not considered adequate for the purposes of this EIS. The evaluation of upstream and downstream GHG emissions it outside of the scope of this EIS. Section 4.5.4.3 provides an updated discussion of interior forest impacts; and section 4.13 discusses cumulative impacts on forested areas.

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General Comments on the Draft EIS and Responses

Comment Code	Comment Summary	Response
CI-2	A few commenters contend that there are increased climate change risks from gas sourced from shale formations, as well as stating that methane is initially a more potent GHG than CO2 after release into the atmosphere. Several commenters expressed concern that the project facilities would leak methane, contributing to GHGs, and that these leaks were not accounted for in the analysis of Project impacts on climate change.	As described in section 4.11.1.2, our use of carbon dioxide equivalents (CO_2e) is consistent with the methods for characterizing methane in greenhouse gas estimates, allowing a common standard for comparison across projects. As discussed in section 4.3.1.5, Mountain Valley would regularly monitor the pipeline for signs of leaks. Similarly, as discussed in section 4.11.1.5 Mountain Valley would comply with all applicable leak detection and repair requirements, including the use of optical gas imaging to conduct leak surveys.
CI-3	Many commenters stated that the cumulative impact analysis was inadequate, including a limited analysis of cumulative impacts on forested wetlands, waterbodies, land use, and other aspects of the human and natural environment.	Cumulative impacts on environmental resources affected by the Project, including wetlands, waterbodies, and land use, are discussed in section 4.13 of the EIS. The analysis is consistent with CEQ guidelines and is sufficient.
CI-4	Several commenters expressed concern regarding the cumulative impacts on air quality and human health from three compressor stations located in close proximity.	An analysis of the cumulative impacts on air quality, including nearby compressor stations, is discussed in section 4.13.2.9 of the EIS. Air quality impacts on public health are discussed in section 4.11.1.7.

APPENDIX I.3

Southgate Project Response to Comments Side-by-Side Table

FA-1 United States Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

SEP 12 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

Re: Draft Environmental Impact Statement (DEIS) for the Southgate Mountain Valley Pipeline Project, FERC Docket No. CP19-14-000; CEQ #20190176

The U.S. Environmental Protection Agency has reviewed the DEIS for the Southgate Mountain Valley Pipeline ('MVP') Project in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. This DEIS evaluates the potential impacts to natural and human environments resulting from the proposed construction and operation of approximately 73 miles of a new natural gas transmission pipeline, a compressor station, and accompanying facilities that would provide roughly 375 million cubic feet per day (MMcf/d) of natural gas. The proposed pipeline location will traverse through Pittsylvania County, Virginia, and Alamance and Rockingham Counties in North Carolina.

The Federal Regulatory Commission (FERC or the 'Commission') has the decision of whether to issue a Certificate of Public Convenience and Necessity will also serve as the NEPA Section 102(2)(C) lead Federal agency. The EPA is providing the following comments consistent with Section 309 of the Clean Air Act.

The DEIS presented the following alternatives: No Action Alternative, System Alternatives, Major Pipeline Route Alternatives, Pipeline Route Variations, Pipeline Route Realignments, and Alternative Aboveground Facility Sites. Based on our review of the DEIS, the EPA identified several issues that could potentially help to improve the Final Environmental Impact Statement (FEIS). The EPA requests that additional analysis be provided and reported in the FEIS. We also recommend that all relevant permits and consultations be concluded. We have enclosed technical comments and recommendations for your consideration that can potentially strengthen the conclusions in the FEIS (See enclosure).

Effective October 22, 2018, the EPA will no longer include ratings in our comment letters. Information about this change and the EPA's continued roles and responsibilities in the review of federal actions can be found on our website at: https://www.epa.gov/nepa/environmental-impact-statement-rating-system-criteria.

The EPA appreciates the opportunity to review and provide comments on this DEIS. If you have questions or wish to discuss our comments and recommendations, please contact Ms. Maria R. Clark at (404) 562-9513 or clark.maria@epa.gov.

Sincerely,

Christopher A. Militscher
Chief, NEPA Section
Strategic Programs Office

FA-1	United States Environmental Protection Agency

ENCLOSURE

Technical Comments and Recommendations on the Draft Environmental Impact Statement (DEIS) for the Southgate Mountain Valley Pipeline Project, FERC Docket No. CP19-14-000 CEQ #20190176

Purpose and Need: The DEIS was not clear concerning a full description of the purpose and need for the action(s). In the Section 1.1 Purpose and Need, the document stated a description of the proposal and how the Commission bases its decisions. However, the need for this project remained uncertain. The purpose and need of the proposed project stated in the DEIS is: "*...to meet the specific requests for natural gas transportation service of its anchor shipper, Dominion Energy (formerly PSNC Energy), a local natural gas distribution company.*" Additionally, the Commission directed the readers to its "Certificate Policy Statement[1]" to try to clarify how the Commission evaluates the need for the project, and as the Commission states in the DEIS: "*...whether there is a need for a proposed project and whether the proposed project would serve the public interest. The Commission decision, in its Order, would review the need for the Project.*"

FA-1a	**Recommendations:** The EPA recognizes that this section of the DEIS needs to be further developed as the Commission receives agency and public input. While finalizing this discussion, the EPA has provided some general information regarding NC's demand/consumption regarding three energy sectors (See chart below). It is noted that in NC the natural gas sector has increased by more than 100%, but we also noted that the available volume of gas as of today is already exceeding NC's present consumption[2]. We understand that one of the many issues FERC considers for its decision is market demand and supply. We recommend that the FEIS include a well-defined purpose and need that would address the underlining need for this project that balances the benefits and impacts from the proposal.	See response GEN-2 in appendix I.2.

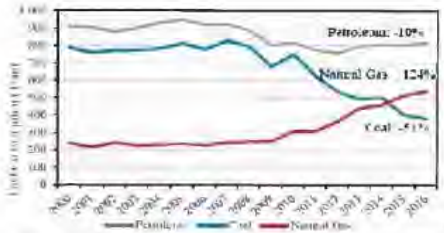

Figure 1 5: Trends in Fossil Fuel Consumption by All Sectors (TBtu)

Alternatives: The EPA's earlier scoping comments recommended that FERC expand the evaluation of the alternatives. While we recommended to further evaluate the Duke Power Alterative (included in this DEIS), and to explore further 'co-location' alternatives that would reduce and minimize environmental impacts.

FA-1b	**Recommendations:** The EPA recommends expanding the System Alternatives section. The DEIS explanation of why this alternative is not feasible is not clear. The EPA also recommends expanding the Major Pipeline Route Alternatives. We recommend studying a new route for the NC proposed route, specifically where the proposed route deviated from co-location at MP 32.8 (begins co-location with the power lines) and beyond. The EPA recognizes that this suggested co-location alternative route would entail additional mileage, but we also recognize the extent of permanent and temporary impacts the proposed new location route would create. We recommend studying the continuation of co-location from MP 32.8 going south and following co-location (with Cardinal Pipeline) looping to the east until reaching the future delivery point at the Haw River location. The EPA can supply the appropriate maps if FERC requires clarification regarding this recommended environmentally-preferable alternative.	See section 3.4.2 of the EIS for discussion of minor route alternatives. The western portion of this alternative was not preferred due to proximity to residences, terrain, and crossings of surface water features and major wetland systems. The eastern portion of this route was considered and is described under the Haw River Alternative. We concluded that these alternatives do not offer a significant environmental advantage when compared to the proposed route.

[1] Certification of New Interstate Natural Gas Pipeline Facilities, Statement of Policy, 88 FERC ¶ 61,227 (1999). "*...the Commission will evaluate the project by balancing the evidence of the project's public benefits against its residual adverse effects.*"
[2] The draft NC Clean Energy Plan was prepared by the North Carolina Department of Environmental Quality, 2019.

NHPA, ESA and CWA Section 404 Compliance: The DEIS states that FERC would complete the

FA-1	United States Environmental Protection Agency	
	process for compliance with the National Historic Preservation Act (NHPA) and the Endangered Species Act (ESA) Section 7 consultations prior to construction. It is also noted that FERC was submitting the DEIS as its biological assessment (BA) and requesting informal consultation with the U.S. Fish and Wildlife Service (FWS). We recognize the substantial information related to NHPA consultations and studies that were presented in the DEIS. We recommend that FERC not allow the applicant to begin ground disturbance until these processes are completed. We also note that the Section 404 of the Clean Water Act (CWA) permitting was pending due to the Corps of Engineers indication that the 404 permits could not be finalized until the NHPA and Section 7 processes were completed.	
FA-1c	**Recommendation:** The EPA strongly recommends that all permits, consultations and the biological opinion (if required) be concluded and available in the FEIS or in the Record of Decision (ROD). The required analyses, ground reconnaissance and consultations for these approvals are extremely important in order to adequately make project decisions.	Comment noted. All consultations would be complete and federal permits would be obtained by Mountain Valley prior to construction.
FA-1d	**Hydrostatic Testing and Horizontal Drill Water**: The DEIS states that hydrostatic test water would be discharge into the Roanoke River Basin and Cape Fear River Basin. Also, the DEIS stated that the project will use municipal water for the test, but at the same time, the DEIS (in a different section) also mentioned that Mountain Valley continues to evaluate other sources of water for hydrostatic testing and Horizontal Directional Drill (HDD) operations. The DEIS mentioned the very high probability of having Inadvertent Return (IR) at the Dan River site and Stony Creek Reservoir when performing HDD activities.	As described in section 2.4.1.6 hydrostatic testing would be completed in compliance with DOT's Minimum Federal Safety Standards 49 CFR 192. See also section 4.12 for discussion of regulations for design requirements related to the prevention and detection of corrosion.
FA-1e	**Recommendations**: The DEIS stated that they will not be using chemicals during hydrostatic testing. By not using chemicals during the testing, water might be left in the pipelines that can cause oxygen corrosion and microbiologically influenced corrosion (MIC). Pipelines might become vulnerable and long-term integrity and safety could become an issue. The EPA recommends that plans be included in the FEIS to prevent these issues. The EPA recommends the use of filter covers to use at the end of the output pipe/hose to capture a variety of deposits such as metals before discharging the used water. It is important to note that if the applicant proposes different sources of water after FERC's licensing decision, the project could require additional permits and therefore, the NEPA process might need to be amended for the additional studies from the affected water bodies from the change in plans involving the hydrostatic test water. The EPA also requests a complete Hydrostatic Testing Plan be included in the FEIS.	Water used for hydrostatic testing would be discharged into upland areas through appropriate energy dissipation devices. Any chemical laden water association with cleaning methods would not be discharged to the ground but instead hauled away and disposed of at an approved waste facility. Mountain Valley would conduct sampling to ensure that discharges meet regulatory thresholds. All drilling fluid would be hauled away and disposed of at an approved and properly permitted waste facility.

FA-1	United States Environmental Protection Agency	
FA-1f	As BMPs for the HDD sites where the possibility of IR exists, the EPA strongly recommends the presence of a 'mud engineer' and a trained crew member ('mud man') to work at every HDD location. We understand that most IR incidents happen when experts and highly trained crew are not at the sites helping to manage this technology and the appropriate mix of materials that this involves. The EPA recommends to strongly consider the following components especially when impacting sensitive areas: • Ticker grade of piping material for crossing water bodies. • The installation of automatic shut-off valves or remote-control valves. • The installation of computerized monitoring and leak detection system. • The use of HDD technique should be considered for more water crossings. • The pipeline should be buried deeper in all water bodies locations to avoid future pipe exposures (thus, the applicant could eliminate pipe degradation that could cost constant repairs/maintenance due to high flow events, human interference and environmental stressors). **Aquatic Resources:** The applicant (Mountain Valley) states that the project would impact 26.8 acres of wetlands, though many of these impacts would be temporary and short-term. The project's operational right-of-way would affect 5.9 acres of wetlands, including the conversion of 0.1 acre of palustrine scrub-shrub (PSS) wetland to palustrine emergent (PEM) wetland, and 4.4 acres of palustrine forested (PFO) wetlands to PSS and PEM wetlands.	Comment noted. Class thickness is designated by DOT. HDD is discussed in section 4.1.4.9.
FA-1g	**Recommendations**: Given the extended time-to-maturity of PFO wetland systems, EPA recommends that temporary PFO impacts be treated as permanent impacts. Filling of aquatic resources, particularly with stream loss, is not only a direct impact, but will likely lead to changes in the biogeochemical and hydrologic conditions of the receiving streams. The EPA is concerned with the potential secondary effects of the project including potential water quality degredation, impacts to hydrology, habitat and biodiversity loss, and downstream impacts from the loss of nutrient cycling, organic matter input and processing, and natural hydrology.	Comment noted. Section 4.4.2 of the EIS describes PFO impacts as long term.
FA-1h	Cumulative impacts from indirect impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Although the impact of a particular action may be considered minor, the cumulative effects of numerous piecemeal changes can result in a major impairment of the water resources. Considering MVP Southgate as a single and complete project, the EPA recommends a cumulative impacts analysis be considered in order to fully assess the effects on water quality, hydrology, habitat and biodiversity in the watersheds within the total project area.	A cumulative impacts analysis of the Southgate project can be found in section 4.13 of the EIS.

FA-1	United States Environmental Protection Agency	
FA-1i	The EPA recommends the applicant document the studies that show minimum or non-impact to upper stream or lower stream sections of these water bodies and their ecosystem. Complete documentation should include communications/consultations to the regular users of these waters.	See response SURF-4 in appendix I.2.
FA-1j	The EPA recommends the completion of any ongoing wetland and stream surveys be included in the FEIS. We also request that practicable avoidance and minimization measures be incorporated into the project design and construction. Although wetland impacts in the DEIS are classified by system type, this classification does not provide details regarding the wetland quality or functional assessment currently provided by these resources. The EPA recommends that functional assessments for impacted waterbodies be provided in the mitigation plan. The EPA recommends a comprehensive mitigation plan be developed to assess and assure the functional performance of any proposed stream mitigation. The plan should include identification of specific performance standards, a monitoring plan, and an adaptive management plan with corrective actions identified should the stream mitigation and relocations be unable to achieve performance standards. The EPA recommends that the baseline assessment of the streams be used to guide the development of these performance standards. If a relocated stream is expected to receive full mitigation credit for the impacted resources, the stream relocation should at a minimum be providing equivalent quality and function to that of the pre-impacted stream. Stream relocations should only be considered 'self-mitigating' if the relocation retains or improves the existing condition of the stream system as measured by the baseline assessment methodology.	A description of existing wetland resources in the Project area is provided in section 4.4.1 of the FEIS. See response SA-2a-10 regarding the completion of surveys. The EIS was prepared in accordance with NEPA, CEQ guidelines, and other applicable requirements. In addition Mountain Valley would be required to comply with all federal and federally-delegated permits as identified in table 1.4-1, including the Section 404 CWA permit. The Compensatory Mitigation Plan would be subject to review and approval by the District Engineer for the COE for the Norfolk District in Virginia and Wilmington District in North Carolina.
FA-1k	An important resource to consider is titled, *"The Framework and Risk Matrix"*. The U.S. Fish and Wildlife Service (USFWS), is one of its developers. This is a pipeline crossing framework and risk analysis approach and it is recommended by the USFWS. This approach is also used for wetlands. For detailed technical information regarding this resource, please contact: Janine_M_Castro@fws.gov **Environmental Justice:** The EPA appreciates that a discussion and analysis of environmental justice (EJ) that was included in the DEIS. The EPA has identified census block groups where linguistically isolated populations are present. **Recommendation:** The EPA recommends expanding the EJ analysis and if linguistically isolated populations are to be impacted by the proposal, the EPA recommends that the applicant should reach out to these communities. All project related documents should be translated into the corresponding languages.	Section 4.3.2 describes the effects of the Projects on surface waterbodies. We recognize that in-stream construction would cause temporary and localized impacts on surface water. However, based on the construction techniques and Mountain Valley's commitment to the Plan. Procedures, and their E&SCP we do not anticipate long-term or significant impacts on surface water resources as a result of construction or operation of the Project
FA-1l	**Air Quality:** The DEIS states that emissions from the new compressor station would be greater than 25,000 metric tons per year. The EPA's 40 CFR Parts 86 et al. rule for mandatory reporting of greenhouse gases will potentially require monitoring and reporting of emissions from this new unit. The DEIS indicated that the new compressor unit could produce up to 16 blowdown events per year.	Comment noted. See revised section 4.9.8.

FA-1	United States Environmental Protection Agency	
FA-1m	**Recommendation:** The EPA recommends that the applicant consider new and proven technologies to reduce methane emissions and include these capture technologies into the new compressor station construction. A variety of applicable resources and technologies can be found at: https://www.epa.gov/natural-gas-star-program/recommended-technologies-reduce-methane-emissions and https://www.epa.gov/natural-gas-star-program/blowdown-reductions. In 2014, the EPA estimated that the transmission and storage sector accounts for 13% of the total methane emissions from the oil and natural gas industry. The EPA reported that Reciprocating Compressors account for 35% of the emissions from this sector. The EPA developed the Natural Gas STAR Program that provides a framework for partner companies with U.S. oil and gas operations to implement methane reducing technologies and practices. We would like to encourage the applicant to join this program and find out its many benefits at: https://www.epa.gov/natural-gas-star-program. On August 28, 2019, the EPA proposed policy amendments to the 2012 and 2016 new source performance standards for the oil and gas industry. These new standards can be found at: https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/proposed-policy-amendments-2012-and-2016-new.	Comment Noted. Mountain Valley considered new and proven technologies to reduce methane emissions for the Lambert Compressor Station and included such technologies in the compressor station design. A discussion of technologies being implemented at the Lambert Compressor Station to achieve low emission levels is in section 4.11.1. Climate change impacts are discussed in section 4.13.2.9.
FA-1n	**Forested Land Impacts:** Approximately 582 acres of forested land would be cleared as proposed. The DEIS indicated that some areas would be allowed to naturally revert to forest, but that such process could take 30 or more years. Additional impacts occurred when the land clearing releases greenhouse gases into the atmosphere. Furthermore, the project will potentially produce large amounts of vegetative debris, and consequently the need for either on-site burning and/or transportation and disposal. **Recommendation:** The EPA recommends calculating greenhouse emissions from this activity and it be added to the project emissions. The EPA recommends analyzing the impacts of forest fragmentation and use the results to develop a replanting proposal. Also, the EPA recommends using a tree targeted clearance in order to allow some of the most important old growth to remain. The EPA recommends some additional resources regarding greenhouse gas emissions: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions; https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references. The EPA recommends that vegetative debris be recycled and/or repurposed to the extent practicable, and it be diverted from landfills.	Comments noted. Forest fragmentation is discussed in section 4.5.4.3. Disposal of vegetative debris is discussed in section 4.5.4.1. Greenhouse gas emissions are discussed in section 4.11.1.7.
FA-1o	**Existing Residential, Commercial and Industrial Facilities:** The DEIS included measurements to reduce impacts to the closest (25 and 50 feet within the project) residents/structures. **Recommnedation:** The EPA recommends to include notices of construction (and blasting) to residents within 250 feet from the pipeline construction. Additionally, we ask to provide community notices in other languages, as apropriate.	Comment noted. See revised section 4.1.4.6.
FA-1p	**Clean Diesel:** The EPA recommends that the applicant consider Implementing diesel controls, cleaner fuel, and cleaner construction practices for on-road and off-road equipment used for transportation, soil movement, or other construction activities, including: • Strategies and technologies that reduce unnecessary idling, including auxiliary power units, the use of electric equipment, and strict enforcement of idling limits; and • Use of clean diesel through add-on control technologies like diesel particulate filters and diesel oxidation catalysts, repowers, or newer, cleaner equipment. For more information on diesel emission controls in construction projects, please see: http://www.northeastdiesel.org/pdf/NEDC-Construction-Contract-Spec.pdf.	Mountain Valley has indicated that they will consider clean diesel technologies and strategies for the project.

FA-1	United States Environmental Protection Agency	
FA-1q	**Pipeline Safety:** The EPA understands that there has been a substantial number of recent articles pertaining to public concerns involving natural gas pipeline projects (in general) around the country and their potential impact radius (high consequence areas) if an incident were to occur. Random leaks or other types of incidents/malfunctions might occur at any time on any segment of the pipeline. The Federal pipeline safety regulations at Title 49 §192.935 identifies the types of areas where additional measures must be taken. **Recommendations**: The EPA suggests the development of a 'Risk Assessment' to inform the public in a more detailed manner. We understand that the Pipeline and Hazardous Materials Safety Administration (PHMSA) oversees pipeline saftey. However, we recommend that FERC share with PHMSA any relevant public concerns received regarding pipeline safety. Please note that we are suggesting a 'Risk Assessment' and not a risk management plan (as they are sometimes confused). We believe that these communication and coordination efforts between the agencies might lessen public and community concerns regarding safety issues from nearby natural gas pipelines. The EPA also recommends the use of the latest technology for leak detection, such as infrared laser detectors, aerial sensing-leak mapping systems, hand-held passive infrared cameras, and infrared laser detectors for leaks detection, as appropriate.	FERC staff are in regular communication with PHMSA and also participate as a member of the USDOT PHMSA's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable. See section 4.11.1.5 in the EIS for discussion on Mountain Valley's leak detection methods.

FA-2 United States Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

September 16, 2019

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NC, Room 1A
Washington, DC 20426

Re: Mountain Valley Southgate DEIS (CP19-14-000)

Dear Ms. Bose:

The U.S. Fish and Wildlife Service (Service) has reviewed the July 2019, Draft Environmental Impact Statement (DEIS) for the Mountain Valley Southgate (MVPS) project and the August 16, 2019 letter from James Martin, FERC, to John Ellis, FWS, regarding Status of Consultation for the Proposed Southgate Project (letter). The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended. The Service has met on a regular basis with the project proponent and the FERC regarding this project.

The Mountain Valley Southgate Project is an interstate natural gas transmission pipeline project that will extend approximately 73.7 miles from Pittsylvania County, Virginia to delivery points in North Carolina ending in Alamance County, North Carolina. The project will have the capacity to transport 375 million cubic feet of natural gas per day.

The Service's overarching comments in regards to the DEIS and the letter are that the Service does not believe there is sufficient information for the FERC to make a determination regarding effects to listed species. This is due to the lack of information regarding things such as stream crossings, lack of completed surveys for listed species and the absence of important information regarding the project such as the Erosion and Sedimentation Control Plan. The Service also believes that this would apply to the Corps determinations for any permits needed for crossing streams and wetlands. The letter mentions that a Biological Assessment (BA) is contained within the DEIS. At this time, there is not sufficient information to decide if formal consultation will be needed, but if it is, the BA as included in the DEIS would not be deemed complete due to the lack of the above referenced information.

FA-2	United States Fish and Wildlife Service	
FA-2a	It is the Service's understanding that most of the listed species surveys have been conducted in areas MVPS has access. As of yet the reports of these surveys have not been released. The reports should contain information regarding what species were found including non-listed species, the habitat conditions, and the dates of the survey. For aquatic species, streamflow and turbidity information should be included. Based on the DEIS, the methods of crossing streams along the route have not been decided upon and geotechnical surveys have not been completed. This information will be integral in assessing impacts to listed species in streams where they occur and the crossings of tributaries just upstream of their confluence with streams with listed species. This information is needed by the FERC and the Corps to make informed effects determinations and the Service to evaluate these determinations.	Mountain Valley provided FWS with outstanding survey results for listed species in October 2019. Mountain Valley would provide its Erosion and Sediment Control Plan (E&SC Plan) once approved by the states. Mountain Valley's draft narrative E&SC Plan was filed on June 21, 2019, see section 2.4 for the location of the this information.
FA-2b		See response SURF-8 in appendix I.2. See also appendix B.5 for the proposed crossing method of each stream.
FA-2c	Throughout the DEIS there are statements that the MVPS's Erosion and Sedimentation Control Plan will minimize or avoid impacts to surface waters and fish and wildlife resources in them. Based on our conversations with the FERC as recently as September 9, 2019, MVPS has not provided the Plan. This plan is an integral part of assessing impacts to listed species. It should include measures to protect not only streams with species but also tributary streams that have crossings in close proximity to streams containing listed species. It should also address permanent and temporary construction roads and restoration of them in these areas. In similar projects, the Service has recommended measures such as not grubbing within 50 feet of surface waters containing sensitive species outside of the growing season, which is considered to be April 15 - Nov 15 in this area. We have also recommended that at the end of each workday unvegetated fill be stabilized with an acceptable erosion control cloth, blanket or matting until the fill is ready to be permanently stabilized. FERC should evaluate this plan when making its effects determination for listed species. During the construction phase, the Service requests that the FERC monitor construction closely due to issues that have occurred on the MVP mainline.	Mountain Valley's E&SC Plans would be designed to meet Virginia and North Carolina standards for erosion and sediment control. These plans would be reviewed by the VADEQ and the NCDEQ. See response GEN-6 in appendix I.2 for further response. See section 2.0 of the EIS for discussion of project construction including erosion and sediment controls. Mountain Valley also has agreed to participate in FERC's third party monitoring program, in which a FERC representative would be on site monitoring construction activities.
FA-2d	The DEIS states that MVPS intends to utilize municipal water sources for hydrostatic testing but then goes on to say that MVPS is evaluating a variety of sources of water for hydrostatic testing, HDD operations, dust control, etc. This is confusing and thus makes it difficult to evaluate the impacts. The Service recommends that MVPS not withdraw water from streams that contain listed species. In any stream withdrawals should use screens to prevent impingement and entrainment of aquatic organisms. In streams with sensitive species, a mesh size of 1 mm and an intake velocity of 0.25 feet per second is commonly used. Furthermore, sufficient instream flow to maintain aquatic life should be present at all times. This information will be important for the FERC to utilize in making its effects determination.	Water sources are addressed in 4.3.2.6 of the EIS. Since the issuance of the draft EIS, Mountain Valley has proposed to use the Dan River as the primary source of water for construction and water from municipalities would be the secondary source. Mountain Valley would need to obtain written permission from the FWS for any water withdrawal from a waterbody containing federally listed species prior to getting FERC approval to commencing withdrawal activities, which includes the Dan River. As discussed in section 4.7 of the EIS, our effects determinations take into consideration the withdrawal of water from the Dan River.
FA-2e	In regards to the Migratory Bird Treaty Act, it is the Service's understanding that MVP intends, where practicable, to avoid vegetation clearing during the migratory bird nesting season (March 15 – August 15 in Virginia and April 1 – August 31 in North Carolina). We believe that this in conjunction with the FERC's recommendation that MVPS consult with the Service if the removal of vegetation removal during the nesting season, in conjunction with efforts to collocate much of the project along existing rights-of-way should minimize impacts to migratory birds.	Comment noted.

FA-2	United States Fish and Wildlife Service

In summary, the Service believes that there is currently insufficient information in the DEIS to thoroughly review the project or for the FERC or Corps to make an informed effects determination. The above mentioned information should be provided to the agencies with adequate time to evaluate and discuss with MVPS prior to the release of the FEIS so that it the Section 7 process can be completed and included in the FEIS. The Service intends to continue working closely with the MVPS, FERC, and Corps on this project. If you have any questions please contact John Ellis (john_ellis@fws.gov).

Sincerely,

John Ellis for

Pete Benjamin
Field Supervisor

EO-1	State Representatives	
	Dennis Riddell, Snow Camp, NC. Combined statement of Alamance County State Representatives Ross and Riddell regarding the proposed MVP Southgate pipeline Since the original announcement of the proposed MVP Southgate project the attention of many property owners along the pipeline path in Alamance County has been galvanized over concerns regarding various aspects of the proposed project. Our offices have been contacted by many Alamance County citizens regarding the impact the project may have on their property. We have visited property sites and spoken with the landowners and representatives from MVP Southgate to learn firsthand what may be the consequences for these landowners.	
EO-1a	We understand that this project is under the supervision of FERC and as a federal project the role of the state is secondary. However, the safety	Section 4.12 of the EIS discusses safety concerns.
EO-1b	and property rights of our constituents, in addition to protecting	Section 4.8 of the EIS discusses property rights.
EO-1c	environmentally sensitive areas are very important to us so it became incumbent for us to learn about the FERC process and what we could do to ensure that everyone's rights under the existing laws and rules would be protected.	The EIS describes the potential impacts on environmental resources resulting from construction and operation of the Project. Staff considered measures to avoid, reduce, and mitigate impacts on the environment, and as appropriate, are including recommendations in the final EIS to the Commission.
EO-1d	We believe that the public hearings that FERC has held regarding the MVP Southgate pipeline were well publicized and well attended. The information available to landowners and other concerned citizens was readily on hand. We noted that professionals representing MVP Southgate were also present to discuss the various issues associated with the project. We had conversations with many concerned property owners, members of special interest groups, engineers and project managers with MVP Southgate, FERC officials and more. We also noted that at each of these public meetings an opportunity was provided for anyone to make a public comment for the record. On several occasions we specifically requested additional time and attention from MVP Southgate representatives to go on site again (if needed) to reconsider constituents' requests regarding their particular land site. In each instance we did find MVP Southgate to be responsive and willing to discuss with the landowners an alternative route for the pipeline. On one occasion a representative from MVP Southgate spent close to an hour walking two property sites with both of us and the landowners. We appreciated their willingness to meet, walk, and hear from the landowners.	Comment noted.
EO-1e	As the project moves from the DEIS stage into subsequent comments and analysis we have the following requests: 1. That our constituents' constitutional rights continue to be protected to the full extent of the law.	Comment noted.

EO-1	State Representatives	
EO-1f	2. We understand that eminent domain is both a necessary and troubling power in the hands of governing bodies. As such we urge great restraint in the exercise of this formidable power to obtain property.	As discussed in section 4.8.2, Mountain Valley would first attempt to reach an easement agreement with each landowner. If an easement cannot be negotiated with a landowner and the project has been certificated by the FERC, the company may use the right of eminent domain granted to it under Section 7(h) of the NGA and the procedures set forth under the Federal Rules of Civil Procedure (Rule 71A) to obtain the right-of-way and extra workspace areas.
EO-1g	3. That MVP Southgate continue to work with our concerned constituents regarding their very real concerns about proposed route paths across existing well/septic lines, proximity to dwellings, historic buildings, tribal burial grounds, ponds, creeks, and other documented critical environmental considerations.	As discussed in section 4.8.3, Mountain Valley has developed a landowner complaint resolution process. Mountain Valley would continue to work with landowners throughout the Project timeline to address their concerns. The Project certificate order would include mandatory environmental conditions, which provide a framework to ensure protection of the human and natural environment during construction of the Project and to address any instances of non-compliance encountered during construction.
EO-1h	4. Finally, if the project is approved and goes forward we believe it is vital that, after all the work is done, the land be returned to its' original appearance and whatever remediation is required be performed quickly and thoroughly. Rep. Dennis Riddell Alamance County North Carolina General Assembly District 64 Rep. Steve Ross Alamance County North Carolina Assembly	Mountain Valley would follow all mitigation and restoration measures as outlined in the Plan and Procedures, including those requiring Mountain Valley to return all areas to preconstruction conditions.

SA-2	Virginia Department of Environmental Quality	
	Part I: Section 5.2 of the FEIS	
SA-2a-1	The Commonwealth of Virginia recommends that Federal Energy Regulatory Commission (FERC or the Commission) include the following recommendations in Section 5.2 of the Final EIS (FEIS) and if the Commission approves the construction and operation of the Southgate Project (the Project), it condition the order on adherence to these recommendations. If FERC does not include these recommendations in Section 5.2, then the Commonwealth of Virginia recommends that they be incorporated in appropriate sections of the FEIS, plans and procedures as mitigation measures. **1) New Recommendations**	Comment noted. We expect that any specific construction and restoration measures deemed necessary by the state would be included in the appropriate state authorizations. It has been the policy of FERC staff to not include conditions from other agencies. Largely, this is because staff may not be able to interpret compliance of conditions generated by other agencies.
SA-2a-2	**a) Recommendation:** Mountain Valley Pipeline, LLC (Mountain Valley, MVP or the applicant) should identify any public surface water supply intakes that are located within five miles of the project and coordinate as needed with any identified public water supply entity. **Findings to support recommendation:** Virginia's water quality standards regulation 9VAC25-260 classifies 5 miles upstream of a surface water supply intake as public water supplies. However, the draft environmental impact statement (DEIS) (page 4-32) references water supply intakes located within three miles of the project in Virginia. See the Virginia Department of Environmental Quality (DEQ) comments in Attachment B.	FERC standards include identification of public surface water intakes that are within 3 miles of Project workspaces. We have used the 3-mile standard for many years and are not aware of any instance in which a greater distance was necessary. State agencies may enforce their own regulations and requirements under any state authorizations and/or permits that Mountain Valley would need to obtain for the Southgate Project. See response to SA-2a-1 above.
SA-2a-3	**b) Recommendation:** Should Mountain Valley choose to release hydrostatic test water to upland areas, the hydrostatic test water shall be released through energy dissipating dewatering devices. The energy dissipating dewatering devices must be sized to accommodate the rate and volume of release and be monitored and regulated to prevent erosion and over pumping of the energy dissipating dewatering devices. The upland discharge of hydrostatic test water shall be monitored in accordance with the Virginia Pollutant Discharge Elimination System (VPDES) General Permit. Mountain Valley shall record and track the daily volumes of water withdrawn for hydrostatic testing activities and make such records available during inspection or upon request by the DEQ. In the event of an inadvertent indirect discharge to surface waters, Mountain Valley shall be responsible for ensuring that such discharge complies with all requirements of the VPDES General Permit, including the requirement to notify DEQ within 14 days.	Measures regarding hydrostatic test water discharge are provided in section 4.3.2.7 of the EIS and VII.D.1 of Mountain Valley' Procedures. Mountain Valley would be required to comply with state regulations in order to meet state authorization and permitting requirements (See response to SA-2a-1 and SA-2a-2 above).

SA-2	Virginia Department of Environmental Quality	
	Findings to support recommendation: The discharge of hydrostatic test water to surface waters is regulated under the VPDES Permit Regulation, 9VAC25-31-10 *et seq.*, and the VPDES General Permit Regulation for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests (VPDES General Permit), 9VAC25-120-10 *et seq.* Prior to discharging hydrostatic test water to surface waters, Mountain Valley must register for coverage under the VPDES General Permit or obtain an individual VPDES permit if the discharge is not eligible for coverage under the VPDES General Permit. See the DEQ comments in Attachment B.	
SA-2a-4	c) **Recommendation:** Mountain Valley should revise plans to dispose of brush and timber to be consistent with the Department of Forestry's (DOF) published Forestry Best Management Practices for Water Quality, which is available online at http://www.dof.virginia.gov/infopubs/BMP-Field-Guide_pub.pdf, and the FERC Upland Erosion Control, Revegetation, and Maintenance Plan, section III.E. See the DOF comments in Attachment B.	Mountain Valley agreed to be compliant with DOF recommendations. See section 4.5.4.1 for further discussion.
SA-2a-5	d) **Recommendation:** Wetland and stream impacts should be avoided and minimized to the maximum extent practicable. Stream impacts should be minimized or avoided by narrowing the active right-of-way to the minimum necessary at each stream and wetland crossing. Where access is required across a wetland, removable mats should be used to reduce compaction and rutting. When excavation for a structure is necessary in a wetland, excess spoil should not be disposed of in adjacent wetland areas unless authorized by a state or federal wetland permit. See the DEQ comments in Attachment B.	Waterbody crossing are discussed in sections 2.4.2.1 and 4.3.2.2 of the EIS. Wetlands are discussed in section 2.4.2.2 and 4.4.1 of the EIS. In addition Mountain Valley would adhere to its Procedures, which limit the construction right-of-way to 75 feet in wetlands (unless specific locations are approved by FERC). Mountain Valley has reduced construction workspace to 75 feet at waterbody crossings where feasible.
SA-2a-6	e) **Recommendation:** Flag or clearly mark all non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading, or filling activities for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no activities are to occur. See the DEQ comments in Attachment B.	Mountain Valley would follow measures outlined in its Plan and Procedures, which address the identification and marking of Project workspaces and sensitive resources. Plan III. A.1 and IV.A.1; Procedures V.B.3.f.
SA-2a-7	f) **Recommendation:** Any temporary impacts to surface waters associated with this project should require restoration to pre-existing conditions. Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub, or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Preserve the top 12 inches of trench material removed from wetlands for use as wetland seed and root-stock in the excavated area. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed. See the DEQ comments in Attachment B.	Waterbody restoration is discussed in sections 2.4.2.1 of the EIS and V.C. of Mountain Valley's Procedures.
SA-2a-8		Wetland restoration methods are discussed in section 2.4.2.2 and VI.C. of Mountain Valley's Plan.

SA-2	Virginia Department of Environmental Quality	
SA-2a-9	g) **Recommendation:** Heavy equipment in temporarily impacted surface waters should be placed on mats, geotextile fabric, or other suitable material, to minimize soil disturbance to the maximum extent practicable. Equipment and materials should be removed immediately upon completion of work. See the DEQ comments in Attachment B.	Waterbody crossing methods are discussed in sections 2.4.2.1 of the EIS and section V.B. of Mountain Valley's Procedures.
SA-2a-10	h) **Recommendation:** Prior to commencing construction, Mountain Valley shall file with the Commission and DEQ Water Permitting Division all outstanding surveys for impacts to surface waters in all disturbed areas of the project in Virginia, including both the construction and operational rights-of-way, all access roads, stockpile and alternative work areas, and materials storage areas, to the extent that landowner access has been granted. See the DEQ comments in Attachment B. • Identify any areas not surveyed in Virginia. Provide any estimates of surface water impacts in these areas and the sources used to make the estimate. • Include all revisions to the wetland and waterbody crossing tables provided in Appendices B.5 and B.6 of the DEIS, including any revised milepost numbering. • Include a copy of all federal jurisdictional determinations, including drawings and graphics, of surveyed surface waters in Virginia, including federal waters of the United States and any state-regulated isolated waters, springs, or open water.	Mountain Valley has indicated that they would file with FERC and VADEQ the results of all outstanding surveys for impacts on surface water when they are able to obtain access to all areas. If the Project receives a Certificate from FERC, Mountain Valley will be granted eminent domain and therefore will be able to complete any remaining surveys.
SA-2a-11	i) **Recommendation:** Prior to commencing construction, Mountain Valley shall file with the Commission and DEQ Water Permitting Division any proposed or final compensatory mitigation plans that are applicable to unavoidable, permanent surface water impacts in Virginia, and the status of the approval of such plans by the United States Army Corps of Engineers (Corps). Compensation for impacts to State Waters, if necessary, should be in accordance with all applicable state wetland regulations, including the compensation for permanent conversion of forested and scrub-shrub wetlands to emergent wetlands. Consider mitigating impacts to forested or converted wetlands by establishing new forested wetlands within the impacted watershed. See the DEQ comments in Attachment B.	Mountain Valley has indicated that they would file with FERC and VADEQ such proposed or final compensatory mitigation plans.
SA-2a-12	j) **Recommendation:** Prior to construction, Mountain Valley shall file with the Commission and DEQ Water Permitting Division all revisions or updates to crossing methodologies for surface waters in Virginia. See the DEQ comments in Attachment B.	Mountain Valley has indicated that they would file with FERC and VADEQ revisions or updates to crossing methodologies for surface waters in Virginia.

SA-2	Virginia Department of Environmental Quality	
SA-2a-13	k) **Recommendation:** No activity may substantially disrupt the movement of aquatic life indigenous to the water body, including those species, which normally migrate through the area, unless the primary purpose of the activity is to impound water. Culverts (if needed) placed in streams must be installed to maintain low flow conditions. No activity may cause more than minimal adverse effect on navigation. The activity must not impede the passage of normal or expected high flows and the structure or discharge must withstand expected high flows. See the DEQ comments in Attachment B.	Waterbody crossing are discussed in sections 2.4.2.1 and 4.3.2.2 of the EIS. In addition Mountain Valley would adhere to its Plan and Procedures.
SA-2a-14	l) **Recommendation:** Activities should be conducted in accordance with any time-of-year restriction(s) as recommended by the United States Fish and Wildlife Service (FWS), Department of Game and Inland Fisheries (DGIF), Department of Conservation and Recreation (DCR), and Virginia Marine Resources Commission (VMRC). The permittee should retain a copy of the agency correspondence concerning the time-of-year restriction(s), or the lack thereof, for the duration of the construction phase of the project. See the DEQ comments in Attachment B.	Based on recommendations from VADGIF, Mountain Valley has committed to adhere to the Virginia warm water fisheries construction window (i.e., no in-water construction between April 15 and July 15). Section 4.3.2.4 has been updated with this information.
SA-2a-15	m) **Recommendation:** Erosion and sedimentation controls should be designed in accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992. These controls should be placed prior to clearing and grading and maintained in good working order to minimize impacts to state waters. These controls should remain in place until the area is stabilized and should then be removed. Any exposed slopes and streambanks should be stabilized immediately upon completion of work in each permitted area. All denuded areas should be properly stabilized in accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992. See the DEQ comments in Attachment B.	Mountain Valley has stated that they would comply with the design requirements of the VA E&S Handbook, Third Edition, 1992, for the creation of the state approved erosion and sedimentation control plans.
SA-2a-16	n) **Recommendation:** All construction, construction access, and demolition activities associated with this project should be accomplished in a manner that minimizes construction materials or waste materials from entering surface waters, unless authorized by a permit. Wet, excess, or waste concrete should be prohibited from entering surface waters. Employ measures to prevent spills of fuels or lubricants into state waters. See the DEQ comments in Attachment B.	Mountain Valley would follow measures outlined in its Plan, Procedures, E&SC Plan, SPCC Plan, and Unanticipated Discovery of Contamination Plan.
SA-2a-17		Mountain Valley has stated that no concrete will be actively cured on the right-of-way.
SA-2a-18	o) **Recommendation:** Herbicides used in or around any surface water should be approved for aquatic use by the United States Environmental Protection Agency (EPA) or the FWS. These herbicides should be applied according to label directions by a licensed herbicide applicator. A non-petroleum based surfactant should be used in or around any surface waters. See the DEQ comments in Attachment B.	Mountain Valley's Plan does not allow the use of herbicides within 100 feet of a wetland or waterbody except as allowed by the appropriate land management or state agency. As part of Mountain Valley's Exotic and Invasive Plant Species Control Plan, If specified for use by federal or state agencies near streams or wetlands, the Project will utilize herbicide applications approved for aquatic use.

SA-2	Virginia Department of Environmental Quality	
SA-2a-19	p) **Recommendation:** In the event that the project does not qualify for a Nationwide Permit 12 (NWP12) from the Corps, then a Virginia Water Protection (VWP) permit may be necessary for project activities in Virginia. Also, should isolated waters be impacted, a VWP permit may be necessary unless otherwise excluded. See the DEQ comments in Attachment B.	Comment noted. See response SA-2a-1.
SA-2a-20	q) **Recommendation:** Removal of riparian buffers not directly associated with the Project's construction activities is prohibited. Disturbance and removal of riparian buffers from Project-related land disturbing activities that would occur within 50 feet of any perennial, intermittent, or ephemeral surface waters shall be avoided where possible, and minimized to the maximum extent practicable if 50 feet is not possible. DEQ shall be notified of any and all instances in which 50 feet is not possible and approval shall be granted by DEQ prior to continuing with an alternate width. Removal of riparian buffers not associated with crossings shall not be allowed where stream bank stability under normal flow conditions would be compromised. See the DEQ comments in Attachment B.	Mountain Valley has stated that as a standard construction practice, the Project will establish a 50' wetland and waterbody buffer with erosion and sediment control devices. The buffer will not be grubbed during the initial right-of-way clearing and grubbing sequence. These buffers will remain undisturbed (aside from hand felling trees) until the pipeline crossing is ready to be installed in the ephemeral, intermittent, or perennial stream. The state may request notifications or additional information from Mountain Valley under state permitting requirements (see response to SA-2a).
SA-2a-21	r) **Recommendation:** The construction limit of disturbance (LOD) in upland areas approaching waterbody and wetland crossings shall be reduced to 75 feet wide and shall apply 50 feet from each side of the stream or wetland crossing to minimize the extent of riparian buffer disturbance. For any area approaching a waterbody or wetland crossing where this reduced LOD is not possible, notification of Commission approval (and Corps approval, if required) shall be provided to the DEQ prior to initiating land disturbing activity in that area. See the DEQ comments in Attachment B.	Mountain Valley would adhere to its Procedures, which limit the construction right-of-way to 75 feet in wetlands (unless specific locations are approved by FERC). Mountain Valley has reduced construction workspace to 75 feet at waterbody crossings where feasible. The state may request additional restriction from Mountain Valley under state permitting requirements
SA-2a-22	s) **Recommendation:** No refueling, hazardous materials storage, equipment maintenance, or equipment parking shall take place within 100 feet of the waterbody or wetland crossing, except as allowed by any applicable and approved Annual Standards and Specifications. See the DEQ comments in Attachment B.	In accordance with Mountain Valley's Procedures, fuel will not be stored within 100 feet of wetlands or waterbodies during construction with the exception of pumps and HDD equipment where secondary containment would be used.

SA-2	Virginia Department of Environmental Quality	
SA-2a-23	t) **Recommendation:** Any surface water withdrawals for the purposes of hydrostatic testing shall not violate applicable Water Quality Standards and shall be managed so that no more than 10% of the instantaneous flow rate from the channel is removed, the intake screens shall be designed so that screen openings are not larger than 1 millimeter, and the screen face intake velocities are not greater than 0.25 feet per second. See the DEQ comments in Attachment B. u) **Recommendation:** Any surface water withdrawals for the purposes of horizontal directional drilling or dust control that do not exceed 10,000 gallons per day from non-tidal waters or two million gallons per day from tidal waters shall not violate applicable Water Quality Standards and shall be managed so that no more than 10% of the instantaneous flow rate from the channel is removed, the intake screens shall be designed so that screen openings are not larger than 1 millimeter and the screen face intake velocities are not greater than 0.25 feet per second. See the DEQ comments in Attachment B. v) **Recommendation:** Daily withdrawals for horizontal directional drilling or dust control activities that exceed 10,000 gallons per day from non-tidal waters and two million gallons per day from tidal waters must comply with the requirements of the Virginia Water Protection Permit Program Regulation. The daily volumes of water withdrawn for horizontal directional drilling or dust control activities shall be tracked and recorded and such records shall be made available during inspection or upon request by DEQ. See the DEQ comments in Attachment B.	Currently no surface water withdrawals are proposed for Project use in Virginia; however, section 4.3.2.6 has been updated to include these specifications for surface water withdrawals.
SA-2a-24	w) **Recommendation:** Water quality monitoring, if required, shall be implemented in accordance with any applicable Upland Construction Water Quality Monitoring Plan. See the DEQ comments in Attachment B.	See response SA-2a-1
SA-2a-25	x) **Recommendation:** The measures identified in the Spill Prevention, Control, and Countermeasure (SPCC) Plan shall be implemented, as well as any subsequent revisions or addenda to the same approved by the Commission. See the DEQ comments in Attachment B.	Comment noted. See response SA-2a-16
SA-2a-26	y) **Recommendation:** All construction and installation associated with the Project shall be accomplished in such a manner that construction material or waste material shall not be placed into any perennial, intermittent, or ephemeral surface waters or karst features. See the DEQ comments in Attachment B.	Mountain Valley's SPCC Plan outlines the handling of waste during construction. All waste would be disposed of at an approved off-site facility.

SA-2	Virginia Department of Environmental Quality	
SA-2a-27	z) **Recommendation:** All measures intended to minimize the potential for discharges of soil or rock shall be implemented as detailed in any applicable General Blasting Plan and Landslide Mitigation Plan, as well as any subsequent revisions or addenda to the same approved by the Commission. If blasting or landslide activity results in unpermitted discharges of soil or rock to any perennial, intermittent, or ephemeral surface waters, DEQ shall be notified immediately, but no later than 24 hours after discovery. Potential impacts to karst features, if present, will be addressed in accordance with any applicable Karst Hazard Assessment and Karst Mitigation Plan. See the DEQ comments in Attachment B.	Comment noted. The state may request notifications or additional information from Mountain Valley under state permitting requirements (see response to SA-2a-1).
SA-2a-28	aa) **Recommendation:** All measures intended to minimize the potential for impacts shall be followed as detailed in any applicable Acid Forming Materials Mitigation Plan, as well as any subsequent revisions or addenda to the same approved by	Comment noted. Mountain Valley has not developed an Acid Forming Materials Mitigation Plan due to the low likelihood of encountering problematic concentrations of acid-producing sulfides.
SA-2a-29	bb) **Recommendation:** The Project, including all relevant records, is subject to inspection at reasonable hours and intervals by DEQ or any authorized representative of DEQ. See the DEQ comments in Attachment B.	Comment noted.
SA-2a-30	cc) **Recommendation:** DEQ shall be notified in writing at least 10 business days prior to any planned Construction Spread pre-construction conferences or meetings. See the DEQ comments in Attachment B.	See response SA-2a-1.
SA-2a-31	dd) **Recommendation:** DEQ shall be notified in writing of any modification of this Project and shall demonstrate in a written statement that said modifications will not violate any license conditions and federal or state approvals. See the DEQ comments in Attachment B.	See response SA-2a-1.
	Part II: FEIS, Plans and Procedures	
	The Commonwealth of Virginia encourages FERC to incorporate the following recommendations into appropriate sections of the FEIS, plans and procedures.	
	1) Proposed Route	
	a) Collocation and Other Route Alignments	
SA-2b-1	i) **Recommendation:** DGIF supports collocating the alignment within an existing utility easement to the greatest extent practicable to avoid and minimize clearing of land and vegetation for new right-of-way. See the DGIF comments in Attachment B.	Section 2.1.1 discuss the collocation of the Project with existing utility easements which is currently at 49 percent.

SA-2	Virginia Department of Environmental Quality	
SA-2b-2	ii) **Recommendation:** While DGIF prefers collocation within an existing utility right-of-way, DGIF supports efforts to minimize creation of new edge habitat and reduce forest fragmentation by locating some sections of the alignment adjacent to and adjoining existing utility easements, when necessary. According to information provided in a separate MVP Southgate Project DRAFT Resource Report 3 addressing fish, wildlife and vegetation, DGIF understands that linear segments of the project totaling 5.6 miles may not be collocated with existing utility easements. DGIF has insufficient information to evaluate what proportion of vegetation clearing along these 5.6 miles will take place within forested habitat, which would result in forest fragmentation and the creation of new edge habitat. Impacts resulting from such vegetation clearing are addressed on page 24 (3-17) of the Resource Report; the major project impact to forest-nesting birds is identified as habitat loss. DGIF submits as an additional consideration that the creation of open corridors within forested habitat exposes forest-nesting birds to increased nest predation pressure from both mammalian and avian predators (including jays, crows, and grackles) and to brood parasitism by brown-headed cowbirds. These in turn impact avian reproductive output, and could result in long-term impacts to avian populations within these newly-created corridors. See the DGIF comments in Attachment B.	Interior forests, habitat fragmentation, and impact to wildlife are discussed in detail in section 4.5.4.3 and 4.6.1.1of the EIS.
SA-2b-3	iii) **Recommendation:** Include a requirement that prior to the end of the FEIS period, Mountain Valley shall file with the Commission and DEQ Water Permitting Division all revisions or updates to Southgate Project maps as provided in Appendix B.1 of the DEIS. See the DEQ comments in Attachment B.	See response SA-2a-1 and SA-2a-10.
SA-2b-4	iv) **Recommendation:** Include a requirement that prior to the end of the FEIS period, Mountain Valley shall file with FERC and DEQ Water Permitting Division a revised TABLE 2.1-2 *Summary of Pipeline Collocated with Existing Rights-of-Way for the Southgate Project a/* to show the collocation lengths in each category by state. See the DEQ comments in Attachment B.	A revised table 2.1-2 has been included in section 2.1.1.

SA-2	Virginia Department of Environmental Quality	
	2) Preconstruction Recommendations	
	a) Air Permitting and Modeling	
SA-2c-1	i) **Recommendation:** Update the FEIS to note that the modeling discussed in Section 5.1.11 used to demonstrate compliance with all air standards does not account for any nearby sources or background emissions. The DEQ Air Division confirms that an application for a minor new source review permit was submitted for the proposed project in November 2018 and an updated application was submitted in April 2019. See the DEQ comments in Attachment B.	See section 4.11.1 of the EIS for the discussion of revised air modeling results.
	b) Aviation	
SA-2c-2	i) **Recommendation:** Ensure that a Form 7460 is submitted to the Federal Aviation Administration for an airspace evaluation as required if any structure associated with this project would be located within 20,000 linear feet of a public use airport or would reach a height above ground of 200 feet or more. See the Department of Aviation (DoAV) comments in Attachment B for additional information.	The nearest public-use airport to the Project route in Virginia is the Virginia Tech-Montgomery Executive Airport. At its closest point, the Project route is approximately 26,000 feet (approximately 4.9 miles) from the airport and approximately 30 feet lower in elevation.
	c) Drinking Water Resources	
SA-2c-3	i) **Recommendation:** Follow recommendations from the Virginia Department of Health (VDH) to verify potential impacts to public water distribution systems or sanitary sewage collection systems with the local utility, implement best management practices (including erosion and sediment controls and spill prevention controls and countermeasures) on the project site, and manage materials onsite and during transport to prevent impacts to nearby surface waters. See the VDH-identified public groundwater wells, surface water intakes and public surface water sources in Attachment B.	Crossing of foreign utilities is discussed in section 2.4.2.5 of the EIS. See response SA-2a-10. Surface water intakes are discussed in section 4.3.2.1.
	d) Floodplain Management	
SA-2c-4	i) **Recommendation:** The DCR Floodplain Management Program recommends that the FEIS include the requirement that Mountain Valley contact the local floodplain administrator for an official floodplain determination, and if the project is located in a Special Flood Hazard Area (SFHA), the project must comply with the community's floodplain ordinance. All development within a SFHA or floodplain, as shown on the locality's Flood Insurance Rate Map, must be permitted and comply with the requirements of the local floodplain ordinance. See the DCR comments in Attachment B for additional information.	Mountain Valley has filed documentation indicating they are coordinating with local floodplain administrators.

SA-2	Virginia Department of Environmental Quality	
	e) Historic Resources	
SA-2c-5	**i) Recommendation:** Continue to coordinate with the Department of Historic Resources (DHR) pursuant to Section 106 of the National Historic Preservation Act, which requires federal agencies to consider the impact of their project on historic properties. See the DHR comments in Attachment B.	Comment noted.
	f) Pollution Prevention	
SA-2c-6	**i) Recommendation:** Include additional information on reuse, recycling and pollution prevention as identified below by the DEQ Office of Pollution Prevention (see the DEQ comments in Attachment B). • Consider the development of an effective Environmental Management System (EMS). An effective EMS will ensure that the proposed project is committed to complying with environmental regulations, reducing risk, minimizing environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program (VEEP). VEEP provides recognition, annual permit fee discounts, and the possibility for alternative compliance methods. • Consider reuse and recycling opportunities when evaluating waste handling, including asphalt recycling, mulching of brush and timber and water reuse opportunities. • Consider contractors' commitment to the environment when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals. • Choose sustainable materials and practices for construction and design, including the use of native species and pollinators when re-establishing vegetation. • Integrate pollution prevention techniques into maintenance and operation. • Encourage supply chain partners to implement pollution prevention, sustainability, and environmental management systems. • Coordinate with the DEQ Office of Pollution Prevention for additional information and technical assistance relating to pollution prevention techniques and EMS.	Section 2.4.2 of the EIS has been updated to discuss measures Mountain Valley would implement for reuse, recycling, and pollution prevention.

SA-2	Virginia Department of Environmental Quality	
	g) Rare, Threatened and Endangered Species	
SA-2c-7	**i) Recommendation:** Ensure that the analysis accurately addresses potential impacts to Piedmont barbara's-buttons (*Marshallia obovata* var. *obovata*, G4G5TNR/S1/NL/NL), Downy phlox (*Phlox pilosa*, G5/S2/NL/NL) and American bluehearts (*Buchnera americana*, G5?/S1S2/NL/NL), which according to DCR have been historically documented in the project area. See the DCR comments in Attachment B.	Section 4.7.7.6 pf the EIS provides discussion of these species.
SA-2c-8	**ii) Recommendation:** Submit survey results for Piedmont barbara's-buttons, Downy phlox and American bluehearts to DCR so DCR can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources. See the DCR comments in Attachment B.	Survey results for Piedmont Barbara's-buttons, Downy phlox and American bluehearts were submitted to VADCR in October 2019; these results are summarized in section 4.7.7.6 of the FEIS.
SA-2c-9	**iii) Recommendation:** Submit copies to DCR Division of Natural Heritage of other completed rare, threatened and endangered species survey reports including the 2018 and 2019 portal bat survey reports as stated on page 4-89. See the DCR comments in Attachment B.	See section 4.7.7 of the FEIS for summaries of other completed rare, threatened and endangered species surveys; Mountain Valley submitted 2018 and 2019 bat portal survey results to VADGIF in October 2019.
SA-2c-10	**iv) Recommendation:** Coordinate results of surveys for state-listed threatened and endangered plant and insect species with DCR and the FWS. Upon review of the results, if it is determined these species are present, and there is a likelihood of a negative impact on the species, DCR will recommend coordination with the Virginia Department of Agriculture and Consumer Services to ensure compliance with Virginia's Endangered Plant and Insect Species Act. See the DCR comments in Attachment B.	Mountain Valley consulted VADGIF and VADCR regarding all state-listed threatened and endangered species potentially present in the Project area and coordinated with the applicable Virginia agency for all state-listed species surveys that were conducted.
	h) Surface Waters and Water Withdrawals	
SA-2c-11	**i) Recommendation:** If surface water sources are used, then the FEIS should include a discussion of what steps will be taken by MVP and its contractors to ensure that the following requirements are met: withdrawing no more than 10% of the instantaneous flow rate from the channel; using the intake screens designed so that screen openings are not larger than 1 millimeter and; ensuring that screen face intake velocities are not greater than 0.25 feet per second. The FEIS should provide the location of withdrawals and some assessment of river flows where withdrawals are proposed with a discussion of how the withdrawals will affect flows, particularly during low-flow or drought conditions. The assessment should explain if any downstream water users may be affected by these water withdrawals, particularly during low flow periods. The DEQ Office of Water Supply can provide information of nearby intakes once the location of the withdrawals is known. See the DEQ comments in Attachment B.	See response SA-2a-23.

SA-2	Virginia Department of Environmental Quality	
SA-2c-12	ii) **Recommendation:** Update Section 4.3.2.6 Surface Water Appropriations with information that identifies the specific municipal or surface water sources from which water for hydrostatic testing would be obtained. See the DEQ comments in Attachment B.	See response SA-2a-23.
SA-2c-13	iii) **Recommendation:** Update Section 4.3.2.6 Surface Water Appropriations with information that identifies the specific sources and estimated amounts of water needed for dust control. See the DEQ comments in Attachment B.	See response SA-2a-23.
SA-2c-14	iv) **Recommendation:** Update Section 4.3.2.6 Surface Water Appropriations to include discussion of procedures to be taken by MVP and its contractors to minimize entrainment of aquatic species and maintain intake rates appropriate to local conditions if surface waters are used. This section should also include a discussion of how the withdrawals might avoid impacts to downstream users during low-flow conditions. See the DEQ comments in Attachment B.	See response SA-2a-23.
SA-2c-15	v) **Recommendation:** Update Section 4.3.2.6 Surface Water Appropriations to state that the following criteria should be used for evaluating proposed water sources (see the DEQ comments in Attachment B): • Withdrawing no more than 10% of the instantaneous flow rate from the channel. • Using the intake screens designed so that screen openings are not larger than 1 millimeter and; • Ensuring that screen face intake velocities are not greater than 0.25 feet per second.	See response SA-2a-23.
	i) Transportation Conflicts	
SA-2c-16	i) **Recommendation:** The Virginia Department of Transportation (VDOT) recommends the monitoring for any potential work plan conflicts related to the Universal Project Code (UPC) T18123 Rural Rustic project on Route 621 that is close to the proposed pipeline. Construction work on UPC T18123 is proposed to begin on 10/04/2022 and conclude on 02/10/2023. See the VDOT comments in Attachment B.	We do not foresee any work plan conflicts related to the UPC T18123 Rural Rustic project, which would be constructed almost a year later in October of 2022. Mountain Valley would coordinate with VADOT in the event that construction activities overlap.
SA-2c-17	ii) **Recommendation:** Continue to monitor the VDOT paving schedule website (https://vdot.maps.arcgis.com/apps/webappviewer/index.html?id=fbf86e85fdcb43e482432f41ddbb51c7) for updated information as there are a number of planned repaving and treatment jobs. The Pavement Status Map Application is updated with new paving projects annually. See the VDOT comments in Attachment B.	All projects in the geographic scope of analysis considered for cumulative impacts are listed in Appendix F.2, including any relevant VADOT projects.

SA-2	Virginia Department of Environmental Quality	
SA-2c-18	iii) **Recommendation:** VDOT recommends the development and implementation of an appropriate work zone to ensure the safe and efficient travel of vehicles during the construction phase of the project. Based upon VDOT's review, the proposed project could pose significant traffic impacts to various roads throughout the service area during construction only. See the VDOT comments in Attachment B.	Comment noted. Mountain Valley has stated it would incorporate all VADOT recommendations into its Traffic and Transportation Management Plan.
SA-2c-19	iv) **Recommendation:** Coordinate with the VDOT Lynchburg District since a VDOT Land Use Permit will be required for any operations within the VDOT right-of-way. See the VDOT comments in Attachment B.	See comment SA-2a-1.
	j) Virginia Outdoors Foundation Easements	
SA-2c-20	i) **Recommendation:** The Virginia Outdoors Foundation (VOF) recommends that FERC revise its analysis to reflect that the VOF easement in Pittsylvania County (PIT-03215) may be intersected by a temporary access road if impacts are unavoidable. This temporary access road, at MP 14.1, is illustrated in Appendix B.1, page B.1-3, with details listed in Appendix B.4, page B.4-2. While specific reference to this intersection of the VOF open-space easement is not mentioned within the DEIS, VOF staff recently spoke with MVP Southgate representatives who acknowledged this encroachment as a possibility. VOF has notified the developers of its conversion/diversion process if impacts are unavoidable but hope Mountain Valley will revise the alignment of the road to completely avoid this open-space easement. See the VOF comments in Attachment B.	Mountain Valley has adjusted access road TA-PI-035 so that it is no longer located on the conservation easement.
SA-2c-22	ii) **Recommendation:** Coordinate directly with VOF regarding the proposed impact to the VOF easement if it is unavoidable or if other impacts are proposed in the future. See the VOF comments in Attachment B.	see response SA-2c-20.

SA-2	Virginia Department of Environmental Quality	
SA-2c-23	***k) Waste Sites in Close Proximity to the Project Site*** **i) Recommendation:** Evaluate the following waste sites to establish their exact location, nature and extent and their potential to impact the proposed project (see the DEQ comments in Attachment B): • *Hazardous Waste/RCRA Facility* ○ VAD003909629, Transcon Gas Pipeline Corp Station 165, 945 Transco Rd, Chatham, Virginia 24531 • *Solid Waste* ○ Permit# SWP571, Pittsylvania Co – Sanitary Landfill, 382 Rainbow Lane, Dryfork, Virginia 24549. Status: Active. ○ Permit# SWP152, Pittsylvania Co – Sanitary Landfill, 382 Rainbow Lane, Dryfork, Virginia 24549. Status: Closed. • *Petroleum Releases* ○ PC# 20087015, Wall Property, 212 Sugarcane Rd, Danville, Virginia 24540 ○ PC# 20112245, Raymond Batterman Residence, 556 Batterman Rd, Chatham, Virginia 24531 ○ PC#20122164, Richard Rust Residence, 5498 Whitmell School Rd, Dry Fork, Virginia 24549	Sections 4.8.5, 4.2.7, and 4.3.1.5 provide discussion regarding the evaluation of hazardous waste and potential contamination sites. All of the sites listed were reviewed.
SA-2c-24	**ii) Recommendation:** DEQ recommends that all construction projects and facilities implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately. See the DEQ comments in Attachment B.	See response SA-2c-6.
SA-2c-25	**iii) Recommendation:** Ensure that the FEIS and applicable procedures include requirements that all structures being demolished/renovated/removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to federal waste-related regulations, state regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP, must be followed. See the DEQ comments in Attachment B.	See response SA-2a-1.

SA-2	Virginia Department of Environmental Quality	
SA-2c-26	**iv) Recommendation:** Ensure that the following requirements are accurately reflected in the FEIS and applicable procedures (see the DEQ comments in Attachment B): • Any soil, sediment or groundwater that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. • Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.* • Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60) • Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); • Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110) • Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.* • Applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Part 107.	See response SA-2a-10.
SA-2c-27	***l) Wetlands and Water Quality*** **i) Recommendation:** Update the FEIS and applicable procedures with the following requirements (see the DEQ comments in Attachment B): • State Water Control Law (Code of Virginia Chapter 3.1 (§ 62.1-44.2 *et seq.*) • Virginia Acts of Assembly, Chapter 636, Senate Bill 950 [S 950], Approved March 30, 2018 • Virginia Administrative Code 9VAC25-210	See response SA-2a-1.
SA-2c-28	***m) Wildlife Resources*** **i) Recommendation:** If bald eagle nests are discovered during the pre-construction winter nest surveys, DGIF recommends following measures adapted from the FWS National Bald Eagle Management Plan Guidelines (FWS, 2007) and the DGIF Bald Eagle Guidelines for Landowners (DGIF, 2012) between December 15 and July 15. The protective measures Mountain Valley would follow are described in the DEIS (page 207). See the DGIF comments in Attachment B.	Section 4.6.3.4 provides discussion regarding bald eagles. Mountain Valley has committed to following the recommended actions.
SA-2c-29	**ii) Recommendation:** DCR DNH recommends coordination with the FWS and DGIF to minimize impacts to migratory birds, colonial nesting birds and eagles. See the DGIF comments in Attachment B.	Comment noted. Mountain Valley's coordination with FWS and DGIF regarding impacts to migratory birds, colonial nesting birds, and eagles is discussed in section 4.6.3 of the EIS.

SA-2	Virginia Department of Environmental Quality	
	Mitigation Measures for Construction and Maintenance Activities ***a) Erosion and Sediment Control***	
SA-2d-1	i) **Recommendation:** Ensure that the following requirements are accurately reflected in the FEIS (stormwater management and erosion and sediment control plans have been submitted to DEQ and are currently under review). See the DEQ comments in Attachment B. • Natural gas transmission projects that result in regulated land disturbing activities equal to or greater than 10,000 square feet must obtain and comply with DEQ approved Annual Standards and Specifications for Stormwater Management (SWM) and Erosion and Sediment Control (ESC). • In accordance with section 402(l)(2) of the Clean Water Act (CWA), discharges of stormwater runoff from the construction of oil and gas transmission pipelines are exempt from National Pollutant Discharge Elimination System (NPDES) and Virginia Pollutant Discharge Elimination System (VPDES) permitting. Therefore, the General VPDES Permit for Discharges of Stormwater from Construction Activities (9VAC25-880) is not applicable to this project. • Annual Standards and Specifications must be prepared in accordance and consistent with the Virginia Stormwater Management Act (VSMA), the Virginia Stormwater Management Program (VSMP) regulation, the Virginia Erosion and Sediment Control Law, and the Virginia Erosion and Sediment Control regulations. • Plans for erosion and sediment control and post-construction stormwater management must be developed and implemented for all regulated land disturbing activities in accordance with the DEQ-approved Annual Standards and Specifications prior to initiating land disturbance. • To minimize runoff impacts following construction activities, the project must demonstrate compliance with the Virginia Stormwater Management Program post-construction requirements for both water quality and quantity. • All specifications and practices used for erosion and sediment control and stormwater management must be in accordance with the DEQ-approved Annual Standards and Specifications, the Virginia Erosion and Sediment Control Handbook, and the Virginia Stormwater Best Management Practice Clearinghouse unless a deviation or exception is approved by DEQ.	See response SA-2a-1.
SA-2d-2		Mountain Valley would continue to work with VADEQ on seed mix development to incorporate native and pollinator species for right-of-way stabilization which would be included in the Project-specific E&SC Plan to be reviewed and approved by Virginia agencies.

SA-2	Virginia Department of Environmental Quality	
SA-2d-2	ii) **Recommendation:** Use a DEQ-approved native pollinator plant mix for permanent vegetative stabilization. See the DEQ comments in Attachment B. ***b) Horizontal Directional Drilling and Hydrostatic Testing*** i) **Recommendation:** DCR recommends conducting a soil analysis to determine suitability for the use of horizontal directional drill (HDD) and supports the development and implementation of a *Horizontal Directional Drill Contingency Plan* as stated on page 4-84 of the DEIS if drilling fluid is released into a waterbody. See the DCR comments in Attachment B.	HDD feasibility and geotechnical investigations, including soil analyses, are discussed in section 4.1.4.9 of the EIS. Mountain Valley's *HDD Contingency Plan* and drilling fluid and inadvertent return management are also discussed in this section.
SA-2d-4	ii) **Recommendation:** DCR supports preventing withdrawal of water for hydrostatic testing from exceptional value waters as those identified on pages 4-37 and 4-38 of the DEIS or waters containing rare, threatened or endangered species. See the DCR comments in Attachment B.	See response SA-2a-23. Also, see 4.3.2.6 of the EIS for a discussion of hydrostatic test water sources and sections 4.3.2.7 and 4.6.5.3 for a discussion of the impacts and mitigation for water withdrawal from surface waters, including the Dan River. Mountain Valley would need to consult with and obtain approval from the USFWS for any withdrawal from a waterbody containing federally listed species.
SA-2d-5	iii) **Recommendation:** If chlorinated water is used for hydrostatic testing, HDD or conventional bore or drilling fluid additives are used, DCR recommends this water not be released into surrounding water bodies to avoid potential impacts to aquatic resources. See the DCR comments in Attachment B. ***c) Forest Resources***	Measures regarding hydrostatic test water discharge are provided in section 4.3.2.7 of the EIS and VII.D.1 of the Procedures
SA-2d-6	i) **Recommendation:** DCR and DOF recommend that Mountain Valley follow the recommendations of the Virginia Forest Conservation Partnership that were submitted to the FERC docket on August 9, 2019 under the name MVP_SouthgateExtension_ForestMitigation_03_2019.pdf. See the DCR comments in Attachment B for additional information. ii) **Recommendation:** DOF recommends that the Virginia Forest Conservation Partnership calculations with regard to forested acre impacts take precedence over the ones developed by FERC. iii) **Recommendation:** Update the forest fragmentation analysis to reflect findings from DCR that edge habitats would not serve as replacement for the interior forested habitats lost and degraded, would provide little benefit in general to interior forest species habitats surrounding the impact, and these new edge habitats would serve as permanent conduits for invasive species and non-interior forest species competition, having a permanent effect on the surrounding forests. See the DCR comments in Attachment B for additional information.	Mountain Valley has committed to minimizing impacts on forest land and continues to coordinate with VDCR on tree clearing mitigation prior to clearing trees. Mountain Valley would follow measures outlined in its Exotic and Invasive Plant Species Control Plan.

SA-2	Virginia Department of Environmental Quality	
	d) Open Burning and Fugitive Dust	
SA-2d-7	**i) Recommendation:** Include requirements that open burning is allowed only in accordance with 9VAC20-81-95 of the Virginia Solid Waste Management Regulations (VSWMR) and localities should be consulted since they may have additional open burning restrictions. See the DEQ comments in Attachment B. **ii) Recommendation:** Include requirements that construction activities associated with the MVP are subject to the Air Pollution Control Regulations regarding open burning (9VAC5-130 *et seq.*) and fugitive dust (9VAC -50-60 *et seq.*). See the DEQ comments in Attachment B.	As discussed in section 4.11.1.7, any open burning would be conducted on a site-specific basis, and in accordance Mountain Valley's Fire Prevention and Suppression Plana and Virginia regulations. This would include burning only in approved burn areas and during appropriate weather conditions to avoid any impacts on nearby residences, and complying with the open burning prohibition in Virginia from May 1 through September 30.
	e) Right-of-Way Maintenance	
SA-2d-8	**i) Recommendation:** DCR recommends the development and implementation of an invasive species plan to be included as part of the maintenance practices for the right-of-way or invasive species as identified within the footprint of the project on page 4-56, Section 4.5.3. See Item 4a below for additional recommendations and the DCR comments in Attachment B for additional information.	Mountain Valley would follow measures outlined in its Exotic and Invasive Plant Species Control Plan.
SA-2d-9	**ii) Recommendation:** DCR recommends the right-of-way restoration and maintenance practices include appropriate revegetation using native species in a mix of grasses and forbs, robust monitoring and the development of adaptive management plan to provide guidance if initial revegetation efforts are unsuccessful or if invasive species outbreaks occur. See the DCR comments in Attachment B.	See response SA-2d-2.
SA-2d-10	**iii) Recommendation:** DCR recommends the use of a native seed mix for re-vegetating disturbed areas as stated on page 4-62 in the DEIS and best management practices on page 4-63 for preventing the spread of invasive species. See the DCR comments in Attachment B.	See response SA-2d-2
SA-2d-11	**iv) Recommendation:** DCR recommends the invasive species plan be implemented for the lifespan of the project as part of the right-of-way maintenance since invasive species outbreaks can occur any time during construction or post construction. See the DCR comments in Attachment B.	Mountain Valley would monitor for invasive species for two years following construction and maintain the restored area in accordance with its Exotic and Invasive Plant Species Control Plan.

SA-2	Virginia Department of Environmental Quality	
SA-2d-12	v) **Recommendation:** DCR recommends maintenance of vegetation using annual mowing in the non-growing season between 15 October and April 1 and minimal to no use of chemicals and especially in sensitive areas with documented natural heritage resources. See the DCR comments in Attachment B.	As stated in Mountain Valley's Plan, Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion/leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 1 and October 14 of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.
	f) Stream Crossings	
SA-2d-13	i) **Recommendation:** Incorporate the following VMRC recommendations, which are standard instream permit conditions, for jurisdictional stream crossings (VMRC states that it will exert jurisdiction over eight of the project's 81 stream crossings based on drainage areas currently identified in the DEIS and/or previously provided by the applicant. See the VMRC letter in Attachment B.):	See response SA-2a-1.
SA-2d-14	• A "frac-out" contingency plan must be provided for any crossings utilizing the directional drill method to address potential frac-outs or related spills associated with any directional drilling activities.	Mountain Valley would follow measures in it HDD Contingency Plan.
SA-2d-15	• In an effort to minimize adverse impacts to threatened and endangered fish and mussel species, instream surveys and species relocations may be required. No instream construction shall be conducted during any recommended time-of-year restrictions of any year unless waived by DGIF in writing.	Mountain Valley has completed aquatic surveys and filed reports with the appropriate agencies. See section 4.6.5 of the EIS for a discussion of impacts and mitigation for aquatic species, including Mountain Valley's proposed species relocations during in-water work.
SA-2d-16	• The instream construction activities shall be accomplished during low flow periods utilizing darn and pump, flume around or within cofferdams constructed of nonerodible materials in such a manner that no more than half the width of the waterway is obstructed at any point in time. All areas of state-owned bottom and adjacent lands disturbed by this activity shall be restored to their original contours and natural conditions within thirty (30) days from the date of completion of the authorized work. All excess materials shall be removed to an upland site and contained in such a manner to prevent its reentry into state waters.	Waterbody crossing are discussed in sections 2.4.2.1 and 4.3.2.2 of the EIS. In addition Mountain Valley would adhere to its Procedures to minimize impacts during waterbody crossings.

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SA-2d-17	• Erosion and sediment control measures shall be in conformance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992, and shall be employed throughout construction. • If it is determined that blasting is necessary at any of the crossings, DGIF shall be notified a minimum of 48 hours in advance of the blasting. • The DCR shall be contacted for any stream crossings where karst landscape features are encountered during installation. • DGIF shall be contacted for any work in trout waters to avoid conflicts with trout stocking activities.	See discussion in section 4.6.5.1 of the EIS.
SA-2d-18		Mountain Valley would adhere to measures in its General Blasting Plan and comply with all reporting and notification requirements.
SA-2d-19		No areas of karst have been identified.
SA-2d-20		No trout stream are crossed by the Project.
SA-2d-21	ii) **Recommendation:** Include a table in the FEIS that cites recommendations to protect freshwater aquatic resources provided by DGIF at each of the VMRC jurisdictional stream crossings and the applicant's intention of following those recommendations. See the VMRC comments in Attachment B.	Section 4.6 of the EIS has been updated to include a list of the VADGIF recommendation which Mountain Valley has agreed to follow.
SA-2d-22	iii) **Recommendation:** DGIF recommends conducting any in-stream activities during low or no-flow conditions, using non-erodible cofferdams to isolate the construction area, and removal of all fish and mussels prior to dewatering the cofferdams. DGIF recommends to the extent practicable, blocking no more than 50% of the streamflow at any given time, stockpiling excavated material in a manner that prevents reentry into the stream, restoring original streambed and streambank contours, re-vegetating barren areas with native vegetation, and implementing strict erosion and sediment control measures. See the DGIF comments in Attachment B.	Waterbody crossings would be completed in accordance with Mountain Valley's Procedures and measures required in other federal or state issued permits.
SA-2d-23	iv) **Recommendation:** DGIF recommends minimizing impacts on fisheries by relocating fishes and mussels from the construction areas. DGIF recommends that all fish and freshwater mussel relocations be supervised by qualified, professional biologists in possession of pertinent federal and/or state permits. See the DGIF comments in Attachment B.	Section 4.6.5.2 of the EIS includes this information and specifies that Mountain Valley would relocate fishes and freshwater mussels present in the waterbody crossing construction area under the d direction of qualified, professional biologists in possession of applicable federal and/or state permits.

SA-2	Virginia Department of Environmental Quality	
	g) Surface Waters and Water Withdrawals	
SA-2d-24	**i) Recommendation:** Update Section 4.3.2.7 General Impacts and Mitigation on Surface Water to include the following to explain how potential impacts to beneficial uses may be avoided (see the DEQ comments in Attachment B): In the event that withdrawals occur from surface water sources, then MVP should avoid an adverse effect or impairment to surface water by: • Withdrawing no more than 10% of the instantaneous flow rate from the channel. • Using the intake screens designed so that screen openings are not larger than 1 millimeter and; • Ensuring that screen face intake velocities are not greater than 0.25 feet per second. If surface water sources are used, then the EIS should include a discussion of what steps will be taken by MVP and its contractors to ensure that the requirements above are met. The EIS should provide the location of withdrawals and some assessment of river flows where withdrawals are proposed with a discussion of how the withdrawals will affect flows, particularly during low flow or drought conditions. The assessment should explain if any downstream water users may be affected by these water withdrawals, particularly during low flow periods. The DEQ Office of Water Supply can provide information of nearby intakes once the location of the withdrawals is known.	See response SA-2a-23.
SA-2d-24	**ii) Recommendation:** Updated Section 4.3.2.8: Surface Water Conclusions with the following information (see the DEQ comments in Attachment B): In the event that withdrawals occur from surface water sources, then MVP should avoid an adverse effect or impairment to surface water by: • Withdrawing no more than 10% of the instantaneous flow rate from the channel. • Using the intake screens designed so that screen openings are not larger than 1 millimeter and; • Ensuring that screen face intake velocities are not greater than 0.25 feet per second. If surface water sources are used, then the FEIS should include a discussion of what steps will be taken by MVP and its contractors to ensure that the requirements above are met. The FEIS should provide the location of withdrawals and some assessment of river flows where withdrawals are proposed with a discussion of how the withdrawals will affect flows, particularly during low flow or drought conditions. The assessment should explain if any downstream water users may be affected by these water withdrawals, particularly during low flow periods. The DEQ Office of Water Supply can provide information of nearby intakes once the location of the withdrawals is known.	See response SA-2a-23.

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SA-2d-25	ii) **Recommendation:** Updated Section 4.3.2.8: Surface Water Conclusions with the following information (see the DEQ comments in Attachment B): In the event that withdrawals occur from surface water sources, then MVP should avoid an adverse effect or impairment to surface water by: • Withdrawing no more than 10% of the instantaneous flow rate from the • Using the intake screens designed so that screen openings are not larger than 1 millimeter and; • Ensuring that screen face intake velocities are not greater than 0.25 feet per second. If surface water sources are used, then the FEIS should include a discussion of what steps will be taken by MVP and its contractors to ensure that the requirements above are met. The FEIS should provide the location of withdrawals and some assessment of river flows where withdrawals are proposed with a discussion of how the withdrawals will affect flows, particularly during low flow or drought conditions. The assessment should explain if any downstream water users may be affected by these water withdrawals, particularly during low flow periods. The DEQ Office of Water Supply can provide information of nearby intakes once the location of the withdrawals is known. ***h) Wildlife Resources***	See response SA-2a-23.
SA-2d-26	i) **Recommendation:** DGIF recommends clearing of trees and vegetation during winter months outside bird nesting periods as proposed. See the time of year restrictions for general guidance at https://www.dgif.virginia.gov/wp-content/uploads/VDGIF-Time-of-Year-Restrictions-Table.pdf. If tree removal becomes necessary, DGIF also recommends adherence to its standard tree removal for bat guidance (https://www.dgif.virginia.gov/environmental-programs/environmental-services-section/) to protect threatened and endangered bats known from the region. See DGIF comments in Attachment B.	Section 4.6.3.2 addresses tree clearing windows for migratory birds. Mountain Valley would attempt to refrain from construction-related vegetation clearing between March 15 and August 15 in Virginia. If avoiding the migratory bird nesting season during construction-related clearing becomes unfeasible, Mountain Valley would consult with the FWS to identify measures to implement to minimize impacts on migratory birds.
SA-2d-27	ii) **Recommendation:** DGIF recommends that the project follow protective measures as described in the DEIS (pages 4-67 to 4-68). DGIF supports the protective measures described, including wildlife escape ramps at regular intervals along the excavated trench. See the DGIF comments in Attachment B.	Comment noted.
SA-2d-28	iii) **Recommendation:** DGIF recommends strict adherence to erosion and sediment controls, use of native plants, creation of a scrub-shrub transition zone between the forest edge and maintained herbaceous right-of-way as described in the DEIS (page 4-70). See the DGIF comments in Attachment B.	Comment noted.

SA-2	Virginia Department of Environmental Quality	
SA-2d-29	iv) **Recommendation:** Update Section 4.6.5.3: General Fisheries and Aquatic impacts to downstream users during low-flow conditions. See the DEQ comments in Attachment B.	Section 4.6.5.3 of the EIS has been revised with this information.
	4) Recommendations for Specific Plans	
	a) *Exotic and Invasive Species Control Plan*	
SA-2e-1	i) **Recommendation:** Include all species on the DCR Invasive Species list (https://www.dcr.virginia.gov/natural-heritage/document/nh-invasive-plant-list-2014.pdf) in the Exotic and Invasive Plant Species Control Plan (January 24, 2019 supplemental filing-Session Number 20190124-5165), not only moderately and highly invasive species as mentioned on page 2 of the plan. See the DCR comments in Attachment B.	Mountain Valley has revised it Exotic and Invasive Plant Species Control Plan to include all species on the DCR Invasive Species List.
SA-2e-2	ii) **Recommendation:** Include an invasive species inventory in the invasive species plan for the project area including species and methods for treating invasive species based on the current DCR Invasive Species List. See the DCR comments in Attachment B.	Mountain Valley has included an inventory in their revised report.
	5) Errors in the EIS	
SA-2f-1	a) **Recommendation:** On pages 2-25 and 4-8 the term "silt rock" was used in error. Replace with "silt sock" if that term meets the intention. See the DEQ comments in Attachment B.	Comment noted. This revision has been made to the EIS.
SA-2f-2	b) **Recommendation:** Revise text on page 2-25 so that silt fence and silt sock practices are used as sediment barriers not diversion structures. See the DEQ comments in Attachment B.	Comment noted. This revision has been made to the EIS.

SA-4	North Carolina Department of Environmental Quality

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

September 16, 2019

Chairman Chatterjee, and Commissioners Glick and McNamee
c/o Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE Room 1A
Washington, D.C. 20426

Re: North Carolina Department of Environmental Quality Comment on the draft Environmental Impact Statement (DEIS) for the Southgate Project, proposed by Mountain Valley Pipeline, LLC: Docket Number: CP19-14-000.

Dear Commissioners:

SA-4a	The following comments are submitted by the North Carolina Department of Environmental Quality (Department or DEQ), in response to the July 26, 2019, Federal Energy Regulatory Commission's (Commission or FERC) Notice of Availability of the Draft Environmental Impact Statement (DEIS) for the Proposed Southgate Project (Docket Number CP19-14-000).[1] In the Notice, the agency "concludes that approval of the proposed project would result in some adverse environmental impacts, [h]owever if … constructed and operated in accordance with applicable laws and regulations, the mitigation measures discussed in this EIS, and our recommendations, these impacts would be reduced to less-than-significant levels."[2] The comments submitted herein relate to those potential impacts of the Proposed Southgate Project (Project) in North Carolina and serve to (i) reiterate the Department's previous concerns that the Project is unnecessary and not in the public interest, (ii) address the inadequate review and consideration of "reasonable alternatives" in the DEIS, and (iii) identify potential environmental effects that require further evaluation.[3]	Comment noted.

SA-4	North Carolina Department of Environmental Quality	
SA-4b	I. The Proposed Southgate Project is Not in the Public Interest At this time, the Department remains unconvinced that the Project satisfies the criteria for the Commission to deem it in the public interest, and whether it is essential to ensure future growth and prosperity for North Carolinians. This concern was articulated in the letter dated November 5, 2018, in our comments on the stated purpose and need for the Project. Despite the Commission's own recognition in 2018, that its review of projects does "not [look] beyond contracts for a further determination of market or supply….",[4] and outside recommendations that FERC consider such factors in its analyses, the Commission appears to ignore these fundamental data points in its review. We provided data in the November 2018 letter, demonstrating the incongruity between the design-day requirements needed to serve projected population growth in the PSNC (now, Dominion Energy) service territory (11% growth) with the additional throughput contracted capacity for the Project (100% increase) and requested that the Commission investigate beyond the precedent agreement as its sole basis for assessing the need for the Project. In fact, as of the date of this comment, 20% of the pipeline capacity is still unsubscribed, which suggests that the basis for this Project satisfies artificial demand. We emphasize our previous assertion that "without further demonstration of actual demand … certifying the Southgate Project could result in overbuilding a gas pipeline in which the single discernible benefit of the provision of an assured excess in gas capacity available only to [Dominion Energy] in the future."[5]	See response GEN-2 in appendix I.2. The Commission will consider the need for the Project and may address these comments in any Order it issues.
SA-4c	II. The DEIS Provides an Inadequate Review and Incomplete Consideration of Alternatives The National Environmental Policy Act requires the Commission to explore all reasonable alternatives by addressing "the potential for accomplishing the proposed objectives through the use of other systems…[including] non-gas energy alternatives, and/or energy conservation or efficiency, as applicable."[6] DEQ submitted comments addressing alternatives assessments first in response to the Notice of Inquiry issued by FERC in April 2018, soliciting feedback on whether and how to revise the policy statement on the certification of new natural gas transportation facilities pursuant to the Natural Gas Act (NGA).[7,8] Again, in September 2018, DEQ provided comments on FERC's alternatives assessment, this time specific to the Notice of Intent for the Proposed EIS/Scoping for the Project. In both comments, the Department	See response ALT-1 in appendix I.2. Because renewable energy sources and energy consetbation are not natural gas transportation alerternative, and therefore, do not meet the purpose and need of the Project, they were not considered in our alternatives analysis.

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SA-4c	requested that FERC amend its alternatives assessment and address "the potential for accomplishing the proposed objectives through the use of other systems," including "non-gas energy alternatives, and/or energy conservation or efficiency, as applicable."[9] For the third time, the Department repeats this position, this time regarding the preparation of the environmental documents for the Project – the FERC alternatives assessment must consider other systems, including *non-gas energy alternatives, and/or energy conservation or efficiency* (emphasis added). The Commission's own 2002 guidance for Environmental Report Preparation provides that the alternatives analysis should "[d]escribe the effect of any state or regional energy conservation, load-management, and demand-side management programs on the long-term and short-term demand for the energy to be supplied by the project."[10] In our July 25, 2018, response to the Notice of Inquiry for changes to the NGA Policy Statement, we stated that natural gas is but one of several resources that can meet customers' electric and thermal energy needs. We projected that within the time horizon to which a new Policy Statement would apply, a sea change in the economic models for natural gas construction and operations, especially when compared to renewable energy resources, would take place. Fifteen months ago, projected natural gas consumption was largely flat due to efficiency gains, shifting populations, and the declining costs of renewable energy resource alternatives. Since then, these predictions have borne out and the narrative continues: • Domestic commercial and residential natural gas demand is flat.[11] • The United States becomes a net energy exporter in 2020, due to large increases in fossil fuel production coupled with slow growth in domestic energy consumption.[12] • In September 2019, natural gas-powered electricity is outbid by record-low solar + storage power purchase agreements (25 year, 3.3¢/kWh deal between Los Angeles Water and Power and 8minute Solar Energy).[13] • By 2035, it will be more expensive to run 90% of the proposed natural gas plants than it will be to build new solar and wind plus storage systems in the United States.[14,15] The alternatives assessment in this DEIS ignores the demonstrated size and scope of the transitioning energy economy which results in artificially tipping the scales for natural gas, no matter the costs to customers or the impacts on the environment. In keeping with the 2002 Guidance Manual, DEQ provided FERC with three examples of state-level and market-based programs specific to energy demand in North Carolina for FERC's consideration as part of our September 2018 response to the NOI for the Proposed EIS. Six weeks after DEQ submitted these comments, Governor Roy Cooper signed Executive Order 80, directing North Carolina to transition to a clean energy economy and address the impacts of climate change on the state. EO 80 establishes a goal of 40% reduction in statewide greenhouse gas emissions (GHGs) from 2005 levels by 2025, and directs the NC Department of Environmental Quality to develop a Clean Energy Plan. EO 80 lays the foundation for North Carolina's clean energy future and DEQ requests that FERC thoroughly consider this new state policy and its implementation to date in its alternatives analysis in the final EIS. We point FERC to the Clean Energy Plan (both the draft document and supporting research)[16,17] as a valuable resource for the Commission to reference in its alternatives analysis.	See response ALT-1 in appendix I.2. Because renewable energy sources and energy conservation are not natural gas transportation alternatives, and therefore, do not meet the purpose and need of the Project, they were not considered in our alternatives analysis.

SA-4	North Carolina Department of Environmental Quality	
SA-4c	DEQ believes that the methodology underlying the FERC's alternatives analysis is insufficient. DEQ concludes this because the process begins with the assumption that the purpose of the Project – as stated by the applicant, Mountain Valley – is substantiated. As a result, the alternatives assessment in the DEIS represents little more than a check box for NEPA compliance, with its results predetermined from the outset. North Carolinians deserve a thorough assessment of Project alternatives, indeed more than what was done in consideration of the No Action Alternative, the four system alternatives assessing other gas transportation infrastructure, and the combined eleven major and minor route alternatives. Despite the limitations in the methodology of the alternatives analysis, DEQ requests that in addition to addressing the aforementioned and our previously submitted comments, FERC conduct a thorough evaluation of non-natural gas alternatives. Specifically, DEQ recommends that FERC evaluate the "potential for energy efficiency, energy conservation programs, and renewable energy (e.g., wind, solar) to eliminate or meet the need for the Southgate Project."[18] The Commission justifies its decision to end its analysis of non-natural gas alternatives because the stated purpose of the Project is to transport natural gas. This circular reasoning based on an unsubstantiated purpose does not hold up in today's rapidly changing energy economy. The cost of renewable energy resources is rapidly declining and the economics now favor utility-scale solar and onshore wind plus storage over construction of natural gas infrastructure. To dismiss cost-effective non-gas energy alternatives with demonstrated *significant environmental advantage* because "they are not transportation alternatives" especially in light of the environmental effects posed by development of greenfield pipelines is inadequate.	See response ALT-1 in appendix I.2. Because renewable energy sources and energy consetbation are not natural gas transportation alerternative, and therefore, do not meet the purpose and need of the Project, they were not considered in our alternatives analysis.
SA-4d	III. Potential Environmental Effects that Require Further Evaluation The Department commends FERC and its staff on its review of the potential environmental effects posed by the Project and the proposed mitigation measures recommended in the DEIS. It is DEQ's responsibility to thoroughly review the DEIS, the Project, and its potential impact on North Carolina's environment and people. As such, we present the following comments and recommendations for FERC to consider in development of the final EIS.	Comment noted.

SA-4	North Carolina Department of Environmental Quality	
SA-4e	*A. Thorough Examination of Greenhouse Gas Emissions* In the DEIS, the Commission recognizes: the threats posed by climate change; the assessments, findings, and projections of the U.S. Global Change Research Program; and Governor Cooper's recent Executive Order 80, North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy.[19] DEQ agrees with the Commission in its statement that the "construction and operation of the Southgate Project would increase the atmospheric concentration of GHGs, in combination with past, current, and future emissions from all other sources globally and contribute incrementally to future climate change impacts."[20] However, the Department disagrees with the Commission's assertion that no methodology exists to attribute or predict the climate change effects from the Project. We presented several approaches on this topic in comments previously submitted to the Commission on July 25, 2018, and September 10, 2018.[21] If our recommendations, in combination with the Commission's own review of modeling tools proved to be insufficient, then NEPA requires the Commission to conduct independent research or otherwise compile missing information necessary to complete its evaluation.[22,23] More broadly, the Department believes that "the Commission should be doing more as part of its are critical to determining whether the Projects are in the public interest."[24,25] In *Sierra Club v. FERC,* the D.C. Circuit Court of Appeals vacated the Commission's decision on a pipeline project in Florida due to FERC's failure to properly analyze GHGs. The Court found that the Commission has a statutory responsibility to document and consider how its approval of a gas pipeline project will lead to increases in emissions of GHGs that contribute to climate change.[26] As a result, the Commission must consider the Project's direct and indirect environmental effects, the latter including GHG emissions, no matter how much later in time or removed in distance from the project the emissions may be.[27] It is our Agency's position that NEPA does not permit agencies to ignore the well-documented impacts of climate change in the conduct and preparation of their environmental impact analyses.[28] Furthermore, NEPA requires federal agencies to take a "hard look" at all environmental consequences – whether direct or indirect – of any proposed action on the environment, and that "hard look" obligates agencies to carefully consider every significant environmental impact of a project, which must necessarily include a project's contribution to climate change through its GHG emissions.[29,30,31] In summary, because we believe the GHG impacts analysis in the is DEIS inadequate, it does not meet the NEPA standard. For the reasons stated above, the Department requests that FERC	See response CI-1 in Appendix I.2.

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SA-4f	IV. Environmental Justice and Other Impacts that Require Further Evaluation *A. Additional Consideration of Environmental Justice* The Department appreciates the initial treatment and evaluation of socioeconomic impacts in Section 4.9 of the DEIS, particularly the Commission's consideration of environmental justice and the character of the potentially impacted communities. Further, we thank FERC for addressing several of the socioeconomic impacts that DEQ recommended in our Project-related comments.[32] After reviewing the DEIS, the Department agrees with the assertion that "[c]onstructing and operating the Project may affect the socioeconomic character of communities near the proposed facilities."[33] DEQ generally agrees with the Commission's finding that "[a]lthough low income and minority populations exist within the Project area, the Project would not have a disproportionately high and adverse environmental or human health impact on minority or low income populations,"[34] However, the Department requests that the Commission conduct further evaluation of the communities surrounding the Project utilizing a screening or mapping tool (e.g. EPA's EJSCREEN or the NCDEQ Community Mapping System), as recommended in the 2017 *Federal Energy Regulatory Commission, Office of Energy Projects Guidance Manual for Environmental Report Preparation for Applications Filed under the Natural Gas Act.*[35,36,37] Employing such a screening or mapping tool would provide a visualization of key findings and make data interpretation easier. This is critical when considering individuals who have a lower level of education or who may be deemed as limited English proficient (LEP). In addition, the EJSCREEN mapping tool allows for a deeper view into the demographics of a population within a designated buffer of the proposed project. Using a mapping tool to analyze varying buffer distances from the Project (i.e. ¼ miles, ½ miles, ¾ miles, 1 mile, etc.) provides a way to see how population demographics may change with increased distance. This methodology allows for more granular analysis of the surrounding communities and provides a better understanding of those individuals who live the closest to the Project. This methodology also allows for comparisons between the population characteristics of those who live nearer and those who live farther away from the Project. DEQ recommends that these comparisons also include the state-level data. *B. Evaluation of Socioeconomic Impacts in Dominion Energy Service Territory*	As discussed in section 4.9.8, while there are several low income and minority populations crossed by the pipeline route, we conclude that they would not be disproportionately affected by the pipeline or the compressor station. Section 4.9.8 has been updated to include an analysis of linguistically isolated populations and an analysis on the educational attainment of the population. Section 4.9.8 has also been updated to include several maps of the Project and all census blocks crossed by the pipeline route, including those that contain Environmental Justice communities. The Environmental Justice analysis conducted in the EIS includes a more thorough analysis than can be conducted using EJScreen; therefore, EJSCREEN was not used.

SA-4	North Carolina Department of Environmental Quality	
SA-4g	To supplement the socioeconomic analysis, the Department requests that FERC evaluate the economic impact on North Carolinians residing or conducting business in the Dominion Energy service territory, in addition to the two counties in the Project area (Alamance and Rockingham). It stands to reason that all Dominion Energy customers will be impacted by changes in their energy rates once the Southgate gas flows. According to Section 4.13 on cumulative impacts, the DEIS states that Mountain Valley reports a subscribed volume of natural gas (300 MMcf/day), which would be used in North Carolina, primarily by residential and small and medium sized commercial customers for heating, cooking, and other end-uses.[38] Because residential and commercial customers will be directly affected by the construction, development, and transport of this new fuel resource, the Department requests that FERC evaluate potential and anticipated economic impacts on these end-users. In such an evaluation, DEQ requests that FERC consider the energy burden – the percentage of a household's annual income that is spent on energy bills – that the Project will have on ratepayers in Dominion Energy's service territory. The U.S. Census Bureau reports that in 2018, approximately 15% of the state's population, or 1.5 million North Carolinians, live in poverty,[39] many of whom live in counties classified as Tier 1 or Tier 2 by the North Carolina Department of Commerce. Every year, all 100 counties are ranked into tiers of economic wellbeing based on average unemployment, median household income, population growth, and adjusted property tax per capita.[40] Tier 1 Counties are considered the most economically distressed, while Tier 3 Counties are considered the least economically distressed. Many of the low income individuals who live in Tier 1 or 2 counties, identify as Hispanic or Latino or African American, and tend to reside in older housing units. The North Carolina Housing Coalition has examined the energy burden on low-income households in the state. According to the Coalition, low-income households spend a disproportionate percentage of their household earnings on energy costs when compared to their higher earning counterparts. The Coalition reports that in some counties individuals who earn less than the Area Median Income (AMI) for that county, spend two- to three-times more of their household incomes on energy than the average household in the county. In some counties, those earning less than the AMI divert nearly 33% of their incomes to pay energy bills.[41] The Department conducted a preliminary evaluation of the energy burden on households in the counties served by Dominion Energy using public data made available by the Coalition layered on the counties identified by the Department of Commerce tier ranking.[42] This evaluation of the energy burden (using the percentage of annual income that energy accounts for in AMI households) was performed for both low income homeowners and low income renters as displayed in Figures 1 and 2 below.	As discussed in section 1.1 of this EIS, The Commission bases its decisions on financing, rates, market demand, gas supply, environmental impact, and other issues concerning a proposed project. A discussion of potential rate increases due to the Project is outside the scope of the EIS.

SA-4	North Carolina Department of Environmental Quality

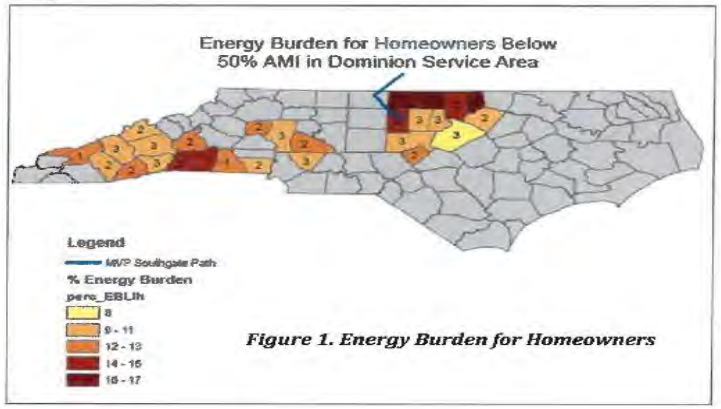

Figure 1. Energy Burden for Homeowners

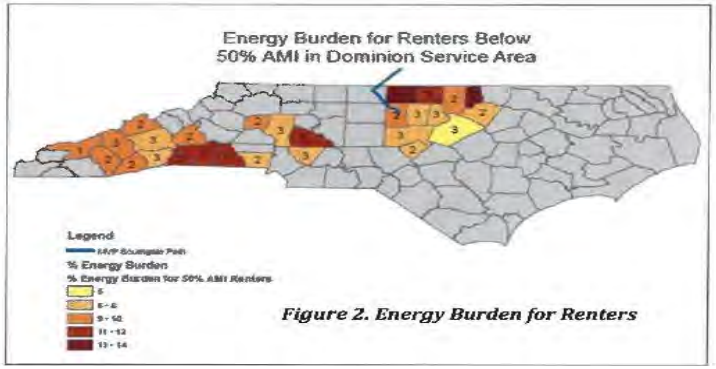

Figure 2. Energy Burden for Renters

SA-4g cont	The energy burden for AMI households in the Dominion Energy service area ranges from 5% (for renters in Wake County) to more than 16% (for homeowners in Person County). To put this in context, the U.S. Department of Health and Human Services classifies energy burden at an amount greater than 6% of a household's annual income as "unaffordable." Based on this definition, each of the counties' lowest earning households (with the exception of Wake County renters) in the Dominion Energy service area have an "unaffordable" average energy burden. Furthermore, these initial evaluations demonstrate that the socioeconomic impacts of the Project potentially extend well beyond the physical route of the pipeline. We ask that FERC use this data to fully evaluate the imposition of pass-through costs for the construction, operation, and ROI for the Project on these populations. This is fundamental information that the Commission must incorporate in its determination of need for the Project. North Carolinians residing or conducting business in Dominion Energy service territory should not be left to shoulder increased energy rates for this Project for which there is no demonstrable demand.	See response SA-4g.

SA-4	North Carolina Department of Environmental Quality	
SA-4h	*C. Issues Beyond DEQ's Jurisdiction* While the increasing practice of "quick take," and anecdotal diminution of property values proximate to pipeline projects are not within DEQ's purview, they are concerns that have been raised to our Department which we believe warrant comprehensive consideration and assessment of their socioeconomic impacts in the final EIS. In addition, we request FERC evaluate the cost-benefit of residential electrification versus greenfield natural gas pipelines to serve heating demand.	Socioeconomic impacts, including property values, are discussed in section 4.9.5 of the EIS. Conducting a cost-benefit analysis of the project compared to other non-proposed projects is outside the scope of the EIS and the requirements of NEPA.
SA-4i	V. Conclusion In summary, we agree with FERC that the Project will result in some adverse environmental impacts with possible extensive socioeconomic impacts as well. In this third comment pertaining to the Project, DEQ reiterates the position that the Project has not been shown to satisfy the criteria for the Commission to deem it in the public interest. We have provided recommendations that FERC evaluate the demand for the Project beyond precedent agreements and assess renewable and other non-gas energy alternatives that are technically and economically feasible substitutes for greenfield gas pipeline development. Anticipating the unlikelihood of the selection of the No Action Alternative, we included numerous suggestions and a glide path for completing a thorough environmental review of the potential impacts the Project poses to North Carolina. Thank you for the opportunity to comment on the DEIS. I trust that the comments will be considered as the Commission reviews and completes the environmental documents for the Project. If you have any questions regarding our comments, please contact me at: (919) 707-8619 or sheila.holman@ncdenr.gov. Sincerely, Sheila C. Holman, Assistant Secretary for the Environment North Carolina Department of Environmental Quality	See response GEN-2 in appendix I.2.

SA-4	North Carolina Department of Environmental Quality	
	APPENDIX A. **DEIS Comments from NCDEQ Division of Energy, Minerals, and Land Resources (DEMLR)**	
SA-4j	**2.3 Land Requirements.** 149.8 acres of contract yards. It is unclear from the DEIS if the contractor yards are land uses in keeping with utility line construction or if they are intended to be long term/permanent laydown areas that are to be used for utility maintenance or future expansion, going forward. Post construction stormwater control measures may be appropriate or required if these sites are to be used long term. No detail was provided on how contractor yard restoration would occur once work is completed. No details, criteria, schedules or detail on post deconstruction inspections were provided. No information was provided to address efforts to abate soil compaction, enhance infiltration, replanting efforts, or identify unauthorized uses, post construction.	Use of contractor yards, temporary work spaces, and access roads would be limited to the time of construction and restoration. All areas would be returned to pre-construction conditions unless otherwise requested by the landowner. See section 2.3.4 for further discussion.
SA-4k	62.4 acres of access roads. DEIS does not clearly explain MVP's criteria for temporary roads. Many different type of land uses install "temporary roads." However, "temporary roads" are often or at least periodically put back into service for use. This commonly occurs in forestry, agriculture and industrial settings. Thereby, the roads are not truly temporary, rather the uses are episodic and fallow roads often remain as an ongoing source of sedimentation. The DEIS does not explain how MVP will ensure the roads are truly temporary and will not remain sources off site sedimentation. No details, criteria, schedules or detail on post deconstruction inspections were provided. No information was provided to address efforts to abate soil compaction, enhance infiltration, replanting efforts, or identify and abate unauthorized uses, post construction.	Unless agreed upon by the landowner, temporary access roads would be returned to pre-construction condition and we expect that use would be temporary and limited to the time of construction and restoration. See section 2.3.5 for further discussion.
SA-4l	Additional Temporary Workspace – 184.9 acres in NC. The DEIS includes no detail on restoration. No information is provided detailing revegetation and abating soil compaction to address increase stormwater runoff and decrease infiltration, post construction.	Section 4.8.1.3 of the FEIS for provides details on the restoration of additional temporary work spaces. Mountain Valley would be required to adhere to the requirements in its Plan and Procedures regarding mitigation, erosion control, and restoration.
SA-4m	**2.4.1.2 Clearing and Grading.** DEIS does not detail how areas beyond construction corridor would be identified to ensure work/land disturbance and impacts to waters do not occur beyond the footprint of the approved construction corridor.	Mountain Valley would follow measures outlined in its Plan and Procedures, which address the identification and marking of Project workspaces and sensitive resources.
SA-4n	**2.4.1.3 Trenching.** The DEIS states "excess rock would be trucked to approved disposal areas." However, the DEIS does not detail how this approval process will occur and be managed to ensure impacts to waters, wetlands, or need for additional erosion control measures would not occur. **2.4.1.5 Lowering-in and Backfilling.** The DEIS states "The pipeline would then be lowered into the trench by side-boom tractors. Trench breakers (such as sand bags or foam) would then be installed in the trench on slopes at specified intervals to prevent subsurface water movement along the pipeline." The DEIS includes no detail, requirements or construction criterial was detailed on installation, construction or specifics of when anti-seep/trench breakers are to be used.	Section 2.4.1.3 of the EIS has been updated with details regarding rock disposal. In areas where the rock/stone is to remain, included in landowner approval is acknowledgement that additional erosion and sediment control may be needed, as well as permanent stormwater management, to be handled in Post-Construction/Restoration Plans. Unless specifically allowed through additional state and Federal permitting, no impacts to aquatic resources will occur through the placement of excess rock. If during construction rock is encountered in steep topographic areas, the rock will be relocated via truck to a stable area with more favorable slope conditions.

SA-4	North Carolina Department of Environmental Quality	
SA-4o	Detail is not provided as to how MVP will ensure contractors understand when to install these measures. Failure to do properly do so could result in impacts to waters and wetlands. The DEIS states "first 12 inches at the bottom of the trench above the pipe would be clean fill, absent of rocks. Limestone dust may be brought in and used as padding material only when other local suitable fill is unavailable." In this section, the DEIS fails to clearly state that suitable material will not consist of soils contaminated with oil, petroleum, hazardous materials, or coal combustion residuals.	See Section 2.4.1.5 of the EIS and Mountain Valley's Plan for details on regarding use of anti-seep/trench breakers. Contractors will be given copies of all plans and an environmental inspector will be on site during construction everyday to monitor appropriate installation of trench breakers.
SA-4p	Detail is not provided as to how MVP will ensure contractors understand when to install these measures. Failure to do properly do so could result in impacts to waters and wetlands. The DEIS states "first 12 inches at the bottom of the trench above the pipe would be clean fill, absent of rocks. Limestone dust may be brought in and used as padding material only when other local suitable fill is unavailable." In this section, the DEIS fails to clearly state that suitable material will not consist of soils contaminated with oil, petroleum, hazardous materials, or coal combustion residuals.	Section 2.4.1.5 has been updated to note that Mountain Valley would use certified clean fill if needed for the Project.
SA-4q	**2.4.1.8 Cleanup and Restoration.** DEIS states that "excess rock/stone would be disposed of within the construction right-of-way with landowner approval or at an approved landfill." Based on this cleanup and restoration approach, the DEIS does not address how this process will occur and be managed to ensure impacts to waters, wetlands, or the need for additional erosion control measures would not occur.	See response to SA-4n.
SA-4r	**2.4.2.1 Waterbody Crossing.** The DEIS states that "Trench spoil would be placed on the banks above the high water mark for use during backfilling. In some cases, the pipeline would be coated with concrete for negative buoyancy." The DEIS does not explain what measures will be taken to prevent direct contact between uncured or curing concrete and waters of the state. The DEIS does not detail how inadvertent contact of uncured concrete will be managed to ensure that discharges to waters of the state do not occur.	Section 2.4.2.1 of the EIS has been revised to describe Mountain Valley's handling of concrete. Mountain Valley has stated that no concrete will be cured on the right-of-way.
SA-4s	**2.4.2.2 Wetland Crossings.** The DEIS does not explain which measures will be taken to prevent direct contact between uncured or curing concrete and water of the state. The DEIS did not detail how inadvertent contacts of uncured concrete will be managed to ensure that discharge to waters of the state do not occur. The DEIS states that "After the pipeline sinks into position, trench breakers are installed where necessary to prevent the subsurface drainage of water out of the wetland." Details are not included to describe how MVP will ensure contractors understand when to install these measures. Failure to do this properly could result in impacts to waters and wetlands. **2.4.2.5 Foreign Utilities.** The DEIS does not clearly address how MVP plans to respond to impacts to potable	See response SA-4r and SA-4o.

SA-4	North Carolina Department of Environmental Quality	
SA-4t	The DEIS does not clearly address how MVP plans to respond to impacts to potable waterlines, reuse lines, sewer lines (both gravity lines and force mains), and other fuel supply lines that may be encountered along the Project route. It is imperative that MVP have contacts with all local governments and utilities along the Project route and have a firm understanding of their reporting, remediation, and any other requirements. This was not addressed in the DEIS.	Discussion of foreign utility lines crossed by the Project is provided in section 2.4.2.5. Septic systems and water lines identified to date and associated mitigation measures are discussed in section 4.8.3.1.
SA-4u	**4.1.4.6 Shallow Bedrock and Blasting.** The DEIS states that "As outlined in the General Blasting Plan, Mountain Valley would: • use seismograph equipment to monitor the velocity of the blasts at select monitoring locations including closest adjacent facilities; • use excess rock from blasting to restore the right-of-way, placed as per landowner agreements, or hauled off-site to an approved disposal site." The DEIS fails to provide specific detail on actual blasting procedures, clearly whether and when seismographs will be used to monitor ground vibration and noise levels.	Section 4.1.4.6 and Mountain Valley's General Blasting Plan provide information on blasting procedures that will be followed by Mountain Valley during construction.
SA-4v	The DEIS does not detail how excess rock disposal approval process will take place and be managed to ensure impacts to waters, wetlands, or need for additional erosion control measures would not occur.	See response SA-4n.
SA-4w	**4.1.4.7 Flooding.** The DEIS explains that mitigation measures may include using concrete coating, gravel-filled blankets, or concrete weights on the pipeline to maintain negative buoyancy. The DEIS does not explain what measures will be taken to prevent direct contact between uncured or curing concrete and water of the state. Furthermore, the DEIS does not detail how inadvertent contacts of uncured concrete will be managed to ensure that discharge to waters of the state do not occur.	See response SA-4r.
SA-4x	**4.3.2.6 Surface Water Appropriations.** Hydrostatic Test Water The hydrostatic test water would be discharged through sediment filters in vegetated uplands away from waterbodies and wetlands. MVP did not detail in the DEIS how it will ensure discharges occur at non-erosive velocities. The DEIS does not include or propose sampling to determine or demonstrate if protective coatings, sediment, turbidity or other constituents would be discharged with test water. Horizontal drilling water The HDD process requires water to be added to a bentonite clay mixture to create drilling fluid. The disposal of the drilling fluid is not adequately detailed in the DEIS.	See section 4.3.2.7 for discussion of impacts and mitigation related to water discharge. Mountain Valley would discharge hydrostatic test water in well-vegetated areas within structures to control runoff. Mountain Valley would assess field conditions to determine the appropriate energy dissipation device and would conduct sampling to ensure that discharges meet any regulatory thresholds.
SA-4y	"All drilling fluid would be disposed of at an approved facility or recycled in an approved manner in accordance with the HDD Contingency Plan. Mountain Valley would separate all water from HDD equipment washing areas from wetlands or waterbodies by drainage barriers to prevent any runoff entry." **2.4.2.6 Agriculture Lands.** The DEIS explains that other mitigation measures in agricultural lands would include relief from compaction and removal of rocks from topsoil.	Section 4.3.2.6 of the FEIS. All drilling fluid would be disposed of at an approved facility or recycled in an approved manner in accordance with the HDD Contingency Plan.
SA-4z	**4.1.2 Mineral Resources.** The DEIS states that "The East Alamance Quarry is a crushed stone aggregates operation in	Comment noted.

SA-4	North Carolina Department of Environmental Quality	
SA-4aa	Haw River and is owned and operated by Martin Marietta Materials, Inc. (North Carolina Department of Environmental and Natural Resources Permit No. 01-08) on 600 acres of land, 375 acres of which are bound under Permit No. 01-08. This permit also provides limitations on blasting practices at the quarry, restricting maximum peak particle velocities to 1.0 inch per second. The Project alignment would cross parcels owned by the East Alamance Quarry for approximately 230 feet, near MP 67. Mountain Valley obtained public information that indicates that the operator has not yet filed for a mining permit on the parcel in question (NC-AL-128); however, through discussions with the operator, it was identified that future mining operations may be completed on this parcel. Mountain Valley therefore proactively rerouted the pipeline on this parcel in an attempt to minimize impacts on any future expansion of the East Alamance Quarry. Currently, the Project alignment is approximately 430 feet from disturbed areas at MP 66.7 and more than 1,200 feet from disturbed areas at MP 67. Mountain Valley has committed to working with the East Alamance Quarry regarding landowner easement agreements to minimize	Mountain Valley has rerouted the pipeline, and the Project would not cross parcels owned by the East Alamance Quarry (Martin Marietta Materials, Inc.). The proposed pipeline would be on average 50 feet from parcels owned by the quarry.
SA-4aa. Cont.	inconvenience and impact to the quarry. Based on these factors, we conclude that the Project would not significantly impact or be affected by the East Alamance Quarry." The DEIS explains that the project alignment would cross parcels owned by the East Alamance Quarry for approximately 230 feet. A permit modification was submitted to DEMLR on April 15, 2019, by Martin Marietta Materials, Inc. for this mine. This modification has not yet been approved by the Division and it did not address this MVP alignment crossing. The modification plans submitted by Martin Marietta Materials will either need to release this area from the permit or Marin Marietta Materials will need to request a modification for its mining permit. Further, the description in the DEIS, as included above, does not accurately depict/address blasting permit conditions as set forth in the East Alamance mining permit 01-08, which includes seismic monitoring.	Mountain Valley has rerouted the pipeline, and the Project would not cross parcels owned by the East Alamance Quarry (Martin Marietta Materials, Inc.). The proposed pipeline would be on average 50 feet from parcels owned by the quarry.
SA-4bb	**4.6.5.3 General Fisheries and Aquatic Resources Impacts and Mitigation.** In the DEIS, Mountain Valley states that it "would minimize impacts from water withdrawals by adhering to the measures in Mountain Valley's Procedures and E&SC Plan. The measures outlined in these plans include preventing water withdrawal from and discharges into exceptional value waters or waters that provide habitat for federally listed threatened and endangered species, unless approved by applicable resource and permitting agencies; screening and positioning water intakes at the water surface to minimize the entrainment of fish and other biota; maintaining adequate flow rates to protect aquatic species; placing water pumps in secondary containment devices to minimize the potential for fuel spills or leaks; regulating discharge rates; and using energy dissipating devices and sediment barriers to prevent erosion. Mountain Valley would obtain and comply with all state water withdrawal and discharge permits." This is not typically required as a part of the state Erosion and Sedimentation Control Plan approval process, and oversight and management of this activity needs to be revisited by MVP.	Mountain Valley would need to obtain written permission from the FWS for any water withdrawal from a waterbody containing federally listed species prior to getting FERC approval to commencing withdrawal activities. In addition, Environmental Inspectors would be on-site to monitor water withdrawal and discharges. Mountain Valley also has agreed to participate in FERC's third party monitoring program, in which a FERC representative would be on site monitoring such activities
	4.8.1.1 Pipeline Facilities, Agriculture Lands.	

SA-4	North Carolina Department of Environmental Quality	
SA-4cc	The DEIS explains that "To avoid and minimize impacts on agricultural lands, Mountain Valley would implement numerous measures as identified in FERC's Plan including measures that address soil segregation, soil compaction, and irrigation systems and would adhere to all other applicable federal, state, and local permit requirements." The DEIS does not clearly detail how soil compaction will be addressed or abated.	Soil compaction is discussin section 4.2.4 of the EIS. Additionally, section 4.8.1.1 of the EIS has been updated to include example mitigation measures. A more detailed list is provided in Mountain Valley's Plan
SA-4dd	**APPENDIX B.** **DEIS Comments from NCDEQ Division of Water Resources (DWR)** **4.3.2.2 Surface Water Crossings.** The DEIS does not explicitly provide that MVP will comply with all the requirements in the state 404 permit and 401 water quality certification, in addition to complying with other pertinent federal and state requirements.	See section 1.4.7 in the EIS (MVP must satisfy all federal permits). Applicants cannot begin construction of the Project until all state, federal, and local permits are received
SA-4ee	**4.3.2.3 Contaminated Sediments and Impaired Waters.** The DEIS does not specifically address whether the Project will cross any watersheds draining to impaired waters and if so, what additional measures will be employed to protect these watersheds.	Section 4.3.2.3 of the EIS discusses impaired waterbodies.
SA-4ff	**4.3.2.4 Federal and State Designated Use and Exceptional Waters.** 1. The DEIS provides that "North Carolina administers a river designation intended to protect specific rivers with outstanding natural, scenic, educational, recreational, geologic, fish and wildlife, historic, scientific, cultural or other values. The Project does not cross any North Carolina rivers with these designations." DEQ repeats its request made in our comment on Draft Resource Report 2 that MVP address whether the Project crosses the watershed of any of these rivers, and if so, describe the additional measures MVP will take to protect these valuable resources. 2. The DEIS provides that the Project will cross WS-II, WS-IV, Nutrient Sensitive Waters (NSW), and HQW, but there is no discussion of what measures MVP will take to avoid those crossings or what additional measures will be employed within the watershed of those classified waters to ensure they are protected. In particular, the Department calls attention to the WS-II watershed (the entire watershed not just the "watershed" designated in the WS rules for development). DEQ repeats its request made in our comment on DRR2 that MVP address specific alternatives analysis in addition to the general discussion of these waterbodies in the DEIS.	Surface waterbody crossing methods are described in sections 2.4.2.1 and 4.3.2.2 of the EIS. In addition Mountain Valley would adhere to Mountain Valley's Plan and Procedures; and the Project-specific E&SC Plan. The Plan and Procedures contain requirements for erosion and sediment control during the construction and restoration of the Project. The Plan and Procedures also contain performance based standards to contain soils within the limits of disturbance. To ensure compliance with these standards, Mountain Valley has agreed to a FERC third-party monitoring program. FERC Compliance Monitors would inspect the project daily to ensure compliance during all phases of construction and restoration. If the Project is determined to be out of compliance, Mountain Valley would be required to remedy the situation as soon as possible.
SA-4gg	**4.3.2.7 General Impacts and Mitigation on Surface Water.** The DEIS states that hydrostatic test water would be discharged over vegetated land surfaces and the discharge rate would be regulated using valves and energy dissipation devices. DEQ requests a detailed evaluation of discharge rates be included in the final EIS.	See response SA-4x.

SA-5 North Carolina Wildlife resources Commission

North Carolina Wildlife Resources Commission

Gordon S. Myers, Executive Director

MEMORANDUM

TO: Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission

FROM: Vann Stancil
Research Coordinator
Habitat Conservation Division

DATE: September 16, 2019

SUBJECT: Comments on Draft Environmental Impact Statement for Southgate Project – Mountain Valley Pipeline, LLC. CP19-14-000

Biologists from the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the Draft Environmental Impact Statement (DEIS) prepared by the Federal Energy Regulatory Commission (FERC) for the Southgate Project proposed by Mountain Valley Pipeline, LLC (MVP). Biologists with the NCWRC have met with representatives of the MVP Southgate Project in the past and provided comments on the project. Comments are provided in accordance with certain provisions of the Clean Water Act of 1977 (33 U.S.C. 1251-1387), the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), North Carolina Environmental Policy Act (G.S. 113A-1 through 113A-10; 1 NCAC 25) and North Carolina General Statutes (G.S. 113-131 et seq.).

The Southgate Project is an interstate natural gas transmission pipeline project that will extend approximately 73.7 miles from Pittsylvania County, Virginia to delivery points in North Carolina. Approximately 42.8 miles of 16" diameter pipeline and associated aboveground facilities will traverse the Dan and Haw river basins in Rockingham and Alamance counties in North Carolina. An additional 4.3 miles of 24" diameter pipeline will be installed in Alamance County. The project will terminate in Alamance County on the east side of the Haw River between Graham and Swepsonville. The project will have the capacity to transport 375 million cubic feet of natural gas per day.

SA-5	North Carolina Wildlife resources Commission	
	MVP has collocated over 50 % of the pipeline with existing linear corridors. The project would impact 26.8 acres of wetlands; 5.9 of these acres are within the operational right-of-way. The proposed Southgate Project will cross 224 waterbodies; three of these are major waterbodies. Most streams will be crossed using dry-ditch methods while five crossing will be done using horizontal direction drill (HDD) or conventional bore techniques. The NCWRC offers the following specific comments on the DEIS:	
SA-5a	1. Pages ES-5 & ES-9. The amount of collocated pipeline is listed as 40 miles and 54 % on page ES-5 and 39 miles and 52.5 % on page ES-9. Table 2.1-2 on page 2-3 lists 38.7 miles or 52.5 % of collocated pipeline. These discrepancies should be compared and clarified.	The noted discrepancies have been revised in the EIS.
SA-5b	2. Page ES-8. Cumulative Impacts. The DEIS does not adequately address the cumulative impacts that will occur as a result of the Southgate Project. The DEIS does not consider the impacts associated with constructing new pipelines for distributing natural gas to customers once the project is complete.	The EIS was prepared in accordance with NEPA, CEQ guidelines, and other applicable requirements. Our analysis in section 4.13 is consistent is consistent with FERC style, formatting, and policy regarding NEPA evaluation of different types of impacts, including cumulative impacts. Our analysis of cumulative impacts was based on the potential geographic scope of impacts on each resource, as described in section 4.13. Plans for construction of new pipelines to distribute gas to customers is unknown and is outside of the scope of this EIS.
SA-5c	3. Page 1-2. Purpose and Need. The proposed Southgate Project will interconnect with the Mountain Valley Pipeline which is still under construction. Until the Mountain Valley Pipeline project is complete and operational, constructing the Southgate Project is premature.	The Commission will consider the need for the Project and may address these comments in any Order it issues.

SA-5	North Carolina Wildlife resources Commission	
SA-5d	4. Page 2-9. 2.3.3. Additional Temporary Workspaces. Appendix B.3 lists locations where additional temporary workspaces (ATW) are located less than 50 feet from a wetland or waterbody. Many of these ATWs are located 0 feet from surface water resources. Providing appropriate comments on ATWs within 50 feet of surface water features is not possible given the lack of detailed information provided in Appendix B.3. Maps showing delineated wetlands and waterbodies along with proposed ATWs are needed to provide comments on this aspect of the project.	As described in 4.4.3 of the EIS, Mountain Valley's Procedures specify that all extra work areas should be set back at least 50 feet from wetlands. Mountain Valley has requested modifications to their Procedures at specific locations within 50 feet of a wetland boundary. Appendix B.3 provides the locations where Mountain Valley proposes less than a 50-foot setback from a wetland and the site-specific rationale for the requested modification from Mountain Valley's Procedures. We have reviewed these ATWS locations and find them acceptable. The current alignment sheets identify the location of all workspaces and the delineated wetlands and waterbodies.
SA-5e	5. Page 2-12. 2.4. Construction Procedures & Page 4-34. Appendix B.8 lists locations where the construction workspace parallels a waterbody within 15 feet. Providing appropriate comments on construction workspaces paralleling surface water features within 15 feet is not possible given the lack of detailed information provided in Appendix B.3. Maps showing delineated wetlands and waterbodies along with proposed construction workspaces and contour lines are needed to provide comments on this aspect of the project.	The current alignment sheets identify the location of all workspaces and the delineated wetlands and waterbodies. Alignment sheet are available on the FERC eLibrary using docket number CP19-14 and accession number 20191220-5298.
SA-5f	6. Page 2-15. 2.4.1.2. Clearing and Grading. NCWRC recommends the use of biodegradable and wildlife-friendly sediment and erosion control devices. Silt fencing, fiber rolls, and/or other products should have loose-weave netting that is made of natural fiber materials with movable joints between the vertical and horizontal twines. Silt fencing or similar materials that have been reinforced with plastic or metal mesh should be avoided as they impede the movement of terrestrial wildlife species. Studies have	Mountain Valley has stated they would evaluate the use of erosion control devices with plastic or metal mesh reinforcement to determine if alternative devices could be installed in certain terrestrial sensitive areas. Mountain Valley has requested additional information from the NCWRC for specific habitat types along the right-of-way as candidates for wildlife friendly alternatives.
SA-5g	7. Page 3-3. 3.3.1. Existing and Approved Natural Gas Pipeline Systems. The Atlantic Coast Pipeline is located east of the Southgate Project, not west.	The noted discrepancies have been revised in the EIS.
SA-5h	8. Page 3-6. 3.4 Route Alternatives and Variations. In a letter dated 10 August 2018, NCWRC recommended routes variations for the Southgate Project. MVP responded to these recommendations on 1 Nov. 2018. While most recommendations were not incorporated into the route, MVP indicated that they adjusted the route in the Town Creek watershed to reduce the number of stream crossings. We recommend that this adjustment be described in the EIS where appropriate.	Section 4.3.2.2 of the EIS has been updated to include this information.

SA-5	North Carolina Wildlife resources Commission	
SA-5i	9. Page 4-32. 4.3.2.2. Surface Water Crossings. Mussel surveys are not yet complete, therefore NCWRC cannot recommend where time of year restrictions (TOYR) are appropriate. In general, NCWRC recommends more stringent measures to control sedimentation and erosion in watersheds that drain to waterbodies with sensitive species. Such measures include installing sediment control fencing and stabilizing unvegetated fill. Unvegetated fill should be stabilized at the end of each work day with an acceptable erosion control cloth, blanket, or matting until the fill is ready to be permanently stabilized. In addition, no grubbing should occur with 50' of surface waters with sensitive species outside of the growing season (TOYR from Nov. 15 – April 1) to protect mussels from sedimentation impacts.	Aquatic species surveys were completed in 2019 and no state- or federal-listed mussel species were observed. Mussel survey results were submitted to NCWRC in October 2019.
SA-5j		As a standard construction practice, the Project will establish a 50' wetland and waterbody buffer with erosion and sediment control devices. The buffer will not be grubbed during the initial right-of-way clearing and grubbing sequence. These buffers will remain undisturbed (aside from hand felling trees) until the pipeline crossing is ready to be installed in the ephemeral, intermittent, or perennial stream.
SA-5k	10. Page 4-33. 4.3.2.2. Surface Water Crossings. NCWRC may request additional HDD or conventional bore crossings if rare aquatic species are detected during surveys.	Comment noted. See response SA-5i.
SA-5l	11. Appendix B.5. In the table Waterbodies Crossed by the Southgate Project, the crossing method listed is "Open Cut – Dam and pump, Flume". Open cut should be described in section 4.3.2.2 and/or the terminology in the table should be updated. It is unclear if open cut is a dry-ditch crossing method or a wet crossing method.	Waterbody crossing methods are described in Section 2.4.2.1 of the EIS. We have updated appendix B-5 to note the Open-Cuts crossings will be Dry-Ditch crossings.
SA-5m	12. Page 4-38. State Designated Use and Exceptional Waters. Five streams with sensitive warmwater fish are proposed to be crossed using HDD or conventional bore. As long as these five streams are crossed using either HDD or conventional bore, NCWRC does not request a TOYR for warmwater fish.	Comment noted.
SA-5n	13. Page 4-42. Horizontal Directional Drill Water & Page 4-43. Dust Control. NCWRC supports the use of municipal water for HDD, dust control and other uses. More information is needed if surface water supplies will be used. If municipal water has any additives such as chlorine or chloramine or if an algicide is added to the water, it should not be released into surface waters unless it is safe for sensitive species including amphibians and aquatic invertebrates.	See section 4.3.2 of the EIS for a discussion of Mountain Valley's proposed water sources for the Project, water discharge procedures, and measures to minimize impacts from water withdrawal and discharge.
SA-5o	14. Page 4-52. 4.4.2. General Impacts and Mitigation. One of the stated requirements for successful wetland revegetation is that invasive species and noxious plants are not present, unless "they are abundant in adjacent areas" undisturbed by construction. Abundant is not defined and it is unclear if the same species must be present and "abundant" to consider revegetation successful despite the presence of invasive species. Efforts should be made to control invasive species and noxious plants regardless of adjacent conditions.	Mountain Valley has stated it would conduct spot eradications of exotic or invasive species that are found within the right-of-way in numbers substantially greater than those existing pre-construction, regardless of adjacent conditions.

SA-5	North Carolina Wildlife resources Commission	
SA-5p	15. Page 4-52. Extra Workspace Within 50 Feet of Wetlands. Appendix B.3 lists locations where additional temporary workspaces (ATW) are located less than 50 feet from a wetland or waterbody. Many of these ATWs are located 0 feet from the resources. Providing appropriate comments on ATWs within 50 feet of surface water features is not possible given the lack of detailed information provided in Appendix B.3. Maps showing delineated wetlands and waterbodies along with proposed ATWs are needed to provide comments on this aspect of the project.	See comment SA-5d.
SA-5q	16. Page 4-55. 4.5.2. Vegetation Communities of Special Concern or Value. The NCWRC does not have purview over plants that are state listed.	Comment noted.
SA-5r	17. Page 4-62. Pipeline Facilities. The EIS should include seeding details such as specific plant species, seeding rates, composition of each species in plant mixes and location and conditions where different seed mixes would be used.	Mountain Valley would continue to work with NCDEQ and NCWRC on seed mix development to incorporate native and pollinator species for right-of-way stabilization which would be included in the Project-specific E&SC Plan to be reviewed and approved by North Carolina agencies.
SA-5s	18. Page 4-64. Interior Forest Fragmentation and Edge Effects. While we recognize that a large percentage of the Southgate Project will be collocated, there are impacts to interior forests. More detail is needed regarding how the acreage of interior forest and forest edge was calculated. A table showing the acreage of forested blocks affected by the pipeline and the amount of interior forest and forest edge impacted in each block would be helpful.	Section 4.5.4.3 and 4.6.1.1 of the EIS have been updated with additional information provided by Mountain Valley in response to an environmental information request regarding impacts on interior forest.
SA-5t	19. Page 4-65. 4.5.5. Vegetation Conclusions. Concluding that there is "extensive distribution of similar vegetation communities" in North Carolina underestimates the local impacts of the pipeline on interior forests and the wildlife species inhabiting them. We recommend efforts in addition to collocation to mitigate for lost acreage of interior forest.	Interior forests, habitat fragmentation, and impact to wildlife are discussed in detail in section 4.5.4.3 and 4.6.1.1of the EIS. Mountain Valley continues to work with Virginia and North Carolina agencies to address forest fragmentation concerns.
SA-5u	20. Page 4-68. 4.6.1.1. Pipeline Facilities. The DEIS states that direct handling of any state or federally listed species will be prohibited unless approved by the applicable regulatory agencies. NCWRC can have further discussions with MVP regarding conditions and procedures for handling state listed species.	Comment noted.

SA-5	North Carolina Wildlife resources Commission	
SA-5v	21. Page 4-68. 4.6.1.1. Pipeline Facilities. The discussion of interior forest impacts and habitat fragmentation does not adequately address the increase in forest edge or loss of large blocks of interior forest. The NCWRC is concerned about forest fragmentation and the impacts on interior forest and their associated wildlife species resulting from the Southgate Project. North Carolina provides migratory corridors as well as breeding habitat for hundreds of species of birds. The loss of habitat and increased fragmentation will result in edge effect, which will intensify predation, reduce productivity, allow for the spread of invasive species and displace already imperiled species. More information is needed regarding forest block sizes before and after right-of-way (ROW) clearing and mitigative measures to reduce impacts to interior forest habitat.	See response SA-5s ad SA-5t.
SA-5w	22. Page 472. 4.6.2. Sensitive and Managed Wildlife Habitats. In North Carolina, "Game Areas" should be referred to as Game Lands.	Section 4.6.2 has been updated with this change.
SA-5x	23. Page 4-73. 4.6.3.1. Migratory Birds. The last sentence of the fourth paragraph should also include the "NC Wildlife Action Plan as species of greatest conservation need" in the list of conservation priorities. Similarly, Table 4.6-2 should reference NCWRC for species such as northern bobwhite and brown-headed nuthatch.	Section 4.6.3.1 has been updated with these changes.
SA-5y	24. Page 4-75. Migratory Birds Impact and Mitigation. Breeding bird capture data suggest that migratory bird breeding can occur as early as late March and continue through August in the Piedmont in North Carolina. Therefore, we support the recommendation from the US Fish and Wildlife Service that clearing be avoided from April through August to minimize impacts to breeding birds. 25. Page 4-76. Migratory Birds Impact and Mitigation. NCWRC recommends a TOYR for ROW maintenance from April 1 to October 1. This will reduce impacts to nesting wildlife, including reptiles, amphibians and ground-nesting birds.	Mountain Valley would attempt to avoid clearing vegetation between April 1 and August 31 during construction in North Carolina. Mountain Valley has proposed to modify its Plan to not conduct maintenance clearing or mowing of the right-of-way between April 1 and October 15 of any year. If avoiding the migratory bird nesting season during construction-related clearing becomes infeasible, Mountain Valley would consult with the FWS to identify measures to implement to minimize impacts on migratory birds.
SA-5z	26. Page 4-79. 4.6.4.1. Game Species Impacts and Mitigation. The DEIS states that measures to keep all-terrain vehicles (ATV) from using ROWs are discussed in Section 4.9 Transportation. Controlling ATV access to ROWs is an important topic but it is not addressed in Section 4.9. Off-road vehicles and ATVs can impact aquatic resources by driving across and along streams as well as impacting vegetation in riparian zones near streams. Access to streams along maintained ROWs will increase once the Southgate Project is completed.	Mountain Valley would manage unauthorized off-road vehicle (ORV) and ATV use on their operational rights-of-way by adhering to Section VI of Mountain Valley's Plan, which includes measures such as signs, fences/gates, and slash, timber, and boulder barriers. Section 4.9 has been updated to include a discussion of ATV vehicles.
SA-5aa	27. Page 4-80. 4.6.5.2. Fisheries of Special Concern Impacts and Mitigation. NCWRC can participate in future discussions to develop a detailed plan for relocating aquatic species at crossing locations.	Comment noted.

SA-5	North Carolina Wildlife resources Commission	
SA-5ab	28. Page 4-85. Hydrostatic Testing and Water Withdrawals. Text in this section of the DEIS indicates that water will be withdrawn from surface waters. Elsewhere in the DEIS, municipal water sources are listed as the primary or only source of water. This discrepancy needs to be addressed. To prevent entrainment and impingement of aquatic organisms, the NCWRC recommends intake velocities, as measured through the intake screening material, of 0.25 feet per second (fps) or less and mesh sizes of 1 mm in surface waters containing sensitive species.	Section 4.6.5.3 of the EIS has been updated with information regarding water sources for the Project and surface water withdrawals. Mountain Valley has agreed to adhere to these recommendations.
SA-5ac	29. Page 4-92. 4.7.4.5. Mussel Surveys. NCWRC should also be consulted if listed or otherwise sensitive mussel species are documented during surveys.	Aquatic species surveys were completed in 2019 and no state- or federally-listed mussel species were observed.
SA-5ad	30. Page 4-94. Table 4.7-2. Northern Long-eared Bats should be listed in the table as state threatened. Northern yellow bat does not occur in the study area. Records confirmed by biologists of the northern yellow bat are only from Brunswick County. Potential records occur in Mecklenburg and New Hanover counties.	Table 4.7-2 has been updated in the EIS to include this information.
SA-5ae	31. Page 4-95. 4.7.7.1 Mammals. Little brown bats may also occur in Rockingham and Alamance counties.	Section 4.7.7.1 of the EIS has been updated with this information.
SA-5af	32. Page 4-95. 4.7.7.1 Mammals. It is stated that "No roost trees for tri-colored bats occur in the Project area." This statement seems unlikely since in the summer, tri-colored bats have been found to roost in dead clusters of leaves, live foliage, and in hollows in trees.	The text in the EIS has been edited slightly to read that no *known* roost trees are present
SA-5ag	33. Page 4-96. 4.7.7.1 Mammals. Due to the decline of bat populations, specifically those of myotis species and tricolored bats, we feel the project would not significantly impact bats if tree clearing activities were avoided during the maternity roosting season for bats (May 15 – August 15).	As noted in section 4.6.3.2, Mountain Valley would attempt to refrain from construction-related vegetation clearing between March 15 and August 15 in Virginia and between April 1 and August 31 in North Carolina.
SA-5ah	34. Page 4-96. 4.7.7.1 Mammals. Due to the decline of bat populations, specifically myotis species and tricolored bats, we recommend that tree clearing activities not occur during the maternity roosting season for bats (May 15 – August 15). Adhering to this TOYR, which coincides with the TOYR for migratory birds, would enable the project to further avoid significant impacts to bats.	See response SA-5ah.
SA-5ai	35. Page 4-97. 4.7.7.4. Mussels. NCWRC can participate in future discussions to develop a detailed plan for relocating mussels and other aquatic species at crossing locations.	Comment noted.
SA-5aj	36. Page 5-8. 5.1.6. Wildlife and Aquatic Resources. While some fish species may migrate away from impacts, some benthic fish species may not move away and freshwater mussels will not move away from impacts.	See response SA-2d-23.

SA-5	North Carolina Wildlife resources Commission	
SA-5ak	37. Appendix B-5. Waterbodies Crossed by the Southgate Project. This table includes streams that are apparently not crossed by the pipeline because the crossing width is 0 and the crossing method is N/A. The reason for including these stream crossings is unclear. Additional commentary is needed.	The footnotes in appendix B-5 have been revised to clarify that waterbodies with a crossing width of 0 and crossing method of N/A would not crossed by the pipeline, but are located within Project workspaces.
SA-5al	38. Appendix B-8. The justification for locating construction workspace within 15 feet of surface waters is often avoiding side slope construction. Including more details about the side slopes, such as the slope percent, would help justify the decision to locate the construction workspace so close to surface waters. Including the minimum and average distance of the workspace to the waterbody and providing a name for streams would also be beneficial.	Additional justification was provided by Mountain Valley and incorporated into appendix B.8.

SA-6	North Carolina Department of Natural and Cultural Resources

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

September 17, 2019

Kimberly D. Bose
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

Re: MVP Southgate Project, Construct Interstate Pipeline, Multi County, ER 18-1041

Dear Ms. Bose:

SA-6a	We have reviewed the draft environmental impact statement for the proposed Southgate Project. The document adequately addresses our concerns about archaeological resources in North Carolina.	Comment noted.
SA-6b	We previously reviewed the revised Plan for Unanticipated Discoveries of Historic Properties and Human Remains for the MVP Southgate Project as appendix 4-C to Resource Report 4. We concur that this plan provides adequate protection for unexpected discoveries that may occur during construction.	Comment noted
SA-6c	We note that listed communications and survey results represent data available up to the early months of 2019 and we look forward to reviewing the updated EIS. Since then, we reviewed the revised architectural survey report and an addendum to that report resulting in changes that will need to be reflected in Table 4.10-11, *Historic Sites Identified by Mountain Valley in the Direst APE of the Southgate Project in North Carolina.*	Table 4.10-11 has been updated in the EIS.
SA-6d	Our responses to those reports were issued on June 18, 2019 and July 22, 2019, respectively. We have enclosed a copy of the table with our edits highlighted. Also, when referencing survey site numbers (SSN) please list all four numerical digits including leading zeros; for example, AM0122.	Comment noted.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.
Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
Deputy State Historic Preservation Officer

Enclosure: Table 4.10-11 with NCHPO edits

cc: Alex Miller, MVP Southgate, LLC, alex.miller@nexteraenergy.com
Paul Webb, TRC Environmental Corporation, pwebb@trcsolutions.com.com

TA-2 City of Burlington

City of Burlington

Robert C. Patterson, Jr., P.E.
Water Resources Director

September 16, 2019

Kimberly D. Bose, Secretary
Federal Regulatory Energy Commission
888 First Street, NE, Room 1A
Washington, DC 20426

RE: OEP/DG2E/Gas3
Mountain Valley Pipeline, LLC
Southgate Project
Docket No. CP19-14-000
Draft Environmental Impact Statement

Dear Secretary Bose:

TA-2a

Upon review of the Draft Environmental Impact Statement (DEIS) prepared by FERC regarding the MVP Southgate Project and on behalf of the City of Burlington, I submit concerns regarding the routing of the MVP Southgate Project. As planned, the pipeline will cross the City-owned Stoney (also spelled Stony) Creek Reservoir - a source of drinking water for nearly 100,000 citizens in Alamance and Guilford counties, including the City of Burlington, the Town of Gibsonville, the Town of Elon, the Town of Haw River, the Village of Alamance, the Town of Ossipee, the Town of Whitsett, as well as a supplemental source to the City of Greensboro and an emergency source for the City of Graham.

1) Following a presentation by MVP representatives to the Burlington City Council on August 20, 2018, the following graphic illustrating a proposed alternative route was prepared by the City of Burlington Engineering Department and presented to MVP on September 6, 2018 for its consideration. The blue shaded area to the north is Lake Cammack and the blue shaded area to the south is Stoney Creek Lake. Water flows from Lake Cammack via Stoney Creek to Stoney Creek Lake and our drinking water intake is located on the southern end of Stoney Creek Lake. The orange line to the south is an approximation of the proposed route of the pipeline, and the green line to the north indicates a possible alternative route.

The proposed route of the pipeline as shown in the DEIS crosses a section of the lake approximately 304 feet wide in the upper reach of Stoney Creek Reservoir just south of NC HWY 62 at approximately MP 63.6 (page 4-33). As noted in Section 4.3.2.4 for the DEIS (page 4-38), the City has requested that the pipeline "not cross city property." Specifically, per our September 6, 2018 submittal, the City of Burlington has requested that the pipeline be routed north of NC HWY 62 such that it crosses the portion of Stoney Creek that runs between Lake Cammack and Stoney Creek Lake, both City-owned drinking water supply sources. This location would not directly cross under the water supply and, would have a narrower crossing on the

See section 3.4.2.6 of the EIS. We evaluated the requested alternative and determined that it would not provide a significant environmental advantage due to the fact that the alternative route would cross through an area that is heavily residential and would be within 25 feet of several residences. Due to the residential nature of the proposed alternative, we conclude that it does not offer a significant advantage to the proposed Southgate route. Section 4.1.4.9 of the EIS provides information regarding the HDD crossing, potential impacts on the Stony Creek Reservoir, and Mountain Valley's mitigation measures to minimize impacts. Based on our review, we conclude that subsurface conditions identified by the geotechnical studies would not render the HDDs infeasible. We conclude that potential impacts from HDD construction and potential inadvertent releases would not be significant.

TA-2	City of Burlington	
TA-2a	creek rather than the lake. The City of Burlington does not own the land along Stoney Creek running between Lake Cammack and Stoney Creek Reservoir. Unfortunately, MVP has not responded to this request leaving the City with concerns regarding potential impact to the water supply. Without sufficient detail to review the potential physical and environmental impacts effects upon the City of Burlington's drinking water reservoir, we are concerned that this crossing could adversely impact the integrity of the reservoir, water quality, and recreational activities.  ***The City of Burlington hereby requests and strongly encourages MVP and FERC to realign the pipeline so that it does not cross a City-owned water supply reservoir, including the above suggested routing or reconsideration of alternative routes presented in Section 3.4 the DEIS (pages 3-6 to 3-11), the Lake Cammack East and North-South Alternatives. Each of these routes would minimize risk to drinking water supplies.***	The Stony Creek Reservoir intake is located approximately 1.8 river miles downstream of the Project's proposed HDD crossing. Mountain Valley representatives met with the City of Burlington officials on November 23, 2019 to discuss the crossing and will continue to coordinate during construction.
TA-2b	2) Stoney Creek Reservoir is also part of the Burlington's Recreation and Parks System (http://burlingtonnc.gov/218/Lakes-Marinas) with various types of outdoor recreation activities available to residents. Without sufficient detail to review the potential physical and environmental impacts effects upon the City of Burlington's drinking water reservoir, we are concerned that this crossing could adversely impact the integrity of the reservoir, water quality, and recreational activities.	Impacts on recreational and special use lands are discussed in section 4.8.4. Also, see response to TA-2a above.

TA-2	City of Burlington	
TA-2c	3) Regarding the proposed alignment, it is noted (pages 4-14, 4-15) only one geotechnical boring near the Stoney Creek Reservoir was completed and that the proposed horizontal directional drilling (HDD) method of crossing of the reservoir is expected to be within bedrock and "A proposed depth of cover of 50 to 55 feet below ground surface would be maintained between the Stoney Creek Reservoir and the proposed alignment." The location of the single boring is not indicated, nor is it clear if the above statement means the HDD crossing will be 50 to 55 feet below the bottom of the reservoir, or 50 to 55 feet below the ground surface at the boring location, which could bring the HDD crossing significantly closer to the bottom of the reservoir, increasing the risk of compromising the reservoir bottom. Further, the City of Burlington requests copies of data requested by FERC on DEIS page 4-15 relating to "… all outstanding geotechnical studies for the proposed … Stoney Creek Reservoir HDD crossings, revised feasibility and hydrofracture analyses, and any proposed mitigation following the completion of these studies."	As stated in Section 4.1.4.9, a proposed depth of cover of 50 to 55 feet bags would be maintained between the Stony Creek Reservoir and the proposed alignment. Mountain Valley's Geotechnical Report of Subsurface Exploration is available on the FERC elibrary using accession number 20191216-5158.
TA-2d	4) Although according to Section 4.3.3.3 and 4.3.3.4 (pages 4-76 & 4-77) indicates that there are no known bald eagle concentration areas or nesting areas within the project, City of Burlington staff have reported numerous bald eagle sightings at both Lake Cammack and Stoney Creek Reservoir over the last several years. We request that care and diligence be taken when performing pre-construction nest surveys to minimize any impacts to these populations. Thank you for your time and consideration of these concerns. Sincerely, Robert C. Patterson, Jr, PE Water Resources Director City of Burlington.	As noted in section 4.6.3.4, there are no currently documented bald eagle nests within 0.5 mile of the Project footprint. Mountain Valley would conduct pre-construction surveys for bald eagles and file results of the surveys with FERC.

NAT-2	Sappony Tribe

CULTURAL HERITAGE PARTNERS
LAW • POLICY • STRATEGY

September 16, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

RE: Sappony Tribe's Response to the Draft Environmental Impact Statement (EIS) for the Southgate extension of the Mountain Valley Pipeline Associated with Docket Nos. CP19-14-000 and PF18-4-000

Dear Secretary Bose:

As you know, my law firm represents the Sappony Tribe ("Sappony") concerning the Mountain Valley Pipeline Southgate extension. This letter summarizes the Tribe's response to the Draft Environmental Impact Statement (EIS) for the project. The Tribe has already submitted extensive comments on the docket, including a privileged letter filed on July 1, 2019 regarding the cultural resources reports.

NAT-2a

The Draft EIS does not provide an accurate summary of Siouan linguistic affiliations, the Tribe's pre-Contact history, its post-Contact history, or its association with the project area. Additionally, the Tribe has a series of requests regarding the cultural resources and other project impacts that have gone unaddressed. These comments on the Draft EIS summarize these concerns as well as concerns about the environmental and socioeconomic impacts of the project.

For these reasons and those set forth below, the Tribe asserts its right to consult with FERC. To this end, this letter requests additional documents needed for the Tribe to understand fully the project's purpose, scope, and need, in addition to all potential adverse environmental effects, along with alternatives that will avoid, minimize, or mitigate those effects.

1. **The Draft EIS mischaracterizes the history and linguistic relationships of the Virginia Siouan tribes.**

NAT-2b

As the Tribe discussed in the privileged letter on the docket filed on July 1, 2019, several of the cultural resource reports underpinning the EIS mischaracterize the history and relatedness of the western Virginia Siouan tribes. The analysis in these sections is deeply flawed and mischaracterizes Sappony and other Virginia tribes' historical associations with and contemporary relationship to the project area. Furthermore, these reports do not acknowledge or discuss the close relationship between the Sappony Tribe and the Cheraw (also spelled Saura or Saraw) in the Piedmont in both northern North Carolina and Virginia.

Within the cultural resources reports for North Carolina and Virginia are Ethnographic Analyses intended to describe tribal historic movements and assess contemporary interests in the

NAT-2a	Section 4.10.3.1 of the EIS briefly summarizes the Pre-Contact, Post-Contact, and linguistic affiliations of the Sappony Tribe. Our description was accurate and based on appropriate anthropological and ethnohistorical references. The EIS text states that the Sappony probably spoke a dialect within the Siouan-Catawaban language family (Woodard et al. 2017). The Late Woodland and Protohistoric cultural traditions of southern Virginia and northern North Carolina are characterized by archaeologists as the Dan River and Saratown Phases (Eastman 1999). John Lederer visited the Sappony in 1670 (Briceland, 1987).
NAT-2b	See response to NAT-2a. With regard to Sappony trade relations with the Saura, the EIS text states that the Occaneechi Path trade route connected tribes in Virginia to tribes in North Carolina. Comments regarding Mountain Valley's cultural resources reports is not relevant to our descriptions in the EIS. The EIS accounts for anthropological scholarship, and in fact cites Hantman 2018.

NAT-2	Sappony Tribe	
NA-2b	project area. These Ethnographic Analyses largely characterize the project area in Pittsylvania, Alamance, and Rockingham Counties as associated with the ancestors of the Catawba Indian Nation and state-recognized North Carolina tribes. For example, the Occaneechi Path, a significant north-south trade route that travels through the project area associated with Monacan and Sappony trading towns and other Tutelo-Saponi communities like Occaneechi Town, is mentioned in the "European Settlement to Society" Cultural Background section but associated solely with the Occaneechi Band of Saponi Nation. The Ethnographic Analysis section mentions briefly that the path "linked south-central Virginia with the Catawba and other groups to the south and the area surrounding Richmond to the north" as early as the 1670s and that European traders traveled on the path. The report fails to acknowledge any Monacan or other Tutelo-Saponi associations with this path. Eighteenth century tribal names, such as the Eno, Occaneechi, and Shakori tribes (in the Eno River drainage), the Cheraw Indians (on the Dan River), the Sissipahaw (on the Haw River), and the Occaneechi, Tutelo, and Saponi tribes (associated with the Gaston culture on the Roanoke River) are generally described in the Ethnographic Analysis as having been later incorporated into the Catawba Indian Nation. The Sappony do not challenge that the Catawba have interests in the pre-Contact cultural resources of this area, but not all members of the piedmont tribes did so, and there are cultural distinctions between the remnant Virginia Siouan groups and the Catawba. It is not the case that the Catawba are the only federally-recognized tribe with a strong connection to the project area, or that FERC should assume that the Catawba claim is stronger than the Monacan one. The Draft EIS disregards the accepted body of contemporary, antiquarian, and early anthropological scholarship that underlines the familial and clan linkages between the Tutelo-Saponi and Monacan groups, and instead assumes that the Catawba tribe is the primary federally-recognized tribe affiliated with this area. Jeffrey Hantman's 2018 book *Monacan Millennium: A Collaborative Archaeology and History of a Virginia Indian People* (p. 143-148), for example, concludes that beginning in the mid-18th century several colonial Monacan trading towns and settlements in the Roanoke River Valley were linked to others along the Occaneechi path. Extensive evidence links the Tutelo-Saponi groups with the Monacan Confederacy. The Bureau of American Ethnology publication *Indians of the South East* clearly identifies the Saponi as a contraction of Monasukapanough, a Saponi town within the Monacan confederacy, located near present-day Charlottesville. The book *The Tutelo Spirit Adoption Ceremony*, by Frank G. Speck and George Herzog, similarly describes the relatedness of these groups in contrast to some of the Sioan groups further south. The book states: "The eastern Siouans must be sharply separated into two groups, the Virginia Siouans, including the Manahoac, Monacan, Nahyssan, Saponi, Tutelo, Occaneechi, and Moneton, and the Carolina Siouans embracing all the rest. Even a superficial comparison of the Tutelo and Catawba vocabularies on one hand and the western dialects on the other is sufficient to show that Catawba stands clearly apart from all of them, and that Tutelo is nearer Dakota, Hidatsa, and others of the western languages than it is to Catawba" (page 1). While the Tribe does not dispute that fragments of some Tutelo and Saponi groups migrated north or south in the 18th century, it is not the case that the Catawba is the only federally-recognized tribe with a strong connection to the project area, or that the Catawba claim should be assumed to be stronger than the Monacan one.	See above NA-2b comment response

NAT-2	Sappony Tribe	
NA-2b	Erroneous conclusions regarding tribal history and Siouan identity have resulted in a flawed tribal affiliation analysis in the cultural resources reports that is replicated in the Draft EIS. Ethnographic Analyses in previous cultural resource reports largely characterize the project area in Pittsylvania, Alamance, and Rockingham Counties as associated with the ancestors of the Catawba Indian Nation and state-recognized North Carolina tribes. The Draft EIS furthermore incorrectly characterizes the Monacan people as not linguistically Siouan. Nevertheless, the Draft EIS then uses this incorrect linguistic characterization and a restricted assessment of Monacan ancestral territory to minimize Monacan affiliation with the project area. While the EIS states that "[w]e believe that the Nottoway Tribe, Sappony Tribe, and Occaneechi Band have a demonstrated interest in the cultural resources of the Project area; and, therefore, they could be consulting parties," it does not include any language affirming Monacan demonstrated interest in the cultural resources. The Sappony Tribe is glad that FERC recognizes the clear cultural association between the Sappony and the project area, but disputes the FERC characterization of the Monacan. The Saponi and the Monacan had an extremely close relationship during prehistory, based on linguistic, familial, and political connections. This EIS casts doubts on Monacan statements regarding affiliation and cultural interest, which are dismissed as mere assertions, as seen in the following statements from the EIS: • "In a letter to the FERC dated July 1, 2019, the Monacan Indian Nation asserts that the Occaneechi Path trade route connected Monacan villages with Tutelo-Sapponi communities such as Occaneechi Town." (Draft EIS page 4-162); and • "The Monacan Indian Nation asserts that Hantman (2018) believes that the Hurt Power Plant site (44PY144) and the Graham-White site (44RN21) are probably associated with the Monacan." (Draft EIS page 4-162). The Sappony Tribe supports these assertions by the Monacan Indian Nation, as does the preponderance of scholarly work on this topic. Letters submitted by both the Sappony Tribe and the Monacan Indian Nation have cited sources that contained evidence regarding these topics, and FERC and the Mountain Valley Pipeline contractors have had every opportunity to directly investigate these questions of affiliation. The EIS and the underlying cultural resources reports must be improved with greater research into these topics, reflecting the following widely-accepted characterizations: 1. The Monacan were linguistically and socio-politically Siouan and are related to the Sappony Tribe. 2. The Sappony interest in the project area includes their relationship with the Upper and Lower Sauratown sites, and several Sappony families have Cheraw descent. 3. Siouan tribes in Virginia engaged in kin-based alliance systems and confederacies supported by a mutually-intelligible language. Tribal history and ceramic patterns suggest an intermarriage system in which the core tribes of central Virginia had a Monacan pattern of ceramic decoration and other site patterns, and the Roanoke Valley was a distinct but related group, with occasional appearance of Monacan-style ceramics suggestive of regular kin exchange, trade, and alliances. 4. Most Virginia Siouan tribe names other than Monacan and Mannahoac (e.g., Saponi, Tutero, Nahyssan, Occaneechi) are not referenced until 1650 or later. There is therefore considerable ambiguity regarding whether these tribes had a strongly separate pre-Contact identity; whether they were family or village names within the Monacan Confederacy pre-Contact; or whether they are post-Contact sub-groups that formed around migration or distinctions in trade practices.	See above NA-2b comment response

NAT-2	Sappony Tribe	
NA-2b	5. During the 17th-18th centuries, Virginia tribes experienced colossal loss of native population and disruption of lifeways as a result of European colonialism. Several of the Virginia Siouan groups traveled west and south to remain on the frontier with minimal contact with settlers. There was considerable bifurcation and amalgamation of tribal groups as necessitated for survival. 6. Because of these factors, modern Virginia Siouan tribes (like many other tribes) are commonly made up of more than one historic tribe, have a variety of consultation interest areas, and have individuals within these tribes who understand themselves to have a descendancy from multiple Virginia Siouan groups. Detailed and accurate examinations of native history are essential, especially when assessing impacts of infrastructure projects to native peoples, especially for tribes that still experience a lack of acknowledgement or recognition from the federal government, and especially when projects propose to damage native sites.	See above NA-2b comment response
NAT-2c	2. **The Sappony Tribe's relationship with the Cheraw tribe is well-documented and has clear implications for the project area.** European expansion caused repeated coalescence and splintering of tribal groups during the 17th and 18th centuries that continues to impact how tribes experience their ancestral relatedness to cultural resources. One of the tribes with a historical and contemporary connection with the Sappony Tribe is the Cheraw, who occupied the project area around Eden, North Carolina in settlements known as Upper and Lower Saratown. In 1715, the Eno and Saraw (Cheraw) tribes petitioned the state of Virginia to be allowed to settle at Fort Christanna with the Saponi, and the Indians who resided in the fort for its short-lived existence became known collectively as the Saponi (see Woodard 2016; Beaudry 1985). Stephanie Gamble's 2013 article in Native South, *A Community of Convenience: The Saponi Nation, Governor Spotswood, and the Experiment at Fort Christanna, 1670-1740*, similarly discusses these tribal complexities. Gamble characterizes the Cheraw, Saponi, and other groups as intimately connected. This follows directly from the work of James Merrell, whose well-recognized THE INDIANS' NEW WORLD: CATAWBAS AND THEIR NEIGHBORS FROM EUROPEAN CONTACT THROUGH THE ERA OF REMOVAL states that a "From Esaws along the Catawba River to Mannahoacs on the Rappahannock, all were descended from Siouan-speaking migrants who had drifted over the mountains centuries before Columbus…These societies were variations on a common theme. A fundamental unity underlay piedmont life, a unity grounded in a shared cultural heritage and physical environment. All spoke Siouan. All built towns on terraces above the rivers and creeks" (Merrell 2009: 10). In May 1732, Saponis and some Cheraw families petitioned Virginia Governor Gooch to return to Virginia, and they were permitted to settle again on the Appamattox or Roanoke River. Merrell attributes this discomfort of the Saponis with the Catawbas as indicative of the differences between Virginia Siouan and those further south, commenting that "Though Siouan-speakers and piedmont peoples, Saponis were descended from the Monacan and Mannahoac stock, branches quite distinct in speech and custom from their southern cousins. It would appear, then, that Catawbas could incorporate small and culturally variant peoples, a Natches or Yamasee band, or sizeable groups that were close relatives, like Cheraws and Waterees, but that large and foreign populations proved more difficult" (Merrell 2009: 116). Furthermore, these Cheraw families appear to have found a home among the Sappony Tribe, because the tribe's Executive Journals (v. 4, page 269) state that the Cheraw formally joined the Sappony in 1732. Rather than melding entirely with the Saponi identity, Sappony Tribe members today maintain a family genealogy that includes information about relatedness to the Cheraw and other incorporated Siouan tribes located along the Virginia and North Carolina border. Because of this, the Tribe is especially concerned with having a high level of detail about any archaeological investigations in the vicinity of Upper and Lower Saratown. The Tribe also wants this tribal connection made clear in cultural resources reports and the EIS. If additional information is needed on this subject, the Tribe invites FERC and TRC to contact the Tribe.	See response NAT-2b.

NAT-2	Sappony Tribe	
NAT-2d	**3. The Tribe requests that their broader questions regarding the cultural resources, stated in July 2019, be acknowledged and addressed.** As the Tribe pointed out in its July 2019 comments, there is a considerable body of contemporary, antiquarian, and early anthropological scholarship that underlines the familial and clan linkages between the Saponi, Monacan, and other Siouan groups. FERC's Ethnographic Analysis underplays the clan and familial associations between Tutelo, Saponi, and Monacan sites, language, and culture, and implies that all the descendants of these grounds are now incorporated within the Catawba or state-recognized North Carolina tribes. The Tribe made requests in July 2019 based on the need to correct inaccuracies in the cultural resources reports. These requests were not acknowledged or addressed, and the requests are also highly pertinent to addressing issues in the Draft EIS. The Tribe again requests that: A) The cultural resources consultant address deficiencies in the Cultural Background and Ethnographic Analysis sections, specifically the way in which these reports mischaracterize Siouan history and treats information on native history as largely useful for determining tribal affiliation rather than incorporating it into the context of the broad swath of history impacted by the project; B) The consultants incorporate into their analysis, which currently relies too heavily on information written before 2000, a variety of sources and texts related to Sappony and Siouan pre- and post-Contact history; C) The consultants perform oral history interviews with local tribes, to illuminate the several centuries of native life and movements currently not covered by these reports and to rectify a lack of reference to native persistence in these areas after 1780; D) The Tribe receive ongoing and active communication regarding planned archaeological testing on pre-Contact sites, especially those in Pittsylvania County; E) Survey reports assessing the eligibility of architecture along the pipeline include information typical for Phase II investigations, such as deed research, which is essential for determining the potential native affiliation or a site's potential eligibility under Criteria A or B; and F) The Tribe receive a call from TRC to discuss the material contained in this letter, so that the Tribe can provide any clarification that may be required. Thus far, the Tribe has received no contact from FERC or TRC regarding these other requests, and the Draft EIS does not reference most of these concerns. Moreover, the Tribe has not been updated regarding the archaeological testing and further work except for one proposed site visit, which was planned by the project proponents on a site that had only been subject for testing for a few days, and which was selected because of ease of access rather than significance to tribes. Furthermore, the Tribe has previously and repeatedly asked for more details on the environmental impact of this project, but has not received materials related to these issues. None of the other requests have been acknowledged or addressed. The Tribe now reiterates these requests be addressed before FERC finalizes the Draft EIS.	See response NAT-2b.

NAT-2	Sappony Tribe	
NAT-2e	**4. The Tribe has environmental and socioeconomic concerns regarding the project.** The Sappony Tribe is located today in High Plains, North Carolina and Virgilina, Virginia, around 70 miles from the pipeline route. Many tribal members are Virginia and North Carolina residents and taxpayers with concerns regarding the pipeline impacts, which tree clearing, impacts to animal species, risks to water quality from sediment discharge and other effluents from construction; and visual effects to a long area of most rural, natural terrain. The Tribe is also concerned about the safety concerns for explosions or fires set off by the pipeline construction or occurring for the life of the project. FERC must include information about the blast or incineration zone radius on either side of the pipeline so that FERC, the Tribe, and the public can understand the full potential for adverse effects.	See response GEN-1 in appendix I.2. Impacts on water resources is discussed in Section 4.3 of the EIS; vegetation in 4.5, and wildlife in 4.6
NAT-2f		See response SAFE-1 in appendix I.2.
NAT-2g	The Tribe also must emphasize the poor track record of this project proponent on previous projects including the Mountain Valley Pipeline mainline, which has been beset by problems that include: • inadequate sediment control plans resulting in considerable sediment fines; • permanent damage to critical historic resources like the Appalachian Trail; and • causation of landslides that endanger residences in West Virginia.	See response GEN-6 in appendix I.2.
NAT-2h	Furthermore, explosions associated with pipeline infrastructure in West Virginia (TransCanada's Leach Xpress Pipeline), Washington (Plymouth LGN storage facility) and Massachusetts (Columbia Gas Pipeline) illustrate the level of impact and harm these events can have. In the Columbia Gas example, one man lost his life, approximately 80 homes and buildings were destroyed, 8,600 people were evacuated, and a state of emergency was declared.	See response SAFE-1 in appendix I.2.
NAT-2i	The Draft EIS for the Southgate project acknowledges that hazards to the project include seismicity, karst topography, landslides (exacerbated by the need for blasting to shallow bedrock in some areas), flooding, and erosion. The document also acknowledges that the project will cross two state level aquifers, both of which are suitable for drinking, and will cross near a variety of private wells, and states that the project poses risks to the water quality in these water sources.	See response GEN-1 in appendix I.2.
NAT-2j	Although FERC currently characterizes the adverse environmental impact as moderate and states that adjustments could reduce these impacts to less-than-significant levels, the Tribe points out that given the previous track record of EQT, it is equally or more likely that the adverse impacts become significantly more substantial than the Draft EIS predicts. For this reason, the Tribe requests that FERC develop a plan to assess and review these impacts and establish periodic monitoring to determine whether impact levels and appropriate mitigation approaches have changed. The Tribe looks forward to assisting FERC on ongoing cultural resources identification and mitigation associated with the Southgate project as the consultation process moves forward. Thank you for consideration of our comments. Best regards, Marion F. Werkheiser Marion Werkheiser Attorney at Law	See response GEN-6 in appendix I.2. To ensure compliance with these standards, Mountain Valley has agreed to a FERC third-party monitoring program. FERC Compliance Monitors would inspect the project daily to ensure compliance during all phases of construction and restoration. If the Project is determined to be out of compliance, Mountain Valley would be required to remedy the situation as soon as possible.

NAT-4	Monancan Nation

CULTURAL HERITAGE PARTNERS
LAW • POLICY • STRATEGY

September 16, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission (FERC)
888 First Street, N.E.
Washington, D.C. 20426

RE: Monacan Indian Nation's Response to the Draft Environmental Impact Statement (EIS) for the Southgate extension of the Mountain Valley Pipeline Associated with Docket Nos. CP19-14-000 and PF18-4-000

Dear Secretary Bose:

As you know, my law firm represents the Monacan Indian Nation ["Nation"] concerning the Mountain Valley Pipeline Southgate extension. This letter summarizes the Nation's response to the Draft Environmental Impact Statement (EIS) for the project. The Nation has submitted extensive comments on the docket, including a privileged letter filed on July 1, 2019 regarding the cultural resources reports.

NAT-4a

The Draft EIS does not provide an accurate summary of the Nation's pre-Contact history, its linguistic affiliation, its post-Contact history, or its association with the project area. Additionally, FERC has not addressed a series of requests from the Nation regarding the cultural resources and other project impacts. The following comments on the Draft EIS summarize these concerns as well as concerns about the environmental and socioeconomic impacts of the project.

For these reasons and those set forth below, the Nation asserts its right to consult with FERC. To this end, this letter requests additional documents needed for the Nation to understand fully the project's purpose, scope, and need, in addition to all potential adverse environmental effects, along with alternatives that will avoid, minimize, or mitigate those effects.

Section 4.10.3.1 of the EIS briefly summarizes the Pre-Contact, Post-Contact, and linguistic affiliations of the Monacan Indian Nation. Our description are accurate and based on appropriate anthropological and ethnohistorical references. The EIS addresses previous letters filed by the Monacan Indian Nation in Section 4.10.1.2.

NAT-4	Monancan Nation	
NAT-4b	**1. The Draft EIS dismisses Monacan interest in the Southgate area, minimizes Monacan history in western Virginia, and mischaracterizes the tribe's linguistic affiliation.** As the Nation discussed in the privileged letter on the docket filed on July 1, 2019, several of the cultural resources reports underpinning the EIS mischaracterize Monacan historical associations with and contemporary relatedness to the project area. The analysis in these sections is deeply flawed and they have resulted in a conclusion in the Draft EIS that ignores impacts of the project on the Monacan Indian Nation. Within the cultural resources reports for North Carolina and Virginia are Ethnographic Analyses intended to describe tribal historic movements and assess contemporary interests in the project area. These Ethnographic Analyses largely characterize the project area in Pittsylvania, Alamance, and Rockingham Counties as associated with the ancestors of the Catawba Indian Nation and state-recognized North Carolina tribes. The EIS furthermore incorrectly characterizes the Monacan people as not linguistically Siouan, and appears to use this linguistic characterization and a restricted assessment of Monacan ancestral territory to minimize Monacan affiliation with the project area. The Draft EIS is incorrect in its statement that the "Monacan and Manahoac had no demonstrated linguistic affiliation with the Siouian language family." The Monacan tribe self-identifies as Siouan and tribes like the Sappony Tribe recognize an association with the Monacan based on participation with the Monacan confederacy and Siouan linguistic and political affiliation. The Monacan/Mannahoac language does not survive, but linguistic sources seem to characterize it as related to Tutelo, the Siouan Saponi language. Sources that dispute the Monacan Siouan affiliation do not appear to have an alternate linguistic history for the Monacans or to dispute their political and trade connections with other eastern Siouan groups that may be representative of a cultural affiliation. Nevertheless, the Draft EIS then uses this incorrect linguistic characterization and a restricted assessment of Monacan ancestral territory to minimize Monacan affiliation with the project area. While the EIS states that "[w]e believe that the Nottoway Tribe, Sappony Tribe, and Occaneechi Band have a demonstrated interest in the cultural resources of the Project area; and, therefore, they could be consulting parties," it does not include any language affirming Monacan demonstrated interest in the cultural resources. Furthermore, Monacan statements regarding affiliation and cultural interest (based on a broad set of information that includes tribal information and scholarly work) are dismissed as assertions, as seen in the following statements from the EIS: • "In a letter to the FERC dated July 1, 2019, the Monacan Indian Nation asserts that the Occaneechi Path trade route connected Monacan villages with Tutelo-Sapponi communities such as Occaneechi Town." (EIS page 4-162) • "The Monacan Indian Nation asserts that Hantman (2018) believes that the Hurt Power Plant site (44PY144) and the Graham-White site (44RN21) are probably associated with the Monacan." (EIS page 4-162)	Section 4.10.3.1 of the EIS provides information from sources recommended by the Monacan Indian Nation. There is no conclusion in the Cultural Context. Instead, we discuss potential Project impacts on the Monacan Indian Nation in Section 4.10.1.2. Archeological sites that may be important to the Nation are mentioned in Section 4.10.3.3. The Nation's comments regarding Mountain Valley's cultural resources reports is not relevant to the EIS; nor does the EIS contain an "Ethnographic Analysis." The quote that: "The Monacan and Manahoac had no demonstrated linguistic affiliation with the Siouian language family, but did have political and trade associations with the Tutelo, Sapponi, and Occaneechi" is taken from Woodard et al., 2017, a source recommended by the Monacan Indian Nation in its July 1, 2019 letter to the FERC. Further, Section 4.10.2.1 of the EIS acknowledged that the Monacan occupied the piedmont region of Virginia at contact.

NAT-4	Monancan Nation	
NAT-4b	Letters submitted by both the Sappony Tribe and the Monacan Indian Nation have cited sources that contained evidence regarding these topics, and FERC and the Mountain Valley Pipeline contractors have had every opportunity to directly investigate these questions of affiliation. Jeffrey Hantman's 2018 book Monacan Millennium: A Collaborative Archaeology and History of a Virginia Indian People (p. 143-148), for example, concludes that beginning in the mid-18th century several colonial Monacan trading towns and settlements in the Roanoke River Valley were linked to others along the Occaneechi Path. There is extensive evidence linking the Tutelo-Saponi groups with the Monacan Confederacy: The Bureau of American Ethnology publication Indians of the South East clearly identifies the Saponi as a contraction of Monasukapanough, a Saponi town within the Monacan Confederacy located near present-day Charlottesville. The Southgate project crosses part of a larger Monacan confederacy, described in a variety of sources including on the tribe's website, in which the Monacan and related Siouan groups continued to operate after the arrival of European colonists. Monacan families were part of the Indian occupation at Fort Christanna, and once the Monacan tribe developed a permanent settlement in Amherst, some members of the Saponi, Occaneechi, Tutelo, and Tuscarora Indians joined with the Monacans there and become part of the contemporary Monacan tribe. This inter-related nature of these Eastern Siouan groups was noted in a 2011 Cultural Affiliation Statement for the New River Gorge National River and Gauley River National Recreation Area prepared by Robert Maslowski for the Northeast Region NAPGRA Program of the National Park Service. Maslowski's report states that "[both] Hantman (2001) and Houck and Maxham (1993) include the Tutelo, Saponi, and Occaneechi under the term Monacan," and characterizes the Eastern Siouan associations as extending west into West Virginia, though the report was written before the Monacan Indian Nation received federal recognition and therefore does not note that they are a relevant federally-recognized tribe. The 19th century persistence of the Monacan in western Virginia is described in some more recent academic work like Rainville 2018 (Invisible Founders: How Two Centuries of African American Families Transformed a Plantation into a College) and Hantman 2018 (p. 150-156). A footnote in the Draft EIS did acknowledge that the Monacan people "have political and trade associations with the Tutelo, Sapponi, and Occaneechi," but chooses to base its determination of cultural relatedness on the flawed conclusion that there was no Monacan linguistic relationship with the Virginia Siouan groups. The Tutelo Spirit Adoption Ceremony, by Frank G. Speck and George Herzog, similarly describes the relatedness of these groups in contrast to some of the Siouan groups further south. The book states that: "the eastern Siouans must be sharply separated into two groups, the Virginia Siouans, including the Manahoac, Monacan, Nahyssan, Saponi, Tutelo, Occaneechi, and Moneton, and the Carolina Siouans embracing all the rest. Even a superficial comparison of the Tutelo and Catawba vocabularies on one hand and the western dialects on the other is sufficient to show that Catawba stands clearly apart from all of them, and that Tutelo is nearer Dakota, Hidatsa, and others of the western languages than it is to Catawba" (page 1). While the Nation does not dispute that fragments of some Tutelo, Saponi, and Monacan groups migrated north or south in response to existential threats, it is not the case that the Catawba are the only federally-recognized tribe with a strong connection to the project area, or that the Catawba claim should be assumed to be stronger than the Monacan one.	See above NAT-4b comment response

NAT-4	Monancan Nation	
NAT-4b	The Ethnographic Analysis underplays the clan and familial associations between Tutelo, Saponi, and Monacan sites, language, and culture, and implies that all the descendants of these grounds are now incorporated within the Catawba or state-recognized North Carolina tribes. Eighteenth century tribal names, such as the Eno, Occaneechi, and Shakori tribes (in the Eno River drainage), the Sara Indians (on the Dan River), the Sissipahaw (on the Haw River), and the Occaneechi, Tutelo, and Saponi tribes (associated with the Gaston culture on the Roanoke River) are generally described in the Ethnographic Analysis as having been later incorporated into the Catawba Indian Nation. The Monacans do not challenge that the Catawba have interests in the pre-Contact cultural resources of this area, but are aware of their own relatedness to this area and perceives a minimization or exclusion of Monacan ancestral interests in the content of the cultural resources reports and the Draft EIS. The Monacan Indian Nation is aware that several families and groups of the Tutelo and Saponi people were incorporated into the Monacan Indian Nation, and these deficiencies in the record combine to erase important Monacan associations with this area.	See above NAT-4b comment response
NAT-4c	The EIS and the underlying cultural resources reports must be improved with greater research into these topics, reflecting the following widely-accepted characterizations: 1. The Monacan were linguistically and socio-politically Siouan and are related to the Sappony Tribe and other Siouan tribes along the North Carolina/Virginia border. 2. Siouan tribes in Virginia engaged in kin-based alliance systems and confederacies supported by a mutually-intelligible language. Tribal history and ceramic patterns suggest an intermarriage system in which the core tribes of central Virginia had a Monacan pattern of ceramic decoration and other site patterns, and the Roanoke Valley was a distinct but related group, with occasional appearance of Monacan-style ceramics suggestive of regular kin exchange, trade, and alliances. 3. Most Virginia Siouan tribe names other than Monacan and Mannahoac (e.g., Saponi, Tutero, Nahyssan, Occaneechi) are not referenced until 1650 or later. There is therefore considerable ambiguity regarding whether these tribes had a strongly separate pre-Contact identity; whether they were family or village names within the Monacan Confederacy pre-Contact; or whether they are post-Contact sub-groups that formed around migration or distinctions in trade practices. 4. During the 17th-18th centuries, Virginia tribes experienced colossal loss of native population and disruption of lifeways as a result of European colonialism. Several of the Virginia Siouan groups traveled west and south to remain on the frontier with minimal contact with settlers. There was considerable bifurcation and amalgamation of tribal groups as necessitated for survival. 5. Because of these factors, modern Virginia Siouan tribes (like many other tribes) are commonly made up of more than one historic tribe, have a variety of consultation interest areas, and have individuals within these tribes who understand themselves to have a descendancy from multiple Virginia Siouan groups. Detailed and accurate examinations of native history are essential, especially when assessing impacts of infrastructure projects to native peoples, especially for tribes that still experience a lack of acknowledgement or recognition from the federal government, and especially when projects propose to damage native sites.	Comments noted. Section 4.10.3.1 provides a short description of Cultural Context, which is intended only as a brief summary and introduction, to address these issues. The EIS acknowledges that the pipeline route would cross historic Monacan territory, and that the Nation has an interest in potential project impacts on cultural resources.

NAT-4	Monancan Nation	
	2. The Nation requests that their broader questions regarding the cultural resources, stated in July 2019, be acknowledged and addressed	
NAT-4d	In its July 2019 comments, the Nation provided evidence for this considerable body of scholarship describing the historical linkages between the Tutelo-Saponi and Monacan groups. The Nation made requests in July 2019 based on the need to correct inaccuracies in the cultural resources reports. These requests were not acknowledged or addressed, and the requests are also highly pertinent to addressing issues in the Draft EIS. The Nation again requests that: A) The cultural resources consultant address deficiencies in the Cultural Background and Ethnographic Analysis sections, specifically the way in which these reports mischaracterize Monacan history and treats information on native history as largely useful for determining tribal affiliation rather than incorporating it into the context of the broad swath of history impacted by the project; B) The consultants incorporate into their analysis, which currently relies too heavily on information written before 2000, a variety of sources and texts related to Monacan and Siouan pre- and post-Contact history; C) The consultants perform oral history interviews with local tribes, to illuminate the several centuries of native life and movements currently not covered by these reports and to rectify a lack of reference to native persistence in these areas after 1780; D) The Nation receive ongoing and active communication regarding planned archaeological testing on pre-Contact sites, especially those in Pittsylvania County; E) Survey reports assessing the eligibility of architecture along the pipeline include information typical for Phase II investigations, such as deed research, which is essential for determining the potential native affiliation or a site's potential eligibility under Criteria A or B; F) The subcontractor TRC develop a method to review the pipeline landscape (including the direct and indirect APE) for potential burial mounds, and provide greater detail on potential impact to a site called Sugar Loaf Mound (31RK141) near the project in North Carolina; and G) The Nation receive a call from TRC to discuss the material contained in this letter, so that the Nation can provide any clarification that may be required. Thus far, the Nation has received no contact from FERC or TRC regarding these other requests, and the Draft EIS does not reference most of these concerns. Moreover, the Nation has not been updated regarding the archaeological testing and further work except for one proposed site visit, which was planned by the project proponents on a site that had only been subject for testing for a few days, and which was selected because of ease of access rather than significance to tribes. Furthermore, the Nation has previously and repeatedly asked for more details on the environmental impact of this project, but has not received materials related to these issues. None of the other requests have been acknowledged or addressed. The Nation now reiterates these requests be addressed before FERC finalizes the Draft EIS.	In Section 4.10.1.2 we discuss correspondence from the Monacan Indian Nation, including the July 2019 letter. The Nation's comment about Mountain Valley's cultural resources reports is not relevant to the EIS. However, Mountain Valley has stated that its contractor reviewed the sources recommended by the Nation. The results of archaeological surveys are detailed in Section 4.10.3.3. Mountain Valley stated that it has provided the Monacan Nation with copies of all cultural resources investigations reports. Site 31RK141 (Sugar Loaf Mound) was not identified in the area of potential effect (APE), so it will not be affected by the Project.

NAT-4	Monancan Nation	
	3. The Monacan Indian Nation has environmental and socioeconomic concerns regarding the project.	
NAT-4e	The Nation has just over 2000 members, many of whom are located in proximity to the pipeline. The tribe's modern home on Bear Mountain is less than 70 miles away from the project area. Many tribal members are Virginia and North Carolina residents and taxpayers with concerns regarding the pipeline impacts, which tree clearing, impacts to animal species, risks to water quality from sediment discharge and other effluents from construction; and visual effects to a long area of most rural, natural terrain. The Nation is also concerned about the safety concerns for explosions or fires set off by the pipeline construction or occurring for the life of the project.	See response GEN-1 in appendix I.2. Impacts on water resources is discussed in Section 4.3 of the EIS; vegetation in 4.5, and wildlife in 4.6.
NAT-4f		See response SAFE-1 in appendix I.2.
NAT-4g	The Nation also must emphasize the poor track record of this project proponent on previous projects including the Mountain Valley Pipeline mainline, which has been beset by problems that include: • inadequate sediment control plans resulting in considerable sediment fines; • permanent damage to critical historic resources like the Appalachian Trail; and • causation of landslides that endanger residences in West Virginia.	See response GEN-6 in appendix I.2.
NAT-4h	Furthermore, explosions associated with LNG pipeline infrastructure in West Virginia (TransCanada's Leach Xpress Pipeline), Washington (Plymouth LGN storage facility) and Massachusetts (Columbia Gas Pipeline) illustrate the level of impact and harm these events can have. In the Columbia Gas example, one man lost his life, approximately 80 homes and buildings were destroyed, 8600 people were evacuated, and a state of emergency was declared.	See response SAFE-1 in appendix I.2.
NAT-4i	The Draft EIS for the Southgate project acknowledges that hazards to the project include seismicity, karst topography, landslides (exacerbated by the need for blasting to shallow bedrock in some areas), flooding, and erosion. The document also acknowledges that the project will cross two state level aquifers, both of which are suitable for drinking, and will cross near a variety of private wells, and states that the project poses risks to the water quality in these water sources.	See response GEN-1 in appendix I.2.

NAT-4	Monancan Nation	
NAT-4j	Finally, the Monacan hold trees to be culturally significant natural resources. As discussed in the Nation's February 2019 letter, trees have such significance to the Nation that they have made cutting trees on their tribal lands unconstitutional. The Nation has requested consultation on tree cutting plans before they are finalized but has so far not received any materials with specific commitments regarding the tree cleaning and restoration plans. Similarly, according to the Draft EIS the project will have an effect on five federally-protected species, the northern long-eared bat, Roanoke logperch, James spiny mussel, small whorled pogonia and smooth coneflower. Although FERC currently characterizes the adverse environmental impact as moderate and states that adjustments could reduce these impacts to less-than-significant levels, the	In Section 4.10 of the EIS we state the following: "Cultural resources are locations of human activity, occupation, or use. According to the FERC's Office of Energy Projects 'Guidelines for Reporting on Cultural Resources Investigations for National Gas Projects' (July 2017), 'cultural resources include any prehistoric or historic archaeological site, district, object, cultural feature, building or structure, cultural landscape, or traditional cultural property.' Although 'cultural resources' are not defined in 36 CFR 800, it is a 'term-of-art' in the field of historic preservation and archaeological research. Indian tribes believe that cultural resources could include natural resources, such as plants and animals of traditional importance to tribes, and topographic features and view sheds that may be sacred." Impacts on forest are discussed in section 4.5 of the EIS. Forest and vegetation clearing plans are discussed in section 2.4.1.2 of the EIS. Threatened and endangered species are discussed in Section 4.7 of the EIS.
NAT-4k	Nation points out that given the previous track record of EQT, it is equally or more likely that the adverse impacts become significantly more substantial than the Draft EIS predicts. For this reason, the Nation requests that FERC develop a plan to assess and review these impacts and establish periodic monitoring to determine whether impact levels and appropriate mitigation approaches have changed. * * * The Nation looks forward to assisting FERC on ongoing cultural resources identification and mitigation associated with the Southgate project as the consultation process moves forward. Thank you for consideration of our comments. Best regards, Marion F. Werkheiser Marion Werkheiser Attorney at Law	See response GEN-6 in appendix I.2.

NAT-7 Monacan Indian Nation

CULTURAL HERITAGE PARTNERS
LAW • POLICY • STRATEGY

November 11, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission (FERC)
888 First Street, N.E.
Washington, D.C. 20426

Re: Monacan Indian Nation's Renewed Request for Information | Southgate extension of the Mountain Valley Pipeline Associated with Docket Nos. CP19-14-000

Dear Secretary Bose:

NAT-7a	As you know, I represent the Monacan Indian Nation in the permitting process for the MVP Southgate project overseen by the Federal Energy Regulatory Commission (FERC). The Nation has a variety of concerns regarding project, its impacts on historic properties significant to the Nation, the Project's incomplete cultural resources reports, and the Draft Environmental Impact Statement (DEIS). Since the Nation submitted its privileged comments in July regarding the cultural resources reports, it has received no response to its concerns or its requests for additional information. As a reminder, in those comments the Nation asked that: A) The cultural resources consultant address deficiencies in the Cultural Background and Ethnographic Analysis sections, specifically the way in which these reports mischaracterize Monacan history and treats information on native history as largely useful for determining tribal affiliation rather than incorporating it into the context of the broad swath of history impacted by the project;	The EIS discusses historic properties important to the Monacan Indian Nation. It acknowledges that cultural resources investigations for the Project are currently incomplete, and makes recommendations to finish the process of complying with Section 106 of the NHPA prior to the Commission allowing construction to begin. In Section 4.10.1.2 of the EIS we discuss correspondence from the Monacan Indian Nation, including the July 2019 letter.
NAT-7b		The Nation's comment about Mountain Valley's cultural resources reports is not relevant to the EIS.
NAT-7c	B) The consultants incorporate into their analysis, which currently relies too heavily on information written before 2000, a variety of sources and texts related to Monacan and Siouan pre- and post-Contact history;	Mountain Valley has stated that its contractor reviewed the sources recommended by the Nation.
NAT-7d	C) The consultants conduct oral history interviews with local tribes, to illuminate the several centuries of native life and movements currently not covered by existing cultural resources reports and to rectify a lack of reference to native persistence in these areas after 1780;	We would not require this information.
NAT-7e	D) The Nation receive ongoing and active communication regarding planned archaeological testing on pre-Contact sites, especially those in Pittsylvania County;	Mountain Valley stated that it has provided the Monacan Indian Nation with copies of all cultural resources investigations reports.

NAT-7	Monacan Indian Nation	
NAT-7f	E) Survey reports assessing the eligibility of architecture along the pipeline include information typical for Phase II investigations, such as deed research, which is essential for determining the potential native affiliation or a site's potential eligibility under Criteria A or B;	The State Historic Preservation Offices (SHPO) of Virginia and North Carolina have accepted Mountain Valley's historic architectural survey reports without requiring deed research.
NAT-7g	F) The subcontractor TRC Solutions, Inc. (TRC) develop a method to review the pipeline landscape (including the direct and indirect APE) for potential burial mounds, and provide greater detail on potential impact to a site called Sugar Loaf Mound (31RK141) near the project in North Carolina; and	Site 31RK141 (Sugar Loaf Mound) was not identified in the area of potential effect (APE), so it will not be affected by the Project.
NAT-7h	G) TRC should contact the Nation to discuss the material contained in this letter, so that the Nation can provide any clarification that TRC may require.	Mountain Valley indicated that it has contacted the Monacan Indian Nation on numerous occasions (see table 4.10-3 in the EIS).
NAT-7i	Moreover, in July 2019, the Nation received the DEIS. The vast majority of the errors identified by the Nation in the cultural resources reports were compounded in the DEIS. The Nation submitted comments on the Draft EIS on September 16, 2019 and has still not heard anything from NextEra or FERC regarding their concerns since that time.	Our responses to comments from the Monacan Indian Nation on the Southgate draft EIS are contained in the final EIS.
NAT-7j	One of the most concerning elements coming out of the cultural resources reports and the DEIS is the mischaracterization of Monacan ancestry and of Eastern Siouan history generally. The Nation would like to affirm the following points, supported by scholarship, which are critical to get right in any analysis of effects for the Southgate extension of the Mountain Valley Pipeline: 1. The Monacan were linguistically and socio-politically Siouan and are related to the Sappony Tribe and other Siouan tribes along the North Carolina/Virginia border. 2. Siouan tribes in Virginia engaged in kin-based alliance systems and confederacies supported by a mutually-intelligible language. Tribal history and ceramic patterns suggest an intermarriage system in which the core tribes of central Virginia had a Monacan pattern of ceramic decoration and other site patterns, and the Roanoke Valley was a distinct but related group, with occasional appearance of Monacan-style ceramics suggestive of regular kin exchange, trade, and alliances. 3. Most Virginia Siouan tribe names other than Monacan and Mannahoac (*e.g.*, Saponi, Tutero, Nahyssan, Occaneechi) are not referenced until 1650 or later. Therefore, there is considerable ambiguity regarding whether these tribes had a strongly separate pre-Contact identity; whether they were family or village names within the Monacan Confederacy pre-Contact; or whether they are post-Contact sub-groups that formed around migration or distinctions in trade practices. 4. During the 17th-18th centuries, Virginia tribes experienced colossal loss of native population and disruption of lifeways as a result of European colonialism. Several of the Virginia Siouan groups traveled west and south to remain on the frontier with minimal contact with settlers. There was considerable bifurcation and amalgamation of tribal groups as necessitated for survival. 5. Because of these factors, modern Virginia Siouan tribes (like many other tribes) are commonly made up of more than one historic tribe, have a variety of consultation interest areas, and have individuals within these tribes who understand themselves to have a descendancy from multiple Virginia Siouan groups.	See response NAT-4d.

NAT-7	Monacan Indian Nation	
NAT-7k	It is disappointing to see the tribe's history misrepresented in the DEIS for this project, and to have received no response from FERC to the tribe's earlier concerns. In our comments on the DEIS, the Nation reiterated the requests associated with the cultural resources reports, and also pointed out the potential adverse effects to historic and cultural properties associated with contemporary members of the Nation located along the proposed project route. The Nation also underlined the importance of forestry resources for the tribe, and asked to see tree cutting plans for the Southgate project for at least the third time. The Nation additionally requested in September that FERC develop a plan to assess and review environmental, historical, and social impacts and establish periodic monitoring to determine whether impact levels and appropriate mitigation approaches have changed. These failures in the consultation process undermine not only FERC's duty to consult with tribes in a meaningful way, but also to engage in government-to-government consultation. As far as the Nation is aware, destructive archaeological data recovery continues on sites associated with Monacan ancestors without Monacan or other tribal involvement. Eligibility assessments for historic architecture are being made by cultural resources consultants without research into past owners, which is required under Virginia survey guidelines and might help identify properties with native associations or other historical importance. Decisions regarding tree clearing and mitigation are likely being made without Monacan or tribal involvement. Monacan tribal history is being mischaracterized based on poor scholarship, despite repeated attempts by the tribe to provide correct information. For all these reasons, the Nation asks FERC to acknowledge these communications and these requests, and to provide a meaningful response to the Nation regarding these requests and the broader context of the September and July communications. Furthermore, in order to assist the Nation's objectives in returning their cultural patrimony to the tribe, we ask that landowners associated with any site likely to have Monacan associations be asked to sign agreements that would return these artifacts and cultural remains to the Nation at the conclusion of the required cultural resources investigations. Sincerely, Marion Werkheiser Attorney at Law	The Cultural Context information is intended to be a brief section, but it does not misrepresent the Tribe's history. Mountain Valley stated that it has provided the Monacan Indian Nation with copies of all cultural resources investigations reports. Impacts on forest are described in Section 4.5 of the EIS. The forest and vegetation clearing process is described in section 2.4.1.2 of the EIS.
NAT-7l		Impacts on cultural resources and mitigation measures for affected historic properties are detailed in Section 4.10 of the EIS.
NAT-7m		There are no failures in our consultations process. As previously noted, Mountain Valley stated that it has provided the Monacan Indian Nation with copies of all cultural resources investigations reports, including treatment plans that recommended archaeological data recovery. The Virginia SHPO accepted Mountain Valley's cultural resources investigations reports. Our scholarship on Monacan history is not poor, as we utilized sources recommended by the Nation. Vegetation is described in Section 4.5 of the EIS. Our draft Programmatic Agreement for the Southgate Project, provided to the Monacan Nation on January 8, 2020, includes a stipulation that Mountain Valley request that landowners donate artifacts to repositories found acceptable by the signatories.

NAT-8 Sappony Tribe

CULTURAL HERITAGE PARTNERS
LAW • POLICY • STRATEGY

December 12, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission (FERC)
888 First Street, N.E.
Washington, D.C. 20426

Re: Response of the Sappony Tribe to the DEIS for the Southgate Extension of the Mountain Valley Pipeline Associated with Docket No. CP19-14-000

Dear Ms. Bose:

As you know, I represent the Sappony Tribe in the permitting process for the MVP Southgate project overseen by the Federal Energy Regulatory Commission ("FERC"). The Tribe has a variety of concerns regarding project, its impacts on historic properties significant to the Tribe, the Project's incomplete cultural resources reports, and the Draft Environmental Impact Statement (DEIS). Since the Tribe submitted its privileged comments in July regarding the cultural resources reports, the Tribe has received no response to many of its concerns or its requests for additional information. As a reminder, in those comments the Tribe asked that:

A) The cultural resources consultant address deficiencies in the Cultural Background and Ethnographic Analysis sections, specifically the way in which these reports mischaracterize Sappony, Monacan, and Siouan history and treats information on native history as largely useful for determining tribal affiliation rather than incorporating it into the context of the broad swath of history impacted by the project;
B) The consultants incorporate into their analysis, which currently relies too heavily on information written before 2000, a variety of sources and texts related to Sappony, Tutelo, Monacan, and Siouan pre- and post-Contact history;
C) The consultants conduct oral history interviews with local tribes, to illuminate the several centuries of native life and movements currently not covered by existing cultural resources reports and to rectify a lack of reference to native persistence in these areas after 1780;
D) The DEIS incorporate information provided by the Tribe in their September 16, 2019 letter, in order to recognize Sappony relatedness to the Cheraw Tribe, which had several major historical towns in the project area of MVP Southgate, and correct currently inaccurate information regarding Cheraw movements after the 18th century;
E) The Tribe receive ongoing and active communication regarding planned archaeological testing on pre-Contact sites;

NAT-8a	Impacts on cultural resources and mitigation measures for affected historic properties are detailed in Section 4.10 of the EIS. We acknowledge that cultural resources investigations for the Project are currently incomplete, and we make a recommendation to finish the process of complying with Section 106 of the NHPA prior to the Commission allowing construction to begin. In Section 4.10.1.2 of the EIS we discuss correspondence from the Sappony Tribe, including the July 2019 letter.
NAT-8b	The Tribe's comment about Mountain Valleys' cultural resources reports is not relevant to the EIS. Section 4.10.3.1 of our EIS discusses historical relationships between the Sappony and Monacan.
NAT-8c	The Tribe's comment about Mountain Valleys' cultural resources reports is not relevant to the EIS.
NAT-8d	We would not require this information.
NAT-8e	Relations between the Sappony and Saura are briefly mentioned in Section 4.10.3.1 of our EIS.
NAT-8f	Mountain Valley indicated that it provided the Tribe with copies of all cultural resources investigations reports.

NAT-8	Sappony Tribe	
NAT-8g	F) Survey reports assessing the eligibility of architecture along the pipeline include information typical for Phase II investigations, such as deed research, which is essential for determining the potential native affiliation or a site's potential eligibility under Criteria A or B; G) TRC should contact the Tribe to discuss the material contained in this letter, so that the Tribe can provide any clarification that TRC may require.	The SHPOs of Virginia and North Carolina have accepted Mountain Valley's historic architectural survey reports without requiring deed research.
NAT-8h		Mountain Valley indicated that it has contacted the Tribe Nation on numerous occasions (see table 4.10-3 in the EIS).
NAT-8i	Moreover, in July 2019, the Tribe received the DEIS. The vast majority of the errors identified by the Tribe in the cultural resources reports were compounded in the DEIS. The Tribe submitted comments on the Draft EIS on September 16, 2019 and has still not heard anything from NextEra or FERC regarding their concerns. One of the most concerning elements coming out of the cultural resources reports and the DEIS is the mischaracterization of Eastern Siouan tribal history. The Sappony would like to affirm the following points, supported by scholarship, which are critical to get right in any analysis of effects for the Southgate extension of the Mountain Valley Pipeline:	Section 4.10.3.1 provides brief information on Eastern Siouan tribal history. The comments of the Sappony Nation on the DEIS are addressed in this FEIS.
NAT-8j	1. The Monacans were linguistically and socio-politically Siouan and are related to the Sappony Tribe and other Siouan tribes along the North Carolina/Virginia border. 2. Siouan tribes in Virginia engaged in kin-based alliance systems and confederacies supported by a mutually-intelligible language. Tribal history and ceramic patterns suggest an intermarriage system in which the core tribes of central Virginia had a Monacan pattern of ceramic decoration and other site patterns, and the Roanoke Valley was a distinct but related group, with occasional appearance of Monacan-style ceramics suggestive of regular kin exchange, trade, and alliances. 3. Most Virginia Siouan tribe names other than Monacan and Mannahoac (*e.g.,* Saponi, Tutero, Nahyssan, Occaneechi) are not referenced until 1650 or later. Therefore, there is considerable ambiguity regarding whether these tribes had a strongly separate pre-Contact identity; whether they were family or village names within the Monacan Confederacy pre-Contact; or whether they are post-Contact sub-groups that formed around migration or distinctions in trade practices. 4. During the 17th-18th centuries, Virginia tribes experienced colossal loss of native population and disruption of lifeways as a result of European colonialism. Several of the Virginia Siouan groups traveled west and south to remain on the frontier with minimal contact with settlers. There was considerable bifurcation and amalgamation of tribal groups as necessitated for survival. 5. Because of these factors, modern Virginia Siouan tribes (like many other tribes) are commonly made up of more than one historic tribe, have a variety of consultation interest areas, and have individuals within these tribes who understand themselves to have a descendancy from multiple Virginia Siouan groups. For example, several Sappony families know themselves to primarily be of Cheraw descent and have both documents and family oral history related to their ancestors joining with the Sappony Tribe after the Cheraw scattered.	Comments noted. See response NAT-2a.

NAT-8	Sappony Tribe	
NAT-8k	In its September comments on the DEIS, the Tribe reiterated the requests associated with the cultural resources reports, and the Tribe pointed out the potential adverse effects to historic and cultural properties associated with contemporary members of the Tribe located along the proposed project route. The Tribe also underlined the importance of forestry resources for the tribe, and asked to see tree cutting plans for the Southgate project for at least the third time they have done so. The Tribe additionally requested that FERC develop a plan to assess and review environmental, historical, and social impacts and establish periodic monitoring to determine whether impact levels and appropriate mitigation approaches have changed.	Impacts on cultural resources and mitigation measures for affected historic properties are detailed in Section 4.10 of the EIS. Vegetation is described in Section 4.5 of the EIS.
NAT-8l	Failures in the consultation process undermine not only FERC's duty to consult with tribes in a meaningful way, but also to engage in government-to-government consultation. As far as the Tribe is aware, destructive archaeological testing has continued on sites associated with Sappony ancestors without Sappony or other tribal involvement. Eligibility assessments for historic architecture are being made by cultural resources consultants without research into past owners, in violation of Virginia survey guidelines. Decisions regarding tree clearing and mitigation are likely being made without Sappony or tribal involvement. Sappony tribal history has been mischaracterized based on poor scholarship, despite repeated attempts by the Tribe to provide correct information. For all these reasons, the Tribe asks FERC to acknowledge these communications and these requests, and to provide a response to the Tribe regarding these requests and the broader context of the September and July communications.	There have been no failures in the FERC's consultation process. As documented in Section 4.10.1.2 of the EIS, the FERC staff consulted on a government-to-government basis with Indian tribes, in accordance with Part 800.2(c)(3). However, the Sappony Tribe does not qualify as an "Indian tribe" defined by Part 800.16(m). Mountain Valley indicated that it provided the Sappony Tribe with copies of all cultural resources investigations reports, including a treatment plan that recommended archaeological data recovery. The Virginia SHPO accepted Mountain Valley cultural resources investigations reports. Our scholarship on Tribal history is not poor; however, the Cultural Context in Section 4.10.3.1 of the EIS is very brief. Vegetation is described in Section 4.5 of the EIS. Our responses to the Sappony Tribe comments on the draft EIS can be found in this final EIS.
NAT-8m	In October, the Tribe received a series of addendum reports and a Treatment Plan for North Carolina site 31RK259. The Tribe notes that revised cultural background reports include acknowledgements of greater aspects of Sappony history, critically their relatedness to Cheraw groups and much greater detail on Sappony post-Contact history as developed through sources communicated by the Tribe in previous letters. The Tribe appreciates this correction of part of the historical record, and asks that this more robust assessment of post-Contact native history be incorporated into the Final EIS. Site 31RK269 is of particular concern to the Tribe because of its age and its proximity near Eden, where the Cheraw and other related tribes lived in the still poorly understood post-Contact period. Given that 1,350 square meters of the site are located within the project permanent easement, with an unknown amount of that area being impacted through construction, the project proposes to conduct data recovery at the site. Because of the time period of the site, analysis of Cheraw lifeways and recovered artifacts would benefit from historical ethnography based on 17th century primary sources. The Tribe therefore also requests that a list of primary source information regarding native communities in this region be compiled and reviewed as part of the background research for this excavation to enable a richer analysis of its results. **The Tribe requests a meeting to discuss proposed Treatment Plan methods and research.** Best regards, Marion F. Werkheiser Marion Werkheiser Attorney At Law Counsel for the Sappony Tribe	Comments noted. However, we do not intend to expand the Cultural Context in the EIS. The Treatment Plan for site 31RK259 was accepted by the North Carolina SHPO on November 18, 2019. Since the Sappony Tribe is an intervener, FERC staff is constrained by ex-parte rules. Typically, staff does not meet with Native American organizations that are not federally-recognized Indian tribes.

Appendix I.3 - Southgate Project Response to Comments Side-by-Side Table				
MVP Southgate Project Comments on the Draft Environmental Impact Statement - September 13, 2019				
Section	**Page**	**Draft Environment Impact Statement (DEIS) Language**	**Mountain Valley DEIS Comment Response to FERC**	**FERC Response**
ES	ES-4	"As described in the Project's Water Resources Identification and Testing Plan, Mountain Valley would offer pre-construction and post-construction water quality testing for water supply wells located within 150 feet of Project workspaces. We are recommending that prior to construction Mountain Valley provide additional information on private water wells or springs, including the well's or springs' status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts on the private water wells or springs."	Mountain Valley would like to clarify that as stated in the Project's Water Resources Identification and Testing Plan, Mountain Valley will conduct pre-construction testing of all private wells located within 150 feet construction workspace. The Project will conduct post- construction tests if requested by a landowner who had a pre-construction test.	**CO-6A** - Mountain Valley confirmed in their December 16, 2019 response that they would offer pre- and post-construction quality and yield testing for all water wells and water supply springs located within 150 feet of construction workspaces. If a landowner does not allow the Project to conduct pre-testing then post-testing will not occur as in such case there would no baseline data by which to measure post-construction water quality. Mountain Valley would offer this testing to the landowner in accordance with the procedures outlined in Mountain Valley's Water Resources Identification and Testing Plan
1.0	1-1	"Mountain Valley is a joint venture between affiliates of EQT Midstream Partners, LP; NextEra Energy US Gas Assets, LLC; WGL Midstream, Inc.; RGC Midstream, LLC; and Con Edison Gas Midstream, LLC. Southgate Project facilities would be operated by an affiliate of the EQT Corporation."	Mountain Valley requests an update to the footnote on page 1-1: "MVP Southgate is a joint venture among affiliates of EQM Midstream Partners, LP; NextEra Energy Inc.; AltaGas Ltd. and RGC Resources, Inc. MVP Southgate Project facilities would be operated by an affiliate of EQM Midstream Partners, LP.	**CO-6b -** Comment noted. The EIS has been updated with this information.
1.4	1-13	Table 1.4-1 Major Environmental Permits, Licenses, Approvals, and Consultations Applicable to the Southgate Project; State of North Carolina NCDEQ-Division of Water Resources	Application was denied on procedural grounds until a preferred route was identified by the FERC, at which time Mountain Valley was instructed it could reapply for the Joint Permit Application under Section 401 of the Clean Water Act; Isolated/non-404 wetland and water permit.	**CO-6c-** Comment noted. Table 1.4-1 has been updated.
2.1.1	2-3	"The pipeline has been designed to transport 375 million MMcf/d of natural gas. The maximum allowable operating pressure (MAOP) for the new pipeline would be about 1,440 pounds per square inch gauge (psig). For 39 miles (52.5 percent) of the route, the Project would be collocated with existing utility corridors and rights-of-way (see table 2.1-2)."	Mountain Valley would like to clarify that the H-605 pipeline's MAOP would be 1,480 psig, while the H-650 pipeline's MAOP would be 1,440 psig.	**CO-6d** – Comment noted. The EIS has been updated with this information.
2.4.1.6	2-18	"Mountain Valley has indicated that after for hydrostatic testing would be obtained from two municipal water sources."	Mountain Valley would like to clarify that surface water sources such as the Dan River are now being proposed as primary hydrostatic test water sources. Mountain Valley intends to file updates to Table 2.3-7 "Proposed Hydrostatic Test Water Use	**CO-6e** – Section 2.4.1.6, 4.3.2.6, and 4.6.5.3 of the EIS have been updated with information regarding water sources for the Project and surface water withdrawals.

			Summary," in a supplemental filing to be filed with FERC in October 2019.	
2.4.1.3	2-16	"The trench would be dug at least 12 inches wider than the diameter of the pipeline and excavated to a depth of 5.5 feet to 9 feet in order to provide sufficient cover over the pipeline in accordance with DOT standards in 49 CFR 192.327 (see table 2.4-1). There would generally be36 inches of cover over the top of the pipeline in deep soils and 18 inches of cover in areas of consolidated rock. At waterbody crossings, the pipe would be more deeply buried; with a minimum of 4 feet of cover at navigable waterways and a minimum of 2 feet of cover at waterbodies with consolidated rock."	Mountain Valley would like to clarify that the trench would provide sufficient cover over the pipeline in accordance with United States Department of Transportation standards in 49 CFR 192.327, as noted in Table 2.4-1 of the DEIS. The depths provided in the DEIS may be specific to topography, soil composition, and pipe diameter and may not be true across the entire project alignment.	**CO-6f** - Comment noted. The EIS has been updated with this information.
4.1.4.2	4-7	Table 4.1-1 Surficial Geology Crossed by the Southgate Project	Mountain Valley requests that Table 4.1-1 in the DEIS be replaced with Table 6.3 that was included in the report "Earthquake and Active Fault Hazard Analyses" filed with RR6, Appendix 6F on November 6, 2018. Mountain Valley has determined this table to be a more accurate summary of faults and zones located in the relative Project vicinity.	**CO-6g** – Comment noted. Table 4.1-1 has been updated.
4.3.2.4, 4.6	4-38, 4-81	"All waterbodies crossed by the Project are designated warm water fisheries. The FERC requires all in-stream work, except the installation and removal of equipment bridges, be completed in warm water fisheries between June 1 and November 30 unless expressly permitted or further restricted by an appropriate federal or state agency in writing. In response to a FERC environmental information request regarding adherence to in water construction windows, Mountain Valley responded that based on correspondence with Virginia and North Carolina state agencies no construction windows were anticipated except possibly for mussels. However, Mountain Valley has not provided any written correspondence from the VADGIF and NCWRC regarding any timing restrictions on waterbodies containing warm water fisheries. Though aquatic surveys have determined that protected fish and mussel species are not present in streams in Virginia, consultation with the	Mountain Valley would like to clarify that no time of year restrictions have been provided from the United States Fish and Wildlife Service (USFWS). Mountain Valley intends to adhere to the Virginia Department of Game and Inland Fisheries (VDGIF) warm water fishery restrictions (April 15-July 15). Based on consultation with North Carolina Wildlife Resource Commission, no timing restrictions are required for warm water fisheries crossed in North Carolina. Mountain Valley will request an alternative measure from FERC's Procedures (Section V.B.1.b.) as part of the supplemental filing to be filed with FERC in October 2019. Agency correspondence from VDGIF and NCWRC are included in Attachment 1a.	**CO-6h** - Based on recommendations from VADGIF, Mountain Valley has committed to adhere to the Virginia warm water fisheries construction window (i.e., no in-water construction between April 15 and July 15); based on the results of Mountain Valley's aquatic surveys in the waterbodies of North Carolina, which did not document any state-listed aquatic species, NCWRC has stated it would not require any in-water construction date restrictions.

		VADGIF is currently ongoing. Consultation with NCWRC and aquatic surveys in North Carolina are still pending, including streams that are proposed to be crossed via conventional bore or HDD methods. Additional details of specific fisheries and agency consultation are addressed in section 4.7. Absent any waivers from or further restrictions on in-waterworks timing from VADGIF and NCWRC, Mountain Valley is required to follow the warm water fisheries timing window in its Procedures (June 1 through November 30)."		
4.5.4.1	4.63	"Once construction is complete, Mountain Valley would monitor and control occurrences of noxious and invasive weed species throughout restoration and for 2 years following restoration in locations along the route where infestations were not identified prior to construction."	Mountain Valley would like to clarify that it will monitor and control occurrences of noxious and invasive weed species until FERC deems restoration is complete. Mountain Valley will submit a revised Exotic and Invasive Species Control Plan to be filed with FERC in October 2019.	**CO-6i** – Section 4.5.4.1 has been updated to note that Mountain Valley would monitor the right-of-way for 2 years post-construction. Mountain Valley's updated EIPSCP was filed in October 2019.
4.6.1.1	4-70	"To increase the speed and success of restoration of wildlife habitat, Mountain Valley would implement right-of-way restoration measures contained in FERC's Plan and Mountain Valley's Procedures, E&SC Plan, and solicit guidance from the USDA NRCS, VADCR, and NCWRC to restore the pipeline corridor using native seed mixes specific to the Project locations."	Mountain Valley will continue to consult with agencies to develop and refine seed mixes that contain as many native and naturalized species as possible to ensure the right-of-way is stabilized and restored.	**CO-6j** – Comment noted. Section 4.6.1 notes that Mountain Valley will continue to consult with agencies regarding seed mixes.

4.6.3.2	4-75	"The FWS recommended that Mountain Valley avoid clearing from March 15 - August 15 in Virginia and from April 1 - August 31 in North Carolina."	As stated in RR3, the Southgate Project intends to clear trees outside of peak Migratory Bird Species of Concern (MBSC) breeding season. Should a significant delay to the start of construction occur, then incidental take may occur; however, as explained by the U.S. Department of the Interior in M- 37050, issued December 22, 2017, the Migratory Bird Treaty Act (MBTA) does not prohibit incidental take. If this situation occurs, the Project will consult with USFWS and NCWRC to determine appropriate voluntary conservation measures to minimize impacts to the greatest extent practicable.	**CO-6k** - Section 4.6.3.2 of the EIS provides discussion on migratory birds.

			While the nesting season is generally considered April 1 to August 31, the majority (eight of 12) of Project MBSC do not begin nesting until May.	
4.7.1	4-88	Table 4.7-1 Federal Endangered, Threatened, or Other Special Status Species Known to Occur or Potentially Occurring in the Southgate Project Area	Table 4.7-1 omits Schweinitz's sunflower, a federally listed endangered species endemic to North Carolina. This species was added on November 20, 2018 to the renewed species list from the USFWS. Following conversation with the USFWS Raleigh office, no surveys are required for this species. Agency correspondence of this communication on December 12, 2018 is included in Attachment 1a.	**CO-6l** - Footnote a/ in table 4.7-1 notes that Schweinitz's sunflower is one of the nine species listed by federal and state agencies as potentially being present in the Project counties; however, the species are not known to occur in the portions of the counties that would be crossed by the Project and they are therefore not listed in the table
4.7.5.1	4-92	"Correspondence with the FWS indicated small whorled pogonia might be present within the Project area in Rockingham and Alamance Counties and recommended that Mountain Valley conduct surveys for the species (FWS, 2018c, 2018d). If small whorled pogonia occurs in the Project right-of-way, it could be vulnerable to removal during clearing and grading, or trampling and crushing by foot traffic or movement of heavy machinery."	The DEIS indicates that small whorled pogonia is vulnerable to sedimentation and run-off in the vicinity of the right-of-way. Mountain Valley would like to clarify that this is an upland species that is not likely to be impacted by run-off.	**CO-6m** – As noted in section 4.7.5.1, clearing and grading in upland areas could potentially cause sedimentation and run-off impacts to upland plants.
4.7.5.1	4-93	"Mountain Valley conducted field surveys for small whorled pogonia in 2018, but surveys were conducted outside of the optimal survey window for the plant."	Mountain Valley would like to clarify that the small whorled pogonia surveys took place in 2018 from July 21-27, August 23, August 28-31, and September 4-6. Surveys during 2019 occurred on June 17-22 and August 6, 8, 9, 12, 14 and 17. Additional surveys are anticipated during September 2019. The optimal survey window for small whorled pogonia is mid-May to early July; however, habitat surveys can be performed outside of this survey window. No species have been identified to date.	**Co-6n** - Comment noted. Clarification regarding the dates and locations that surveys were conducted in 2018 and 2019 and are planned for 2020 has been included in the EIS.
4.7.5.1	4-93	"Right-of-way clearing could also adversely affect smooth coneflower habitat by altering light exposure or hydrology or by increasing sedimentation and runoff in the vicinity of the right-of-way."	Mountain Valley would like to clarify that the smooth coneflower actually prefers open woods, roadsides, clear-cuts, and utility rights-of-ways, etc. Because of this, clearing is likely to not to adversely affect potential habitat for smooth coneflower.	**CO-6o** - As noted in section 4.7.5.1, clearing and grading in the habitats preferred by the smooth coneflower could potentially cause sedimentation and run-off impacts.
4.7.5.2	4-93	"Mountain Valley conducted field surveys for smooth coneflower and its habitat in 2018; however, Mountain Valley was not able to survey all areas with potentially suitable habitat due to a lack of land access. Therefore, Mountain Valley	Mountain Valley would like to clarify that surveys for smooth coneflower are being conducted throughout the summer and early fall months. Smooth coneflower surveys took place in 2018 from July 21-27, August 23, August 28-31, and September	**CO-6p** - See response CO-6p -

		plans to complete surveys for smooth coneflower in June of 2019."	4-6. Surveys during 2019 occurred to date on June 17-22 and August 6, 8, 9, 12, 14 and 17. Additional surveys are anticipated during September 2019. The optimal survey window for smooth coneflower is late May to October. No species have been identified to date.	
4.7.7.4	4-97	"Three state-listed mussel species, in addition to the five federally listed species discussed in section 4.7.4, potentially occur in the Project area."	The statement on Page 4-97 (Section 4.7.7.4) of the DEIS that five federally listed mussel species are discussed in section 4.7.4 is incorrect. Section 4.7.4 discusses four mussel species of which only one is federally listed. James spinymussel (*Pleurobema collina*) is federally Endangered, the Green Floater (*Lasmigona subviridis*) and Yellow Lampmussel (Lampsilis cariosa) are federal species of concern, and the Atlantic Pigtoe (Fusconaia masoni) is proposed for listing as Threatened. "Species of concern" is an informal term and does not signify federal listing, and species proposed for listing cannot be defined as "listed" until the determination process is complete.	**CO-6q -** Comment noted. Section 4.7.7.4 in the FEIS has been revised.
4.7.7.4	4-97	"Mountain Valley conducted surveys in Rockingham and Alamance Counties for crayfish in 2019 in conjunction with its mussel surveys but has not filed the results of the surveys to date."	The DEIS states that Mountain Valley conducted surveys in Rockingham and Alamance Counties for crayfish in 2019 in conjunction with its mussel surveys but has not filed the results of the surveys to date. Mountain Valley would like to clarify that this sentence implies that crayfish surveys were conducted for both species of crayfish; however, only Carolina Ladle crayfish surveys were completed in conjunction with mussel surveys.	**CO-6r -** Comment noted. Section 4.7.7.4 in the EIS has been revised.
4.13.2.9	4-629	Climate Change	See Attachment 1b	**CO-6s -** As described in section 4.11.1.2, our use of carbon dioxide equivalents (CO2e) is consistent with the methods for characterizing methane in greenhouse gas estimates, allowing a common standard for comparison across projects.
5.1.3	5-4	"The river crossing would take 3 to 7 days to complete"	Mountain Valley would like to clarify, as stated, in its Environmental Information Request Response dated February 13, 2019, the crossing of the Sandy River could take approximately 5- 10 days. This timeframe is approximate and is dependent on field conditions, weather, and access.	**CO-6t** – Comment noted. Sections 5.1.3 and 4.8.4.1 have been updated in the EIS

CO-7	Blue Ridge Environmental Defense League

the information to create the map in **Attachment 1** and several other maps illustrating the presence of former uranium mining leases in Pittsylvania County extending from the area northeast of the massive uranium deposit at Coles Hill in Chatham down to the southwestern corner of Pittsylvania County

FROM: Ann Rogers, Blue Ridge Environmental Defense League (BREDL)

RE: OEP/DG2E/Gas 3
Mountain Valley Pipeline, LLC
Southgate Project
Docket No. CP19-14-000

SUBJECT: Failure of Southgate Draft Environmental Impact Statement to document the Southgate pipeline's co-location with multiple uranium mining leases historically held by Marline Uranium Corporation in the uranium-rich Chatham fault zone

INTRODUCTION

The Draft Environmental Impact Statement (DEIS) for the Southgate pipeline states in Section 4.1.4.8 (pages 4-12 and 4-13), "The closest economically viable uranium deposit to the Project is at Coles Hill in Pittsylvania County, Virginia, 3.5 miles north of the Lambert Compressor Station (Coles Hill, LLC). This deposit is exposed locally within Coles Hill and proceeds to dip and extend underground (RTII, 2012). No encounters with the Coles Hill deposit are anticipated as a result of Project-required excavation due to the deposit depth and distance from the Project. . . . Concentrations of uranium in sediment, soils, shallow bedrock, and groundwater near the Project workspace in Pittsylvania County are comparable to concentrations in environmental media in the conterminous United States. . . . Significant impacts on human health and the environment are not anticipated during construction and operation of the project."

CO-7a

This assessment offered by the DEIS fails to consider dozens of uranium mining leases that were held by Marline Uranium Corporation in the area in Pittsylvania County through which the Southgate pipeline has been routed.

Below we: (1) discuss the documentation of the Marline uranium mining leases conducted by Piedmont Residents in Defense of the Environment (PRIDE) in 2010 and 2011, (2) offer mapping to illustrate PRIDE's findings, and (3) offer additional evidence of the presence of economically viable uranium ore deposits that coincide with the geographic area now planned for construction of the Southgate pipeline.

The discussion of uranium in Section 4.1.4.8 has been updated.

HISTORIC MARLINE LEASES COINCIDE WITH SOUTHGATE PIPELINE CORRIDOR

Research conducted by BREDL's chapter, PRIDE in 2010-11

CO-7b

During 2010-11, members of PRIDE conducted research at the Pittsylvania County (VA) Real Estate Office to obtain documentation of leases held by Marline Uranium Corporation to conduct uranium mining in Virginia. Their research generated a database containing over 600 records of these historic Marline leases. PRIDE's research was shared with Piedmont Environmental Council in 2011, who used

the information to create the map in **Attachment 1** and several other maps illustrating the presence of former uranium mining leases in Pittsylvania County extending from the area northeast of the massive uranium deposit at Coles Hill in Chatham down to the southwestern corner of Pittsylvania County

See response CO-7a.

CO-7	Blue Ridge Environmental Defense League	
CO-7c	The map in **Attachment 2** illustrates the Southgate pipeline corridor and its proximity to the historic Marline leases. On the map, the Southgate pipeline corridor is indicated by the brown line extending from Chatham southwest to where the pipeline crosses into North Carolina. The red dots on the map indicate the locations of some of the Marline leases that were discovered by PRIDE to be on record with the Pittsylvania County government in 2010-11. The map illustrates only a small fraction of the 618 total leases documented by PRIDE in the communities of Hurt, Long Island, Gretna, Chatham, Dry Fork, Danville, Cascade, and Axton, VA. The map clearly illustrates that the Southgate pipeline is planned for construction in a geographic area coinciding with dozens of Marline leases. ***Berry Hill Mega Park and Judy Byrd Mountain*** The public has long had knowledge of a large uranium deposit at the Berry Hill Mega Park and nearby Judy Byrd Mountain in southern Pittsylvania County, both of which are proposed to be crossed by the Southgate pipeline. In describing Pittsylvania Supervisor Tim Barber's position on uranium mining, an October 29, 2015 article appearing in the Danville Register & Bee states, "Barber opposes uranium mining because he doesn't think it's proven to be safe and it would decrease property values. Also, there is a large uranium deposit on Judy Byrd Mountain – adjacent to Berry Hill mega park – in southwestern Pittsylvania County that could be mined if the moratorium were lifted, he said." The Pittsylvania County Board of Supervisors passed a resolution in June, 2010 prohibiting the mining or milling of uranium at the Berry Hill Mega Park. Please see copy of the supervisors' resolution in **Attachment 3**. The Berry Hill Mega Park and Judy Byrd Mountain both appear on the map in **Attachment 2**. The Southgate DEIS fails to consider the impacts of excavation and pipeline development through the sizable uranium deposit at Berry Hill and Judy Byrd Mountain. ***Perkins Mountain*** On August 29, a landowner whose property is proposed to be crossed by the Southgate pipeline disclosed to BREDL staff that his father had received payments for a uranium lease on Perkins Mountain, located west of the City of Danville. Perkins Mountain, illustrated on the map in **Attachment 2**, is crossed by the Southgate pipeline. ***Danville Triassic Basin*** In 2007, PAC Geological Consulting, Inc. issued a report titled, "Technical Report on the Coles Hill Uranium Property, Pittsylvania County, Virginia". The report, which was written for Virginia Uranium, Inc., the company seeking to mine the very large uranium deposit at Coles Hill, contains the following description of the geology of the Coles Hill deposit:	See section 4.1.4.8 for a discussion on Uranium in the Project area. According to the Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety and Regulatory Aspects of Uranium Mining and Processing in Virginia (2012), the Judy Byrd Mountain may be within an area associated with Triassic aged sedimentary rocks that have the potential to contain occurrences of uranium based on generalized geologic stratigraphy. Sedimentary rocks in this area may contain uranium concentrations of 70 - 140 parts per million (ppm). Uranium concentrations of this size are not considered economically viable due to the lower uranium grades present in comparison to similar geologic deposits that exist globally. The National Geochemical database indicates that two rock samples were collected from a site located approximately 3,300 feet from Judy Byrd Mountain. The average uranium concentration from the rocks samples collected was approximately 4.65 ppm. In comparison the global average uranium concentration of granite is 4.8 ppm. Furthermore, the Mountain Valley Project pipeline easement is located approximately 640 feet from the location of Judy Byrd Mountain. The construction practices utilized in pipeline installation limit trenching activities to a depth of 7 feet below land surface. The shallow excavation depth further limits the possibility of encountering rock materials that may contain uranium concentrations.
CO-7d	***Perkins Mountain*** On August 29, a landowner whose property is proposed to be crossed by the Southgate pipeline disclosed to BREDL staff that his father had received payments for a uranium lease on Perkins Mountain, located west of the City of Danville. Perkins Mountain, illustrated on the map in **Attachment 2**, is crossed by the Southgate pipeline.	See response CO-7a.

CO-7	Blue Ridge Environmental Defense League	
CO-7e	***Danville Triassic Basin*** In 2007, PAC Geological Consulting, Inc. issued a report titled, "Technical Report on the Coles Hill Uranium Property, Pittsylvania County, Virginia". The report, which was written for Virginia Uranium, Inc., the company seeking to mine the very large uranium deposit at Coles Hill, contains the following description of the geology of the Coles Hill deposit: ***9.2** Property and Local Geology (Fig. **9.2**)* The property geology of the CHUP [Coles Hill Uranium Property] has been mapped by Marline geologists and Henika and Thayer (1983) and modified by Jerden (2001) . . . The Chatham Fault Zone has been mapped and studied by Lineberger (1983). The deposits are hosted within a fault-bounded wedge of Precambrian or Paleozoic mylonitic quartzofeldspathic gneiss and some amphibolite exposed along the Chatham fault zone at the faulted northwest margin of the Danville Triassic Basin. The augen gneiss is probably a tectonically and hydrothermally altered variety of biotite gneiss and mica schist of the Fork Mountain Formation. Initial cataclasis and brecciation along the Chatham fault zone resulted in hydrothermal events causing sodium metasomatism, chloritization, and argillization that may have been followed by hematization and uranium mineralization. The hydrothermal events coextend and are coeval with northerly trending Jurassic diabase dykes. Jerden and Sinha (1999) suggested that the Coles Hill uranium deposit formed within a structurally controlled, hydrothermal cell that developed during Mesozoic extension in response to a localized heat flux associated with mafic intrusive activity. The report contains a map showing the Danville Triassic Basin associated with the Chatham fault zone in which, as described above, the uranium deposits at Coles Hill and elsewhere in Pittsylvania County are found. A copy of this map appears in **Attachment 4.** The Chatham fault zone is recognized by geologists as being rich in uranium ore deposits and potentially exploitable as an economic asset. The DEIS should be revised to recognize that the Southgate pipeline has been routed through an area with a reputation among geologists as having rich potential for uranium mining.	See section 4.1.4.8 for a discussion on Uranium in the Project area. The Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety and Regulatory Aspects of Uranium Mining and Processing in Virginia (2012) study indicates that the only economically viable uranium deposit within both the Chatham fault zone and the state of Virginia occurs within the Cole Hills property. The Chatham fault zone is associated with Triassic aged sedimentary rocks that have the potential to contain uranium concentrations based on g+C1eneralized geologic stratigraphy. However, the uranium concentrations of these sedimentary rocks range from approximately 70 ppm to 140 ppm and are not considered an economically viable resource when compared to similar geologic deposits that exist globally.
CO-7f	**REQUEST TO FERC** We request that FERC require Mountain Valley Pipeline, LLC to (1) revise the Southgate DEIS so that it recognizes that the Southgate has been routed through an area containing significant quantities of economically viable uranium, and (2) consider the environmental impacts of building the Southgate through an area with significant concentrations of uranium ore.	As discussed in section 4.1.4.8, concentrations of uranium in soil the Project area in Pittsylvania County, Virginia are comparable to concentration in environmental media in the conterminous U.S. and concentrations of uranium in groundwater is significantly lower than U.S. Environmental Protection Agency maximum contaminant levels. Significant impacts on human health and the environment are not anticipated during construction and operation of the Project.

CO-8	Friends of the Central Shenandoah

Comments Regarding the MVP-Southgate Project DEIS
Submitted by
Friends of the Central Shenandoah

CO-8a	**Executive Summary - Flaws in the Draft Environmental Impact Statement** The Federal Energy Regulatory Commission has failed to address all of the issues required by the Natural Gas Act and the National Environmental Policy Act in the preparation of the Draft Environmental Impact Statement for the Southgate project.	See response GEN-4 in appendix I.2.
CO-8b	Neither the Commission nor the applicant has produced any substantiated information that shows an increased demand for gas supply exists for PSNC/Dominion Energy. This is crucial to determine the "necessity" for the project. Only 0.1 percent of PSNC/Dominion Energy's customers are in the industrial category. The remaining 99.9 percent of customers are either residential or commercial. Project developers have said that no gas is expected to be provided to electric generators. Information provided by the North Carolina Utility Commission shows that gas usage by residential and commercial customers in North Carolina is less in 2017 than in 2013, despite annual increases in the number of customers in both categories. Decreased gas usage per residential and commercial customer is expected to continue. PSNC experts testified to the state regulator that its winter baseload requirements are not expected to increase for the next five years. The worst-case Design Day scenario for PSNC is expected to increase in the future, although the assumptions that are used in that calculation have not been provided. Design Day estimates project the maximum gas usage under extreme conditions that may happen rarely, or not at all. PSNC/Dominion Energy has multiple options for meeting peak conditions that do not require year-round payments for unnecessary pipeline capacity which would severely burden ratepayers with billions of dollars in higher costs. The burden of proof is on the applicant to show that its project is better than the situation that currently exists.	See response GEN-2 in appendix I.2.
CO-8c	The "No Action" alternative is superior to the proposed Southgate project. That would mean the Southgate project would not be built and PSNC/Dominion Energy would continue to depend on Transco, which has served it reliably for decades.	We concluded in Section 3.2 that the No Action Alternative does not meet the Project objective and is not likely to provide a significant environmental advantage.

CO-8	Friends of the Central Shenandoah	
CO-8d	Transco has already expanded in capacity by far more than the amount proposed by Southgate. Providing more capacity using the Transco system would not require any new construction, as opposed to the 73 miles of new pipeline construction required for the Southgate project. New capacity could be added in small increments from Transco instead of committing to a huge amount of capacity from Southgate that must be paid for in full even if it is not used. PSNC/Dominion Energy has committed to capacity additions in 2020-21 that more than doubles its firm capacity reservation. This is poor utility planning and irresponsible regulatory oversight. If the Southgate DEIS had included a side by side comparison of alternatives, as required by NEPA, it would show that continuing to use Transco would provide more operational flexibility, require no new construction, and would cost, at most, half of what the Southgate project would cost. It is difficult to understand how any objective regulator could approve the Southgate projects given the availability of a lower cost, lower impact, and currently operating alternative.	See section 3.3.2.1 of the EIS for discussion of the Transco Alternative.
CO-8e	The Commission seems to have taken the position that because they have ignored the requirements of NEPA, the Natural Gas Act and their own guidelines for the past 20 years, and because few cared or objected, they could continue to do so. We care. We object to the Commission failing to follow the legal requirements. The consideration of the need for a project and whether it serves the public interest should be an integral part of the evaluation of a new pipeline project, as the law requires. The Commission should fulfill its role as an objective arbiter to balance the interests of the project developers with the interests of the public that the project is intended to serve. The missing portions in the Draft Environmental Impact Statement that are required by NEPA and the Natural Gas Act should be provided and the DEIS should be re-issued for public comment.	See response GEN-4 in appendix I.2.

CO-9	Good Stewards of Rockingham

Good Stewards of Rockingham
Dan Riverkeeper
P.O. Box 592
Stoneville, NC 27048
DanRiverkeeper.org

DEIS Comments
MVP Southgate Project
Docket No. CP19-14-000

Federal Energy Regulatory Commission
888 First Street, N.E. Washington, D.C. 20426

Our organization represents the resources, citizens and wildlife of the Dan River Basin in Virginia and North Carolina.

CO-9a	Though the majority of our comments are directly related to the DEIS, there is one major issue in which we feel compelled to address. The MVP Southgate Project is a proposed extension of an incomplete and highly troubled pipeline- the MVP mainline project. The mainline has been troubled for years by violations, accidents, lawsuits and significant community opposition. MVP has not confidently portrayed the ability to not only construct the mainline project with any regard to the environment or their own quality standards, but have not proven their ability to complete the ever inflating project altogether. MVP seems to be 'putting the wagon before the horse' when applying for permits for MVP Southgate. We would highly recommend denying the project altogether for the reasons following in this submission and believe that the FERC should at the least deny this project until MVP has successfully demonstrated their ability to complete a project with any regard to meeting the conditions outlined in their permits without causing continued harm to landowners and communities in Virginia and West Virginia.	See response GEN-6 in appendix I.2.
CO-9b	The lack of a confident analysis proving the need for the MVP Southgate is also a major concern. Can FERC justify permitting this project when the negative impacts on the environment, water sources and communities greatly outweigh any proven need, or lack thereof? The NCDEQ and other independent analyses do not show a definite need for this project and some estimate the need of NG supply to fall as other sources of energy are continually made more available and cost efficient. The gas supply existing in NC is already in a surplus. Rockingham County alone already has three existing pipelines, one of which (Transco) has been upgraded with capabilities to flow gas in either direction. We highly recommend that the FERC review this when considering any impact stated in the DEIS.	See response GEN-2 in appendix I.2.

CO-9	Good Stewards of Rockingham	
CO-9c	**Aesthetic Impacts to the Region** The 72-mile long, 100-foot wide construction zone for this pipeline will leave a needless and damaging scar of visual blight and degraded lands. The aesthetic value of our region is an important asset in building the thriving and economy-boosting tourism attraction that each county in the project path is diligently working toward. The DEIS greatly underestimates the long term and significant impacts the deforestation and permanent ROW would cause our region.	See section 4.8.6.1 of the EIS for a discussion of visual impacts.
CO-9d	Residents and landowners who would frequently view the ROW will be hit hardest by visual impacts and the loss of use of their land. Residents will lose the privacy and visual screens of large trees and hedgerows to construction; the pipeline and its numerous new roads would be built and operated directly next to scores of homes – and will pass right through one home; and construction will render many property owners' land unusable for farming, habitation or other uses. Even so, the DEIS claims that there will be no impacts on local property values.	See response LU-1 in appendix I.2.
CO-9e	The pipeline would also impact the experiences of countless recreational users of public parks, recreation and conservation areas by generating dust and noise pollution, disturbing wildlife, and disrupting public access during construction. Users of National Wild & Scenic River candidates like the Dan and Haw Rivers; future designated recreational water trails like the Banister River; and public trails like the Mountains-to-Sea Trail and a planned public trail in Alamance County would all be affected. The project would also clear trees within view of the Colonial Heritage Byway (Route 150 in Rockingham County), causing permanent impacts. The HDD crossing of the Dan River is planned for the only river access in a minority and/or impoverished community. The DEIS does not seriously consider the potential impacts to our communities and tourism by the proposed project.	See section 4.8.4 of the EIS for a discussion on impacts on recreation.
CO-9f	**Wetlands** Pipeline construction will have a long term impact on nearly 27 acres of wetlands. In addition to the pipeline construction, Mountain Valley is asking for a waiver of FERC's wetland protection setbacks and plans to locate 23 additional temporary workspaces within 50 foot of wetlands. This is not protective of the sensitive Haw River watershed and should not be allowed.	See response WET-1 in appendix I.2.

CO-9	Good Stewards of Rockingham	
	Wildlife and Fisheries	
CO-9g	Constructing the Project would disturb approximately 1,439 acres of wildlife habitat, much of which would be permanently destroyed by the project. The project would also cross 21 perennial waterbodies containing fisheries of special concern: 8 in Virginia, and 13 in North Carolina. Recreational fishing is a large economic driver in both Virginia and North Carolina and any risk to our economic inputs should be considered a serious concern.	See section 4.6 of the EIS for further discussion.
CO-9h	The U.S. Fish & Wildlife Service requested that Mountain Valley minimize impacts to vulnerable migratory bird species which use the project area such as bald eagles, northern bobwhite, and red-headed woodpecker by avoiding clearing vegetation during the peak migratory bird nesting season (March 15 - August 15 in Virginia and April 1 - August 31 in North Carolina). Mountain Valley has defied the agency's guidance and has proposed clearing vegetation during peak nesting season from March 15 – April 30 and from August 16 - 31. FERC's DEIS ignored the obvious impacts to migratory birds that would result from this reckless activity.	See section 4.6.3.2 of the EIS for a discussion on migratory birds.
CO-9i	This project would impact and disrupt key wildlife habitat, including the North Carolina Forest Legacy Areas and Piedmont Land Conservancy Easement, as well as the Virginia Piedmont Forest Block Complex Important Bird Area (IBA).	See section 4.6 of the EIS for a discussion of these areas.
	Threatened/Endangered Species	
CO-9j	Pipeline construction would harm numerous aquatic species, including the Roanoke logperch, James spineymussel, Atlantic pigtoe and smooth coneflower. All are currently listed as endangered under the Endangered Species Act with the exception of the Atlantic pigtoe, which is currently under consideration for protection. Habitat for these aquatic species along the Virginia-North Carolina border would be at great risk from sedimentation caused by pipeline construction.	See section 4.7 of the EIS for a discussion of impacts to listed species. Federal agency compliance for the Endangered Species Act (ESA) Section 7 is described in section 4.7.1 of the EIS.
CO-9k	The scope of downstream impact considered in the DEIS is insufficient, as well as the scope of surveys for endangered aquatic species. The DEIS and MVP have also mentioned species may simply migrate away from wildlife-threatening impacts caused by the construction, this is false. Some species are considered sedentary and will not simply remove themselves from dangers brought about by MVP Southgate. Furthermore, shallow water depths of certain streams will further prevent migration of species capable of doing so. Our waters are currently impaired by turbidity and cannot afford the potential of any further impacts brought about by an unnecessary project. Our wildlife is in the process of rebounding and this project can only cause harm to the process.	See response WILD-3 in appendix I.2.

CO-9	Good Stewards of Rockingham	
CO-9l	**Socioeconomics** Construction of the project will cause long term impacts to the environment and would overlap with peak tourism season, both potentially negatively impacting the tourism economy in the area. Local employment is unlikely to be increased, property values will likely decrease, and the negative effects of the pipeline will be long-lasting. Many of the impacts referred to as short-term in the DEIS, like deforestation, must absolutely be considered a long-term impact considering the extensive amount of time required to naturally rehabilitate the area. FERC's analysis of the positive economic impacts state they will be "temporary and minor". We agree to that extent. MVP has more recently claimed that this project will add local jobs but with no agreements of proof of this statement. It is unclear why this was included in the DEIS when there can be no guarantee to this degree. MVP has not sufficiently demonstrated the likelihood of hiring locals in their history on the mainline and common contractors of this scope would be hired by bid, leaving much uncertainty to this claim.	Impacts to tourism are discussed in section 4.9.6 of the EIS.
CO-9m	**Environmental Justice** The DEIS neglects the entirety of neighborhoods such as Draper Village in Rockingham County, NC. The sole river access local to this community is the location of the proposed HDD drilling under the Dan River at Draper Landing. The scope of EJ must be expanded and more attentively addressed. The race and income of our residents must not dictate their ability to access clean and useable resources. The HDD process and deforestation poses very real and likely risks to the enjoyment, ecosystems and access to Draper Landing. The DEIS minimizes these risks and seems to suggest the additional ROW will not be damaging to any degree because of its proximity to an existing ROW. **If FERC cannot consider the cumulative impacts of greenhouse emissions, environment loss and public safety by adding additional fossil fuel infrastructure- FERC should not be so brazzen to consider it in this sense.**	See section 4.9.8 for discussion of impacts on Environmental Justice communities. See section 4.8.4 for discussion on recreation areas.
CO-9n	**Air Quality and Noise** The Lambert compressor station has the potential to emit 125,000 tons of greenhouse gases, 3.5 tons of formaldehyde each year and over 10 tons of particulate matter each year, putting nearby communities at risk for cardiovascular issues and asthma.	Air quality impacts are discussed in section 4.11.1.7.
CO-9o	The compressor station will be built in proximity to two Transco compressor stations already in operation. Cumulative impacts and the potential to impact human health with two minor source polluting facilities and one Title V facility (pending FERC approval) have not been adequately evaluated to assume that human and environmental health will not be adversely impacted. The potential risks for this project greatly outweigh any proof of need.	See response CI-4 in appendix I.2.

CO-9	Good Stewards of Rockingham	
CO-9p	**Reliability and Safety** The DEIS merely states that pipeline developers would comply with minimum construction and operation standards. It gives no reason for people living within the blast radius to feel safe. The National Transportation Safety Board documents interstate pipeline accidents, and its database includes numerous recent natural gas pipeline ruptures, leaks, and explosions. Moreover, studies show a spike in accidents involving new pipelines in recent years. The majority of the pipeline would be in Class 1 population density areas, meaning it would mandate the lowest safety standards and put those living near the pipeline at an even greater risk.	See response SAFE-1 in appendix I.2.
CO-9q	**Cumulative Impacts** FERC states that impacts from construction and operation of the pipeline will be temporary and localized. However, this assessment fails to take into account the long term and cumulative impacts that will occur to forested wetlands and forested habitats. It also fails to take into account the amount of dirt and mud entering streams from construction runoff. The nearly 3 miles of in-stream work paired with the removal of streamside vegetation will have cumulative, and negative impacts in the watershed, a watershed which is designated by the State as nutrient and sediment sensitive and is already experiencing negative effects on water quality and aquatic life.	Cumulative impacts to forested wetlands and habitats were evaluated in sections 4.13.2.3 and 4.13.2.4. Cumulative impacts to streams and other waterbodies were evaluated in section 4.13.2.2. Our analysis in section 4.13 is consistent is consistent with FERC style, formatting, and policy regarding NEPA evaluation of cumulative impacts.
CO-9r	**Conclusions of the DEIS** FERC is ignoring the significant impacts of this project. The DEIS describes widespread, permanent impacts like the long-lasting or permanent destruction of hundreds of acres of forests and wetlands, but in turn says that impacts won't be significant because mitigation measures will be used during construction. Mitigation can not prevent the significant impacts that permanent forest and wetland destruction cause. The DEIS' reliance on mitigation measures to argue that the project will cause no significant impacts falls short because many of the mitigation measures proposed to prevent significant impacts to local resources are unknown. In many instances, the DEIS instructs Mountain Valley Pipeline to come up with mitigation measures that are currently not defined. FERC can not claim that unknown measures will prevent significant environmental impacts.	See response GEN-9 in appendix I-2.
CO-9s	FERC concluded that no significant environmental impacts would be inflicted by this project while lacking the necessary information to assess what those impacts would be. For example, MVP has yet to provide FERC with its feasibility studies for its plan to cross Deep Creek with the pipeline, a site where imperiled aquatic species are suspected to live.	See response SURF-8 in appendix I.2. As discussed in section 4.6.5 of the EIS, Mountain Valley has provided aquatic species surveys results.

CO-9	Good Stewards of Rockingham	
CO-9t	FERC acknowledges that MVP will use 5.9 million gallons of water in constructing the project and MVP has only announced within the week their plans to use the Dan River as the source. Our rivers have suffered enough, especially the Dan. Our species cannot withstand the risks, neither can our tourism. The removal of the water from the Dan leads to the belief that the water will be returned their, supposedly with no chemicals. As the EPA has recently suggested, the lack of chemicals in the hydrostatic test water may lead to issues such as corrosion in the tested pipe. The plan for this project is immature, vague in scope and mitigation, and overly minimizing of the true risks to our land, air, water and citizens. The lack of information and scope is preventing FERC from assessing the project thoroughly.	See response SURF-6 in appendix I.2.
CO-9u	Residents throughout the proposed path of MVP Southgate must already deal with contaminated drinking water in their recreation and homes. The disregard by FERC to substantially consider alternatives to this project are a direct slap in the face to all those living here, working here and raising families here who deserve and require clean water. The possibility of this project being completed without long term impacts is non existent. We cannot afford the risks and are not willing to roll the dice on a company whose history clearly shows a disregard for safety and environmental control measures. As stated previously, **the MVP Southgate project is a proposed extension of a highly troubled and ever inflacting project that has not demonstrated a capability of being completed.** On behalf of our resources, wildlife, environment and residents- we strongly suggest that FERC deny permits for MVP Southgate.	See response GEN-4 in appendix I.2.

CO-14 Southern Environmental Law Center

SOUTHERN ENVIRONMENTAL LAW CENTER

phone 919-967-1450 601 WEST ROSEMARY STREET, SUITE 220 CHAPEL HILL, NC 27516-2356 Facsimile 919-929-9421

September 16, 2019

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Comments on FERC's Draft Environmental Impact Statement for Mountain Valley Pipeline's Southgate Project (Docket Number: CP19-14-000)

Dear Ms. Bose:

The Southern Environmental Law Center offers the following comments on the Federal Energy Regulatory Commission's ("FERC" or "the Commission") Draft Environmental Impact Statement for the Southgate Project ("project") proposed by Mountain Valley Pipeline, LLC ("Mountain Valley"). These comments are submitted on behalf of the Haw River Assembly, Waterkeeper Alliance, Sierra Club, and Appalachian Voices.

The National Environmental Policy Act ("NEPA") requires that federal agencies prepare a "detailed" environmental impact statement ("EIS") for every "major [f]ederal action[] significantly affecting the quality of the human environment."[1] The purpose of NEPA is to "prevent or eliminate damage to the environment and biosphere by focusing [g]overnment and public attention on the environmental effects of proposed agency action."[2] By focusing the agency's attention on the environmental consequences of its proposed action, NEPA "ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast."[3]

CO-14a

The proposed project would tear through over 70 miles of Virginia and North Carolina, causing long-lasting damage to rivers, streams, and wetlands. It would threaten vulnerable ecosystems and numerous endangered, threatened, and other sensitive species. And it would harm already overburdened environmental justice communities. Moreover, the North Carolina Department of Environmental Quality has expressed serious doubts about whether this pipeline is even necessary to meet the energy demands. Despite all of this, the Commission has failed to put together a thorough and detailed environmental impact statement as required by NEPA

See response GEN-1 in appendix I.2.

CO-14	Southern Environmental Law Center	
CO-14b	Most notably, the draft EIS is missing critical reports regarding the potential environmental effects of the project—information that the Commission must have to identify and evaluate impacts in preparing the draft EIS. In addition, the Commission has failed to evaluate all reasonable alternatives to the project, to assess significant health impacts to environmental justice communities, and to adequately analyze cumulative impacts. The draft EIS thus fails to provide the public with an opportunity for meaningful review and comment, in violation of NEPA. The Commission must acknowledge the deficiencies in the draft EIS, as discussed in these comments, and issue a revised draft EIS for public comment. Alternatively, the Commission must issue a supplemental draft EIS for public comment.	See response GEN-4 in appendix I.2, as well as additional comments below.
CO-14c	**I. The project's purpose and need impermissibly excludes reasonable alternatives to the project.** A purpose and need for an action is essential to the NEPA process, as it guides an agency's scope of review—in particular, an agency's consideration of all reasonable alternatives.[4] As NEPA regulations state, an agency's alternatives analysis "is the heart of the environmental impact statement," "providing a clear basis for choice among options by the decisionmaker and the public."[5] In this case, the project's purpose and need is defined too narrowly. As a result, the Commission fails to consider all reasonable alternatives in the draft The purpose and need for the project is defined narrowly as meeting "requests for *natural gas transportation service* of [Mountain Valley's] anchor shipper, Dominion Energy," rather than meeting the energy need within the region.[6] Because the Commission is only looking at alternatives that can transport natural gas, the agency ignores energy efficiency and all renewable alternatives—such as solar, wind, and battery storage. Renewable energy alternatives, which are gaining market share as their costs continue to drop,[7] might provide the needed energy while avoiding the proposed project's significant environmental impacts. Similarly, because the Commission only considered alternatives that transport natural gas, the agency has not taken a hard look at the No Action Alternative—or the possibility that the project is not constructed, as required by NEPA.[8] In fact, the Commission has not considered whether or not there is an energy need for the proposed project.[9] That failure persists despite the North Carolina Department of Environmental Quality's letter to the Commission questioning whether or not the project is needed, and providing evidence that the project would instead create an excess supply of natural gas in the region.[10] The Commission's constricted statement of purpose and need is not allowed under NEPA. Because the purpose and need forms the basis upon which to compare alternatives, an agency is not permitted "to contrive a purpose so slender as to define competing 'reasonable alternatives' out of consideration."[11] As written, the project's purpose and need can only be met by providing one energy source through one mode of transportation for the benefit of one company. The Commission must broaden the purpose and need for the project so that it actually considers a No Action Alternative—or the possibility that the project is not constructed—and renewable energy alternatives in its alternatives analysis.	The Project's purpose and how it relates to alternatives is addressed in the introduction to section 3.0. As stated in the EIS, the FERC reviews proposals developed by other entities. However, the FERC does not plan, design, build, or operate natural gas infrastructure. Accordingly, the project proponent is the source for identifying the purpose for developing and constructing a project. The Commission cannot simply ignore a project's purpose and substitute an alternative purpose for it that a commenter deems more suitable. As stated in section 1.1, the purpose of the Southgate Project is to is to meet the specific requests for natural gas transportation service of its anchor shipper, Dominion Energy, a local natural gas distribution company. Alternatives that do not achieve this purpose cannot be considered as feasible or reasonable alternatives to the Project. Also see responses ALT-1 and ALT-2 in appendix I.2.

CO-14	Southern Environmental Law Center	
	II. The draft EIS is missing information that is essential for the Commission's assessment of environmental effects. The Commission's conclusion that the project would not have significant environmental impacts cannot be substantiated because critical information is incomplete or omitted entirely. The Commission cannot, lawfully, reach a determination regarding the environmental effects of the project based on such unsupported speculation. An EIS is fundamentally an information dissemination tool: it allows federal agencies and the public to fully understand the environmental impacts of proposed actions before they begin and before resources have been committed.[12] Under NEPA, the public has a right to review and to provide comments on draft EISs.[13] This makes it essential that all relevant information is available—so that the agency drafting a draft EIS can adequately assess environmental impacts, and so that the public has the needed information to review and comment on the draft EIS.[14] The Commission's failure to collect and provide all relevant information on the project's environmental impacts is a fatal flaw in its draft EIS. A. <u>The Commission does not have adequate information to evaluate impacts to sensitive species</u>. The Commission does not have enough information to evaluate the impacts that the project would have on federal or state-listed species or their habitats, yet the draft EIS erroneously assumes that sensitive species and their habitats are not in affected areas. The agency has not yet consulted with the U.S. Fish and Wildlife Service to determine whether or not any federally listed or proposed endangered or threatened species or their designated critical habitats would be affected by the project.[15] The agency has not determined the nature and extent of adverse impacts, nor measures that would avoid, reduce, or mitigate impacts on habitats or species.[16] Moreover, Mountain Valley has not completed aquatic surveys to determine that protected fish and mussel species are not present in impacted rivers and streams, and the company has not completed its consultation with the Virginia Department of Game and Inland Fisheries and the North Carolina Wildlife Resources Commission.[17] As the draft EIS states, impacts on these species "may be greater […] because these species may be more sensitive to a disturbance; more specific to a habitat; and less able to move to unaffected suitable habitat."[18] These species could experience "habitat fragmentation, loss, or degradation; decreased breeding or nesting success; increased predation or decreased food sources; and injury or mortality."[19] For instance, sedimentation from the project would likely endanger numerous sensitive mussel species in both Virginia and North Carolina.[20] Studies show that excess sedimentation harms freshwater mussels by clogging their gills and suffocating them, by interfering with filter feeding, and by reducing the production of food from decreased sunlight.[21]	See responses GEN-4 and T&E-1 in appendix I-2.

CO-14d

CO-14	Southern Environmental Law Center	
CO-14d	Without having conducted aquatic surveys or finished consultations with state and federal wildlife agencies, the Commission and Mountain Valley falsely assume that they have all the information that they need to protect sensitive species in constructing the project. For instance, the draft EIS states that where sensitive fish or mussel species are present—and therefore, where it is necessary for Mountain Valley to avoid disturbing a particular stream—construction methods that do not trench through the stream are proposed.[22] The draft EIS also states that "*none of the crossings with sensitive fish or mussel species* have the potential to require blasting."[23] Without completed aquatic surveys, and completed consultations with the appropriate agencies—including the Virginia Department of Game and Inland Fisheries, the North Carolina Wildlife Resources Commission, and the U.S. Fish and Wildlife Service—Mountain Valley and the Commission cannot possibly ensure that the project's actions, including river and stream crossings or blasting events, would avoid sensitive aquatic species. The Commission must prepare a revised draft EIS, or issue a supplemental draft EIS, that addresses the new information regarding impacts to sensitive species, and release it for public comment. B. <u>The Commission does not have other key information to adequately evaluate environmental impacts.</u> Other missing information includes, but is not limited to: • Final site-specific plans for all stream, river, and wetland crossings, including horizontal directional drilling ("HDD") and conventional bore crossings; • All wetland surveys; • Mountain Valley's Stormwater Pollution Prevention Plan; • Mountain Valley's Compensatory Mitigation Plan for wetland impacts; • Mountain Valley's Final Erosion and Sediment Control Plan; • Written correspondence from Virginia and North Carolina state agencies regarding any timing restrictions on waterbodies containing warmwater fisheries; • Geotechnical studies for the proposed Dan River and Stony Creek Reservoir HDD crossings, revised feasibility and hydrofracture analyses, and any proposed mitigation for these crossings; • Information on impacts to North Carolina's Jordan Lake Riparian Buffer Area, including information on proposed mitigation and impacts to riparian buffers; • Complete locations of all private water wells and springs within 150 feet of the Project work areas, including information on the well's or springs' status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts on the private water wells or springs; • A list of final water sources to be used for the project, including for dust control, hydrostatic testing, and HDD operations—including information on intake locations, waterbody names, withdrawal rates and methods, measures to minimize entrainment of fish, and water discharge locations; • Mountain Valley's revised plans to dispose of brush and timber; • Measures that Mountain Valley will take to minimize impacts on migratory birds; • Results of Mountain Valley's pre-construction bald eagle nest and colonial rookery surveys;	See above CO-14d comment response

CO-14	Southern Environmental Law Center	
CO-14d	• All cultural resources survey reports, Mountain Valley's site evaluation reports and avoidance or treatment plans, and comments on Mountain Valley's cultural resources reports and plans from the Virginia and North Carolina State Historic Preservation Officers and interested Indian tribes; • Mountain Valley's Nighttime Construction Noise Management Plan, and • Toxicological, environmental, and health information for coatings used for the project's pipeline and associated utilities. Not only does the draft EIS rely on incomplete and missing information to conclude that there would be no significant impacts from the project, the draft EIS is filled with indeterminate and discretionary phrases that fail to give the public enough information to assess the project's impacts, for instance: • Construction would only be conducted during low flow periods "when *practicable.*"[24] • Blasting would only be used "after all *reasonable* means of trench excavation are unsuccessful," and would be completed during dry or low flow periods "where *practicable.*"[25] • Vegetative buffer would only be "allow[ed]" for conventional bores "*to the extent practicable.*"[26] Casing to prevent conventional bores from collapsing would only be used "*if required.*"[27] • Ground surface would only be restored "as closely *as practicable* to original contours."[28] At no point does the Commission define what is "practicable," or when certain protective measures would be "required." In many of these scenarios, the risk is significant. For instance, crossing a river or stream using a conventional bore method is dangerous because of "the possibility of the borehole collapsing without warning."[29] The draft EIS states that certain measures can be taken to reduce this risk—for instance, Mountain Valley could "allow for a vegetative buffer on each side" of the river or stream, or the company could "use a casing [...] to prevent the bore from collapsing."[30] However, these actions depend on whether not the company finds it "practicable" or whether the company believes it is "required," yet the draft EIS fails to provide any clarity for the public as to whether or not these protective actions will be taken.[31] For the reasons stated above, the draft EIS is "so inadequate as to preclude meaningful analysis," and the Commission must prepare a revised draft EIS and release it for public comment.[32] Alternatively, the Commission must issue a supplemental draft EIS that addresses new information.[33] Without crucial additional information, the Commission simply cannot evaluate how the project will affect the environment, and the public cannot meaningfully comment on the project.	See above CO-14d comment response

CO-14	Southern Environmental Law Center	
CO-14e	**III. The Commission failed to adequately analyze impacts to environmental justice communities.** The Commission failed to take a hard look at how the project would degrade the "healthful environment" for environmental justice communities in close proximity to the project. When enacting NEPA, Congress declared that "each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment."[34] The Commission thwarted this central goal of NEPA in failing to adequately consider how the project would harm low-income communities, Native Americans, and communities of color. For instance, two census block groups within one mile of the project's Lambert compressor station contain environmental justice populations.[35] Yet, the draft EIS does not assess the health impacts that the compressor station would have on these populations. The draft EIS only states that, while there will be "long-term impacts on air quality," they would "not be significant" because potential pollution emissions would be below National Ambient Air Quality Standards.[36] However, the existing evidence indicates that impacts could be significant, and the Commission must further analyze potential impacts to the communities surrounding the Lambert Compressor Station.	Environmental justice communities are discussed in section 4.9.8 of the EIS.
CO-14f	The Lambert compressor station would cause significant increases in hazardous air pollutants, particulate matter, precursors to ozone, and other air pollution. Ozone exposure can cause respiratory symptoms, such as coughing, throat irritation, chest pain and tightness, wheezing, and shortness of breath; reduced lung function; and airway inflammation.[37] Fine particle pollution also causes health problems, such as heart attacks, aggravated asthma, decreased lung function, and irregular heartbeats.[38] Ozone and fine particulate matter contribute to over 200,000 premature deaths in the United States each year.[39] Moreover, there is no evidence of a safe level of exposure for either of these pollutants, and both have health effects even below the current National Ambient Air Quality Standards.[40] A recent report from Physicians for Social Responsibility indicates additional potential pollution from compressor The draft EIS ignores all of these potential health impacts when briefly discussing potential harms to environmental justice communities. The Commission failed to collect information on the local, baseline health conditions that will be degraded, and it failed to assess the cumulative impacts to the health of environmental justice communities. In fact, the draft EIS does not even offer any information about the people or communities who live closest to the Lambert compressor station. The most harmful impacts from the compressor station will be suffered by those who live in the areas closest to and downwind of the compressor station. Therefore, the Commission must assess the makeup of the communities living closest to the station. And in order to assess harm to these communities, the Commission must evaluate local, baseline health conditions that will be degraded by the compressor station's pollution, and assess the cumulative health impacts to environmental justice communities caused by the station and by other projects nearby. The draft EIS lacks sufficient information for the public to understand the project's impact on environmental justice communities. The Commission must revise the draft EIS to include additional environmental justice analysis, particularly regarding impacts from the Lambert compressor station.	Air quality impacts are discussed in detail in section 4.11.1.7 of the EIS. Air quality impacts on environmental justice communities are discussed in section 4.9.8 of the EIS. A cumulative air quality impact analysis can be found in section 4.13 of the EIS. Also see response AIR-2 in appendix I.2.

CO-14	Southern Environmental Law Center	

IV. The Commission has not analyzed trenchless construction methods at over 200 crossings, thus failing to consider all reasonable alternatives.

CO-14g

Under NEPA, the Commission is required to "[r]igorously explore and objectively evaluate *all reasonable alternatives*."[43] The Commission has failed to evaluate the possibility of trenchless construction—which is known to be less harmful—for hundreds of crossings through rivers, streams, and wetlands. Rather than selecting construction methods that allow the company to dig under these waters, Mountain Valley has instead proposed to blast, carve, and dig through all but five or six of 224 stream and river crossings—turning to methods that cost the least, but have the most potential for severe impacts.[44]

Trenchless construction methods that go under rivers and streams are less harmful than construction methods that use trenches within waters.[45] During construction that uses trenches, the "[c]learing and grading of stream banks, in-stream trenching, the installation and removal of temporary crossing structures, trench dewatering, and backfilling" all harm water quality.[46] Construction in rivers and streams can "cause the dislodging and transport of channel bed sediments and the alteration of stream contours," which "could alter stream dynamics and increase downstream erosion or deposition."[47] Sedimentation can also "alter stream bottom characteristics, such as converting sand, gravel, or rock substrate to silt or mud."[48] Turbidity can reduce the amount of light in streams and photosynthetic oxygen production, and it could "introduce chemical and nutrient pollution from sediments."[49] Stirring up "deposited organic material and inorganic sediments could cause an increase in biological and chemical use of oxygen," decreasing dissolved oxygen concentrations.[50]

Increased sedimentation and turbidity caused by in-stream construction significantly harm aquatic life. As stated in the draft EIS, "[s]edimentation could smother fish eggs and other benthic biota."[51] Changes to habitat caused by construction "could reduce juvenile fish survival, spawning habitat, and benthic community diversity and health"; "reduce dissolved oxygen levels in the water column and reduce respiratory functions of in-stream biota"; and "reduce the ability for biota to find food sources or avoid prey."[52]

Even after construction is completed, there would be significant long-term damage to rivers and streams. The project would leave a permanent gaping strip above the right-of-way in forested riparian areas, where trees would not be permitted to regrow. Riparian vegetation provides numerous key functions for waterbodies, including protecting waters from pesticides, sediment, and other pollutants, stabilizing stream banks, and regulating water temperatures. Furthermore, sedimentation and erosion can be expected to continue long after construction from disturbed stream beds and unanticipated flooding and storm events—resulting in the chronic degradation of water quality and habitats.[53] These impacts to rivers and streams are not "temporary and localized" impacts, as the Commission claims,[54] particularly given that there are many instances where the proposed pipeline would affect several tributaries to the same stream.

Construction that uses trenches similarly harms wetlands. As stated in the draft EIS, construction could increase turbidity; "alter the capacity of wetlands to function as habitat and as erosion control buffers"; and cause soil compaction or rutting from heavy equipment, thus "alter[ing] water infiltration, hydrology, and potentially inhibiting germination of seeds and the ability of plants to develop root systems."[55] Discharges "from stormwater, dewatering structures, or hydrostatic testing" could also harm water quality by sending sediments and pollutants into wetlands.[56] As the Commission states, many of these impacts to wetlands "would be longer term or permanent."[57] For instance, the project would fragment forested wetlands by

North Carolina will be impacted by construction from the pipeline,[59] and at least 75 wetlands would suffer from "permanent impacts."[60]

Section 4.3.2 and 4.4.2 discusses measures that Mountain Valley would implement to reduce potential impacts on surface waters and wetlands crossed by the Project. We reviewed all wetland and waterbody crossings and the proposed crossing method. We conclude in the EIS that implementation of Mountain Valley's collocation routing, workspace design, and construction methods would avoid impacts on wetlands and waterbodies to the extent practicable, and constructing the Project in accordance with Mountain Valley's Procedures and other plans, impacts would be minimized, and most impacts would be minor and temporary or short-term.

CO-14	Southern Environmental Law Center	
CO-14g	Mountain Valley proposes to use trenches for more than 200 crossings—including crossings through the Banister River, a potential Blueway river (a state-designated recreational water trail); through the Sandy River in Virginia, which potentially qualifies for a designation that the river "possess[es] outstanding scenic, recreational, historic, and natural characteristics of statewide significance";[61] through the Haw River, a designated protected watershed in North Carolina; as well as many water supply waters and nutrient sensitive waters in North Carolina.[62] Because there are reasonable trenchless construction alternatives to these crossings and many others, the Commission must require Mountain Valley to evaluate the possibility of crossing each river and stream without using harmful trenches, and the Commission must prepare a revised draft or supplemental EIS that reflects that additional analysis.	See above CO-14g comment response
CO-14h	**V. The draft EIS fails to take a hard look at cumulative impacts.** The Commission's draft EIS fails to take a hard look at cumulative impacts that result from adding the project's impacts to the impacts of other past, present, and reasonably foreseeable projects on the environment. A cumulative impact is the [I]mpact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[63] Cumulative impact analyses that contain "cursory statement[s]" and "conclusory terms" are insufficient under NEPA.[64]	See response CI-1 in appendix I.2.
CO-14i	First, the temporal and geographic scope of the Commission's cumulative impacts analysis for the project is far too limited. This is evidenced by the fact that the Commission neglects to mention the cumulative impacts to the Haw River watershed caused by a massive mixed-use development on 7,120 acres in Pittsboro, North Carolina—Chatham Park.[65] Chatham Park is expected to add up to 22 million square feet of commercial space and 22,000 new residential dwelling units—enough homes to accommodate 60,000 new residents.[66] The proposed site for Chatham Park includes important and sensitive natural resources, including important habitat for the federally endangered Cape Fear Shiner and other sensitive species.[67] The U.S. Fish and Wildlife Service has written several letters to the Town of Pittsboro's Board of Commissioners and Town Manager regarding the impact that the development would have on the Haw River, particularly impacts on sensitive species.[68] The agency states in one letter, Many areas along the Haw River are recognized for their rarity, ecological function in the landscape, and unique natural resources that they support. The importance of the habitats these areas provide for fish and wildlife makes protection from habitat degradation essential.[69]	The Chatham Park development is located approximately 25 miles southeast of the project, and is considered outside of the Southgate Project's geographic scope for cumulative impacts.

CO-14	Southern Environmental Law Center	
CO-14i	Chatham Park would exacerbate existing water quality problems in the Haw River, as well as Robeson Creek and Jordan Lake, by significantly increasing stormwater runoff, sedimentation, and nutrient loading. Yet the draft EIS's cumulative impacts analysis does not even mention the massive planned development. The Commission's failure to discuss the cumulative environmental impacts caused by the project and Chatham Park is a glaring omission in its analysis—and it demonstrates that the Commission's temporal and geographic boundaries for its analysis are too narrow. They exclude pending or already planned projects that would cause significant impacts on the environment, such as Chatham Park. EPA guidance on cumulative impacts states that "[s]patial and temporal boundaries should not be overly restrictive in cumulative impact analysis."[70] Accordingly, the Commission must revise the draft EIS to broaden the scope of its cumulative impacts analysis so that it includes impacts caused by massive projects that are known to cause harm to the same environmental resources.	See above CO-14i comment response
CO-14j	In addition, cumulative impacts must be analyzed using metrics that are actually helpful to understanding specific environmental impacts. For instance, cumulative impacts to particular rivers, streams, and wetlands can be measured by quantifying increased sediment discharge, stream bank erosion, and soil compaction. However, instead of quantifying impacts to streams and wetlands in a manner that informs the public and agencies, the draft EIS makes a serious of vague statements about potential impacts: > Turbidity plumes *may travel* downstream for a few miles, but typically the plume would disperse and become diluted to background levels […] Projects involving in-water work would have to occur within similar timeframes within close distance to have a cumulative effect on turbidity […] Clearing, grading or other earthwork within the watershed *may* also increase the potential for cumulative impacts on water quality from increased stormwater runoff and sedimentation.[71] The draft EIS does not discuss what background levels are in specific streams or wetlands; how much turbidity there would be from other projects or how far turbidity would travel; whether or not many projects occur within similar time frames; or whether or not other projects involve clearing, grading or other earthwork that could increase stormwater runoff and sedimentation. Without providing any support, the draft EIS further assumes that dozens of other projects "would likely have similar impacts on surface waters due to increased turbidity and sedimentation during construction" as Mountain Valley's project would.[72] Such vague and conclusory assertions do not meet the Commission's obligations under NEPA. Moreover, Commission cannot ignore its NEPA obligations by relying on the permitting processes of other agencies,[73] yet it does this repeatedly throughout the draft EIS. For instance: • Instead of actually taking a hard look at the cumulative impacts of non-jurisdictional project-related facilities, the draft EIS simply states that "impacts associated […] are *expected to be minimal* due to the limited footprint of these projects and potential mitigation measures required by permitting agencies."[74] • With regards to mining operations, the draft EIS states that "[n]o significant cumulative impacts are anticipated from these facilities as operational activities would be subject to state and local permit requirements."[75]	The assessment of cumulative impacts is dependent upon readily available information. When there is uncertainty concerning the impacts of other projects, staff uses its experience to reduce this uncertainty and communicates this uncertainty to decision makers and the public. It is reasonable to assume that other projects would be subject to permit requirements including environmental impact minimization and mitigation measures.

CO-14	Southern Environmental Law Center	
CO-14j	• The Commission further "*assume[s]* other non-FERC-regulated projects would follow similar requirements set by the permitting agencies" that FERC sets for projects under FERC's jurisdiction regarding the protection and restoration of soils.[76] • The Commission "*assume[s]* that the […] prime farmland affected by the Cypress Creek Renewables Solar Farm, and the Husky Solar Farm would also be required to return these areas to pre-construction conditions."[77] • The Commission also assumes that non-FERC projects "would be required (by permit) to install erosion and stormwater control devices to minimize runoff."[78] and that projects "would *likely be required* to install and maintain [best management practices] similar to those proposed for the Southgate Project as required by federal, state, and local permitting requirements so as to minimize impacts on waterbodies."[79] • The Commission "*expect[s]*" that other projects "that are subject to permitting approval would be designed to minimize impacts on fisheries and aquatic resources and that the [Virginia Department of Environmental Quality] and [the North Carolina Department of Environmental Quality] would require any other projects to adhere to state-mandated or recommended timing windows for construction within waterbodies containing sensitive fish species."[80] The Commission cannot broadly assume that the actions of other state and federal permitting agencies will protect environmental resources, ignore its own obligation to assess the cumulative impacts of all of these projects, and then arbitrarily conclude that the cumulative impacts will not be significant. Finally, the Commission provides numerous excuses for failing to adequately assess cumulative impacts, before it simply concludes that the impacts would not be significant. For instance, the draft EIS states: • "Construction timeframes […] are currently unknown" for particular transportation and road improvement projects.[81] • "Due to the speculative nature of the housing and development markets and funding mechanisms for other projects listed […], it is difficult to determine the amount of land that would ultimately be affected."[82] • "It is unknown whether construction activities" would "coincide with the Southgate Project."[83] • "We were unable to quantitatively determine the number of [water wells and springs] on a HUC-12 watershed basis."[84]	See above CO-14 comment response
CO-14j	These excuses cannot withstand scrutiny—the Commission cannot continue to rely on missing or incomplete information to avoid evaluating impacts caused by the project and by other past, present, and reasonably foreseeable projects. Because the Commission unreasonably restricted the scope of its cumulative impacts analysis, failed to quantify many of the effects that it does acknowledge, relied inappropriately on other agencies' permitting decisions, and failed to collect the necessary information to evaluate cumulative impacts, the draft EIS's cumulative impacts analysis does not meet the requirements of NEPA. **VI. Conclusion** For the reasons set forth above, the Commission's draft EIS for the Southgate Project proposed by Mountain Valley Pipeline, LLC fails to satisfy the requirements of the National Environmental Policy Act. To remedy these defects, the Commission must prepare and issue a	See response GEN-4 in appendix I.2.

CO-17 Blue Ridge Environmental Defense League

BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE

1828 Brandon Ave. SW
Roanoke, VA 24015

September 16, 2019

Docket No. CP19-14-000

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

FERC DEIS [FERC/EIS-0297D] – MVP Southgate Project

Comments and Request for 60-Day Extension for Comments

I am submitting comments on behalf of the Blue Ridge Environmental Defense League (BREDL) based in Glendale Springs, NC. BREDL is a regional, community-based, non-profit environmental organization founded in March 1984. Our founding principles are earth stewardship, environmental democracy, social justice, and community empowerment. BREDL has chapters and members throughout the Southeast including in the MVP Southgate impacted counties of Pittsylvania in Virginia and Rockingham and Alamance counties in North Carolina.

BREDL will submit additional comments.

CO-17	Blue Ridge Environmental Defense League	
CO-17a	**Public Release of DEIS was Premature** Per Federal Energy Regulatory Commission (FERC) regulations on implementing the National Environmental Policy Act (NEPA), 18 CFR § 380.3(b), an applicant must (1) Provide all necessary or relevant information to the Commission and (2) Conduct any studies that the Commission staff considers necessary or relevant to determine the impact of the proposal on the human environment and natural resources. There are too many instances of incomplete data or lack of information mentioned throughout the DEIS. This DEIS should not have been released for public comment until the information was completed. For examples, • Regarding geotechnical studies for Dan River and Stony Creek Reservoir crossings: "Mountain Valley's geotechnical contractor determined that the current HDD design is feasible; however, additional geotechnical borings are planned to confirm the findings." "Access issues limited collection of geotechnical information at the Stony Creek Reservoir crossing location."[1] • Regarding data on springs in Virginia and North Carolina: "Published, recent data on springs in Virginia and North Carolina are not currently available. ..Based on surveys completed at this time..." [2] • Regarding wetlands: "Couldn't survey all wetlands..."[3] • Regarding Endangered, Threatened and Sensitive Species: " To date, Mountain Valley has not completed surveys or provided survey results to the Commission for federally listed bat hibernacula, aquatic biota, and plant species along the Project survey corridor." [4] Because the DEIS contains many information deficiencies, there are numerous FERC Staff recommendations listed throughout. These so-called recommendations illegally sidesteps public input and offer no guarantee that recommendations will become requirements. These holes in the DEIS will increase variance requests. The FERC variance process is not governed by regulations or published policy, does not include public input and does not allow for detailed analysis. FERC's reliance on recommendations and variances unlawfully circumvents the NEPA process. Moreover, the DEIS states that, "We determined that, for most resources, the construction and operation of the Project would result in limited adverse environmental impacts. This determination is based on our review of the information provided by Mountain Valley and further developed from environmental information requests; field reconnaissance; scoping; literature research; alternatives analyses; and contacts with federal, state, and local agencies, and other stakeholders. We conclude that approval of the Project would result in some adverse environmental impacts, but these impacts would be reduced to less-than-significant levels through implementation of our recommendations and Mountain Valley's proposed avoidance, minimization, and mitigation measures."[5]	See response GEN-4 in Appendix I.2. Our analysis is based on the best available survey and publically available data. Mountain Valley has completed geotechnical studies for the Dan River and Stony Creek HDD. Mountain Valley has also completed surveys for aquatic species and has submitted reports to FERC, USFWS, and state agencies. At the time of the final EIS, limited surveys are still pending for bat portals, federal and state listed plant species, and wetlands. Mountain Valley would be required to submit the results of these remaining surveys to FERC and the appropriate agencies prior to approval for construction.

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CO-17b	The DEIS is relying on recommendations to justify FERC's determination of less-than-significant impacts. There is no guarantee that these recommendations will become requirements or that they will be implemented. FERC must take a "hard look" at the environmental consequences of an action. Coalition for Responsible Growth ~ Res. Conservation v. FERC, 485 F. App'x 472, 474 (2d Cir. 2012).	Our recommendations will become conditions of the Commission Order. Mountain Valley would be required to satisfy all of the conditions of the Order prior to approval to begin construction.
CO-17c	This DEIS is fatally flawed because it lacks detailed and complete analysis which would aid public input and agency decision-making. It should be rescinded, fully completed, then re-released for public review once FERC's NEPA implementation regulations are properly met.	See response GEN-4 in appendix I.2.
CO-17d	**Request for 60-Day Extension** In light of numerous shortcomings of information throughout the DEIS, BREDL respectfully requests a 60-Day Extension for Public Comments.	See response GEN-5 in appendix I.2.
CO-17e	**Segmentation** FERC and Mountain Valley Pipeline, LLC have segmented the MVP Southgate project as a separate project outside of the MVP-mainline, illegally splitting this project into two parts. As BREDL pointed out in our August 21, 2018 comments at the Chatham, VA scoping meeting, "While this project is deemed as independent from the Mountain Valley Pipeline...it is indeed dependent on the completion of the MVP project." We further charge that FERC's attempt to mislead the public and to not evaluate these two "projects" in one environmental document was arbitrary and capricious. We are not convinced that FERC did not know about the Southgate Project prior to April 11, 2018. Construction had already started on the MVP-Mainline Project – just two months prior to the MVP-Southgate Project being announced. As soon as FERC received notice of the Southgate Project, FERC should have taken the appropriate actions. **Jun. 23, 2017 FERC issued the Final Environmental Impact Statement.** **Oct. 13, 2017 FERC issued a Certificate of Public Convenience and Necessity for MVP.** **Feb. 2018 Construction of the MVP began with tree-cutting.** **Apr. 11, 2018 MVP announces the MVP Southgate Project.** Federal agencies may not "artificially divid[e] a major federal action into smaller components, each without a `significant' impact." Coalition on Sensible Transp. v. Dole, 826 E2d 60, 68 (D.C. Cir. 1987). Without the MVP mainline project, the MVP Southgate project would be void. The mainline project has yet to be completed. FERC must consider both "projects" in one environmental document. The time between the issuance of the MVP-mainline FEIS in June, 2017 and the announcement of plans to build the Southgate in April, 2018 was just ten months. FERC certified the MVP-mainline in October, 2017 based on plans to have its gas flow into the Transco pipeline system, and then within a period of only six months, began articulating that this MVP-mainline gas would be redirected by the Southgate to "two new delivery points on the Dominion Energy distribution system in Rockingham and Alamance Counties, North Carolina."	See response GEN-8 in appendix I.2.

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CO-17e	Mountain Valley Pipeline, LLC sought to avoid addressing the entire project and its cumulative impacts. FERC had the authority and the responsibility to stop work on the MVP-mainline as soon as it received the news regarding the Southgate project. In fact, FERC is required to do so. FERC must analyze the MVP-Mainline and MVP-Southgate projects in one environmental document so that cumulative impacts can be properly considered and addressed. The Draft Environmental Impact Statement (DEIS) for the MVP Southgate says the following: "Mountain Valley states that the Project will provide additional firm natural gas transportation services for Dominion Energy to meet its growing supply needs via interconnections with the under construction Mountain Valley Pipeline project in southern Virginia and the interstate pipeline of East Tennessee in North Carolina to two new delivery points on the Dominion Energy distribution system in Rockingham and Alamance Counties, North Carolina."[9] The Southgate DEIS further states that "The Transco system does not connect with the Project's proposed receipt point with the Mountain Valley Pipeline."[10] However, the Final Environmental Impact Statement (FEIS) for the MVP-mainline, issued in June, 2017, states, "In general, as described by the Applicants, the purpose of both the MVP and the EEP is to transport natural gas produced in the Appalachian Basin to markets in the Northeast, Mid-Atlantic, and Southeastern United States. Specifically, the MVP would deliver the identified gas volumes (2 Bcf/d) to five contracted shippers via a pooling point at Transco Station 165 in Pittsylvania County, Virginia."[11] FERC has not shown that there are logical termini between the projects, or that each project results in a segment that has substantial independent utility apart from the other project. See Taxpayers Watchdog, Inc. v. Stanley, 819 F.2d 294, 298 (D.C. Cir. 1987) (Taxpayers Watchdog). In fact, the DEIS has indicated the opposite by stating that the purpose and need for the Southgate project is dependent on "Dominion Energy [meeting] its growing supply needs via interconnections with the under construction Mountain Valley Pipeline project." Per NEPA regulations, §1508.25, scope consists of the range of actions, alternatives and impacts to be considered in an environmental impact statement. The scope of an individual statement may depend on its relationships to other statements. Connected actions must be discussed in the same impact statement. Actions are connected if they automatically trigger other actions. Cumulative actions when viewed with other proposed actions to have significant impacts must be discussed in the same impact statement. The courts have ruled against such pipeline segmentation. Delaware Riverkeeper Network et al successfully argued that FERC's pipeline approval process was illegal because it had segmented its environmental review. On June 6, 2014, the United States Court of Appeals for the District of Columbia issued an opinion and order finding that FERC's segmentation violated NEPA and that FERC had failed to consider the cumulative impacts of these projects. The court decision stated:	See above CO-17e comment response

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	"The temporal nexus here is clear. Tennessee Gas proposed the Northeast Project while the 300 Line Project was under construction, and FERC plainly was aware of the physical, functional, and financial links between the two projects. And FERC's consideration of the Northeast Project application overlapped with its consideration of the remaining two projects. Indeed, FERC's review of the Northeast Project overlapped with its review of the Northeast Supply Diversification Project for the first six months and with the MPP Project's review for the final six months. Thus, FERC was obliged to take into account the condition of the environment reflected in the recently related and connected upgrades. The adjacent lands were recently disturbed, wildlife faced a larger habitat disruption, there was an increase in pressure and gas moving through the system, and wetlands and groundwater flow was disrupted. These effects could not be ignored in FERC's NEPA review of the Northeast Project.	
CO-17e	Tennessee Gas states that it did not know at the time it commenced the 300 Line Project that it was embarking on a series of upgrade projects that would soon transform the entire pipeline. That may be so. But the important question here is whether FERC was justified in rejecting commenters' requests that it analyze the entire pipeline upgrade project once the Northeast Project was under review and once the parties had pointed out the interrelatedness of the sequential pieces of pipeline which were, in fact, creating a complete, new, linear pipeline. Because of the temporal overlap of the projects, the scope and interrelatedness of the work should have been evident to FERC as it reviewed the Northeast Project. Yet FERC wrote and relied upon an EA that failed to consider fully the contemporaneous, connected projects."	See above CO-17e comment response
	No matter that construction on the MVP-Mainline Project is underway or how far along that construction may or may not be. **FERC must immediately stop work on the MVP-mainline project, halt the Southgate DEIS process, and return to square one. FERC must consider and evaluate these two projects - dependent on each other – in one environmental document.**	
	Purpose and Need / Convenience and Necessity	
CO-17f	FERC needs to further explain the purpose and need for this project. Meeting the "specific requests" of Dominion Energy is an extremely vague reason and frail attempt at meeting purpose and need and following the spirit of the NEPA.	
	The DEIS states,	
	"In general, as described by Mountain Valley, the purpose and need for the Southgate Project is to meet the specific requests for natural gas transportation service of its anchor shipper, Dominion Energy, a local natural gas distribution company. Mountain Valley states that the Project will provide additional firm natural gas transportation services for Dominion Energy to meet its growing supply needs via interconnections with the under construction Mountain Valley Pipeline project in southern Virginia and the interstate pipeline of East Tennessee in North Carolina to two new delivery points on the Dominion Energy distribution system in Rockingham and Alamance Counties, North Carolina."[12]	See response GEN-2 in Appendix I.2.

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CO-17f	The CEQ principle regulations for implementing the National Environmental Policy Act are "to make sure that federal agencies act according to the letter and the spirit of the Act."[13] Per NEPA CEQ regulation, Section 1502.13—the Purpose and Need Statement, the environmental impact statement "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." FERC approval of a pipeline requires a demonstration of need and that, on balance, the project will serve the public interest. (Certification of New Interstate Natural Gas Pipeline Facilities, 88 FERC ¶ 61,227 (1999), clarified, 90 FERC ¶ 61,128, further certified, 92 FERC ¶ 61,094 (2000)). Sources indicate that natural gas usage is beginning to decline both in the United States and Globally. In the U.S., the Energy Information Administration projects that gas production will decline 2% from 12% in 2018 to 10% in 2019. U.S. power generators' gas usage may be peaking, rising to an expected record 30.6 bcfd in 2019 but then falling to 29.6 bcfd in 2020 as renewables produce more electricity, EIA data shows.[14] Across the globe, demand for natural gas surged by 4.6% in 2018. However, the International Energy Agency says that extraordinary growth rate is not sustainable. Over the next five years, IEA expects gas demand to only increase by 1.6% per year on average.[15] As renewable energy continues to increase, the demand for natural gas will continue to decline. Further indication that the purpose and need of this project is weak at best and why more details are needed. In January 2018 a report by the International Renewable Energy Agency (IRENA), which has more than 150 member countries, says the cost of renewable energy is falling so fast globally that it should be a consistently cheaper source of electricity generation than fossil fuels by 2020. The report says the cost of generating power from onshore wind has fallen by 23% since 2010 while the cost of solar photovoltaic Solar Photovoltaic (PV) electricity has fallen by 73%. IRENA projects that wind and solar (PV) generation costs will fall to $0.03 per kilowatt hour by 2020.[16] In the U.S. a 2017 Department of Energy report confirmed that the United States can safely and reliably operate the electric grid with high levels of renewables. In 2010 renewables accounted for 11.9% of electricity generated with 3.5% from wind and 0.2% from solar. By 2017 renewables grew to 17.0% of electricity generated. Wind power grew to 6.3% and solar increased to 1.3%.[17] In October 2018, the United Nations released a dire report on Climate Change. The report said that by 2050, emissions of heat-trapping greenhouse gasses, including methane, should be reduced by 35%, relative to the 2010 rate. "Emissions would need to decline rapidly across all of society's main sectors, including buildings, industry, transport, energy, and agriculture, forestry and other land use," the report said.	See above CO-17f comment response

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CO-17f	The report also recommended changes to land use, urban planning, infrastructure systems and energy use. They recommended gas should only account for 8% of energy by 2050. Currently, natural gas makes up around 25% of global consumption. The Commission's role in reviewing the details of any project is to make a determination of public convenience and necessity. The Commission is supposed to base its decisions on financing, rates, market demand, gas supply, environmental impact, and other issues concerning a proposed project. It's not done so here. As mentioned earlier, market demand is waning. Steve Schlotterbeck, former CEO of EQT, has provided some details in financing and market demand. Here's an excerpt from desmogblog.com: "Back in 2014, Sheffield told Forbes that he expected Pioneer could produce a million barrels of oil a day from the Permian basin by 2024 — up from 45,000 barrels a day in 2011. Now, Sheffield, who left the helm of Pioneer in 2016 and returned this February, says that those million-barrel-a-day plans are looking increasingly doubtful as the industry has struggled to prove to investors that it's capable not only of producing enormous volumes of oil and gas, but that it can do so while booking profits rather than losses. 'We lost the growth investors,' Pioneer CEO Scott Sheffield told the Journal. 'Now we've got to attract a whole other set of investors.' Sheffield's comments on the shale oil industry's fiscal difficulties come on the heels of a warning from the former CEO of the country's largest natural gas producer about the shale gas industry's financial distress. Steve Schlotterbeck, former CEO of America's largest producer of natural gas, described the impact over a decade of fracking on Marcellus shale drilling companies at a recent petrochemical industry conference. 'In a little more than a decade, most of these companies just destroyed a very large percentage of their companies' value that they had at the beginning of the shale revolution,' he said, in remarks reported by DeSmog on Sunday. 'Excluding capital, the big eight basin producers have destroyed on average 80 percent of the value of their companies since the beginning of the shale revolution.' Schlotterbeck, the former CEO of EQT who now serves on the board of directors for the Energy Innovation Center Institute which offers training for workers in the oil and gas, solar, and construction trades, offered his view of the end results for investors at the petrochemical industry conference on Friday. A 2016 study conducted by Synapse Energy considering the need for the Mountain Valley and Atlantic Coast pipelines found that the regions natural gas supply using existing and upgraded infrastructure is sufficient to meet the maximum demand through 2030.[20] Additional new pipelines are not needed.	See above CO-17f comment response

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CO-17g	**EQT Financing** Following the financial trouble and drama coming out of EQT is like watching a television episode of Dallas or Yellowstone. It does not paint a stable picture of the company. If FERC fulfills its duties and responsibilities in an unbiased manner, then the shaky financing alone should void the MVP-Southgate Project. What follows is a timeline highlighting EQTs financial shenanigans: November 2017 Rice Energy was purchased by EQT making EQT the largest U.S. natural gas producer, according to Marcellus Drilling News. August 2018 In the middle of a family vacation, Rob McNally was summoned to Pittsburgh to interview for EQT's top job. He got the job after the unexpected departure of EQT's last CEO, Steve Schlotterbeck. EQT woes continued as the Pittsburgh Post-Gazette reported. "Things in the drilling fields had gotten off track to the tune of a $300 million cost overrun, which was revealed in a disastrous call with analysts in late October. Mr. McNally, then still the company's CFO, took a hit. He claims he learned of the operating issues late in the quarter and has blamed the EQT's siloed structure and punitive environment for not being told sooner. Analysts and some former employees have said Mr. McNally either knew or should have known about a derailment that significant. The morning of the analyst call, the executives were unprepared, said Jimmi Sue Smith, EQT's CFO. The team didn't have a cohesive message, she said. Even as the call was beginning, they were still piecing together what had gone wrong. "I knew it would be bad," Mr. McNally said. "But I didn't know how bad." The day of the call, EQT's stock price slid 13 percent. Mr. McNally officially became the CEO a few weeks later. And in a few more weeks, he'd become a target of a proxy war waged by former Rice Energy founders Toby and Derek Rice, who said Mr. McNally was part of the problem and — nothing personal, but ... — needed to be replaced at once. The logical replacement, they argued, was Toby Rice."[21]	Comment noted. These comments are outside the scope of the environmental analysis. However, as discussed in section 1.1 of this EIS, the Commission bases its decisions on financing, rates, market demand, gas supply, environmental impact, and other issues concerning a proposed project.

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CO-17g	December 2018 Once source told Marcellus Drilling News that EQT is a "total mess." "'Well, the EQT situation is a total mess.' So began a super secret email to Marcellus Drilling News from a highly-placed source we implicitly trust. Not long after receiving that email, we spotted a press release from the Rice brothers, Toby and Derek, who along with their other two brothers, previously founded and built Rice Energy into a major Marcellus/Utica operator."[22] January 2019 The Pittsburgh Post-Gazette reported on the Rice Brothers efforts to gain control of EQT and recent layoffs. Nearly a month after the founders of a company acquired by EQT Corp. challenged its CEO to a proxy fight, Rob McNally is fighting back. In a letter to shareholders issued on Monday — the same day that the Downtown-based oil and gas firm laid off more than 100 employees and promised the cuts would save $50 million annually — Mr. McNally offered confidence for the company's future and said returning money to shareholders would be among EQT's top priorities for the year. The letter comes after a long silence from the company which faced public criticism from two former executives of Rice Energy Corp., a company that EQT bought in a $6.7 billion deal in 2017. Derek and Toby Rice, with the support of at least one hedge fund, want to replace Mr. McNally with Toby Rice and to reconfigure the board of directors. Meanwhile, Monday's job cuts follow the layoffs of more than 200 employees in November 2017 after the close of the Rice deal. [23] February 2019 Prior to being laid off on Jan. 7, 2019, two EQT employees allegedly logged onto company computers and stole secrets. Thousands of proprietary documents, ranging from emails to a mission-critical program that tracks all of EQT's wells. [24] March 2019 Fitch Ratings changed EQM Midstream Partners and Equitrans Midstream outlook from stable to negative, as reported by Dow Jones & Company, Inc.	See above CO-17g comment response

CO-17	Blue Ridge Environmental Defense League	
CO-17g	June 2019 As The Street posted on its Real Money website section, there is nothing positive about EQT stocks. The site recommended they be avoided. Excerpts from the website point to EQT's financial slide. "In his second "Executive Decision" segment on *Mad Money* Tuesday night, our own Jim Cramer sat down with Rob McNally, president and CEO of EQT Corp. (EQT) , the natural gas producer embroiled in a bitter proxy fight with Rice Energy, a company it acquired in 2017. McNally said since his management team was put in place in November 2018, EQT has split its upstream and midstream businesses and has outperformed their peers. He admitted that in absolute numbers, this has been disappointing for shareholders, as natural gas prices have fallen. When asked about the proposals made by those backing Rice Energy, McNally said simply that those claims are not based in reality. He said while EQT is drilling fewer wells than before, they still expect 5% production growth this year." "In the weekly bar chart of EQT, below, we can see a three-year decline for this stock. Prices have remained below the declining 40-week moving average line for much of the past three years.  **Bottom-line strategy:** There is nothing positive or constructive about the charts of EQT. Avoid."[25]	See above CO-17g comment response

CO-17	Blue Ridge Environmental Defense League	
CO-17g	One of the shareholders of EQT stock has decided to sue the company over alleged fraudulent activities. Marcellus Drilling News reported: "The Cambridge (Massachusetts) Retirement System is not happy with their investment in EQT shares of stock, so they're suing the company. They hope to turn the lawsuit into a class action on behalf of other shareholders. Cambridge claims EQT made false and misleading statements about their purchase of Rice Energy–claims about cost efficiencies that never materialized, and claims about the location of Rice leases that were not as close to EQT's acreage as claimed. In a word, Cambridge is alleging fraud on the part of EQT."[26] July 2019 "Natural gas producer EQT Corp's largest shareholder on Monday extended its support for the nominees of Toby and Derek Rice, the two brothers who sold their company to EQT more than a year ago and are pressing for changes to its board. The Rice brothers were part of the founding team at Rice Energy, which was bought by EQT in November 2017. They say EQT management is responsible for the company's underperformance since the deal and have pushed for an overhaul of its board."[27] Toby Rice is named CEO of EQT. Rice ousted former CEO Robert McNally, who was named CEO last year after Steven Schlotterbeck resigned. August 2019 Jimmi Sue Smith, who became EQT's senior vice president and chief financial officer in November 2018, was terminated — without cause — effective Thursday, according to a Securities and Exchange Commission filing. Earlier in the month, Gary Gould, on the job roughly six months as chief operating officer, abruptly left EQT.[28] September 2019 The Pittsburgh Post-Gazette reported that EQT Corp. is laying off 196 employees, nearly one-quarter of its workforce, the Downtown Pittsburgh-based natural gas producer announced Tuesday, September 10. The newly announced layoffs bring EQT's total number of employees down to about 650, compared to more than 900 who were on payroll last year. WPXI has reported on EQT plans to lay off around 200 as the company's financial instability continues. "EQT Corp. is readying plans to lay off around 200 employees in a move that could happen sometime this week. Multiple sources told the Business Times about the plans for the layoffs, which would be a significant portion of the 800 or so employees that are working at the downtown Pittsburgh-based natural gas driller. It would be the second round of layoffs at EQT (NYSE: EQT) since January, when about 100 employees were laid off by the previous management team. EQT declined comment."[29] As you can see from the above timeline, EQT is an unstable company with significant financial problems.	See above CO-17g comment response

CO-17	Blue Ridge Environmental Defense League	
CO-17h	**Exports** The DEIS indicates that MVP has said the company has no plans to export natural gas.[11] Yet, once the natural gas gets to the end of the pipeline, it is no longer up to MVP. MVP has said that themselves. In addition, market forces indicate exporting LNG will increase in the coming years. "Analysts believe the natural gas market is not trading on demand fundamentals because supply growth continues to far outpace rising consumption. Energy firms are pulling record amounts of oil from shale formations and with that oil comes associated gas that needs either to be shipped or burned off."[12] "U.S. Natural Gas supplies will increasingly reach foreign markets in the form of liquefied natural gas, a form of the fuel chilled to its liquid form, mostly for transport by sea. IEA says the U.S. could top Qatar and Australia as the world's top LNG exporter by 2024. IEA expects new LNG capacity from the U.S., Australia and Russia will make up 90% of export growth."[13] In a November 2016 Roanoke Times article, it was reported that "[t]wo years ago, WGL Midstream and Vega Energy Partners signed a 20-year natural gas sales agreement with a U.S.-based subsidiary of GAIL Ltd., a natural gas company in India, to supply natural gas for export through the Dominion Cove Point liquefied natural gas export facility in Maryland. WGL reported that "the majority of the natural gas would be purchased by WGL Midstream through an existing arrangement with Antero Resources Corp. In a June 2015 email, Ruben Rodriguez of WGL affirmed that most of the natural gas for the GAIL agreement would be supplied by Antero but noted that "natural gas from the Mountain Valley Pipeline could be part of the remaining GAIL supply portfolio."[14] In the Roanoke Times article, Natalie Cox, a spokeswoman for Mountain Valley Pipeline, noted "The proposed MVP terminates at Transco's station 165, at which time the shippers determine where their portion of the gas will be used."[15] The DEIS further states, "The nearest LNG export terminal to the terminus of the Project would be the existing Cove Point LNG terminal on the Chesapeake Bay in Calvert County, Maryland, about 190 miles away. There is no direct connection from the Project terminus in Alamance County, North Carolina to the Cove Point terminal."[16] As FERC should be quite aware, pipelines criss cross throughout the United States. Natural Gas via the MVP and MVP Southgate Projects finding its way overseas is clearly possible. That MVP would have to seek approval if the project is expanded to export natural gas is no substitute for review now. At that point, the MVP Southgate would have already been completed. There has to be more of a guarantee that exportation will not be needed to financially sustain this project.	As noted in section 2.8, the Southgate Project is not able or designed to export natural gas.

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CO-17i	**Section 106** More effort is required to contact and seek input from the tribes. Just because there was no response is not sufficient. Per NEPA §1501.2 (2), FERC is obligated to consult early with Indian tribes. Federal and FERC guidance also requires that FERC must reach out to tribes, not just the project sponsor – MVP in this case. **We are requesting under the Freedom of Information Act all communications between FERC and the tribes.** In the DEIS, it is stated that, "A private citizen of Virginia, Ann Rodgers, suggested that we consult with the Cheyenne River Sioux Tribe and the Rosebud Sioux Tribe of South Dakota about the Project. However, when Mountain Valley reached out to the Cheyenne River Sioux Tribe and the Rosebud Sioux Tribe, these two tribes did not respond to correspondence."[37] Executive Order 13175 (2000), Consultation and Coordination with Tribal Governments lists as one of its purposes "to strengthen the United States' government-to-government relationships with Indian tribes..." Thus, the government-to-government consultation process continues to embody the unique relationship between the United States and Indian tribes. FERC's own procedures require consultation: "The Commission does not delegate its government-to-government Tribal consultation responsibilities. Within the context of our governing statutes (e.g., the NGA), the FERC has a trust responsibility to federally recognized Tribes, as described more fully in the FERC's Policy Statement on Consultation with Indian Tribes in Commission Proceedings.19 Tribes may also have additional interests beyond the identification and treatment of cultural resources, and those concerns may be of a larger environmental, socio-economic, or health context. If a Tribe does not wish to communicate or coordinate with the project sponsor, the Commission will consult directly with the Tribes. While a project sponsor is expected to reach out to Tribes early in its application planning stage, the FERC typically initiates consultation when the FERC staff has enough information to initiate its NEPA process and issues a Notice of Intent to Issue an Environmental Document. Additionally, project-specific letters from the FERC staff to Tribes may be issued on a project-by-project basis."[38] It further states: "If no response is received from a Tribe within 30 days after the request for comments is sent that does not necessarily mean that the Tribe does not have interest. The project sponsor or its consultant should follow-up with a telephone call, email, or other means, to verify that the appropriate Tribal representative has received the information, and either doesn't require any further information or has no comments."[39] The courts have made it clear that a federal agency must fulfill its obligation to consult. City of Phoenix, Arizona v. Huerta, 869 F.3d 963 (D.C. Cir. 2017) FERC's duty here is inescapable.	In section 4.10.4 of the DEIS, we acknowledge that the entire pipeline route has not yet been completely inventoried for cultural resources, and recommend that the Commission Order authorizing the Project contain an environmental condition that construction may not begin until after all archaeological surveys have been completed and reviewed, and we have completed the process of compliance with the NHPA.

CO-17	Blue Ridge Environmental Defense League	
CO-17j	BREDL will submit additional comments on Section 106. **Cumulative Air Quality Impacts** ***Why we need a cumulative air quality impact assessment at Transco Village*** The Lambert compressor station is proposed for construction as part of the Southgate pipeline at Transco Village in Chatham, VA. As stated in the Southgate DEIS, the proposed construction site of the Lambert compressor is approximately 0.62 mile from Transco Compressor Station 165 and about 600 feet from Lambert Compressor Station 166. Anticipated air pollution from the Lambert compressor station, combined with air pollution from Transco Compressors 165 and 166, will cumulatively exceed threshold levels under PSD/NNSR Major Source for NOx, CO, and Total HAPs, as well as thresholds levels under Title V for NOx, CO, VOC, and Total HAPs. FERC must perform a cumulative impacts assessment to quantify the air pollution impacts of adding the Lambert compressor station to the two existing compressors at Transco Village. We understand that permitting under PSD/NNSR Major Source and Title V is conducted on a "per facility" basis. However, this does not exonerate FERC from considering cumulative impacts of all three compressors, all of which will be confined to a space less than a mile in length. Paradoxically, the Article 6 Air Permit Application for the Lambert Compressor Station, submitted by Southgate developer Mountain Valley Pipeline, LLC in November 2018 states on page 9-23, "Because operation of the Southgate Project, along with the other existing and proposed major Title V projects/facilities, will be regulated by the VADEQ and NCDEQ through the air permitting process, the cumulative effects of the operation of the Project with other projects is not expected to result in adverse air quality impacts." Here it appears that the permitting processes of the state DEQs are being proffered by Mountain Valley Pipeline, LLC as a substitute for a cumulative impact assessment of co-locating three compressor stations in a very confined geographic area. The need for FERC to perform this cumulative impact assessment is supported by Virginia Department of Environmental Quality (DEQ)'s comments to the Southgate DEIS, which state, "In section 5.1.11 they discuss conducting modeling to demonstrate compliance with all air standards. It should be noted the modeling conducted did not account for any nearby sources or background emissions." A cumulative impacts assessment must be performed by FERC to prevent the creation of an "air pollution ghetto" in the rural community surrounding Transco Village in Chatham, VA. Wilma Subra, who served for seven eyars as vice-chair of the EPA's National Advisory Council for Environmental Policy and Technology, and for six years on the EPA's National Environmental Justice Advisory Council, documented the following health threats to families living near compressor stations (source: Southwest Pennsylvania Environmental Health Project, Summary on Compressor Stations and Health Impacts, February 24, 2015):	An analysis of the cumulative impacts on air quality, including nearby compressor stations, is discussed in section 4.13.2.9 of the EIS. Air quality impacts on public health are discussed in section 4.11.1.7.

CO-17	Blue Ridge Environmental Defense League	
CO-17j	Acute Health Impacts Experienced by Individuals Living and Working near Compressor Stations tension and nervousness joint and muscle aches and pains vision impairment personality changes depression, anxiety irritability confusion drowsiness weakness irregular heartbeat irritation to skin, eyes, nose, throat and lungs respiratory impacts sinus problems allergic reactions headaches dizziness, light headedness nausea, vomiting skin rashes fatigue weakness Chronic Health Impacts Experienced by Individuals Living and Working Near Compressor Stations damage to liver and kidneys damage to lungs damage to cardiovascular system damage to developing fetus reproductive damage mutagenic impacts developmental malformations damage to nervous system brain impacts leukemia aplastic anemia changes in blood cells and clotting. ***Transco compressor renovations*** Transco Compressor 166 was completed in 2018. Transco Compressor 165 is currently in the planning process for major renovation, with expected completion date of June, 2021. The permitting process for this renovation is still in progress, and there is potential that Virginia DEQ may deny the permit or require that it be amended. For this reason, it is necessary to acknowledge that the combined air pollution outputs of Transco stations 165 and 166 consist of two sets of figures, one "before renovation", i.e. the existing outputs, and another "after renovation", reflecting drastically reduced pollution outputs resulting from equipment upgrades.	See above CO-17j comment response

CO-17	Blue Ridge Environmental Defense League	
CO-17j	For this reason, we offer the following table to illustrate the "before" and "after" pollution scenarios anticipated at Transco Village. Table 2.1 is taken from the Transco Southeastern Trail Project Air Permit Application (source: Transcontinental Gas Pipeline Company, LLC, Southeastern Trail Project, Air Permit Application, Compressor Station 165, June 20, 2018, Table 2-1, p.4). *TABLE 2.1 POTENTIAL EMISSIONS CHANGE FOR STATIONS 165 & 166 (TONS/YR)* **Potential Emissions** / NO_x / CO / VOC / PM / PM_{10} / $PM_{2.5}$ / SO_2 / Total HAPs Existing Stations 165 and 166 Potential Emissions: 3,746.10 / 1,026.40 / 251.20 / 60.30 / 60.30 / 60.30 / 10.10 / 73.49 Potential Emissions Increase From New Equipment: 92.75 / 33.08 / 17.28 / 11.67 / 11.67 / 11.67 / 6.00 / 3.56 Potential Emissions Decrease For M/L 1 – M/L 10 Shutdown: (3,222.00) / (668.00) / (159.00) / (36.00) / (36.00) / (36.00) / (2.20) / (53.31) **Post Project Potential Emissions From Stations 165 and 166**: **616.85** / **391.48** / **109.48** / **35.97** / **35.97** / **35.97** / **13.90** / **23.74** In light of the information provided by Transcontinental Gas Pipeline Company in Table 2.1, above, it is very concerning to BREDL that the Southgate DEIS drastically underreports the air pollution levels anticipated to be emitted by Transco Compressors 165 and 166. This underreporting, occurring in Table 4.13-6 from the Southgate DEIS (copied below), must be corrected so that the Southgate FEIS more accurately reflects the data offered by Transcontinental Gas Pipeline Company. TABLE 4.13-6 **Potential Annual Emission Rates Associated with the Southgate Project and Transco Compressor Station 165 and 166 (tons per year)** NOx / CO / VOC / SO_2 / $PM_{2.5}/PM_{10}$ Lambert Compressor Station: 34.9 / 58.6 / 8.4 / 5.4 / 10.4 Transco Compressor Station 165 a/: 182.3 / 207 / 35.4 / 12 / 23.3 Transco Compressor Station 166 b/: 32.4 / 29.49 / 3.2 / 5.16E-02 / 2.1/3.8 a/ Source: FERC 2019 b/ Source: FERC 2016 ***Thresholds will be exceeded*** To illustrate the facts supporting the need for a cumulative air quality impact assessment, BREDL offers the following chart, which has been compiled using data from the Lambert revised permit application (source: Mountain Valley Pipeline, LLC, Lambert Compressor Station, Southgate Project, Article 6 Air Permit Application, Revision 1, April 25, 2019) and the Transco permit application for renovation of Transco compressor 165 (source: Transcontinental Gas Pipeline Company, LLC, Southeastern Trail Project, Air Permit Application, Compressor Station 165, June 20, 2018). As can be seen by comparing the chart below with Table 2.1, above, we have used the "after renovation" air pollution outputs from Transco Compressor 165 as the basis of our calculations. Even after accounting for the drastic air quality improvements anticipated through renovation of Transco Compressor 165, the combined pollution from the three compressors at Transco Village will exceed thresholds for NOx, CO, and Total HAPs.	See above CO-17j comment response

CO-17 **Blue Ridge Environmental Defense League**

Cumulative air pollution impacts of 3 compressors at Transco Village meet 7 threshold criteria

Source	NOx	CO	VOC	PM	PM10	PM2.5	SO2	Total HAPS
MVP Lambert	34.86	58.58	8.44	10.35	10.35	10.35	5.38	4.52
Transco 165/166	616.85	391.48	109.48	35.97	35.97	35.97	13.90	23.74
TOTAL	651.71	450.06	117.92	46.32	46.32	46.32	19.28	28.26
PSD/NNSR Major Source Threshold (tons/year)	250	250	250	n.a.	250	250	250	25
Does TOTAL meet threshold under PSD/NNSR?	yes	yes	no	n.a.	no	no	no	yes
Title V permit (40 CFR 70) major source threshold	100 of any air pollutant	100 of any air pollutant	100 of any air pollutant	100 of any air pollutant	100 of any air pollutant	100 of any air pollutant	100 of any air pollutant	25
Does TOTAL meet threshold under Title V?	yes	yes	yes	no	no	no	no	yes

It should be reiterated that BREDL recognizes that permitting under the two programs cited in the chart above, PSD/NNSR Major Source and Title V (40 CFR 70), is conducted on a "per facility" basis which does not take into account the outputs of neighboring facilities. However, the requirements under NEPA for consideration of cumulative impacts in cases such as we see developing at Transco Village are clear and unequivocal.

Hazardous air pollutants

As illustration of what is meant by "Total HAPS" in the chart, above, we offer the following chart providing a detailed list of the Hazardous Air Pollutants (HAPs) anticipated as combined emissions from the three compressors at the Transco Village site. Please note that the figures in this chart reflect the improved emissions that are anticipated after the renovation of Transco compressor 165.

Lambert and proposed Transco Stations 165 & 166 potential emissions – after renovations of Transco compressor 165 (source: Transcontinental Gas Pipeline Company, LLC, Southeastern Trail Project, Air Permit Application, Compressor Station 165, June 20, 2018)

		LAMBERT	TRANSCO 165/166	TPY	lbs/yr
Hazardous Air Pollutants (HAPs)	AP-42 Emission Factor (lb/MMBtu)	Facility PTE (tons/yr)	Post Project Potential to Emit (tons/yr)	TOTAL	TOTAL
VOC-HAP					
Acetaldehyde	4.00E-05	0.115	2.01	2.125	4,250.00
Acrolein	6.00E-06	0.0184	1.56	1.5784	3,156.80
Benzene	1.20E-05	0.0345	0.09	0.1245	249.00
1,3-Butadiene	0.00E+00	0.0124	0.00159	0.01399	27.98
Dichlorobenzene		0.000004		0.000004	0.01
Ethylbenzene	3.20E-05	0.092	0.12	0.212	424.00
Formaldehyde	7.10E-04	3.47	18.93	22.4	44,800.00
Hexane		0.00595	0.17	0.17595	351.90
Naphthalene	1.00E-06	0.00374	0.00253	0.00627	12.54
PAH	2.00E-06	0.00632	0.00396	0.01028	20.56
Propylene Oxide	2.90E-05	0.0834	0.05	0.1334	266.80
Toluene	1.30E-04	0.374	0.48	0.854	1,708.00
Xylenes	6.40E-05	0.184	0.31	0.494	988.00

Thank you for your prompt attention to this matter.

CO-17j

See above CO-17j comment response

CO-17	Blue Ridge Environmental Defense League	
CO-17k	**Restrict Burning on Moderate PM 2.5 Forecasted Days in the Region** The DEIS (p. 4-193 or pdf p. 323) mentions that open burning will be used to dispose of land clearing debris. To lessen severe health impacts, especially to sensitive populations, open burning must be restricted to days when regional particulate matter is forecasted to be low. Sources of fine particles (PM 2.5) include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. PM 2.5 is associated with increased premature deaths and is especially harmful to people with lung disease such as asthma and chronic obstructive pulmonary disease (COPD), including chronic bronchitis and emphysema, as well as people with heart disease. Exposure to particulate air pollution can trigger asthma attacks and cause wheezing, coughing, and respiratory irritation in individuals with sensitive airways. An estimated 200,000 people die early deaths each year in the U.S. because of PM 2.5 exposure. Researchers have found that for every increase of five micrograms per cubic meter of PM 2.5 pollution the risk of lung cancer rose by 18%, and for every increase of 10 micrograms per cubic meter in PM 10 pollution the risk increased by 22%.[46] An earlier study found for each 10 µg/m3 increase in PM2.5 concentrations there was an associated 15–27% increase in lung cancer mortality.[47]	As discussed in section 4.11.1.7, any open burning would be conducted on a site-specific basis, and in accordance Mountain Valley's Fire Prevention and Suppression Plan and Virginia and North Carolina regulations (9VAC5-130; 15A NCAC 02D.1900). This would include burning only in approved burn areas and during appropriate weather conditions to avoid any impacts on nearby residences, and complying with the open burning prohibition in Virginia from May 1 through September 30.
	Safety	
CO-17l	The DEIS states, "In accordance with DOT regulations, the proposed facilities would be regularly inspected for leakage and potential pipeline hazards such as construction activity, encroachments, and evidence of recent unmonitored excavations as part of scheduled operations and maintenance, including: • physically walking and inspecting the pipeline corridor periodically; • conducting fly-over inspections of the right-of-way as required; • inspecting and maintaining MLVs and meter stations; and • conducting leak surveys at least once every calendar year or as required by regulations."[48] Please define "periodically" and "as required".	See response SAFE-1 in appendix I.2.
	Additional Comments	
	Erosion and Sediment Control	
CO-17l	The DEIS states, "The Project would cross about 1.8 miles of slopes greater than 30 percent. Mountain Valley has developed construction methods for rugged terrain, which include slopes that typically exceed 30 to 35 percent, to allow for the safe operation of equipment, and prevention of severe erosion. "(DEIS, p. 77) With all due respect, after what has occurred along the MVP mainline, we have no faith that MVP's Erosion and Sediment Control Plan (E&SC Plan) and Best Management Practices (BMPs) (DEIS, p. 28) will work and pose "no permanent effects to surface or ground water." (DEIS, p. 30)	See response GEN-6 in appendix I.2.
	Endangered and Threatened Species	

CO-17	Blue Ridge Environmental Defense League	
CO-17n	According to the DEIS MVP/FERC would like to use the DEIS as the Biological Assessment for the project.[49] We strongly object to this. We respectfully request that the FWS require and complete the proper Biological Assessment. An assessment that – unlike this DEIS - is not lacking in species surveys.	See response T&E-2 in appendix I.2.
CO-17o	**Working 24-Hour a day** Longstanding policy of the Federal Energy Regulatory Commission (FERC) is to cooperate with local jurisdictions. As stated in the MVP Southgate DEIS, "the FERC encourages cooperation between applicants and state and local authorities[50]..." This statement is in consonance with FERC policy under sections 3 and 7 of the Natural Gas Act[51]. However, instead of respecting local governments' ordinances that were put in place to promote the health, safety and general welfare of its citizens, FERC is allowing MVP to upend this protection. The DEIS stated that "Mountain Valley is in discussion with Pittsylvania County to assess applicability of the Pittsylvania County Noise Ordinance with regards to 24-hour construction at the Lambert Compressor Station."[52] MVP does not need to work 24 hours a day to construct a compressor station. Buildings and facilities go up every day all over this country without continuous noisy work going on 24 hours a day. Let the residents and animals near the compressor station get a good nights sleep.	See section 4.11.2.3 for a revised discussion of noise levels due to 24-hour construction at the Lambert Compressor Station.
CO-17p	**Property Values** The DEIS stated, "Our review of available studies indicates that the Project is not likely to have a significant adverse impact on property values."[53] BREDL research indicates that property values have plunged for some landowners who signed easements for the Atlantic Coast Pipeline in Highland and Nelson Counties, Virginia. In Nelson County, we found three properties that averaged a reduction in property value of 32.5%. In Highland County, many properties with signed easements decreased in value on an average of 7%.[54]	See section 4.9.5 of the EIS for a discussion or property values.
CO-17q	**No Action Alternative** We respectfully request the Commission to choose the No Action Alternative and deny the Certificate for the Mountain Valley Pipeline, LLC Southgate Project. This project is not needed and does not serve the public convenience and necessity. Respectfully submitted, Mark E. Barker Executive Assistant, BREDL	We concluded in Section 3.2 that the No Action Alternative does not meet the Project objective and is not likely to provide a significant environmental advantage.

CO-22	Haw River Assembly

Haw River Assembly
Phone: (919) 542-5790 P.O Box 187 Bynum, NC 27228 www.hawriver.org

September 16, 2019

Emily Sutton, Riverkeeper
Haw River Assembly
P.O Box 187
Bynum, NC 27228

Haw River Assembly is the Waterkeeper organization responsible for protecting the Haw River watershed in North Carolina. Our organization represents over 1,000 members and supporters in 8 counties throughout our watershed. The Mountain Valley Pipeline Southgate extension project would cause irreversible harm to the Haw River watershed. The proposed Draft Environmental Impact Statement excludes many significant impacts to the watershed and overlooks potential threats and risks. Please see the following comments and revise the Draft Environmental Impact Statement to accurately assess the environmental threats posed by this project.

4.3 Water Resources

Landowner surveys have not been completed and many locations of wells and springs are unknown. Not enough information is included and finalized to approve this DEIS based on this uncertainty.

The DEIS minimizes the risk of impacts to private well owners water quality. Blasting and heavy equipment can damage infrastructure and make well water unsafe. This is not a risk the impacted communities and landowners can bear.

Communities already face contaminated drinking water sourced from the Haw River and surface water reservoirs. The risk of contaminated wells is a significant risk. Many of these contaminants can go undetected in drinking water, due to no color or scent. Private well owners are financially responsible for testing well water; this testing is extremely cost prohibitive, leaving many landowners unaware of contamination.

Erosion and sedimentation is an ongoing concern in the Haw River basin, and many of our streams are impaired due to poor benthic life. Most streams have not been surveyed by the state, but at Haw River Assembly, we monitor streams through our volunteer programs and through ongoing certified lab sampling. Sedimentation, erosion, and increases in stormwater velocity, has left many creeks with steep, inaccessible banks, void of healthy aquatic habitat. The risk of increasing erosion and sedimentation, increasing turbidity levels should not be minimized.

All of these streams in the Haw River basin must adhere to the Jordan Lake rules, which requires strong nutrient protections and sedimentation measures. Mountain Valley's requirement

CO-22a	See response GW-1 in appendix I.2.
CO-22b	See response SURF-2 in appendix I.2.
CO-22c	Section 4.3.2.4 of the EIS discusses the Jordan Lake Riparian Buffer.

CO-22	Haw River Assembly	
CO-22d	to restore the ground surface "to original contours as closely as practicable" leaves us with serious concerns. We have seen the work MVP contractors have done on the mainline and have little faith that these requirements will be met at all. However, leaving so much subjectivity in what is or what is not practicable allows MVP Southgate to argue the the bare minimum is all that is necessary. This is a sensitive watershed and this project will not be completed in a way that prevents serious watershed degradation.	See response GEN-6 in appendix I.2.
CO-22e	Many public water supply intakes are located downstream of these stream crossings, but further than three miles downstream. Many of the contaminants that could impact drinking water quality do not breakdown. Therefore, this three mile limit for downstream impacts is not an accurate assessment of the full scope of impacts.	See response CO-22c.
CO-22f	Dam - and - pump or flume methods can cause potentially irreversible degradation to stream health. In order to adequately assess impacts, the crossing methods should be specified for each stream crossing in the initial DEIS in order for thorough review and comment.	See response SA-2a-2 in appendix I.3. See also response SURF-4 in appendix I.2.
CO-22g	Including clauses like "when practicable" leaves too much subjectivity to MVP Southgate contractors. We have seen over 200 water quality and sediment and erosion control violations on the mainline done by the same teams.	Appendix B.5 provides the proposed crossing method for each waterbody.
CO-22h	HDD and conventional bore crossing methods do in fact have impacts on surface water bodies and ground water, though this DEIS states otherwise.	see response GEN-6 in appendix I.2.
CO-22i	Crossing Stony Creek Reservoir is a threat to over 50,000 people who depend on the reservoir for protected drinking water.	See section 4.3.2.2 and 4.3.2.7 for discussion of impacts from HDD and conventional bore crossings.
CO-22j	The lack of information regarding Deep Creek crossings leaves this DEIS incomplete.	See section 4.3.2.4 for discussion of the Stony Creek Reservoir crossing.
CO-22k	Having work areas back 50 ft from wetlands and waterbodies is inadequate. Allowing for less than a 50 foot setback is against the Jordan Lake Rules which are in place to protect streams from nutrient and sediment impairment.	Section 4.3.2.2 has been updated with information regarding the Deep Creek crossing.
CO-22l	Having a 15 foot butter on waterbodies and wetlands is not adequate and does not adhere to the Jordan Lake Rules.	See response CO-22c.
CO-22m	Many impacted waterbodies are listed as inclusive data. This is not enough information to assume that those waterbodies are not impaired and careful attention should be given to all stream crossings. Downstream segments are impaired due to turbidity, nutrients, and benthic life, all of which could be degraded by this project upstream.	See section 4.3.23 for a discussion of impaired waterbodies.
CO-22n	Variance request should be denied due to high risks of sedimentation and nutrient pollution in Jordan Lake.	See response CO-22c.
CO-22o	Much of the pipeline is in the flood zone of the Haw River, which has seen record flooding the past two years. This volume and velocity of water will be increased with less buffer protection and compacted soils from heavy machinery.	See response SURF-7 in appendix I.2.
	The DEIS also minimizes any cumulative impacts to surface waters. This is misleading. Dredging, open-cut pipeline crossings, and other instream activities will have a great impact on surface water quality health in the stream and downstream throughout the watershed.	

CO-22	Haw River Assembly	
CO-22p	The DEIS also minimizes impacts by stating that a HUC-10 is an appropriate sized watershed for this project, implying that the streams and cumulative impacts to those streams will be managed and mitigated through the natural processes of the aquatic system. The Haw River watershed has extremely flashy flow tendencies. The high and low flow points have not been factored into this review. Jordan Lake Buffer rules have also not been mentioned in the cumulative impacts. What will the sediment and nutrient load be? How will cumulative impacts be quantified for long term impacts to the buffer zones?	See section 4.12.2.2 for discussion of cumulative impacts on water resources.
CO-22q	There has not been a feasibility study done to assess access to Deep Creek. This DEIS should not be approved until that assessment has been completed and the public has had adequate time to comment and review that assessment.	See response CO-22k.
CO-22r	Dry- ditch crossing methods in impaired streams are not an adequate way to prevent sedimentation, erosion, and aquatic health destruction.	See response CO-22m.
CO-22s	This project proposes to use 5.9 million gallons from two municipal water sources. How will that water be disposed of? What will the impacts be to receiving waters? These are critical questions that have been excluded from this review.	Measures regarding hydrostatic test water discharge are provided in section 4.3.2.7 of the EIS and VII.D.1 of Mountain Valley's Procedures.
CO-22t	**4.4 Wetlands** Pipeline construction will impact nearly 27 acres of wetlands and will result in permanent impacts to nearly 6 acres of wetlands through ongoing maintenance. Although some areas would be allowed to regrow, due to the length of time required for the wetlands to regenerate, construction impacts would be long-term. And despite FERC's own Procedures which specify that all additional temporary work spaces be set back at least 50 feet from a wetland, Mountain Valley has proposed 23 locations for workspaces within 50 feet of a wetland and has asked for modifications to those procedures.	See response WET-1 in appendix I.2.
CO-22u	**4.6 Wildlife and Fisheries** MVP says it relies on its "consultation with US Fish and Wildlife Service" to minimize impacts, but courts have just recently thrown out multiple FWS permits regarding endangered species relying on similar assumptions and stating that this is not sufficient to protect species. MVP, LLC presents no evidence to show that construction of the pipeline will not harm or destroy these numerous species and instead relies on a broad, general promise that it will not harm species because it will do its best not to. "Mountain Valley would implement erosion and sediment control BMPs described in its E&SC Plan at all crossings of waterbodies containing fisheries of special concern. Mountain Valley also would adhere to all federal and state permit conditions, including those regarding the minimization of impacts on fisheries of special concern including adhering to recommended work windows for in-water construction (or requesting a work-window modification, if needed)."	FERC continues to work with FWS and state agencies. Consultation with the FWS is required by Section 7 of the ESA. Federal agency compliance for the Endangered Species Act (ESA) Section 7 is described in section 4.7.1 of the EIS.

CO-22	Haw River Assembly	
CO-22v	**4.9 Socioeconomics** The Socioeconomic impacts do not include social services that will be provided to out of town workers for this project. The DEIS is misleading in stating that "Affected counties would experience the greatest impacts associated with employment, housing, public services, transportation, traffic, property values, economy, and taxes." Local employment will not be increased, property values will decrease, and any impacts to the surrounding economy will be short lived.	An assessment of the social services provided to our of town workers is beyond scope of EIS. A socioeconomics analysis is provided in section 4.9 of EIS
CO-22w	**4.13 Cumulative Impacts** The DEIS states that soil impacts would be localized, however, ground disturbance in the buffer areas and in the streams during crossings construction will result in extreme sedimentation and erosion impacts. Many small streams are crossed in a close proximity in this proposed project, and these small streams will be inundated with sediment and aquatic habitat will be threatened. The cumulative impacts have not factored in the amount of increased impervious surfaces that will also be contributing to stormwater velocity and temperature increases. The DEIS lists the Mountain Valley Pipeline (mainline) project as an example for minimizing cumulative impacts, yet this project has already seen over 200 water quality violations, which is not only a burden to stream health, but to state agency staff budgets. The DEIS also minimizes any cumulative impacts to surface waters. This is misleading. Dredging, open-cut pipeline crossings, and other instream activities will have a great impact on surface water quality health in the stream and downstream throughout the watershed. The DEIS repeatedly describes large, significant impacts, and then bases its prediction of no significant impacts on MVP's compliance with mitigation measures. There are many problems with this. These include MVP's history of noncompliance during construction of the mainline , many of the mitigation measures relied upon to predict no significant impacts are unspecified in the DEIS, and the DEIS predicts long-lasting or permanent impacts to hundreds of acres of forests and wetlands, but ignores these impacts in saying that mitigation measures will avoid significant impacts. Mitigation can not prevent significant impacts permanent forest and wetland destruction that is essential to the design of the project.	See response CI-1 in appendix I.2. Also, see response to GEN-6 and SURF-2 in appendix I.2. There would be a minimal increase in impervious surfaces as a result of the Project as most areas would be revegetated after construction is complete.
CO-22x	By its own admission, FERC released this DEIS - and its conclusion that no significant environmental impacts would be inflicted by this project - while lacking the necessary information to assess what the impacts to various environmental resources would be. For example, MVP has yet to provide FERC with its feasibility studies for its plan to cross Deep Creek with the pipeline, a site where imperiled aquatic species are suspected to live. The DEIS acknowledges that MVP will use 5.9 million gallons of water in constructing the project, but has no information regarding where MVP will source that water from, preventing FERC from assessing the environmental impact of those water withdrawals. Lastly, archaeological surveys have not been completed for the project area, preventing analysis of impacts to cultural resources.	See response GEN-4, SURF-8, and CULT-1 in appendix I.2. As discussed in section 4.6.5 of the EIS, Mountain Valley has provided aquatic species surveys results.

CO-22	Haw River Assembly	
CO-22y	MVP, LLC has failed to show that it will not harm threatened and endangered species in constructing MVP Southgate, relying on nothing more than tautological assurances that pipeline construction will not harm species because it has concluded after review that the pipeline will not harm species.	See response T&E-2 in appendix I.2.
CO-22z	In conclusion, too many critical components have been overlooked and excluded from this Draft Environmental Impact Statement. The communities who would potentially face the burden of those impacts should have adequate time to read a respond to additional information that would be submitted later in the process. Additionally, impacts that have been admitted and included here have been presented in a misleading way, or have been significantly lessened. We urge you to deny this Draft Environmental Impact Statement until it is complete and accurately assess the impacts of this proposed project.	Comment noted. See responses above.

CO-24 Appalachian Mountain Advocates

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of

MOUNTAIN VALLEY PIPELINE, LLC Docket No. CP19-14-000

COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR MOUNTAIN VALLEY PIPELINE, LLC'S PROPOSED SOUTHGATE PROJECT

Appalachian Mountain Advocates, Center for Biological Diversity, and Sierra Club submit the following on behalf of Appalachian Voices, Center for Biological Diversity, Chesapeake Climate Action Network, Food and Water Watch, Haw River Assembly, Honor the Earth, NC Council of Churches, NC Interfaith Power and Light, and the Sierra Club (collectively, "Commenters") regarding the Federal Energy Regulatory Commission's ("FERC") draft environmental impact statement ("DEIS") for Mountain Valley Pipeline, LLC's ("Mountain Valley") proposed Southgate Project ("the Project"). For the reasons described below, the DEIS fails to fulfill FERC's duty under the National Environmental Policy Act ("NEPA") to take a "hard look" at the Project's impacts.[1]

I. The DEIS's Failure to Independently Assess the Purpose and Need for the Project Undermines Its Alternatives Analysis

CO-24a

To establish the purpose and need for the Project, FERC relies entirely on Mountain Valley's desires and ignores the question of whether there is a real public need for the additional pipeline capacity proposed to be added. DEIS at 1-2 (relying on "the specific requests for natural gas transportation service of [Mountain Valley's] anchor shipper, Dominion Energy" to establish the purpose and need for the Project). In so doing, FERC improperly restricts its analysis of alternatives to those that can transport Mountain Valley's full desired volume of gas from its desired starting and ending points. *See* DEIS at 3-1 ("An alternative that cannot achieve the purpose for the Project cannot be considered as an acceptable replacement for the Project."); *id.* at 3-3—3-6 (rejecting system alternatives because they purportedly cannot accommodate Mountain Valley's full desired volume of gas).

As noted in Section 3.0, FERC identified and evaluated reasonable alternatives to the Project. Reasonable alternatives would meet the Project's stated purpose. See also responses GEN-2 and ALT-1 in appendix I.2; and response to CO-14c in appendix I.3.

CO-24	Appalachian Mountain Advocates	
Co-24a	The Council on Environmental Quality's ("CEQ") regulations for implementing the National Environmental Policy Act ("NEPA") require that an Environmental Impact Statement (EIS) "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action."[2] The CEQ regulations also require the Commission to consider and evaluate the no action alternative.[3] A properly drafted purpose and need statement is critical to "inform the agency's review of alternatives to the proposed action and guide its final selection."[4] A purpose and need statement "will fail if it unreasonably narrows the agency's consideration of alternatives so that the out-come is preordained."[5] Where, as here, a federal agency is reviewing an applicant-sponsored project, it "cannot restrict its analysis to those 'alternative means by which a particular applicant can reach his goals.'"[6] An agency must "exercise a degree of skepticism in dealing with self-serving statements from a prime beneficiary of the project."[7] As courts have noted, "[r]equiring agencies to consider private objectives . . . is a far cry from mandating that those private interests define the scope of the proposed project."[8] An agency must also "look hard at the factors relevant to the definition of purpose" and "always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other congressional directives."[9] The Natural Gas Act ("NGA") gives FERC powerful tools to regulate the development of pipeline infrastructure, directing the Commission to deny any application not "required by the present or future public convenience and necessity" and allowing it to impose "such reasonable terms and conditions as the public convenience and necessity may require."[10] In addition, FERC's Certificate Policy requires the Commission to balance the alleged need for a project against the adverse impacts on affected landowners and the surrounding communities.[11] Thus, when identifying a purpose and need, the Commission should consider its authority to shape pipeline certificates and reject unnecessary construction. More generally, the Commission should recognize that the main purpose of the NGA is "to encourage the *orderly* development of plentiful supplies	See above CO-24a comment response

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Co-24a	of . . . natural gas at reasonable prices."[12] The goals of promoting order and economy would be frustrated by a piecemeal analysis that ignores the potential for haphazard and redundant pipeline development. Likewise, the subsidiary goals of the NGA—including "conservation" and "environmental" considerations[13]—would be poorly served if the Commission failed to consider a regional perspective. FERC may not uncritically accept a project proponents' stated need for a pipeline, as it has in the DEIS. Rather, the agency must consider whether expected gas demand can be met by existing pipeline capacity. If not, FERC must consider how much additional capacity is needed to meet demand and to what extent that capacity can be provided by alternatives to the proposal, including but not limited to alternatives that upgrade existing gas pipelines and/or involve building new pipelines on existing rights-of way. In so doing, FERC should also look at the potential for significant decline in production from the Marcellus and Utica formations that would supply the gas for the pipelines and the ability of increasingly price-competitive renewable energy sources and energy efficiency to meet electric demand over the life of the proposed pipelines.[14] FERC should project electric-sector natural gas use in the region using detailed data on specific generating units, estimating gas demand both on an annual basis and for the hour of peak demand in each year. FERC must critically analyze and document any assumptions regarding: 1) market rules and topology, 2) hourly load profiles, 3) forecasted annual peak demand and total energy, 4) thermal-unit characteristics, 5) conventional hydro and pumped storage unit characteristics, 6) fuel prices, 7) renewable unit characteristics, 8) transmission system paths and upgrades, 9) generation retirements, additions, and uprates, 10) outages, 11) environmental regulations, and 12) demand response resources. Only by analyzing all of those factors can FERC determine whether the proposed pipeline project is actually needed.	See above CO-24a comment response

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CO-24b	Mountain Valley justifies the need for the Project primarily by referenced to futur increased demand for natural gas in the region.[15] But objective evidence shows that such deman is unlikely to increase, and that any such increase could be met with expansion of renewabl energy, which must be considered as an alternative to the Project. Available evidence demonstrates that demand for natural gas for power generation in the region that includes Virginia and North Carolina is level through 2030.[16] Projections from the Energy Information Administration (EIA) show that demand for natural gas for power generatio is not growing in the region that includes Virginia and North Carolina. In EIA's 2017 Energy Outlook, the reference case for the South Atlantic region, *i.e.* a scenario reflecting improvements in known technologies and the views of leading economic forecasters and demographers,[17] projects that the demand for natural gas for electricity generation will decrease from 2015 to 2020 and will not return to 2015 levels until approximately 2034.[18] Thus, According to EIA's analysis, new gas transmission capacity is not needed until 2034 at the earliest. An analysis performed by the Applied Economics Clinic[19] ("AEC Report") confirms tha the increased demand that Mountain Valley claims necessitates the Project is illusory. Because Mountain Valley has provided no evidence that MVP Southgate or Dominion Energy[20] will use the additional supply to provide gas to electric generators, the report focuses on gas demand for final use by residential, commercial, and industrial customers. AEC Report at 7. The report find that Mountain Valley's claims of increased future demand are uniformly inflated. Mountain Valley relies on a nationwide projection to claim that gas demand is likely to increase by 0.9 percent per year between 2017 and 2040, but the EIA's projection for the region that would be served by the Project only foresees growth of 0.2 percent annually for the period analyzed. *Id.* at 8. Further, Mountain Valley wrongly cites an annual increase of in demand for gas in North Carolina of 7.6 percent from 2010 to 2017 as evidence of need for the Project. That figure, however, includes the increase in consumption of gas both for direct use and for electric generation, whereas there is no evidence the Project will be used to deliver gas for electric customers. North Carolina's direct gas consumption by residential, commercial, and industrial customers—which is what the proposed project would serve—actually fell by an annual rate of 0.1 percent between 2010 and 2017. *Id.* at 9. Finally, MVP uses an inflated projection of future	See response GEN-2 in appendix I.2.

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CO-24b	population growth and fails to acknowledge that per capita gas consumption has been steadily falling due to increased energy efficiency and other advances when claiming that future population growth necessitates increased supply. *Id.* at 9-10. **Table 1: North Carolina gas and population growth, MVP LLC and corrections** **MVP LLC Claims** / **AEC Fact Check** MVP claims: **7.6 percent** historical (2010-2017) annual growth in North Carolina gas demand (including gas for electricity) / Fact check: **-0.1 percent** historical (2010-2017) annual growth in North Carolina gas demand (excluding gas for electricity) MVP claims: **0.9 percent** annual growth in future gas sales (2017-2040) based on all U.S. expected growth from EIA forecast / Fact check: **0.2 percent** annual growth in future gas sales (2017-2040) for the South Atlantic region from EIA forecast MVP claims: **1.6 percent** annual growth in future gas use (2020-2035) for the Southeast, which MVP states is largely due to population growth / Fact check: North Carolina's population is only expected to grow **1.0 percent** annually (2020-2035) *Sources: EIA, North Carolina Natural Gas Consumption by End Use. Available at: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_snc_a.htm; EIA, AEO 2019, Reference Case. Available at: https://www.eia.gov/outlooks/aeo/data/browser/#/?id=2-AEO2019&region=1-5&cases=ref2019&start=2017&end=2050&f=A&linechart=ref2019-d111618a.8-2-AEO2019.1-5&ctype=linechart&sourcekey=0; North Carolina Office of State Budget and Management, County/State Population Projections. Available at: https://www.osbm.nc.gov/demog/county-projections. Note: South Atlantic region includes Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, and the District of Columbia.* It is very likely that any additional future demand could be met with efficiency programs and other measures which would not require the taking of private property by eminent domain and substantial harm to environmental resources. The AEC Report explains that "[g]as energy efficiency and other demand-side programs may be an inexpensive alternative to pipeline investments.... Efficiency programs reduce the amount of gas needed to provide the same level of energy and heating and can be a cheap and effective way to reduce peak demand." *Id.* at 19. FERC's overly narrow statement of purpose and need caused it to fail to adequately consider such alternatives, which would have far less impact. FERC must not simply accept the applicant's claims of need at face value, but rather must independently verify that there is a true market demand for the Project that justifies the taking of private property through eminent domain and substantial harm to communities, water quality, air quality, forests, wildlife, and the climate. Because the DEIS fails to do so, it does not satisfy NEPA's hard look requirement.	See above CO-24b comment response

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	II. The DEIS Improperly Fails to Consider the Project as a Connected Action With the Mountain Valley Pipeline Mainline and Thus Fails to Consider the Full Impacts of Both Projects Together in a Single EIS	
CO-24c	FERC's EIS fails to fully analyze the impacts of the Project together with the impacts of the closely related Mountain Valley Pipeline mainline ("MVP mainline"), thus undermining its significance determinations. The MVP Southgate Project is an interdependent part of and dependent upon the larger MVP mainline. FERC's scope of review in an environmental analysis should encompass connected, cumulative, and similar actions.[21] Actions are connected if they automatically trigger other actions which may require an EIS, cannot or will not proceed unless other actions are taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for their justification.[22] "[A]n agency must discuss '[c]onnected actions' – that is, 'closely related' actions – 'in the same impact statement.'"[23] Similar actions are those actions that, when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.[24] An agency should analyze similar actions in the same EIS when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single EIS.[25] Importantly, "significance cannot be avoided by terming an action temporary or by breaking it down into small component parts."[26] "An agency impermissibly 'segments' NEPA review when it divides connected, cumulative, or similar federal actions into separate projects and thereby fails to address the true scope and impact of the activities that should be under consideration."[27]	See response GEN-8 in appendix I.2.
CO-24d	Further, it is well-established that FERC must evaluate the cumulative impacts of a natural gas pipeline before it issues a certificate of public convenience and necessity for the project.[28] NEPA's implementing regulations define these impacts as the > impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.[29] A cumulative impacts analysis provides the agency and the public "with a complete understanding" of the impacts that will result from the project.[30] Importantly, an agency cannot defer this analysis "when meaningful consideration can be given now."[31] The agency must evaluate the cumulative impacts of related projects proposed or reasonably foreseeable in a geographic area in a single, comprehensive, regional EIS in order to fully understand the impacts of the proposed action in its proper context.[32]	Cumulative impacts are discussed in section 4.13 of the EIS.

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CO-24e	Because it relies almost entirely on the MVP mainline project (which is currently under construction despite lacking several federal permits) for its supply of gas, the MVP Southgate unquestionably depends on the mainline for its existence and thus both "[c]annot or will not proceed unless other actions are taken previously or simultaneously" and "depend[s] on the larger action for [its] justification."[33] The two projects thus should have been analyzed as connected actions. FERC's failure to analyze the impacts of Mountain Valley Pipeline's connected projects together renders its significance findings incomplete.[34] FERC concludes that the Project will not have significant adverse impacts on any of the resources analyzed, such as soils, vegetation, wildlife, and aquatic resources. DEIS at 5-1 to 5-12. Even if some impacts of the Project alone were not significant, the combined impacts of the two connected actions may be significant. That is particularly true in regards to impacts to forests, which FERC found in the MVP mainline EIS to be significant, and impacts to aquatic resources, which have in practice proven to be significant during construction of the MVP mainline.[35]	See response GEN-8 in appendix I.2.
CO-24f	FERC's minimal analysis of the MVP mainline's impacts in the cumulative impacts section, DEIS at 4-246, does not cure this defect. It is well-established that FERC must evaluate the cumulative impacts of a natural gas pipeline before it issues a certificate of public convenience and necessity for the project.[36] As explained above, because the projects are connected actions FERC must analyze the full impacts of each project in a single EIS,[37] which it fails to do. In addition, in the instances where FERC analyzes the cumulative impacts of the projects together, it does so on too small a scale by looking only at impacts within the same HUC-12 watersheds. As the MVP mainline's substantial sedimentation impacts on the Roanoke River basin demonstrate, the projects' impacts can extend far beyond the HUC-12 level. FERC's cumulative impacts analysis thus does not capture the actual combined impacts of the two projects and fails to satisfy NEPA's hard look requirement.	See response CI-1 and CI-3 in appendix I-2.

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CO-24g	**III. The DEIS Fails to Adequately Assess the Project's Greenhouse Gas Emissions and Climate Impacts** The DEIS does not take the required hard look at the Project's greenhouse gas ("GHG") emissions and climate impacts. FERC fails to estimate upstream and downstream GHG emissions, to utilize readily available tools for assessing their climate impact (including significance), to consider potential mitigation, or to distinguish the Project's climate impacts from those of feasible alternatives. **A. The DEIS fails to Estimate Upstream GHG Emissions** NEPA requires consideration of reasonably foreseeable "indirect effects" of a proposed action that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[38] This includes "growth inducing effects and other effects related to induced changes in the pattern of land use . . . and related effects on air and water and other natural systems" that are "removed in distance" from the site of the proposed action.[39] FERC has acknowledged that "there may well be instances in which upstream gas production is both reasonably foreseeable and sufficiently causally connected to a pipeline project to qualify as an indirect effect."[40] Yet the DEIS makes no effort to assess upstream GHG emissions associated with the Project. FERC must disclose the fact and nature of foreseeable effects of gas production that will be induced by the Project. FERC should seek out information, including from the Project applicant, that would help it "predict the number and location of any additional wells that would be drilled as a result of production demand created by the Project."[41] "It should go without saying that NEPA . . . requires the Commission to at least attempt to obtain the information necessary to fulfill its statutory responsibilities." *Id.* at 5.	See response CI-1 in appendix I.2.

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CO-24g	Even if FERC undertakes the requisite attempt but determines it cannot obtain specific information regarding upstream activities, the DEIS can still provide useful information. For example, FERC has previously "estimated the impacts associated with the production wells that would be required to provide 100 percent of the volume of natural gas to be transported by [a gas pipeline project], on an annual basis for GHGs."[42] In that case, FERC used "the project volume and the expected estimated ultimate recovery of Marcellus shale wells" to estimate the number of wells that "would be required to provide the gas over the estimated 30-year lifespan of the project."[43] FERC then used the Department of Energy's Life Cycle Analysis of Natural Gas Extraction and Power Generation to estimate upstream GHG emissions. *Id.* at n.210. In sum, FERC must attempt to obtain more information regarding upstream activity that would result from the Project. If specific information proves unobtainable, FERC can still estimate upstream GHG emissions based on the volume of gas that the Project is designed to transport. Instead, the DEIS fails to do either—and also fails to comply with 40 C.F.R. § 1502.22, which outlines the procedures an agency must comply with when "there is incomplete or unavailable information."[44] **B. The DEIS Fails to Estimate Downstream GHG Emissions** Effects are reasonably foreseeable if they are "sufficiently likely to occur that a person of ordinary prudence would take [them] into account in reaching a decision."[45] In the gas pipeline context, downstream greenhouse-gas emissions are quintessential indirect effects, because such emissions predictably result from operating a pipeline whose sole purpose is to transport gas that will be consumed by end-users.[46]	See above CO-24g comment response.

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CO-24g	Downstream emissions are an indirect effect even if the ultimate destination of the fuel is unknown.[47] For example, any uncertainty regarding the ultimate destination of the gas does not change the fact that the Project is designed to transport 375 million cubic feet of gas per day to end users. FERC is a legally relevant cause of the emissions resulting from combustion of the transported gas.[48] [49] Moreover, here "Mountain Valley has indicated that the currently subscribed volume of natural gas, 300 MMcf/d, would be used in North Carolina, primarily by residential and small and medium-sized commercial customers for heating, cooking, and other end-uses." DEIS at 4-269. This information could be used to estimate the downstream GHGs. Greenhouse gas "estimation tools have become widely available" and are "already in broad use." Council on Environmental Quality, Revised Draft Greenhouse Gas Emissions and Climate Change Guidance (Dec. 2014) at 15.[50] If FERC for some reason believe it required additional information to estimate downstream GHG emissions, it must explain why and attempt to obtain that information. As FERC has conceded, "its lack of jurisdiction over shippers, distributors, and end users 'doesn't preclude or foreclose' it from further developing the record by requesting additional data from the project applicant."[51] For example, FERC could require the project applicant to obtain additional information from "anchor shipper, Dominion Energy (formerly PSNC Energy), a local natural gas distribution company," regarding its purported "growing supply needs."[52] The DEIS states that the remaining 75 MMcf/d "could be utilized in either North Carolina or Virginia," and "[t]he end use of this gas is not known." DEIS at 4-269.[53] Analyzing GHG emissions and climate impacts does not depend on knowing the specific locations where gas combustion will occur. If FERC believes a full-burn estimate does not accurately reflect anticipated emissions, FERC should explain why—and must attempt to provide a more accurate estimate.[54] NEPA requires agencies to analyze and consider downstream effects even if the "exact[]" net increase in emissions may "depend[] on several uncertain variables."[55] "[S]ome educated assumptions are inevitable in the NEPA process," and agencies can disclose "assumptions so that readers can take the resulting estimates with the appropriate amount of salt."[56]	See above CO-24g comment response

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CO-24g	The Project's direct and indirect GHG emissions, and resulting climate impacts, must also be considered along with other projects in the region, including but not limited to other interstate gas pipelines.[57] **C. The DEIS Fails to Utilize Available Methodologies to Assess the Project's Climate Impact** In addition to failing to estimate indirect GHG emissions, the DEIS fails to account for the climate impact of GHG emissions. As a result of this deficiency, nothing in the DEIS allows the public or decisionmakers to meaningfully determine whether the harm caused by Project GHG emissions would warrant mitigation, selection of a less harmful alternative, or certificate denial. "The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."[58] The DEIS outlines some general climate change impacts, DEIS at 4-267 to 4-268, but does not assess the impacts caused by *this Project*.[59] Moreover, because the tools used by the U.S. Global Change Research Program to assess current and future impacts of climate change respond to different emission scenarios, it is possible to meaningfully discuss the *incremental* impact of the emissions at issue here. The DEIS recognizes that "[w]hen determining the significance of an impact, both context and intensity are relevant. DEIS at 4-0.[60] Context "means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality."[61] Intensity "refers to the severity of impact."[62] Yet the DEIS fails to assess the context or intensity of the Project's greenhouse-gas effects. FERC's failure to assess the Project's GHG emissions and their climate impacts invalidates the DEIS's conclusion that the Project would not have significant impacts. DEIS at 4-270, 5-1. FERC cannot approve a project on the basis that it will have no significant impacts when it has failed to assess one of the Project's most severe and long-term impacts.	See above CO-24g comment response

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	FERC first claims that it has "not been able to find any GHG emissions reduction goals established at the federal level," noting that the national emissions reduction targets expressed in the Clean Power Plan and the Paris climate accord are pending repeal and withdrawal, respectively. DEIS at 4-269. Even if repeal or withdrawal were complete, these targets could be used to provide context. Moreover, the United States remains a party to the United Nations Framework Convention on Climate Change and its associated Paris Agreement. While President Trump has indicated the United States will remove itself from the Agreement, the United States presently has an internationally established commitment to limiting the average increase in global temperatures to 1.5 degrees Celsius. But the DEIS fails to consider the Paris Agreement commitments--or other useful targets that would help provide context, such as the IPCC's established carbon budget--as part of its consideration of the Project's GHG emissions. The DEIS fails to explain why any of these targets could not be used to provide context for Project emissions.	
CO-24g	FERC's excuses related to state climate goals also fail. The DEIS mentions that Virginia has a plan that calls for a reduction of GHG emissions 30% below a "business as usual" scenaric by 2025, but then simply states: "We do not have the data that identified the 'business as usual' scenario." DEIS at 4-269. In other words, despite the numerous steps that Virginia has taken on climate change that are identified in the DEIS (e.g., the Governor's Commission on Climate Change, Executive Order 19, Governor's Climate Change and Resiliency Update Commission and associated report that includes "an inventory of contributors of GHG" and "evaluation of impacts," and carbon trading regulation), the DEIS makes no attempt to use any of this to provide context for the Project's emissions.[63] The DEIS also states that because the Project "is intended to serve end users in North Carolina, we cannot determine Southgate Project effects, if any, on Virginia's GHG goals."[64] But a portion of the Project is being constructed in Virginia, and the location of the end-use is not relevant to climate impacts. This statement also conflicts with the DEIS's statement in the next paragraph that "[t]he remaining 75 MMcf/d could be utilized in either North Carolina or Virginia."[65]	See above CO-24g comment response

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CO-24g	The DEIS mentions North Carolina Governor Roy Cooper's Executive Order 80, which mandates a statewide reduction of GHG emissions by 2025 to 40% below 2005 levels, but provides no explanation of how the Project's GHG emissions--including from downstream combustion--would affect that goal. Instead, the DEIS simply concludes the discussion with the conclusory statement that "[f]or both the subscribed and unsubscribed volumes, we cannot determine Southgate Project effects on the states' goals." DEIS at 4-269. The DEIS makes no attempt to provide the states' goals in terms of actual GHG emissions targets, or to calculate the Project's lifecycle emissions, which would provide helpful context for decision-makers and the public.	See above CO-24g comment response
CO-24h	FERC should also provide further information regarding the impact of Project GHG emissions, including context and intensity, by using the Interagency Working Group's ("IWG") social cost of carbon ("SCC") protocol.[66] The DEIS states that "there is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Southgate Project's incremental contribution to GHGs." DEIS at 4-269. But a "universally accepted methodology" is not the standard—and while FERC maintains that it lacks "a method for relating GHG emissions to specific resource impacts," *Id.* at 4-270 elsewhere FERC has acknowledged that the Social Cost of Carbon "constitute[s] a tool that can be used to estimate incremental physical climate change impacts."[67] The SCC "estimates the monetized climate change damage associated with an incremental increase in CO2 emissions."[68] The damage estimate includes lost agricultural productivity, human health impacts, property damage from increased flooding, and lost ecosystem services. FERC has acknowledged that the SCC is an "appropriate[]" tool for federal agencies to use "to inform their decisions," and that agencies have been rightly "faulted for failing to use it."[69] Like those other agencies, FERC is the legally relevant cause of the GHG emissions at issue.[70] FERC does not (and cannot) offer a rational explanation for refusing to use a tool it acknowledges is useful and appropriate to inform other agencies' decisionmaking—including project-level reviews.[71] In another recent case concerning an energy infrastructure project, where the agency's NEPA analysis quantified greenhouse gas emissions but claimed that it was impossible to discuss the effects thereof, the court ruled that the agency's refusal to use the social cost of carbon to illustrate the impact of these emissions was arbitrary and capricious.[72]	See response CI-1 in appendix I.2

CO-24	Appalachian Mountain Advocates	
CO-24h	Accordingly, the DEIS is incorrect when it states that FERC is "not able to assess potential GHG-related impacts attributable to the Southgate Project." DEIS at 4-270. Although FERC has discretion to choose among reliable methodologies for evaluating impacts, FERC cannot refuse to provide any evaluation whatsoever when a generally accepted methodology is available.[73] A widely used tool that FERC has acknowledged is useful for project-level reviews is available, but the DEIS fails to even mention it. In other gas pipeline proceedings, FERC has provided excuses for refusing to use the SCC. Those excuses fail. For example, FERC has claimed there is no consensus on the appropriate discount rate, resulting in significant variation in output. But courts have rejected this reasoning.[74] As the 2010 Technical Support Document explained, a range of three discount rates—2.5, 3, and 5 percent—"reflect reasonable judgments" and "span a plausible range" of appropriate discount rates, and are consistent with OMB Circular A-4.[75] As explained by the IWG, uncertainty as to the most appropriate discount rate is a reason to provide social cost estimates using the range of plausible rates—which FERC and other agencies have done in other proceedings—but it is not a reason for ignoring the social cost of greenhouse-gas emissions entirely.[76] FERC has also claimed there is no basis to designate a particular dollar amount as significant. But assessing the significance of any impact requires FERC's professional judgment. For example, no third party provided FERC with a threshold for significance for impacts on housing, recreation areas, and tourism, but FERC nonetheless concluded such impacts would not be significant. DEIS at 4-124, 4-128, 4-137. And FERC routinely evaluates the relative importance of monetized benefits that it anticipates, *see, e.g., id.* at 4-129 (taxes), weighing them against qualitative impacts. NEPA does not, of course, require agencies to monetize adverse impacts in all cases.[77] The statute does, however, require FERC to take a hard look at the "ecological …, aesthetic, historic, cultural, economic, social, [and] health," effects of its actions, "whether direct, indirect, or cumulative."[78] Monetization of costs may be required where	See above CO-24h comment response

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CO-24h	available "alternative mode[s] of [NEPA] evaluation [are] insufficiently detailed to aid the decision-makers in deciding whether to proceed, or to provide the information the public needs to evaluate the project effectively." Translating GHG emissions into climate damages would contextualize[79] the impact, making it more accessible to the public and decision-makers, and would aid a significance determination. Thus, while FERC claims that it is "unable to determine the significance of the Southgate Project's contribution to climate change," it ignored a tool that would have helped it do just that. DEIS at 4-270. Although they likely underestimate the true costs of GHG emissions, the IWG's social cost metrics remain the best estimates yet produced by the federal government for monetizing the impacts of GHG emissions and are "generally accepted in the scientific community."[80] This is true notwithstanding Executive Order 13,783, which disbanded the Interagency Working Group and formally withdrew its technical support documents.[81] Indeed, that Executive Order did not find fault with any component of the IWG's analysis. To the contrary, it encourages agencies to "monetiz[e] the value of changes in greenhouse gas emissions" and instructs agencies to ensure such estimates are "consistent with the guidance contained in OMB Circular A-4."[82] The IWG tool, however, illustrates how agencies can appropriately comply with the guidance provided in Circular A-4: OMB participated in the IWG and did not object to the group's conclusions. As agencies follow the Circular's standards for using the best available data and methodologies, they will necessarily choose similar data, methodologies, and estimates as the IWG, since the IWG's work continues to represent the best estimates presently available.[83] Thus, the IWG's 2016 update to the estimates of the social costs of greenhouse gases remains the best available and generally accepted tool for assessing the impact of greenhouse gas emissions, notwithstanding the fact that this document has formally been withdrawn.[84]	See above CO-24h comment response

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CO-24h	The estimates of social cost are based on reasonable forecasts of the actual physical effects greenhouse gas emissions will have on the environment, including temperature, sea level rise, ecosystem services, and other physical impacts, together with assessments of how these physical changes will impact agriculture, human health, etc. The social cost protocol identifies the social cost imposed by a ton of emissions' pro rata contribution to these environmental problems. This either amounts to an assessment of physical impacts or the best available generally accepted alternative to such an assessment; either way, the tool is appropriate for use under NEPA.[85] As noted, although FERC has discretion to choose among reliable methodologies for evaluating impacts, that discretion does not allow FERC to provide no evaluation whatsoever when a generally accepted methodology is available.[86] **D. The DEIS's Failure to Adequately Assess the Project's GHG Effects Precludes Informed Decision-Making** The failure to adequately assess the Project's indirect greenhouse-gas emissions—including their volume, climate impact, significance, and cumulative effect—is contrary to NEPA's goals of informed decisionmaking and informed public comment. Failure to grapple with the importance and consequences of greenhouse gas emissions undermines several aspects of the Project analysis. For example, estimating the social cost of GHG emissions would help the public and FERC understand whether the adverse consequences of the Project's emissions are severe enough to tip the balance toward the conclusion that the project is contrary to, and not required by, the public convenience and necessity. Moreover, had FERC concluded that the climate impacts were significant, this would have supported more meaningful evaluation of alternatives that could potentially reduce these impacts. Instead, the DEIS fails to disclose the climate benefits (or lack thereof) of any of the potential alternatives. The Project's GHG emissions and climate impacts should be compared to the emissions and impacts of various alternatives, including the no-action alternative. FERC's arbitrarily narrow Project purpose and need compound this error because it caused FERC to improperly exclude alternatives involving renewable energy and energy efficiency, which would have lower direct and indirect GHG emissions.	See above CO-24h comment response

CO-24	Appalachian Mountain Advocates	
CO-24h	In sum, FERC must take a hard look at these impacts so it can consider them when deciding whether to approve the Project, deny it on the ground that it "would be too harmful to the environment," or select a less harmful alternative.[87] The DEIS fails to provide information that would be useful in answering these questions. Estimating the impacts of emissions using the social cost protocols would speak to these issues, regardless of whether FERC concludes that the impact is or is not significant. The DEIS also fails to assess possible mitigation of greenhouse-gas impacts. *See id.* at 1374 (FERC "has legal authority to mitigate" downstream emissions).	See above CO-24h comment response
CO-24i	**IV. The DEIS Fails to Adequately Analyze Impacts to Aquatic Resources Because It Unreasonably Relies on Minimization and Mitigation Measures That Have Proven Ineffective in Practice** The Project would require crossing 224 waterbodies, including three major waterbodies, using primarily a dry, open-cut crossing technique. DEIS at 4-32. It would also traverse substantial areas of steep slopes. *Id.*, Appendix C.3. FERC recognizes that > Construction activities in-stream channels and on adjacent banks may affect waterbodies. Clearing and grading of stream banks, in-stream trenching, the installation and removal of temporary crossing structures (e.g., culverts, cofferdams), trench dewatering, and backfilling could each cause temporary, local modifications of aquatic habitat involving sedimentation, increased turbidity, and decreased dissolved oxygen concentrations; DEIS at 4-43. FERC likewise notes that > The clearing and grading of stream banks could expose soil to erosional forces and would reduce riparian vegetation along the cleared section of the waterbody. The use of heavy equipment for construction could cause compaction of near-surface soils, an effect that could result in increased runoff into surface waters in the immediate vicinity of the proposed construction right-of-way. Increased surface runoff could transport sediment into surface waters, resulting in increased turbidity levels and increased sedimentation rates in the receiving waterbody. Disturbances to stream channels and stream banks could also increase the likelihood of scour after construction *Id.* at 4-44. Nonetheless, FERC concludes that these impacts would be temporary and localized and that Mountain Valley's compliance with FERC's Plan and Procedures and the Project-specific Erosion and Sediment Control Plan would minimize impacts to the level of	See response GEN-9 in appendix I.2

CO-24	Appalachian Mountain Advocates	
CO-24j	FERC's conclusions are not supported by the available evidence showing that pipeline construction has substantial adverse impacts on water quality, primarily through sedimentation associated with slips and runoff from cleared areas adjacent to stream crossings. FERC offers no explanation for why past projects, which were subject to the very same sorts of Best Management Practices in FERC's Procedures and the Project-specific ES&C Plan, led to significant water quality impacts but the MVP Southgate Project will not. FERC's conclusions are thus arbitrary and capricious. Pipeline construction has a long, unacceptable track record of causing severe water quality problems in this region. In particular, Mountain Valley and its contractors have caused severe adverse impacts to water quality during construction of the MVP mainline in Virginia and West Virginia. In light of these past problems, FERC may not reasonably rely on its standard mitigation measures, particularly for erosion and sedimentation control, to conclude that impacts to aquatic implementation of those controls. FERC knows that implementation is never perfect and that, with this particular project applicant, it has been anything but. FERC's assurances that its standard mitigation measures can effectively minimize aquatic impacts have unfortunately proven hollow in experience. For example, on the MVP mainline the U.S. Forest Service's compliance monitoring firm, Transcon Environmental, cited Mountain Valley for causing sediment pollution in Jefferson National Forest and noted that the company's sediment control measures were "failing" and "not functioning properly," resulting in sedimentation impacts as far as 300 feet downstream from a Project stream crossing.[90]	See response GEN-6 in appendix I.2.

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CO024j	Likewise, the West Virginia Department of Environmental Protection (WVDEP) on April 3, 2018, cited Mountain Valley for violations at the construction sites of two compressor stations, noting that the erosion control measures had failed to contain sediment and sediment-laden water from leaving the work site.[91] WVDEP issued another Notice of Violation on May 9, 2018, for an incident where sediment controls at a stream crossing "failed and were breached allowing sediment laden water to enter stream. … Sediment deposits were observed in stream causing conditions not allowable" under West Virginia's water quality standards.[92] Additionally, separate WVDEP inspections on June 6, 2018, resulted in two Notices for failure of control measures leading to sediment and sediment-laden water leaving the pipeline right-of-way, noting that MVP's plans were inadequate and that additional mitigation measures were required.[93] More recently, a July 6, 2018, WVDEP inspection led to yet another notice for failing to prevent sediment and sediment laden water from leaving the right-of-way.[94] The Virginia Department of Environmental Quality (VADEQ) issued a Notice of Violation on July 9, 2018 for widespread sedimentation impacts identified in citizen-complaint driven investigations conducted on May 21, May 23, May 24, May 30, June 6, June 13, June 26, and June 27, 2018.[95] Those impacts occurred along the project route in Craig, Franklin, Giles, Montgomery, Pittsylvania and Roanoke Counties.[96] VADEQ noted that many of Mountain Valley's erosion and sedimentation controls were ineffective and that the company did not repair failing controls within the required timeframe.[97] In one instance, "[c]ombined impacts to the two stream channels covered a distance of approximately 2,800 linear feet. This unauthorized fill ranged in depth up to eleven inches of sediment, which was released from MVP's construction right of way due to overwhelmed and damaged erosion and sediment controls."[98] Failing controls at another site led to 6,009 linear feet of impacts with sediment depositions up to seven inches deep.[99] Mountain Valley itself has identified numerous sedimentation events, including events not cited in the above notices, in its weekly status reports to FERC.[100] Those failures continue to this day.[101]	See above CO-24j comment response

CO-24	Appalachian Mountain Advocates	
CO-24j	Such failures are not simply a result of faulty implementation, but in many cases inadequacy of the chosen mitigation measures. Indeed, following a severe event that resulted in asserted that its "controls were installed properly."[102] The fact that FERC has not taken a single enforcement action or issued a stop work order for violations of its own Plans and Procedures on which it relied further demonstrates that the mitigation measures themselves, not just Mountain Valley's implementation, are inadequate. Such incidents have not been limited to the MVP mainline or to other large 42-inch diameter pipelines. Indeed, there are numerous examples of significant sedimentation and other pollution impacts occurring during smaller pipeline construction despite the use of industry-standard erosion and sedimentation controls. For example, in 2006, during construction of a 20-inch East Tennessee Gas Pipeline in Tazewell and Smyth Counties, Virginia, slopes failed in two independent events in Indian Creek and North Fork Holston River, resulting in a kill of several hundreds of individuals and multiple species of endangered mussels.[103] The worst sediment problems originated not directly at the stream crossings, but high in the watershed where small streams transported sediment to the larger streams. Evidence of the sediment was detected as far as two kilometers downstream of the slips. These impacts occurred despite extreme care taken by FERC, USFWS, the Virginia Department of Conservation and Recreation, and the company to ensure that state-of-the-art erosion control measures were in place.[104] Similarly, a 2014 Columbia Gas of Virginia project to add a 12-inch pipeline adjacent to an existing 6-inch pipeline along Peter's Mountain near a portion of the Jefferson National Forest in Giles County, Virginia, led to extreme sedimentation impacts.[105] Inspection reports by the US Forest Service describe sediment movement that "looked like a lava flow" and note that the inspector had "never seen that much sediment move off site before."[106] Much of the sediment became embedded in a nearby stream.[107] These impacts occurred despite the existence of comprehensive erosion control plans, implementation of Best Management Practices, and weekly inspections by the company to ensure proper implementation.[108]	See above CO-24j comment response

CO-24	Appalachian Mountain Advocates	
CO-24j	Additionally, construction of Dominion's G-150 and TL-589 gas pipelines in West Virginia led to slope failure at pipeline stream crossing locations during and post construction, resulting in harm to streams despite the application of industry-standard erosion and sediment control practices. West Virginia Department of Environmental Protection Consent Order No. 8078, dated October 1, 2014, addressed a series of 13 locations in West Virginia where lower slope slippage or landslides along pipeline construction right-of-ways introduced sediment into streams in violation of regulations concerning conditions not allowable in waters of the State, specifically sediment deposits. Likewise, the Stonewall Gathering Line, a 36-inch pipeline constructed in the central part of the state, racked up 53 violations from the West Virginia Department of Environmental Protection (WVDEP) for failure to maintain sediment and erosion controls, not using the proper best management practices and failing to comply with their stormwater pollution prevention plan and groundwater protection plan. The same story occurred in Pennsylvania with construction of Tennessee Gas Pipeline's (TGP) 300 Line Project, part of the Susquehanna West Project.[109] In May of 2010, FERC issued an environmental assessment for the 300 Line Project, finding there would be no significant impacts when TGP crossed streams in northeast and north-central Pennsylvania. FERC relied on TGP's plan to follow construction guidelines created by the Corps, USDA, NRCS, and FERC. In addition, FERC imposed its own conditions. However, despite what FERC believed to be adequate measures, TGP's construction violated Pennsylvania's Clean Water Law multiple times. The majority of the project's compliance reports contained at least one violation of the project plans, but the plan was never enforced.[110] Whether the plan was inadequate in its substance or inadequately enforced, the end result is the same; the pipeline's stream crossings, which FERC believed would cause no significant environmental impact, resulted in numerous violations and an $800,000 penalty settlement with the Pennsylvania DEP.[111]	See above CO-24j comment response

CO-24	Appalachian Mountain Advocates	
CO-24j	More recently, construction of the Rover Pipeline resulted in the WVDEP having to issue a Cease and Desist Order issued on July 17, 2017, after numerous violations for failure to maintain erosion control devices which allowed sediment to enter nearby streams. The photos included with that order demonstrate that FERC's erosion and sedimentation control measures are insufficient to prevent significant violations of water quality standards. Importantly, the violations cited there made clear that it was not simply that Rover failed to follow its plans, but that the stormwater pollution prevention plans themselves were inadequate.[112]. Rover's violations did not end there, however. Prior to the cease and desist order being lifted, Rover was cited for additional violations of West Virginia's water quality standards associated with sediment discharges and failure of BMPs.[113] These consistent failures make clear that FERC cannot reasonably rely on its standard erosion and sediment control measures to conclude that impacts to aquatic resources will not be significant. FERC must instead calculate the amount of sedimentation that would occur in the absence of controls, the expected reductions to be achieved by those controls, and how the uncontrolled sediment would affect aquatic resources in terms of increased turbidity, sediment deposition on stream bottoms, lowered dissolved oxygen levels, and other known consequences of increased erosion and sedimentation. FERC's failure to do so means that its DEIS does not satisfy NEPA's hard look standard.	See above CO-24j comment response
CO-24k	**V. The DEIS Fails to Adequately Analyze Impacts to Sensitive Wildlife Species** FERC has not provided sufficient information in the DEIS for Commenters to assess the actual impacts to listed species, or to assess the *not likely to adversely affect* determination was made. Therefore, FERC has failed to provide the "hard look" required in an EIS, and has thereby precluded the public from having sufficient information on which to base comments on the impacts that the Project will have on these species. Providing the public with sufficient information to analyze the circumstances and impacts of a proposed project is essential to the NEPA process.	See response GEN-4 and T&E-2 in appendix I.2. A majority of species surveys have been completed by Mountain Valley and section 4.7 of the EIS has been updated with this information. Our analysis of impacts to T&E species has been updated; however, survey data did not alter our determinations in section 4.7.1. Federal agency compliance for the Endangered Species Act (ESA) Section 7, including concurrence of determinations of effect by the FWS, would be required as described in section 4.7.1 of the EIS

CO-24	Appalachian Mountain Advocates	
CO-24k	FERC may not gloss over the impacts to listed species that may be adversely affected by the Project. By declaring that it will gather more information on such impacts at a later time, and/or will begin or complete formal consultation with the U.S. Fish and Wildlife Service on certain species at a later time, FERC is in direct violation of 40 C.F.R. §1502.25(a), which states that "[t]o the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analysis and related surveys and studies required by the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.), the Endangered Species Act of 1973 ("ESA")(16 U.S.C. 1531 et seq.), and other environmental review laws and executive orders." The concurrency requirement for the NEPA and ESA process is essential for public involvement. There is no opportunity for public comment on the development of a Biological Assessment or Biological Opinion; therefore, it is only through the NEPA process that the public may comment on the impacts to listed species. Furthermore, in order to fully assess the cumulative impacts of the proposal as NEPA requires, all impacts must be fully vetted in the NEPA documents. FERC has undermined this analysis by failing to fully analyze them in the DEIS, and by failing to provide a sufficient Biological Assessment. While FERC has provided a discussion within the DEIS that it claims to be its "Biological Assessment," it is readily apparent that FERC has failed to provide a "hard look" at the impacts that the MVP Southgate will have on listed species as required by NEPA. Pursuant to NEPA, FERC must analyze whether the project will have impacts on species that are listed as endangered or threatened under the Endangered Species Act, 16 U.S.C. §§ 1531–1544. *See* 40 C.F.R. § 1508.27(b)(9). A federal agency's legal obligations under NEPA and the ESA are entirely separate; compliance with the ESA Section 7's prohibition against jeopardizing a species' continued existence, 16 U.S.C. § 1536(a)(2), does not simultaneously satisfy NEPA's requirements to analyze significant impacts short of the threat of extinction. *See Greater Yellowstone Coalition v. Flowers*, 359 F.3d 1257, 1275–76 (10th Cir. 2004) (recognizing FWS conclusion that action not likely to cause jeopardy does not necessarily mean impacts are insignificant); *Makua v. Rumsfeld*, 163 F. Supp. 2d 1202, 1218 (D. Haw. 2001) ("A FONSI . . .	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24k	must be based on a review of the potential for significant impact, including impact short of extinction. Clearly, there can be a significant impact on a species even if its existence is not jeopardized."); *Portland Audubon Society v. Lujan*, 795 F. Supp. 1489, 1509 (D. Or. 1992) (rejecting agency's request for the court to "accept that its consultation with [FWS under the ESA] constitutes a substitute for compliance with NEPA."). As discussed below, FERC's analysis falls well short of what is required under NEPA. Moreover, the DEIS itself indicates that the information FERC is relying on to understand project impacts is woefully incomplete. The DEIS relies upon unspecified conservation measures to address potential impacts to these species. It catalogues numerous potentially deleterious effects of the proposed action on all of the listed species potentially inhabiting the project area, but lacks complete population surveys and/or critical impacts analyses for each listed species, and supports *not likely to adversely affect* determinations with Mountain Valley's promised adherence to implementation plans with unspecified mitigation measures. DEIS at Section 4.7.1. Further, the DEIS indicates that no construction may begin until "[FERC] staff completes ESA consultation with the FWS." *Id.* at 4-94. This indicates that such consultation has not been completed at this time. Furthermore, the DEIS indicates that surveys still need to be completed for most of the listed and proposed species at issue. Given that these biological surveys have not been completed, it remains entirely unclear how FERC has determined that many of these species are not likely to be adversely affected or whether the Project risks extensive habitat damage due to construction-related and operational impacts.	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24k	It is therefore evident that FERC has not undertaken the requisite hard look at the impacts of this Project on listed species, as required pursuant to both NEPA and the ESA. FERC cannot possibly make a determination as to such impacts when consultation has not yet been completed and biological surveys have not been accomplished. FERC should have had this information before it when developing its conclusions as to the Project's impacts in the DEIS. Furthermore, this precludes the public from reviewing such information and providing comments during this DEIS comment period. Rather, FERC must require that all pertinent information on impacts to listed species and their habitats be included in the DEIS, and the failure to do so renders the DEIS incomplete. For example, the DEIS indicates that surveys for the federally listed northern long-eared bat hibernacula portals were not completed prior to the drafting of the DEIS, but that Mountain Valley will continue surveys after publication of the DEIS. DEIS at 4-89. With such inadequate impacts information on record, FERC is left defending its premature *not likely to adversely affect* determinations with patently inadequate statements such as "[d]ue to the lack of hibernacula and maternity roosts in the survey area, and if no additional individuals, hibernacula, or maternity roosts are located during additional surveys . . . we find that the Project . . . *is not likely to* Moreover, FERC's use of the DEIS section on listed species as its Biological Assessment (BA) for the ESA Section 7 consultation process is inadequate, since the DEIS fails to meet the requirements for a BA. A BA is supposed to include "an analysis of the effects of the action on the species and habitat, including consideration of cumulative effects, and the results of any related studies," as well as "an analysis of alternate actions considered by the Federal agency for the proposed action." 50 CFR §402.12(f). Moreover, according to FWS' Guidance for Preparing a Biological Assessment, the BA should include a description of "how the action may affect each protected resource," and the agency should "document [the] analysis of the what, when and how the protected resources will be exposed to and how such individuals or habitat are likely to respond to this exposure."[814] The DEIS falls well short of this requirement. Not only is the information on impacts entirely incomplete – which FERC evidences by requesting that the Applicants provide more information on species locations and conservation measures as discussed above and below – but the species-specific discussions fail to include an analysis of	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24k	the cumulative impacts of the Project and do not discuss the potential impacts of Project operation, even though FWS' Guidance requires that the BA analysis include "effects that may occur later in time (e.g., after completion of initial construction)."[115] FERC has therefore failed to provide complete information on the impacts of the proposal and has not fulfilled its ESA or NEPA requirements. Commenters therefore insist that FERC require the Applicants to complete the required field surveys, and then provide a new or supplemental DEIS with this information and a complete Biological Assessment, and reopen the DEIS comment period once formal ESA consultation is complete, so that the public may then have the opportunity to properly participate in analyzing the cumulative environmental impacts of this proposal. **A. Northern Long-Eared Bat** The northern long-eared bat is listed as threatened under the ESA. As discussed above, the DEIS analysis of impacts to this species is entirely inadequate since it is readily apparent that FERC did not have sufficient information on which to base its conclusions. Mountain Valley never completed bat hibernacula portal surveys for the entire project prior to the preparation of the DEIS, which purports to contain the conclusions of a Biological Assessment. DEIS at 4-89. Without complete information regarding the absence or presence of this species in the project area, it is impossible for FERC to analyze the construction or operational impacts of the MVP Southgate pipeline to the species, rendering FERC's *not likely to adversely affect* determination for this species unsupported by facts, arbitrary and capricious. Furthermore, without complete information regarding the absence or presence of this species in the project area, it is impossible for FERC to satisfy its NEPA obligations to take a "hard look" at the impacts of the Project to this species. The DEIS' *not likely to adversely affect* determination for the northern long-eared bat is based, in part, on the presumed application of the 4(d) rule for this species, which prohibits incidental take within hibernacula and alteration of the hibernacula environment in a manner that causes incidental take. *Id.* Manifestly, FERC cannot make a determination as to whether incidental take in hibernacula will be avoided when hibernacula surveys have not been completed for the project area.	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24k	**B. Roanoke Logperch** The Roanoke logperch is listed as endangered under the ESA. The DEIS determines that the Project will cross several waterbodies in North Carolina that serve as habitat for this species, and identifies in-water work and upland construction runoff as significant turbidity and sedimentation impacts risk factors for the species. DEIS at 4-90. The DEIS anticipates potential aquatic impacts from the project, including sedimentation, turbidity, drilling fluid spills, collapse of streams, loss of stream bank cover, fuel and chemical spills, water withdrawals and blasting. The DEIS fails to quantify water withdrawal impacts to aquatic species and habitat, and does not quantify blasting impacts to aquatic species and habitat. FERC defends its *not likely to adversely affect* determination with the caveats that Mountain Valley would "attempt to avoid blasting during waterbody crossings," and that it would adhere to a SPCC spill contingency plan that would require 100-foot setbacks for equipment and fuel. DEIS at 4-85,86. However, neither of these caveats provide real assurance that blasting or spill impacts to aquatic habitat will be avoided. The DEIS bases its *not likely to adversely affect* determination for this species on the use of horizontal directional drilling ("HDD") and conventional bore drilling for stream crossings, as well as on the use of stream setbacks, vegetative buffers, sediment barriers and mulch on sloped sections of the construction right of way. However, FERC's reliance on these measures is misplaced. The use of HDD elevates the risk of drilling fluid spills in aquatic habitat for listed species. The DEIS notes an elevated risk of drilling fluid spills near the exit point of the drill for the Dan River and Stony Creek reservoir. DEIS at 4-14. FERC's reliance on stream setbacks for HDD and conventional bore drilling to support its *not likely to adversely affect* determination for this species is inappropriate, particularly where FERC has already granted Mountain Valley variances from its policy of requiring 50-foot setbacks from the stream. Furthermore, FERC's reliance on vegetative buffers for sedimentation impacts from drilling is misplaced, as these buffers are only being required by FERC where practicable. Finally, the DEIS relies on compliance with Mountain Valley's proposed HDD contingency plan to support its *not likely to adversely affect* determination is arbitrary and capricious, as the plan does nothing to prevent drilling fluid spills that result from geological features, and mostly provides means to respond to a spill after it has contaminated aquatic	See above CO-24k

CO-24	Appalachian Mountain Advocates	
CO-24k	habitat, and when it is too late to prevent adverse impacts to listed species such as the Roanoke logperch. Further, FERC's reliance on sediment barriers and mulched slopes to support its *not likely to adversely affect* determination for this or any of the other listed or proposed aquatic species is arbitrary and capricious. As the DEIS readily admits, the indirect sedimentation effects analysis has not yet been completed. Furthermore, several site-specific drilling plans have yet to be completed. As such, the DEIS did not fully consider the indirect sedimentation effects of the Project. Without knowing the results of the indirect sedimentation analysis or the particulars of the specific drilling plans involved, FERC can not determine the efficacy of sediment barriers and mulched slopes in protecting aquatic habitat, relative to the amount of sedimentation that is expected to be inflicted on the receiving water bodies. Notably, construction of the MVP mainline has already resulted in severe sedimentation in Roanoke logperch habitat. *See, e.g.*, Letter from Sierra Club *et al.* to U.S. Fish and Wildlife Service requesting stay pending review under CP16-10 (Aug. 12, 2019) (Accession No. These flaws in FERC's analysis render the *not likely to adversely affect* determination and the DEIS arbitrary and capricious. Due to the aforementioned failures of analysis, FERC's DEIS has failed to take a "hard look" at impacts to listed and proposed aquatic species. **C. Freshwater Mussels** Freshwater mussels are some of the most imperiled species in the U.S. According to the FWS website "America's Mussels: Silent Sentinels," no other group of animals is so gravely imperiled. "To put this in perspective, The Nature Conservancy reports that about 70 percent of mussels in North America are extinct or imperiled, compared to 16.5 percent of mammalian species and 14.6 percent of bird species."[116] The James spineymussel is listed as endangered under the ESA. The Atlantic pigtoe is proposed for listing as threatened under the ESA. The DEIS warns of potential turbidity, sedimentation and habitat alteration impacts to mussel habitat in and downstream from the project area. DEIS at 4-92. The proposed Project has the potential to result in significant direct impacts to streams and wetlands from runoff and erosion, and potential contamination of waterbodies through construction activities and leaks or spills of natural gas or other substances (i.e. drilling fluids), with associated impacts to downstream species and communities, including	See above CO-24k comment response

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	harm to listed mussels. Freshwater mussels are incredibly susceptible to sediment loading. Studies have shown that "[o]ne of the most ubiquitous factors that may adversely affect mussel populations is excessive sedimentation caused, in part, by poor land-use practices. Excessive sedimentation has been suspected as a cause of unionid mussel declines since the late 1800s."[117] Species in the Project area -- such as the James spinymussel, which has been extirpated from 90% of its historic range -- have experienced a precipitous decline over the past several decades due to development of the region. These species have a very restricted distribution, and are therefore incredibly susceptible to water quality impacts, since they are limited to areas of unpolluted water with clean sand and cobble bottom sediments.[118] FERC has failed to consider the downstream impacts of the proposed activities. These activities have the potential to increase sediment loads not only from stream crossing construction activities, but from the loss of riparian vegetation and upland construction activities, which will lead to increased erosion and sedimentation.	
CO-24k	Excessive amounts of sediments, especially fine particles that wash into streams, can potentially affect mussels through multiple mechanisms. Fine sediments can lodge between coarse grains of the substrate to form a hardpan layer,[119] thereby reducing interstitial flow rates. Silt and clay particles can clog the gills of mussels,[120] interfere with filter feeding,[121] or affect mussels indirectly by reducing the light available for photosynthesis and the production of food items.[122] Much of the region contains ecological communities characterized by thin soils and exposed parent material that result in localized complexes of bare soils and rock, herbaceous and/or shrubby vegetation, and thin, often stunted woods and sparse woodlands with shallow, drought-prone soils. Other areas are characterized by rugged, mountainous terrain with steep hills and ridges dissected by a network of deeply incised valleys. These communities are susceptible to erosion from activities that remove vegetation and disturb soil. Construction activities therefore have the potential to cause substantial sediment discharge into receiving waters that provide habitat for endangered mussels.	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24k	The DEIS anticipates potential aquatic impacts from the project, including sedimentation, turbidity, drilling fluid spills, collapse of streams, loss of stream bank cover, fuel and chemical spills, water withdrawals and blasting. The DEIS fails to quantify water withdrawal impacts to aquatic species and habitat, and does not quantify blasting impacts to aquatic species and habitat. FERC defends its *not likely to adversely affect* determination with the caveats that Mountain Valley would "attempt to avoid blasting during waterbody crossings," and that it would adhere to a SPCC spill contingency plan that would require 100-foot setbacks for equipment and fuel. DEIS at 4-85, 4-86. However, neither of these caveats provide real assurance that blasting or spill impacts to aquatic habitat will be avoided. Commenters are very concerned by FERC's failure to properly analyze the potential impacts to freshwater mussels. It is clear that FERC does not even have sufficient information on these species, given that the DEIS states that Mountain Valley has yet to file completed mussel population surveys for the project area in Rockingham and Alamance Counties. DEIS at 4-92. It is axiomatic that completed surveys are necessary to undertake the hard look that NEPA requires, as well as to comply with the ESA, yet FERC has made a *not likely to adversely affect* determination for the James spinymussel and Atlantic pigtoe without even knowing where these species may be. Further, FERC's NEPA analysis and *not likely to adversely affect* determination are based on compliance with the HDD contingency plan, whose terms are neither specified, nor considered in detail. *Id.* Lastly, the use of HDD elevates the risk of drilling fluid spills in aquatic habitat for listed species. The DEIS notes an elevated risk of drilling fluid spills near the exit point of the drill for the Dan River and Stony Creek reservoir. DEIS at 4-14. These drilling fluids can be comprised of any number of toxic substances, provided that FERC has approved of those additives' inclusion in the drilling fluid. DEIS at 4-15. Approval of said substances is planned to take place after the publication of the DEIS, rendering the DEIS incapable of considering the full impacts of drilling fluid spills. *Id.* Moreover, inadvertent returns can adversely impact aquatic ecosystems regardless of toxicity. FERC's willful ignorance regarding listed and proposed mussel populations in the Project area, as well as its lack of consideration of the details regarding crucial mitigation measures, amounts to arbitrary and capricious agency action and a failure under NEPA to give a "hard look" at the Project's impacts to listed and sensitive mussel species.	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24k	**D. Smooth Coneflower** The federally-endangered smooth coneflower has been documented in Rockingham County, North Carolina. FERC has acknowledged that the smooth coneflower is vulnerable to removal and crushing by construction-related activities, and to impacts from altered light exposure, altered hydrology, or sedimentation and runoff caused by the Project. DEIS at 4-93. The U.S. Fish and Wildlife Service has recommended population surveys for these plants in the section of the Project area in North Carolina. However, while Mountain Valley has identified 88.3 acres of potential suitable habitat within the Project area, it has not completed these surveys. Without knowledge of where these plants are in the Project area, FERC's *not likely to adversely affect* determination in the DEIS is arbitrary and capricious. Furthermore, for the same reason, FERC's NEPA duties to take a "hard look" at impacts to smooth coneflowers were not fulfilled. **E. Small Whorled Pogonia** The U.S. Fish and Wildlife Service has indicated that the federally-endangered small whorled pogonia may be in the Project area in Rockingham and Alamance Counties, North Carolina. The DEIS indicates that this species is vulnerable to the same impacts listed above for the smooth coneflower. DEIS at 4-92. While Mountain Valley has identified 271 acres of potential suitable habitat in the Project area, it has not completed adequate population surveys for the species. Without knowledge of where these plants are in the Project area, FERC's *not likely to adversely affect* determination in the DEIS is arbitrary and capricious. Furthermore, for the same reason, FERC's NEPA duties to take a "hard look" at impacts to small whorled pogonia were not fulfilled.	See above CO-24k comment response

CO-24	Appalachian Mountain Advocates	
CO-24l	**VI. The DEIS Inflates the Project's Economic Benefits and Understates Its Adverse Impacts** Relying in part on a study that Mountain Valley commissioned from consulting firm FTI, FERC claims that the "Project would result in temporary beneficial impacts on the state and local economics." DEIS at 4-129. That study and FERC's resulting analysis simultaneously overestimate the Project's benefits and ignore or improperly discount its adverse economic impacts to communities affected by the Project. *Id.* at 4-137—4-138. The FTI study's bias towards overestimating economic benefits is inherent in its methodology.[123] The study uses an input-output model called IMPLAN to determine the direct, indirect, and induced economic benefits of the Project. These types of models wrongly assume that all future spending and hiring decisions are made the same way that they have historically been made, such that any additional marginal income generated is assumed to be spent in local communities to the same degree as existing income, despite evidence showing that is not the case in reality.[124] This flaw leads to an overestimate of firm spending and "multiplier effects."[125] Mountain valley's study is further flawed because it uses the entire states of North Carolina and Virginia as its impact area, instead of a more appropriate region that focuses on the local communities that would be affected by the Project. The larger the impact region, the more likely that direct, indirect, or induced spending can happen within it. A much smaller subset region would more appropriately reflect potential benefits to the areas most impacted by the project. For example, "MVP Southgate may be able to buy materials in northern Virginia, over 200 miles away from where the pipeline would be located in southern Virginia, but by including all of Virginia in the impact region, the impact of that spending is still counted as direct spending and then, due to the multiplier effect, counted as additional indirect and induced spending."[126] FERC thus cannot rely on Mountain Valley's claims of economic benefits to support its conclusions.	Section 4.9 provides a discussion of socioeconomic impacts. See responses SOCIO-8, SOCIO-7, and CI-1 in appendix I.2. The cost to ratepayers is outside of the scope of this EIS. The commission will consider rates and may address this in any Order it issues for the Project.

CO-24	Appalachian Mountain Advocates	
CO-24l	Not only does the DEIS rely on inflated projections of the Project's economic benefits, it also ignores or wrongly dismisses its adverse economic impacts. First, it ignores that ratepayers will likely be on the hook for this expensive, unnecessary infrastructure and fails to disclose the socioeconomic impacts of those rate increases. Further, the DEIS fails to account for the loss in ecosystem services that is currently provided by air, water, forest, and other natural resources that will be disturbed or destroyed by Project construction and operation. Such losses were estimated at between $4.12 and $14.8 million per year for the MVP Mainline.[127] Nor does the DEIS account for the economic impacts due to the increase in greenhouse gas emissions caused by the Project, which could be monetized using the Social Cost of Carbon tool. Finally, the DEIS wrongly accepts Mountain Valley's claims that its pipeline would not adversely affect adjacent property values, which claims rely on flawed studies that do not account for importance of pristine, undeveloped character to the value of the type of rural properties that will be primarily impacted by the Project.[128] DEIS 4-126–4-128. These failures undermine the DEIS's conclusions regarding socioeconomic impact and violate NEPA.	See above CO-24l comment response
	CONCLUSION	
CO-24m	For all of the reasons stated above, FERC's DEIS for the Mountain Valley Pipeline Southgate Project does not comply with NEPA. In order to meet the requirements of that statute, FERC must remedy the flaws identified herein and reissue a revised DEIS for review and comment by the public.	See response GEN-4 in appendix I.2.

CO-25 Blue Ridge Environmental Defense League

September 16, 2019

TO: Federal Energy Regulatory Commission

FROM: Ann Rogers, Section 106 Coordinator, Blue Ridge Environmental Defense League

RE: OEP/DG2E/Gas 3
Mountain Valley Pipeline, LLC.
Southgate Project
Docket No. CP19-14-000

SUBJECT: Request for realignment of Southgate ATWS to avoid impacts to Little Cherrystone property

Introduction to Little Cherrystone

Little Cherrystone is a historic home located near Chatham, in Pittsylvania County, VA which was listed on the National Register of Historic Places in 1969. The portion that remains standing was described in the National Register of Historic Places Inventory-Nomination Form in 1969 as follows:

> . . . a circa 1800, two-story brick structure with gable roof and exterior and chimney. The brick is laid in three-course American bond with queen closers. The nine-over-nine sash windows have thin Federalist muntins, architrave framing and plaster flat arches with double keystones. The fine cornice with its dentils, mutules and guttae are matched by the arched entrance doorway on the east front which uses pilasters, strapwork and pierced detailings. The doorway is unfortunately in a deteriorated condition. A west porch, which until recently also existed in a deteriorated condition, ws removed and replaced by a frame wing. . . . It is in the two rooms of the circa 1800 brick section where the exterior woodwork style is continued. The interior framing of the old entrance doorway, now a window, matches the exterior arch design, but the pilasters have been removed; architrave moldings frame all doors. The south room has a marbleized dado combined with imitation ashlar. The chair rail has a frieze of alternating reeded and fluted panels. The cornice combined a cable design with a corbel motif repeated from the exterior cornice. The mantel consists of twin turned colonnettes on either side of the fireplace with a frieze of three sunbursts above, each of which swells gently outward in a low convex curve. The marbleizing is repeated around the sunbursts, and at either end of the frieze are small lancet arched tabernacles."

The old frame wing of Little Cherrystone was probably on the land when Col. Robert Wooding of Halifax gave to Thomas Hill Wooding "a parcel of land containing 200 acres of Pittsylvania County on the draughts of Great Cherrystone Creek ..." just after the latter was married in 1790. Thomas Wooding, who probably build the brick addition, was commander of his home militia in Pittsylvania in 1806 and served in the House of Delegates between 1799 and 1821.

As a collection of traditional Virginia architectural styles, Little Cherrystone is a valuable example, especially considering the pleasant contrast of size and shape among the various units. Its finely carved and painted woodwork, especially on the interior, is exceptional not only for the South Piedmont area but as an example of provincial Virginia design.

According to a Works Progress Administration of Virginia Historical Inventory published in 1938, the property owner, Col. Thomas H. Wooding was the son of Col. Robert Wooding of Halifax, commandant of Halifax's military forces during the Revolutionary War.

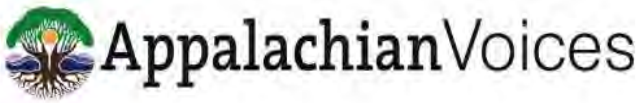
Please see photos of Little Cherrystone in **Attachment 1, Attachment 2,** and **Attachment 3.**

CO-25

Little Cherrystone Manor/Wooding Cemetery/Site 71-36 is mentioned on page 4-166 of the draft EIS as a NRHP-listed property and listed on table 4.10-9, with the recommendation to "avoid or mitigate." In an environmental information request issued by the FERC on October 3, 2019 we asked Mountain Valley to file either an avoidance plan or a treatment plan for Little Cherrystone Manor. In an October 18, 2019 filing, Mountain Valley stated it would be filing an avoidance plan for Little Cherrystone Manor.

CO-25	Blue Ridge Environmental Defense League	
CO-25	***Cemetery and mound at Little Cherrystone*** The Little Cherrystone property includes a family cemetery located about 275 feet southwest of the Little Cherrystone dwelling. Please see photos 2in **Attachments 4 and 5**. According to the same 1938 Works Progress Administration of Virginia Historic Inventory cited above, the cemetery at Little Cherrystone contains the graves of Thomas A. Wooding's son, George, born in 1813, and at least two other relatives, J.B. Wooding, born 1840, and Mary Nat Wooding, born 1849. Adjacent to the stone wall on the western side of the cemetery is a mound. Please see photo of this mound in **Attachment 6**. The mound is potentially significant from an archaeological standpoint in that it may contain unmarked graves, which can commonly be found on the perimeter of rural cemeteries of this era. Additionally, there is potential for the mound to have significance as a Native American burial site. ***Proximity of proposed Southgate pipeline to Little Cherrystone, cemetery, and mound*** The Southgate pipeline has been routed in close proximity to Little Cherrystone, its cemetery, and the mound adjacent to the cemetery. **Attachment 7**, a map of Little Cherrystone and the planned Southgate pipeline, illustrates that the Little Cherrystone structure, its cemetery, and the mound are all contained within the Southgate pipeline's Study Corridor Boundaries. An Additional Temporary Work Space (ATWS) is planned to be constructed and utilized within about 100 feet of the cemetery and 50 feet of the mound. ***Request to FERC*** Little Cherrystone and its accompanying cemetery and mound make important contributions to the history of Pittsylvania County. They offer the visitor a glimpse into the landscapes and architecture of 18th and 19th century Pittsylvania County, an area from which many farmers eventually migrated westward to form settlements in the Blue Ridge region of Virginia and elsewhere. It is very important for us to keep structures like Little Cherrystone and their surrounding landscape features intact, so as to inform future generations of how and where Americans lived in times past. For these reasons, BREDL requests that the edge of the Southgate pipeline's Additional Temporary Work Space (ATWS) be moved a minimum of 500 feet west of its current location, in order to buffer Little Cherrystone and its cemetery and mound from ground disturbances and visual impairment which would likely result during pipeline construction with the current position of the ATWS, as illustrated on **Attachment 7**. Thank you for your prompt attention to this matter.	See above CO-25 comment response

CO-26	Appalachian Voices



AppalachianVoices.org
outreach@appvoices.org

BOONE
589 West King Street
Boone, NC 28607
828.262.1500

CHARLOTTESVILLE
612 East High Street
Charlottesville, VA 22902
434.293.6373

KNOXVILLE
2507 Mineral Springs Ave.
Suite D
Knoxville, TN 37917
865.291.0083 ext. 700

NORTON
816 Park Avenue NW
Norton, VA 24273
276.679.1691

September 16, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

RE: Docket No. CP19-14-000 Draft Environmental Impact Statement for the Mountain Valley Southgate Project

Dear Secretary Bose:

Appalachian Voices and approximately 1,289 supporters, whose names are attached below, respectfully submit the following comments on the Draft Environmental Impact Statement for the proposed Mountain Valley Project Southgate Project:

CO-26a	The MVP Southgate Project is not in the public interest. Not only will it create permanent adverse impacts on the local environment, it will also contribute to several more decades of global climate pollution. Studies show that existing gas infrastructure is more than sufficient to meet regional energy needs for residents and industry. Therefore, the primary beneficiaries of the pipeline will be private companies. This is deeply concerning, given that a Certificate of Public Convenience and Necessity would allow the taking of private property for this project. The Draft Environmental Impact Statement (DEIS) issued by the Federal Energy Regulatory Commission (FERC) fails to provide adequate information for public comment and fails to fully account for all of the environmental threats posed by the MVP Southgate Project.	See response GEN-2 in appendix I.2.
CO-26b		See response GEN-4 in appendix I.2.
CO-26c	Construction of the pipeline is expected to cause heavy erosion and consequent sedimentation of local waterways. The developer has already been cited for numerous water quality violations during the construction of the MVP mainline, so FERC's assumption that the developer will comply with standard water protection measures and uphold water quality standards is misguided, undermining the credibility of the analysis.	See response GEN-6 in appendix I.2.

CO-26	Appalachian Voices	
CO-26d	Erosion and sedimentation is an ongoing concern in the Haw River basin where many of the streams are impaired due to poor aquatic life. Sedimentation, erosion and increases in stormwater velocity, has left many creeks with steep, inaccessible banks, void of healthy aquatic habitat. Cutting forested streamside buffers and wetlands increases the risks of erosion and sedimentation, increasing turbidity levels and impacting aquatic life.	See response SURF-2 in appendix I.2.
CO-26e	Much of the pipeline is in the flood zone of the Haw River, which has seen record flooding the past two years. The volume and velocity of water will be increased with less buffer protection and compacted soils from heavy machinery. The Haw River watershed has extremely variable high flow tendencies. The high and low flow points have not been factored into this review.	See response SURF-7 in appendix I.2.
CO-26f	Adjacent communities already face contaminated drinking water sourced from the Dan River, Haw River and surface water reservoirs. Additional public water supply intakes are located downstream of these stream crossings. Though these intakes are further downstream than the DEIS assessment limit of three miles, many of the contaminants that could impact drinking water quality do not break down, and, therefore, the three-mile limit for downstream impacts is arbitrary and does not provide an accurate assessment of the full scope of impacts.	See response SA-2A-2 in appendix I.3 and response SURF-4 in appendix I.2.
CO-26c	We have seen the work MVP contractors have done on the mainline and have little faith that the requirements of the erosion and sediment control plan will be met at all. Including clauses like "when practicable" leaves too much subjectivity to MVP Southgate contractors. We have seen over 300 water quality and sediment and erosion control violations committed by the same construction teams on the MVP mainline . However, leaving so much subjectivity in what is or what is not practicable allows MVP Southgate to argue that the bare minimum is all that is necessary. This is a sensitive watershed, and this project cannot be completed in a way that prevents serious watershed degradation.	See response GEN-6 in appendix I.2.
CO-26g	Construction of the pipeline would have long-term, permanent impacts to 615 acres of forested uplands, 10 acres of forested wetlands and nearly 12 acres of protected riparian forested lands in the Jordan Lake Watershed. These areas would require decades to recover from the kind of blasting, demolition and construction contemplated for this project.	Comment noted.

CO-26	Appalachian Voices	
CO-26h	FERC is ignoring the significant impacts of this project. The DEIS identifies widespread, permanent impacts like the long-lasting or permanent destruction of hundreds of acres of forests and wetlands, but then says that impacts will not be significant because mitigation measures will be used during construction. Mitigation cannot prevent or repair the significant impacts of permanent forest and wetland destruction. The agency's reliance on mitigation measures to argue that the project will cause no significant impacts is inadequate because many of the mitigation measures proposed are unspecified. In many instances, the DEIS instructs Mountain Valley Pipeline to come up with mitigation measures that are currently not defined. It is disingenuous for FERC to claim that unknown measures will prevent significant environmental impacts.	See response GEN-9 in appendix I.2.
CO-26i	FERC concludes that no significant environmental impacts would be inflicted by this project, yet it lacks the necessary information to assess what the impacts to various environmental resources would be. For example, MVP has yet to provide FERC with its feasibility studies to cross Deep Creek, a site where imperiled aquatic species are suspected to live. FERC acknowledges that MVP will use 5.9 million gallons of water in constructing the project, but MVP has not identified where it will source that water, preventing FERC from assessing the environmental impact of those water withdrawals. Lastly, archaeological surveys have not been completed for the project area, preventing analysis of impacts to cultural resources.	See response SURF-8, SURF-6, and CULT-1 in appendix I.2.

Sincerely,

Tom Cormons, J.D.
Executive Director

CO-27 Atlantic Coast Pipeline

707 East Main Street
Richmond, VA 23219

September 16, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

Re: Mountain Valley Pipeline, LLC, Docket No. CP19-14-000
Comments of Atlantic Coast Pipeline, LLC on
Draft Environmental Impact Statement for Southgate Project

Dear Ms. Bose:

CO-27a

In accordance with the procedures established in the "Notice of Availability of the Draft Environmental Impact Statement for the Proposed Southgate Project" issued in the above-captioned proceeding on July 26, 2019, the Atlantic Coast Pipeline, LLC (Atlantic) respectfully submits these comments on the draft environmental impact statement (DEIS) prepared by the Commission Staff for the Southgate Project (Southgate or the "Project") proposed by Mountain Valley Pipeline LLC (MVP).

Atlantic limits its comments on the Southgate DEIS to the discussion of System Alternatives provided in DEIS Section 3.3. As explained in the DEIS, "[s]ystem alternatives to the proposed action would make use of existing or other proposed natural gas transmission systems/facilities to meet the stated purpose of the Project. Implementing a system alternative would make it unnecessary to construct all or part of the Project, although some modifications or additions to an existing transmission system/facilities may be necessary."[1] In particular, the discussion of Atlantic Coast Pipeline (ACP) as an alternative to Southgate in DEIS Section 3.3.2.3 is inaccurate.

MVP has explained that the purposes of its Project include: meeting the growing needs of natural gas users in the southeastern U.S.; adding a new gas transmission pipeline to provide competition and to enhance the reliability and resiliency of the existing pipeline infrastructure in North Carolina and southern Virginia; and providing North Carolina and southern Virginia with direct pipeline access to Marcellus and Utica gas supplies.[2] Atlantic is serving these same important purposes with the ACP, an approximately 600-mile, 1.5 Billion Cubic Feet per day (BCF/d), pipeline certificated by the Commission and currently under construction. ACP will begin from the gas supply region in West Virginia, extend through Virginia with a lateral extending east to Chesapeake, Virginia, and then continue south into eastern North Carolina, ending in Robeson County.

See revised section 3.3.2.3 for a discussion of the Atlantic Coast Pipeline Alternative.

CO-27	Atlantic Coast Pipeline	
CO-27a	a precedent agreement for 300,000 Dekatherms per day ("Dth/d") of firm transportation capacity on Southgate. Both MVP and PSNC itself have explained the growing demand for natural gas in North Carolina generally and by PSNC in particular, as well as PSNC's desire for direct access to Marcellus and Utica supplies and for a new pipeline alternative to serve North Carolina.[3] Atlantic fully understands and appreciates these factors, which also help undergird the need for the ACP. Atlantic also readily acknowledges that PSNC has elected to contract with MVP for the incremental transportation capacity of the Project, and Atlantic does not question that decision here. Furthermore, Atlantic does not contend or believe that the Commission should "look behind" precedent agreements to judge a pipeline customer's decision. Nevertheless, the alternative of ACP should not be dismissed based on incorrect assumptions as was done in the DEIS. The DEIS recognized the under-construction ACP project as a potential system alternative, stating that the ACP route is approximately 100 miles east of Southgate's proposed delivery points at the Dan River (in Rockingham County, North Carolina) and the Haw River (in Alamance County, North Carolina).[4] Based on that location, the DEIS asserted that "a minimum of 100 miles of new pipeline and compression infrastructure would be required to modify the ACP Project to serve as an alternative to the Project."[5] And, *for that reason alone*, the DEIS concluded that ACP would not provide a significant environmental advantage to the Project and did not warrant any further study.[6] Staff should ***not*** assume when considering ACP as an alternative to Southgate that ACP would deliver gas to PSNC at the same delivery points proposed by MVP. The ACP route is close to the *eastern* side of PSNC's service area whereas the planned Southgate delivery points are to the west of that service territory.[7] Furthermore, Atlantic has leased capacity on the Piedmont system (as approved in the ACP certificate order) in Johnson County, North Carolina that can be used to transport gas from ACP directly to the PSNC system near Clayton, North Carolina.[8] Deliveries from ACP to PSNC would be on that side of the PSNC service territory (near the heart of its demand growth). There would be no need for ACP to construct a pipeline across the PSNC territory to make deliveries to the west where Southgate would be located – as is incorrectly assumed in the DEIS. Indeed, ACP could offer more effective infrastructure support for the areas of PSNC that are projected to experience demand growth, and better supply support for the PSNC system overall. Notably, Raleigh, one of PSNC's largest and fastest growing markets,[9] is only about 30 miles from the ACP route, and even closer to Clayton (the end-point of ACP's capacity leased on Piedmont). Additionally, with its location to the east side of the PSNC territory, ACP would provide greater geographical diversity (with the resulting reliability and resiliency benefits) compared to the existing Transcontinental Gas Pipe Line and Southgate route, which are in the similar vicinity to the west of the PSNC territory. Furthermore, the ACP alternative provides for direct access to Marcellus and Utica gas supplies in the most liquid natural production areas in the northeast and to Dominion Southpoint, a very active virtual trading hub.	See response CO-27a above

CO-27	Atlantic Coast Pipeline	
CO-27a	The DEIS states, at Section 3.3.1, that ACP and other potential pipeline alternatives do not have the capacity to individually or combined meet the needs served by the Project. Yet, Atlantic has available capacity of as much as 140,000 Dth/d of its own to serve PSNC's needs beyond the quantities already subscribed on ACP by PSNC. Additional gas demand for PSNC could be accommodated through limited ancillary facility enhancements on ACP which likely would be less environmentally impactful than the new facilities proposed for the Southgate Project. If it were necessary, the existing Piedmont infrastructure leased by Atlantic also could be upgraded as needed to transport additional volumes from APC to the PSNC system – which also could require less intrastate facility construction (and accompanying environmental impacts) than what may be necessary to transport gas from the proposed Southgate delivery points further downstream to the areas where needed by PSNC. The DEIS simply fails to consider any of these factors bearing on the reasonableness of ACP as an alternative to the Southgate project. Accordingly, Atlantic is filing these comments to correct for the record the viability of ACP as an alternative for the Project.	See response CO-27a above

CO-28	Appalachian Voices

AppalachianVoices

AppalachianVoices.org

BOONE
589 West King Street
Boone, NC 28607
828.262.1500

CHARLOTTESVILLE
812 East High Street
Charlottesville, VA 22902
434.293.6373

KNOXVILLE
2507 Mineral Springs Ave,
Suite D
Knoxville, TN 37917
865.291.0083 ext. 700

NORTON
816 Park Avenue NW
Norton, VA 24273
276.679.1691

September 16, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Federal Energy Regulatory Commission Draft Environmental Impact Statement for OEP/DG2E/Gas 3 Mountain Valley Pipeline, LLC Southgate Project (FERC/EIS0297D; FERC Docket Number CP19-14-000.

Dear Secretary Bose:

In response to FERC's draft Environmental Impact Statement for the MVP Southgate project Appalachian Voices engaged Dr. Pamela C. Dodds, Licensed Professional Geologist, to prepare a Hydrogeological Assessment of the Mountain Valley Pipeline Southgate Project's expected construction impacts in Virginia and North Carolina.

This report provides details and comments concerning the adverse impacts to streams and wetlands, the highlights of which are summarized here:

1. Deforestation, soil compaction, and dewatering will result in increased peak stormwater discharge, which will transport sediment to receiving streams and will cause increased downstream stream bank erosion.

2. Pre- and post-construction peak stormwater discharge calculations were not presented in the DEIS in order to evaluate the increase in peak stormwater discharge as it impacts stream bed scour and downstream stream bank erosion.

3. The minimal Best Management Practices selected by the agency will allow the transport of sediment to receiving streams, thereby degrading and destroying aquatic habitats.

CO-28a	See response SURF-2 in appendix I.2. As indicated in Table 4.13-2 of the EIS, Project construction would affect no more than 0.3 percent of any HUC-10 watershed affected by the Project. Additionally, as described in the EIS, Mountain Valley would decompact soils and revegetate areas after construction is complete. Due to the relatively small footprint of the Project and due to Mountain Valley's proposed erosion control measures, as well as measures to return areas to pre-construction condition, we determined that there would not likely be a discernable effect on peak storm water discharge.
CO-28b	See response SURF-2 in appendix I.2.

CO-28	Appalachian Voices	
CO-28c	4. Headwater areas and associated seeps and wetlands will be deforested, compacted, and dewatered, thereby destroying aquatic habitats at the base of the food chain for the river continuum.	The EIS includes an analysis of all water features affected by the Project, including wetlands (Section 4.3 and 4.4 of the EIS). No seeps were found in the Project area. Mountain Valley would follow its Plan and Procedures and E&SCP to minimize impacts on sensitive water features and aquatic habitat. The EIS discusses impacts on less mobile species, noting that there is a chance that some will be killed. However, the footprint of the Project is not large enough to have a significant impact on the food chain for the river continuum. Mountain Valley would return all areas to pre-construction condition thereby allowing aquatic habitats to recover shortly after construction.
	5. Numerous headwater areas and tributaries to specific larger streams will cumulatively impact the larger streams.	See response SURF-4 in appendix I.2.
CO-28d	In addition, the report provides details concerning the deficient and dismissive discussion of earthquake activity and soil liquefaction, as well as release of Lead-210 (radioactive) and Lead-206 (toxic) to the atmosphere during gas venting (blowdown events) for maintenance and resulting from cleaning the pipe interior with "pigs" (devices used to clean gas pipelines). You can find these conclusions and further research in the report attached.	Earthquakes and soil liquefaction are discussed in section 4.1.4 in the EIS.
CO-28e	Thank you for the opportunity to comment on this important matter. Sincerely,  Peter Anderson, Virginia Program Manager Appalachian Voices 812 E. High Street Charlottesville, VA 22903	Radon can be entrained in fossil fuels and decay into isotopes such as Lead-210 and Lead-206, which could form a thin coat on the interior of the pipeline. If the replacement or removal of portion of the pipeline or equipment should take place during maintenance, the pipeline company must comply with the Resource Conservation and Recovery Act (RCRA) to ensure that high levels of contaminants (including lead) are not disposed of improperly. In addition, cleaning "pigs" used to remove solid and liquid materials from the pipeline would be disposed of properly in compliance with the RCRA and state laws.

CO-29	Transcontinental Gas Pipeline Company, LLC

Williams

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713-215-2000

September 17, 2019

Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Attention: Ms. Kimberly D. Bose, Secretary

Reference: Mountain Valley Pipeline, LLC
Southgate Project
Docket No. CP19-14-000
Comments on Draft Environmental Impact Statement

Ladies and Gentlemen:

Transcontinental Gas Pipe Line Company, LLC (Transco) is pleased to provide the following information to assist in the Federal Energy Regulatory Commission's (Commission) review of potential alternatives to the Mountain Valley Pipeline (MVP) Southgate Project as part of its environmental review process under the National Environmental Policy Act. As described below, Transco most certainly would be able to meet the market needs of the Southgate Project with significantly less environmental impact, lower cost, and greater security and resiliency than as proposed by MVP.

CO-29a	The Commission's Draft Environmental Impact Statement (DEIS) issued in the referenced proceeding states that to meet the purpose of the Southgate Project using the Transco pipeline system, "major system modifications similar to the proposed Project would be necessary," including "approximately 40 miles of new pipeline from the Transco pipeline system to the T-21 Haw River Interconnect, mainline pipeline upgrades to the Transco pipeline system, and additional compression." The DEIS concludes that these modifications would result in environmental impacts "similar" to those that would occur as proposed by the Southgate Project, and that, therefore, a Transco alternative "would not provide a significant environmental advantage." As shown below, the DEIS has missed the mark with regard to the configuration of a Transco alternative that would provide the same firm transportation service as the Southgate Project and, accordingly, the Commission has completely overlooked the advantages that a Transco alternative would have over the Southgate Project.	See section 3.3.2.1 of the EIS for a discussion of the Transco Pipeline System Alternative.

CO-29	Transcontinental Gas Pipeline Company, LLC	
CO-29a	For the Southgate Project, MVP requests authorization to construct and operate new pipeline facilities that would provide 375,000 dt per day of new pipeline capacity from Pittsylvania County, Virginia to delivery points with Dominion Energy (formerly Public Service Company of North Carolina, Inc., a long-time customer of Transco) (PSNC) in Rockingham County, North Carolina and Alamance County, North Carolina. The Southgate Project will involve the construction of 73 miles of new, greenfield pipeline, three new greenfield interconnect facilities, and a new greenfield 29,000 horsepower compressor station in order to provide such capacity to PSNC. While the firm transportation capacity of Transco's system is currently fully subscribed, given the efficient expandability of the Transco pipeline system and the integrated operations of the Transco system with its intrastate affiliate in North Carolina, Cardinal Pipeline, Transco would be able to expand and extend its system following the existing Cardinal Pipeline right-of-way in a significantly less impactful manner than MVP Southgate. Specifically, to provide the same capacity to PSNC as being proposed by MVP, Transco would need only to install a 37.7-mile pipeline lateral, which would follow the existing Cardinal Pipeline right-of-way, and perform only *minor* modifications to *existing* compression at Transco's Compressor Station 160 in Rockingham County, North Carolina. This Transco alternative would completely eliminate the need for MVP to construct its Southgate Project, which is comprised entirely of greenfield pipeline and compression facilities, including a greenfield compressor station in Pittsylvania County, Virginia, and would thus represent a substantial reduction in required facilities and land use. And, because Transco would require no new compression, this solution would help ensure that emissions from gas-driven compression in Pittsylvania County would not be increased. Also, inasmuch as the Transco alternative could be constructed entirely within existing right-of-way and by expanding existing facilities, it would significantly reduce costs to the shippers and their customers. While MVP is proposing a recourse rate for firm transportation service consisting of a monthly reservation rate of $18.7659 per dt, Transco, in stark contrast, estimates that its monthly reservation recourse rate would be at least 40% lower, a major savings for ratepayers.[1] The Transco alternative would provide shippers with the reliability of Transco's multi-line mainline system (up to six loops in parts of our system), numerous compressor stations that are generally designed to provide bi-directional flows, and approximately 200 Bcf of directly connected operating gas storage. In contrast, the Southgate Project would only consist of a single line and one compressor station, which would not have the flexibility or reliability that Transco's system offers.	See response CO-29a above

CO-30	Virginia Forest Conservation Group

Mitigation Recommendations for Impacts of the proposed Southgate Extension of the Mountain Valley Pipeline on Virginia's Forests

developed and presented by

The Virginia Forest Conservation Partnership

26 March 2019

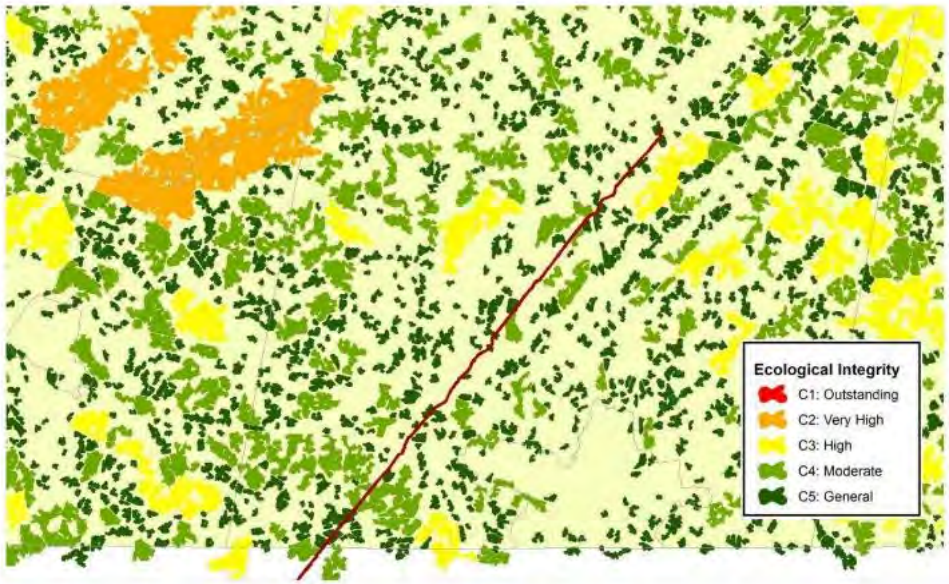
This is a review of the proposed Southgate extension of the Mountain Valley Pipeline (MVP Southgate) for forest fragmentation impacts, conducted by the Virginia Forest Conservation Partnership (VFCP) using the spatial representation provided by the developer's consultant, EQT Corporation, in a compressed file named "Frozen_08202018_Proposed_Route.zip." The Virginia portion of MVP Southgate is entirely within Pittsylvania County (Figure 1). The VFCP, instituted by the Virginia Secretary of

CO-30a

Figure 1. Location of the proposed MVP Southgate project in Virginia.

Natural Resources is comprised of Virginia state agency representatives and subject matter experts from the Department of Conservation and Recreation (DCR), the Department of Forestry, the Department of Game and Inland Fisheries, and the Department of Environmental Quality. This review assesses and quantifies both direct and indirect impacts of the proposed construction to forests, and provides recommendations to specifically address these impacts with long-term compensatory mitigation approaches, by comparing the proposed MVP Southgate route to features identified by the 2017 Virginia Natural Landscape Assessment (VaNLA 2017) (Figure 2). VaNLA 2017 identifies, classifies, and ranks all existing "Ecological Cores" (≥100-interior-acre forest patches) and smaller non-core (10-99-interior-acre forest patches) "Habitat Fragments" in Virginia based on several key indicators of biodiversity and ecological functions of forests. For more detail on VaNLA 2017, see http://www.dcr.virginia.gov/natural-heritage/vaconvisvnla.

Section 4.5.4.3 of the EIS discusses impacts related to forest fragmentation. This section has been updated with additional analysis on forest fragmentation. In addition, Mountain Valley has committed to minimizing impacts on forest land and continues to coordinate with VADCR on tree clearing mitigation prior to clearing trees.

CO-30	Virginia Forest Conservation Group	
CO-30a	Figure 2. Ecological Cores and Habitat Fragments from the VaNLA 2017 with the proposed MVP Southgate project route.  This review employs the same methodology used to assess forest fragmentation impacts of the main route of the MVP (i.e. the 303-mile span from northwestern West Virginia to southern Virginia). This method addresses both direct and indirect impacts by calculating forest lost, even if only temporary, as well as loss of integrity of core forest due to fragmentation that reduces interior area, increases perimeter, and/or decreases the depth of core forest. For background information and methodology specifics, see this document on the Federal Energy Regulatory Commission (FERC) docket: "Commonwealth of Virginia Department of Conservation and Recreation comments on MVP FEIS and Forest Fragmentation Impacts and Mitigation Recommendations of Virginia State Agency Staff under CP16-10" (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20170721-5183).	See response CO-30a above

CO-30	Virginia Forest Conservation Group	
CO-30a	The proposed route of MVP Southgate aligns with an existing utility corridor in Virginia, thus, significantly minimizing potential forest impacts. The VFCP recognizes colocation as an important consideration for minimizing forest impacts. **Results** A total of 15 Ecological Cores and Habitat Fragments would be impacted by the proposed MVP Southgate project. Tables 1 and 2 summarize these features by type and rank. Table 1. Summary by type of Ecological Cores or Habitat Fragments impacted by MVP Southgate. **Type** / **Count** / **Acres** Non-Core Forest / 11 / 1,318.6 Small-sized Core Forest / 3 / 985.9 Medium-sized Core Forest / 1 / 1,516.9 Table 2. Summary by rank of Ecological Cores or Habitat Fragments impacted by MVP Southgate. **Ecological Integrity Rank** / **Count** / **Acres** C4 / 3 / 2,177.6 C5 / 12 / 1,643.7 The raw impact totals were calculated for each of the 15 Ecological Cores and Habitat Fragments intersected by MVP Southgate (Table 3). Note that indirect impacts were not estimated for Habitat Fragments because they do not qualify as cores due to insufficient interior area. Direct and indirect impacts were also separated based on the ecological integrity of the intersected cores; C1-Outstanding and C2-Very High ranked cores were treated separately than cores ranked C3, C4 and C5, to allow mitigation ratios and mitigation activities to account for the fact that some forest cores would receive disproportionately greater impacts due to having greater ecological integrity.	See response CO-30a above

CO-30	Virginia Forest Conservation Group	
CO-30a	Table 3. Raw impact summary showing direct and indirect impacts to forests by MVP Southgate. **Direct Impact Acres** / **Indirect Impact Acres** **C1 and C2 Cores**: 0 / 0 **C2 – C5 Cores**: 13.7 / 198.4 **Habitat Fragments**: 24.1 / n/a **Total**: 37.8 / 198.4 The DCR comments on the FERC docket describe three mitigation activities, their rates of implementation, and specific mitigation ratios as recommended by the VFCP for forest fragmentation impacts of the MVP. These mitigation activities are afforestation, avoided deforestation, and forest enhancement. Stated simply, afforestation is the conversion of open land to forest by planting trees, avoided deforestation is permanent protection of forestland from conversion, and enhancement is implementation of forest management to improve ecological integrity. A different ratio of mitigation acres to impact acres was identified for each of these mitigation activities, as were different rates of implementation, to ensure mitigation results in effective conservation. Separate mitigation ratios were developed to specifically account for the impacts to C1 and C2 cores; C3-C5 cores, and Habitat Fragments. Full descriptions of mitigation activities and their rates, and justifications for mitigation ratios, are provided in the DCR Comments on the FERC docket. Tables 4 and 5 summarize the mitigation activities, their ratios, and their rates of implementation, and Table 6 summarizes the recommended total mitigation acreage broken down by activity. The VFCP recommends a total of 472 acres of land be identified, placed under permanent conservation, managed, and protected as core forest as mitigation for MVP Southgate.	See response CO-30a above

CO-30 Virginia Forest Conservation Group

CO-30a

Table 4. Recommended direct impact mitigation activities, ratios, and rates of implementation to address MVP Southgate impacts.

Direct Impact	Impact Acres	Afforestation - 25%		Avoided Deforestation - 75%	
		Ratio	Acres	Ratio	Acres
C1 and C2 Cores	0	5.0	0	7.0	0
C3 – C5 Cores	14	3.0	10	5.0	51
Non-Core Forest Blocks	24.1	1.5	9	3.0	54
TOTAL	38		19		106

Table 5. Recommended indirect impact mitigation activities, ratios, and rates of implementation to address MVP Southgate impacts.

Indirect Impact	Impact Acres	Forest Enhancement - 50%		Avoided Deforestation - 50%	
		Ratio	Acres	Ratio	Acres
C1 and C2 Cores	0	3.0	0	4.0	0
C3 – C5 Cores	198	1.5	149	2.0	198
TOTAL	198		149		198

Table 6. Recommended total acres of impact mitigation broken down by mitigation activity to address MVP Southgate impacts.

Afforestation	Avoided Deforestation	Forest Enhancement	Total Acres
19.3	304.0	148.8	472.1

See response CO-30a above

CO-37	Mr. Joyner - Danville Historical Society	
CO-37a	MR. JOYNER: Since this is indeed a draft EIS, or whatever, there are a couple of issues that I have. As President of the Danville Historical Society, the historical society has never been contacted by MVP, Precision or EQT. They contacted the City of Danville and Pittsylvania Historical Society, but since it goes through the Danville region, they never contacted Danville Historical Society for comments on this. That's the first thing.	In an October 18, 2019 filing, Mountain Valley indicated that it would provide the Danville Historical Society with copies of cultural resources investigations reports covering the Project APE in Pittsylvania County, Virginia.
CO-37b	And then the second issue is--there are many issues, but I'm just gonna go over a few of them--this is, at the very beginning stages of this, there is a state and national historical property that is listed on both of them, right here in the very beginning, and it's all lays with inside of the LOD. There is a cemetery sitting right here that also has a Native American Indian ground outside of the cemetery, but it butts up to the cemetery, as well as a 1790s house right here that is affected by the LOD that's on both State and National Register of Historic Properties. So there's gonna have to be a route adjustment. They're not gonna be able to deal with this cemetery, period. Because, especially with a Native American Indian burial ground being there. And with it being inside of the t no construction workers can approach it, interpret it, sit in it, sit on the stone wall, protraction to it, etcetera, etcetera, to keep it monitored. And so that's one of the big issues right there is this historic property through here.	Little Cherrystone Manor/Wooding Cemetery/Site 71-36 is mentioned on page 4-166 of the DEIS as a NRHP-listed property and listed on table 4.10-9, with the recommendation to "avoid or mitigate." In an environmental information request issued by the FERC on October 3, 2019 we asked Mountain Valley to file either an avoidance plan or a treatment plan for Little Cherrystone Manor. In an October 18, 2019 filing, Mountain Valley stated it would be filing an avoidance plan for Little Cherrystone Manor.

CO-37	Mr. Joyner - Danville Historical Society	
CO-37c	Now, one of the other things is, is that here at Lambert station 165 is being abandoned. They're building their new substation back here behind it for the interconnect to come through. They must indeed, even though they've been given a carte blanche angle on "no special-use" permits to build lines, but the compressor station to go down to Burlington, North Carolina, requires a special-use permit through County of Pittsylvania. I mean that is just an absolute requirement.	Mountain Valley would be required to comply with all federal and federally-delegated permits. These permits along with other state and local permits are identified in table 1.4-1.
CO-37d	But we also have a secondary historic site. Other than Little Cherrystone, which is zero feet in distance away from the pipeline, we have Mountain View is another historic, 1790s home, finished and completed in 1840, and that's also in the Chatham District on Route 29, zero distance. So it's gonna affect both of these.	Historical architectural site 71-25 (Mountain View Manor) was recorded during surveys conducted by TRC for Mountain Valley between September 2018 and June 2019 (Karpynec, September 2019). It was noted as listed on the NRHP. We have revised the FEIS to reflect this new information.
CO-37e	And in the EIS, with their archeological information, whatever, is they've listed a few of the archeological sites, but they've given no indication as to any of their findings, any of their attempts to what their findings are, even though usually they consider that as what's the word, not private, but, having a brain issue	See response CO-37a.

CO-37	Mr. Joyner - Danville Historical Society	
CO-37e	here--exclusive information, no. Help me with the word. Proprietary information, to not release any of the archeological data and information. But the EIS doesn't even cover that other than these two pages of archeology in the State of Virginia to North Carolina. And that's all it is. And it doesn't tell us anything about any of the information or the sites in which then noted as prehistoric, historic, contact, post-contact, any kind of that information. And so then, just to show you--let's see, right here, that Little Cherrystone, this is through all of y'all's paperwork. Cherrystone, oh, there it is. That even in your EIS, it shows that it is already listed for both national and Virginia State historic properties. And so that requires a route adjustment to go around this historic site. And there is no route adjustment planned at this time to go around this historic location. So there's gonna be a lot of argumentation, a lot of fight against Southgate and MVP with EQT about going through this piece of property, as well as the property directly across the street here. This land owner has specifically been told they're only going to remove one fence post to allow their vehicles to come into the property, because it's fenced at both of these road accesses. And that is absolutely not	See response CO-37a.
CO-37f		See above for response in CO-37b.
CO-37g		See response LU-1 in appendix I.2.

CO-37	Mr. Joyner - Danville Historical Society	
CO-37h	along with these two additional work spaces, but this is also a Native American village site through here. And our archeological company's already been able to verify this information by doing our own study out there that we've been studying now for twelve years, as well as Native American Indian over here. So the suggested route adjustment is, from this shortest property, is that is out of the interconnect station, the compressor station that the pipeline needs to come around this way, and at one time, they were considering that, but they have, for some reason, abandoned that idea of doing a route adjustment to go away from this historic property. So the state's gonna be arguing that against MVP and EQT, also in a legal format, about protecting this particular site, because this is one of the oldest standing homes in Pittsylvania County. And then, of course, other than that, there's also the endangered species, and you know, you're gonna hear a lot of that tonight. But those are mainly my main issues that I have with Southgate, other than also the compressor station.	See response CO-37a.
CO-37i		See response T&E-3 in the appendix I.2.

CO-37	Mr. Joyner - Danville Historical Society	
CO-37j	The 155 acres that was purchased back here, there is also an additional old home site, there is an additional home site sitting right back in here, so with the 155 acres purchased, whatever, we're not sure how this new compressor station -- because we know the main line's gonna have an interconnect into Transco and then a substation, compressor station going down to Burlington, North Carolina, to pressurize it till it gets to the first main valve compressor. So we're concerned about this whole track of land back through here. It's just gonna have to go around it. And other than that, I'm not one of these jump up and down and wear the badges and get out there with a sign protesting. There are proper ways to go through these channels to deal with the EIS. Now, since this is just the draft EIS, when are they gonna come back with the final EIS? Do you have any kind of recommended date on that?	See response LU-1 in appendix I.2. This site is listed in appendix E.2 and has been purchased by Mountain Valley for use during construction.
CO-37k		Response to comments are incorporated into the FEIS.
CO-37l	Another major concern is the use of Precision Pipeline doing the construction and building of the Southgate line. It's obvious that they've already created such a havoc with the main line with over 300 violations, lot of water issues, game and wildlife issues, endangered species, that Precision Pipeline has always had a very bad reputation in doing pipeline construction. And they've already had so many violations with the main line that we're concerned that they're gonna continue to do so with the Southgate line. Because one of the first rivers that they're gonna cross is our Banister River, and that is registered as a scenic waterway, and they're gonna have to cross that twice to get even through our county.	See response GEN-6 in appendix I-1
CO-37m		Section 4.3.2 of the EIS discusses the Project's impacts on surface water resources

CO-38	Sojna Ingram: Preservation Virginia	
CO-38a	MS. INGRAM: I'm Sonja Ingram, and I work for Preservation Virginia. I'm concerned mostly about the historic resources along the route. One thing I wanted to mention is that I submitted a letter back several months ago, but I never received any response, and I don't know if that's typical, but I did wanna mention that. And another thing is, usually, Preservation Virginia, since we're the statewide non-profit and we filled out all the appropriate documents, we usually receive the archeological reports, but I haven't received any for the Southgate Pipeline, so I'd like to get those. One of the reasons is, I was reading the draft	In an October 18, 2019 filing, Mountain Valley indicated that it would provide Preservation Virginia with copies of cultural resources investigations reports covering the Project APE in Pittsylvania County, Virginia.
CO-38b	EIS and I saw there's a lot of comments back and forth between the archeology firm and DHR, but usually we are in those comments. We have an opportunity to comment on that as well. There's some sites that I noticed that were previously identified, but the archeologists have not relocated them this time.	In section 4.10.4 of the DEIS, we acknowledge that the entire pipeline route has not yet been completely inventoried for cultural resources, and recommend that the Commission Order authorizing the Project contain an environmental condition that construction may not begin until after all archaeological surveys have been completed and reviewed, and we have completed the process of compliance with the NHPA
CO38c	And another thing that I wanted to mention is there's a few really important historic resources. One is Little Cherrystone, and this is a historic house, it's one of the earliest houses in Pittsylvania County. There's a cemetery next to it, and according to the maps, it shows that the pipeline right away is very close to that house and the cemetery.	See response CO-25

CO-38	Sojna Ingram: Preservation Virginia	
CO-38c	There's also -- I know that there was a historic scatter of artifacts recovered at one point, and I don't know if that was in relation to this pipeline or to maybe the previous Williams Pipeline, but that whole area out there is so historic, and it's just the pipeline is going way too close to it. I mean the cemetery probably has more burials outside of it. There's a stonewall and also a little metal iron wall, but there's probably more graves on the outside of those walls. And there's also this really odd little mound just beside of that cemetery that I'm just curious about it. It could be where they had just piled up soil when they were digging graves, but it also looks similar to Native American mounds that I've seen in the past. So that particular site and also Mountain View, which is also another historic plantation. It's very close to that. These are some of the ones that have stood out, just from looking at the draft EIS, but like I said, I haven't had a chance to look at the archeological reports to be able to really see what was recovered and comment on those in detail. So I will be submitting the written comments, but I do wanna get those reports, too, and that's about it.	See response CO-25
CO-38d		See response CO-37d
CO-38e		See response CO-38a.

CO-39	Deep Creek Church

United States of America
Federal Energy Regulatory Commission

Attention: Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Southgate Project Mountain Valley Pipeline, LLC.
Docket No. CP19-14-000

Date: August 22, 2019

Mountain Valley has requested authorization to construct and operate approximately 73 miles of natural gas transmission pipeline, one new compressor station, and accompanying facilities, which will environmentally affect Deep Creek Church and Cemetery located in Alamance County, North Carolina.

Deep Creek Church and Cemetery offers the following comments concerns on the above-referenced docket environmental impact statement (EIS).

a. That the Deep Creek Church and Cemetery burial site remains intact and undisturbed by said Mountain Valley pipeline.
b. That future burial(s) be unimpeded by said Mountain Valley pipeline.
c. That future upkeep of the Deep Creek Church and Cemetery be unimpeded by said Mountain Valley pipeline.
d. That access to Deep Creek Church and Cemetery be unimpeded by said Mountain Valley pipeline.
e. That clear signage specify demarc between Deep Creek Church, Cemetery, and the Mountain Valley pipeline.
f. That Mountain Valley Pipeline, LLC. SHALL be fiscally responsible for any and all damage caused by the installation, the maintenance, and the transmission of said Mountain Valley Pipeline.
g. That Deep Creek Church and Cemetery receive fiscal compensation for loss of land, building structure, procuring proper demarc signage/fencing, and restoration of landscaping from Mountain Valley pipeline LLC.

Sincerely,

Crystal D. Chandler
Deep Creek Church and Cemetery
Alamance County, NC
336.253.5518

CO-39a	An avoidance plan for the Deep Creek Primitive Baptist Church and Cemetery was filed by Mountain Valley on October 23, 2019.

IND-3	Janek Patel	
	Janak Patel, Haw River, NC. Dear Secretary;	
IND-3a	I am a lodging business(Days Inn) owner of land located at 1370 Truby Drive, Haw River,NC 27258 which is off Jimmie Kerr road. Based on my understanding from FERC/EIS-0297D Truby drive dead ends to within 400 to 500 feet from proposed gas line. Being a hotel having entrance on this road and line near the hotel I am seeking more details of this project. 1) what kind of environmental impact to hotel	Access roads are discussed in sections 2.3.5 and 4.8.1.4 of the EIS. At the location off Jimmy Kerr Road, Truby Drive is an existing paved road and no improvements are anticipated. Limited and temporary noise and traffic impacts may result from the use of this access road during construction.
IND-3b	2) the exact scope of construction plan	Section 2.0 details the construction methods of the Project. Alignment sheets showing the construction plan in this area are available on the FERC elibrary using accession number 20191220-5298.
IND-3c	3)Use of Truby drive during construction	Truby Drive would be used by Mountain Valley to access temporary access road TA-AL-188.
IND-3d	4)Traffic and access impact to hotel	Traffic impacts and management are discussed in section 4.9.4 of the EIS.
IND-3e	5)Noise impact to hotel guest.	Noise impacts are discussed in section 4.11.2.3 of the EIS. There would be limited, temporary noise impact to hotel as the use of nearby roadways are likely, but the use would be temporary and limited to a few days as the work is accomplished in a given area and then moves elsewhere. Any work outside the hours of 7am to 7pm, or sunrise to sunset in non-residential areas, other than low noise generating activities would require approval from FERC.

IND-4	David Hill	

8/16/2019

FERC
MVP Southgate Project DEIS
Docket # CP19-14-000

Dear Sir or Madam:

IND-4a	I would like to comment on the MVP Southgate Project DEIS. My family and I live in Alamance County, NC and our access to drinking water is from a well located on our property. We live 1.5 miles from the Haw River and 9 miles south of the proposed terminus of the MVP Southgate pipeline. The DEIS summary states that the Project will have limited adverse environmental impacts. I totally disagree with this and it is false.	Comment noted.
IND-4b	The DEIS states that there would only be temporary or localized surface water impacts. I disagree with this and it is false. The crossing of 7.1 miles of protected watersheds and 1.5 miles of critical watersheds, within the last 20 miles of the project, endangers those watersheds. The crossing of 161 water bodies within NC is an example of the broad potential for permanent negative impacts along the Project route. The HDD crossings of major water bodies carries the risk of IR's with them.	Section 4.3.2 of the EIS discusses surface waters, watersheds, and floodplains. Section 4.3.2.7 of the EIS discusses Mountain Valley's impacts of blasting and the mitigation efforts needed if there are negative effects in the project area. Section 4.1.4.4 of the EIS discusses the potential of landslides occurring with project operations and how Mountain Valley will minimize the chances of a landslide occurring.
IND-4c	Just within the last 4 miles of the Project, there are numerous examples of potential serious, permanent surface water impacts. The last 4 miles are within ¼ mile of the Haw River. There are 5 workspaces within 50 feet of the River, including 2 at Mile Posts (MP) 70 & 73 right on the River. There are 23 crossings of tributaries of the Haw. There are 3 points where the Project is within 15 feet of the Haw. There are 7 sites of landslide concern, including MP 72.7 (52 feet from the Haw). There are 5 potential blasting sites. There are 30 sites listed as steep slopes. All of these instances are capable of causing adverse, permanent damage to the Haw River, associated tributaries, and associated groundwater.	Section 4.3.1 includes a detailed discussion of the potential impacts that construction and operation of the Project could have on groundwater resources, including aquifers.
IND-4d	The DEIS states that there would be no significant groundwater impacts. I disagree with this. The water quality of the Haw River directly affects nearby aquifers. This project would permanently damage the waters of the Haw River, and permanently damage aquifers close to the Haw River. The Project is a direct threat to the aquifer that supplies drinking water for my family.	See response SURF-7 in appendix I.2.

IND-4	David Hill	
IND-4e	With the last 4 miles of the Project, it crosses a 100 year flood plain of the Haw River. Six of the last 26 greatest recorded high water crests of the Haw River happened in 2018 alone. Major flooding of this area would devastate the pipeline, including the T-21 Interconnect and Project terminus. Right of way maintenance will use herbicides to control vegetation. These would be a potential source of toxic pollution of nearby waterways and harm to nearby citizens. There are reports that the epoxy coating used on the pipeline is very toxic.	Mountain Valley's Plan does not allow the use of herbicides within 100 feet of a wetland or waterbody except as allowed by the appropriate land management or state agency. As part of Mountain Valley's *Exotic and Invasive Plant Species Control Plan* , If specified for use by federal or state agencies near streams or wetlands, the Project will utilize herbicide applications approved for aquatic use.
IND-4f		Fusion bonded epoxy (FBE) coatings have been in use for over 50 years and have been the subject of numerous scientific studies. Epoxy coatings have undergone NSF/ANSI 61 toxicological review process and been certified for use in applications that bring them into contact with drinking water. Therefore, FBE coatings do not present a risk to human health, including when the pipe coating is exposed to groundwater that may serve as a source of drinking water.
IND-4g	The DEIS states that there would be no significant impact of the Project on property values and insurance of neighboring citizens. This is false. Construction and permanent maintenance of a pipeline owned by major corporations next door to a home will cause a significant lowering of the property values and increase the cost and availability of property insurance.	See response SOCIO-1 in appendix I.2.
IND-4h	The DEIS states that public safety of neighboring citizens would not be affected. I disagree. The County Commissioners of Alamance County, NC are opposed to the project. One of their concerns was that local volunteer fire departments would not have the resources to deal with a pipeline fire. Leaks and fires have happened with major pipelines of this nature.	See response SAFE-3 in appendix I.2.
IND-4i	The MVP pipeline in West Virginia and Virginia has had constant environmental violations during construction there. In April 2019, MVP paid over $250,000 in fines for erosion and water contamination violations in West Virginia (20 notices). The Virginia Attorney General has sued MVP for over 300 water quality violations in Virginia. A pipeline contractor, Precision Pipeline, has had repeated violations and has been fined millions of dollars. Five major construction permits for work in Virginia have been suspended since work began. The NC Department of Environmental Quality denied recently denied a water quality permit for MVP Southgate and also previously stated that there was no public need for the Project.	See response GEN-6 in appendix I.2.

IND-4	David Hill	
IND-4j	The DEIS omits a No Action Alternative. This seems to be counterintuitive to the NEPA process. The No Action Alternative is that the Project is not built.	See response ALT-1 in appendix I.2.
IND-4k	The Project will help create and maintain a market for fracked natural gas. Fracking is source of major air and water pollution where it occurs. Methane is a major cause of global climate change. The MVP Southgate Project would have many serious and permanent environmental impacts on any and all citizens and communities associated with the Project. The Project is a direct environmental threat to associated citizens and communities. This Project would have negative environmental impacts on my family. The Project should not be built.	The evaluation of the market for fracked natural gas, including induced production, is outside of the scope of the EIS. Those activities are regulated by individual states. Section 4.11 of the EIS discusses methane emissions. See response CI-1 in appendix I.2 regarding climate change.
IND-4l	Thank you very much. David Hill Graham, NC	See response GEN-1 in appendix I-2.

IND-8	Eleanor Amidon	
	Eleanor M. Amidon, Afton, VA. Like a big Swiss cheese, the Southgate DEIS is riddled with holes. The gaps in content and conditional statements are red flags identifying areas where a lot more analysis is needed. The following significant shortcomings and omissions need to be rectified and made public for a period of comment before finalizing the EIS. proposed HDD crossings	
IND-8a	The preliminary work on evaluating the proposed Dan River HDD crossing is exactly that: preliminary. Based on two geotechnical borings, the current design is deemed "feasible." (See DEIS, page 4-14.) However, ideally, borings should be spaced approximately every 500 feet. (See https://www.geoengineers.com/wp-content/uploads/2018/02/6H-The-HDD-Evaluation-and-Design-Process-Notes-1.pdf) Since the proposed Dan River HDD would be 2,523 feet, there should be three more borings, and the results of those additional three borings should be included in this DEIS.	See section 4.1.4.9 of the EIS, which has been updated with additional information.
IND-8b	That the Dan River HDD initial hydrofracture risk assessment determined that there would be an elevated risk of inadvertent returns (IRs) of drilling fluid near the exit point of the drill does not sound promising. Exactly what is this "mud-receiving pit" they propose to expand? How close is it to the Dan River? How will toxic spillage be prevented from entering and contaminating the water in the Dan River? Additional hydrofracture analysis for the HDD crossing needs to be done before proceeding, and the results should be included in this DEIS for public comment.	See sections 2.4.2.1, 4.1.4.9, 4.3.2.2, and 4.3.2.7 for further discussion on HDD crossing methods, impacts, and mitigation.
IND-8c	The total crossing length of the proposed Stony Creek Reservoir HDD would be 1,619 feet, and is considered feasible based on one geotechnical boring. Additional borings should be made and the results included for public viewing and commentary in this DEIS. Also, the Stony Creek Reservoir HDD initial hydrofracture risk assessment determined that there would be an elevated risk of inadvertent returns (IRs) of drilling fluid near the exit point of the drill. Again, they propose to expand the "mud-receiving pit." This sounds like a contamination of the Stony Creek Reservoir is inevitable. What guarantees are there, that the toxic drilling fluid won't eventually leak or spill into the reservoir? In the scheme of evaluating sites, avoidance of environmental damage is the number one priority, and mitigation comes into play only as a weak second option. In this case, with the possible contamination of a reservoir, "mitigation" is not an acceptable alternative.	See section 4.1.4.9 of the EIS, which has been updated with additional information.
IND-8d	The proposed HDD sites have not been properly vetted. Making a determination with less than 50% of the necessary data (2 of 5, or 40%, and 1 of 3, or 33% of borings for feasibility analysis) is premature and unreliable. All feasibility studies for the proposed HDD borings under the Dan River and the Stony Creek Reservoir should be completed and their results incorporated into the DEIS so that the public can read and comment on them.	See section 4.1.4.9 of the EIS, which has been updated with additional information.

IND-8	Eleanor Amidon	
IND-8e	Uranium and radioactive contamination Page 4-12 of the DEIS states, "Uranium mobilization in the environment can occur through the exposure of uranium- containing rocks and sediments to the weathering process (physical or chemical), causing uranium to be released from its parent material. Redistribution can further occur via activities and processes that move soil and rock. Therefore, background concentrations of uranium in soils, sediments, shallow bedrock, and groundwater were assessed via a review of publicly available information." The USGS National Uranium Resource Evaluation (NURE) database that was used consists of data obtained through airborne gamma-ray spectrometry, which only detects gamma rays emitted by uranium in the crust of the earth. Deeper deposits are not detected. Disturbing rock and soil, such as would be done by this proposed project, could loosen and expose as yet undetected underground uranium to rainwater. Uranium, being highly soluble, can be easily dissolved and transported into local groundwater. Contrary to the conclusion on page 4-13 of the DEIS, this could lead to significant impacts on human health and the environment. A more detailed and robust study of the amount and location of uranium is needed before unnecessarily engaging in earth-disturbing activities in Pittsylvania County, VA.	See section 4.1.4.8 of the EIS. We consulted the USGS NURE database, which contains the results of sediment and water sampling, and other resources including USGS soil geochemistry data and information obtained from the U.S. Department of Health and Human Services.
IND-8f	Although the DEIS on page 4-30 states that Mountain Valley does not not anticipate long-term or significant impacts on groundwater resources, "not anticipating" is not adequate when the damage could be huge. Water travels. If uranium (or other undisclosed proprietary industrial chemicals used in drilling) contaminate the Staunton River, Dan River, and/or Roanoke River, then Lake Gaston could be affected. Lake Gaston supplies water to a large population in Virginia Beach. Prevention is the only reasonable strategy here, namely, avoiding disturbing areas which contain uranium deposits. "Mitigation" is not an acceptable alternative, and the danger of radioactive contamination of public water supplies should be taken very seriously.	See section 4.1.4.8 of the EIS. We describe the existing conditions relative to concentrations of uranium in soils, sediment, bedrock, and groundwater that may be disturbed, as well as the behavior of and mobility of uranium in the environment.

IND-16 **IND-88**	**Heise and Dyer**

Part 1

Pg. 27/421 Draft EIS - ES-2

"The most common comments we received were on project need. The Commission's role in reviewing the details of any project is to make a determination of public convenience and necessity. The Commission bases its decisions on financing, rates, market demand, gas supply, environmental impact, and other issues concerning a proposed project. The forthcoming Commission order for the Project will address need. We also received numerous comments regarding impacts on water quality, socioeconomics, and health and safety. These resources are addressed in the draft EIS."

IND-16a	The scope of this DRAFT EIS appears to address the issues associated only with the pipeline and not the gas contained therein. This is equivalent to discussing the pipeline as if it were pumping compressed air. If this is indeed the scope of the DRAFT EIS then state it explicitly and justify the limited nature of this document. The North Carolina Department of Environmental Quality (NCDEQ), in their September 10, 2019 document submission to FERC makes this precise point when they state (page 2): *"The Department is concerned that the four alternatives proposed in the NOI excludes non-natural gas energy alternatives…Furthermore, the Project induces additional natural gas production resulting in increased direct and cumulative environmental impacts, including reasonably foreseeable indirect impacts."*	The draft and final EIS describe the potential impacts on environmental resources resulting from construction and operation of the Project. Staff considered measures to avoid, reduce, and mitigate impacts on the environment, and as appropriate, are including recommendations in the final EIS to the Commission.
IND-16b	NCDEQ explicitly uses the word "induces" and the DRAFT EIS purposefully constrains itself to the pipeline construction process with an extremely narrow summation of leak potential along the entirety of the pipeline. Production/fracking through induced/increased production at source location appears not to be considered. Additionally the major leak source, the Lambert Compressor Station, " would not result in a significant impact on local or regional air quality" (Pg. 32 Draft EIS. ES-7). However, note that by constraining the leak discussion to the more narrow issue of just the pipeline there is an "end-run" around the Mandatory Reporting of Greenhouse Gas Rule:	See response IND-4k in appendix I.3.

IND-16	
IND-88	**Heise and Dyer**

Pg 320/421 DRAFT EIS - 4-191

> *Potential GHG emissions from the Lambert Compressor Station would be greater than 25,000 metric tpy (see table 4.11-3). However, the rule establishes reporting requirements based on actual emissions. Mountain Valley would monitor emissions in accordance with the reporting rule. If actual emissions exceed the 25,000 metric tpy threshold, GHG emissions would be reported to the EPA as required.*

IND-16c	A discussion juxtaposing potential and actual may be missing the purpose of the DRAFT EIS. A statement of probable/expected leakage rates based on other compressor stations leakage rates would be more appropriate.	Section 4.11.1.5 includes discussion of potential emissions of the Lambert Compressor Station, including fugitives from incidental leaks.
IND-16d	By segmenting the DRAFT EIS to address just the pipeline project by eliminating discussion of gas production leak issues in totality (from fracking to consumption), the impact of reporting requirements as a result of meeting certain thresholds can be minimized, thereby allowing the FERC to conclude that the environmental impacts are minimal. **Part 2** There appears to be a disturbingly dismissive undertone to the DRAFT EIS that is decidedly uncharacteristic of a factual undertaking.	The evaluation of upstream and downstream markets and consumption impacts is outside the scope of this EIS. As appropriate, issues outside the scope of an EIS may be addressed in any Order the Commission may issue.

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> *We received a comment from the Roanoke River Basin Association (RRBA), which suggested mitigation for tree removal at a 5:1 ratio to offset the GHG effects of pipe leakage. The RRBA estimated that five new trees should be planted for every tree removed for construction of the pipeline right-of-way. Their estimate is based on their findings of 1% leakage rates of methane gas from other pipelines. RRBA states that methane is 25 times stronger than carbon dioxide in its effect as a greenhouse gas, and while it would be better to eliminate pipe leakage, the leakage should be offset with tree mitigation until the pipe leakage can be eliminated. We note that Virginia has 15.72 million acres of forestland (Virginia Department of Forestry [VADOF]) and North Carolina has 18.8 million acres of forests (North Carolina Forestry Association [NCFA]). Within this context, we conclude that impacts on forests would be long-term but would not be significant.*

IND-16e	As published in Science, (R. A. Alvarez *et al.*, *Science* 10.1126/science.aar7204 (2018).), https://science.sciencemag.org/content/361/6398/186 actual emissions for the total infrastructure gas production and transmission appear to be much higher. I seriously doubt that the RRBA made the "findings" of a 1% leakage rate, rather they researched the issue. The Science article lists an additional 77 references. RRBA statement of methane being 25 times stronger ghg than CO_2 may be conservative. (https://www.sciencedaily.com/releases/2018/06/180621141154.htm). The 25 time stronger estimate seems to come from a GWP_{100} rather than a GWP_{20} (Global Warming Potential - years measurement). A GWP_{20} estimate for methane impact is much higher as the methane has not degraded into CO_2 thereby lessening its impact.	See response CI-1 in appendix I.2. Emissions are discussed in section 4.11.1.5 and climate change is discussed in section 4.13.2.9

IND-16 IND-88	Heise and Dyer	
IND-16f	The quoted paragraph above then states the acreage of forest in Virginia and North Carolina as if the millions of trees has an impact on assessing methane emissions and thereby dismisses the 5:1 ratio offset. Frankly a 5:1 ratio may be vastly underselling the offset required to mitigate the methane releases from production, transmission leakage and combustion. It is not the existence of forests that offset additional methane release, it is the creation of new forests that offer the potential to mitigate new methane releases. **Part 3** Pg. 81 DRAFT EIS - 2-29 *During public scoping, a comment was submitted regarding the potential for Mountain Valley to further expand the Project and eventually export natural gas. Mountain Valley stated that it has no plans at this time to either expand or abandon the proposed facilities, nor is the Project able or designed to export natural gas. If Mountain Valley proposes any expansion or abandonment of the Project facilities, it would have to seek specific authorization for that action from the FERC. An appropriate environmental review would be conducted, and the public would have the opportunity to comment on Mountain Valley's proposal. Likewise, any proposed abandonment of any facilities approved in these dockets would require additional environmental and regulatory review under section 7(b) of the NGA.*	Mountain Valley has committed to minimizing impacts on forest land and continues to coordinate with VDCR on tree clearing mitigation prior to clearing trees
IND-16g	Having submitted prior comments along these lines, it is important to note some significant difference in these prior submitted statements on 8-23-2018 to Docket No. PF18-4-000. Specifically: *If no declaration is made, is MVP southgate barred from ever exporting gas?* *Is MVP Southgate allowed to petition, post pipeline completion, to allow export if excluded initially?* *Are the MVP investors allowed to increase exports to other outlets as an offset to any restrictions specifically made to the MVP Southgate project?* These questions were posed for a couple of reasons. MVP is an LLC that proposes to sell gas to PSNC for residential consumption. PSNC has since been purchased by Dominion Energy which, not incidentally, is a large shareholder in the Atlantic Coast Pipeline. Any statement or promise to not export gas from the MVP pipeline should include Dominion Energy as a whole. MVP/Dominion should be constrained to delivering gas to the Alamance terminus for distribution to the original PSNC distribution area. The Alamance terminus should not be used as a distribution point to balance excess production for exporting gas from other pipelines to other locales overseas. Additionally, trading bulk LNG through different companies to create artificial local demand is an abuse of a need requirement. If not so constrained, Rockingham and Alamance County residents, landowners and gas consumers are paying multiple times over for this pipeline. The residents would be paying higher prices for unneeded gas through an artificial demand created by export. The residents would be paying for unnecessary	See section 2.8 of the EIS

IND-16 **IND-88**	**Heise and Dyer**	
	discusses the impact of the gas production and consumption as induced by the pipeline?	
IND-16g	Finally, it is unusual to see this DRAFT EIS include a discussion about export when the purported intent of this DRAFT EIS was relegated to environmental issues associated with the pipeline. This leaves one to wonder if this was a mistake on the part of the writers' of the DRAFT EIS or whether the issue of restrictions on export will be addressed in the "Commission order for the Project." Additionally, will there be a comment period on the "Commission order for the Project" and will there be an EIS that discusses the impact of the gas production and consumption as induced by the pipeline?	See above IND-16 comment response

IND-19	Katie Whitehead

Docket No. CP19-14-000

General Comment Regarding the MVP Southgate Project

Draft Environmental Impact Statement

Submitted September 10, 2019 by Katie Whitehead

IND-19a	**The Federal Energy Regulatory Commission (FERC) knows that its process for reviewing interstate natural gas pipelines is flawed, yet the agency is repeating its mistakes as it goes through the motions of assessing whether the Mountain Valley Pipeline Southgate Extension would, on balance, provide a vital public benefit.** In February 2017 former Commissioner and FERC Chairman Norman Bay recommended that FERC look at how the Commission determines whether there is a need for new pipelines and conducts environmental reviews. Bay acknowledged that "the Commission has largely relied on the extent to which potential shippers have signed precedent agreements for capacity on the proposed pipeline," in spite of a "litany of other factors to consider." Bay's letter did not slow FERC approval of the highly controversial Mountain Valley Pipeline (MVP) and Atlantic Coast Pipeline (ACP), now poster children for the need for FERC policy reform. Residents of Virginia, West Virginia and North Carolina are experiencing the havoc and controversy that result from a failed initial review as federal and state agencies and courts address charges of regulatory and constitutional violations and project costs soar. Former Commissioner Cheryl LaFleur dissented, a rare move on the Commission, in the 2-1vote approving MVP and ACP in October 2017. She was unconvinced of the need for the pipelines and cited FERC's failure to look at alternatives with less environmental impact. In November 2017 an Analysis Group report described how the gas industry has changed since FERC instituted its now-outdated 1999 policies, under which Commissioners have approved over 400 new pipelines and rejected two. In December 2017 then FERC Chairman Kevin McIntyre announced that FERC would review its 1999 Statement of Policy on Certification of New Interstate Gas Pipeline Facilities. In April 2018 FERC solicited comments on possible reform to better meet its policy's aim "to appropriately consider the enhancement of competitive transportation alternatives, the possibility of over building, the avoidance of unnecessary disruption of the environment, and the unneeded exercise of eminent domain." Predictably, the gas industry spoke for the status quo. Noteworthy among those commenting in support of change were Senators Mark Warner and Tim Kaine; Giles and Roanoke Counties; 61 Public Interest Organizations; and the Niskanen Center, a policy think tank. Frequently expressed concerns were that FERC does not adequately scrutinize project need, investigate alternatives, justify use of eminent domain, evaluate environmental impacts, or facilitate public participation. The comment period ended in late July 2018; there's been no evidence of further action by FERC.	See responses GEN-2 and GEN-4 in appendix I.2.

IND-19	Katie Whitehead	
	Meanwhile, under FERC's old policies, MVP Southgate appears to be moving toward an unscrutinized rubber-stamp approval. Mountain Valley Pipeline, LLC (Mountain Valley) has applied to FERC for certification of the MVP Southgate Extension, 73 miles of natural gas pipeline that could transport as much as 375 million cubic feet of gas per day from the MVP mainline through a new compressor station near Chatham in Pittsylvania County, VA, to Dominion Energy delivery points near Eden in Rockingham County and Graham in Alamance County, NC. **FERC is now soliciting public comment on its Southgate Project Draft Environmental Impact Statement (DEIS). Reading the 700-page DEIS is not just daunting, it's disheartening.** In the DEIS, FERC does not question the purpose and need for Southgate; it merely reports: "In general, as described by Mountain Valley, the purpose and need for the Southgate Project is to meet the specific requests for natural gas transportation service of its anchor shipper, Dominion Energy, a local natural gas distribution company. Mountain Valley states that the Project will provide additional firm natural gas transportation services for Dominion Energy to meet its growing supply needs via interconnections with the under construction Mountain Valley Pipeline project in southern Virginia and the interstate pipeline of East Tennessee in North Carolina to two new delivery points on the Dominion Energy distribution system in Rockingham and Alamance Counties, North Carolina." *(DEIS section 1.1)*	
IND-19b		See response GEN-2 in appendix I.2.
	The DEIS states that FERC has two options: (1) approve the project with or without conditions, or (2) deny approval – the "No Action Alternative." According to the DEIS, No Action would mean no construction, no environmental impacts, and the project's stated purpose not being met. The DEIS then speculates, "If the Project is not constructed, shippers may seek other means to obtain an equivalent supply of natural gas from new or existing pipeline systems … (which) may result in the expansion of existing natural gas transportation systems or the construction of new infrastructure; both of which are likely to result in impacts comparable to those described in … this draft EIS. … Therefore, we dismiss (the No Action Alternative) from further consideration." Poof! Just like that, FERC dismisses any other means of meeting the incremental growth in gas demand that may arise in North Carolina.	
IND-19c		See response ALT-1 in appendix I.2.
	Here is another example in which FERC avoids its job of evaluating alternatives: "Some commenters recommended that we evaluate the potential for energy efficiency, energy conservation programs, and renewable energy (e.g., wind, solar) to eliminate or meet the need for the Southgate Project. … However, because the purpose of the Project is to transport natural gas, and (these) are not transportation alternatives, they cannot function as a substitute for the Project and are not considered further in this analysis." *(DEIS section 3.1.1)* Poof! Dismissed!	
IND-19d		See response ALT-2 in appendix I.2.

IND-19	Katie Whitehead	
IND-19e	As former gas and electric utility executive Thomas Hadwin has pointed out, "The National Environmental Policy Act requires (FERC) to consider issues outside of their normal jurisdiction when reviewing alternatives to the proposed project." Yet FERC dismisses all possible alternatives because they are not a pipeline delivering gas from the precise production zone in West Virginia used by Mountain Valley to connection points in North Carolina proposed by Mountain Valley.	See response ALT-1 in appendix I.2.
IND-19f	**FERC has a unique capacity to take the big picture view and abrogates its opportunity and responsibility.** Whereas FERC's DEIS rejects existing pipeline systems as alternatives, Hadwin emphasized the common-sense advantages of using the Transco (Transcontinental Gas Pipe Line, LLC) system: "The future capacity additions that might be needed by PSNC(recently purchased by Dominion Energy, Inc.) can be most easily and certainly less expensively obtained by incremental additions using the existing connections to Transco. Connecting to any of the new pipelines (such as MVP) in the region will add unnecessary expenses for PSNC(Dominion) ratepayers to bear and result in substantial overcapacity. PSNC has been reliably served by Transco for decades. Transco has abundant capacity to continue to do so. … There is no evidence of unreliable supplies of gas to North Carolina that would justify the need for a new pipeline to serve the area … a new pipeline that adds millions or billions to the energy costs of the ultimate gas customers. … The Transco alternative is one that should be fully examined by the Commission before rendering any judgment about the necessity and public convenience of the MVP-Southgate project." Hadwin cited the 2016 Synapse Energy Economics study, "which determined that the expansions to the existing pipeline system would provide more than sufficient capacity for Virginia and the Carolinas through 2030, even under an unlikely 'high demand scenario.'" **There is no reason that alternatives should exactly meet the precise stated purpose of the MVP Southgate project. What's important is to meet North Carolina's energy needs without undue burden on landowners, communities, our environment, and utility customers.** Hadwin's system alternatives involving Transco "are all superior to the proposed project. Although not every option has its primary source of gas from the same production zone as the proposed project, they have access to production zones that offer equivalent prices and more options. They are less expensive, can be accomplished sooner, and can provide a graduated increase in capacity rather than requiring years of payments of $160 million per year for unused capacity from MVP/Southgate that provides no benefit to the customers of PSNC(Dominion). Little or no construction is required by these various alternatives, thus, environmental impacts and intrusion upon landowners is much less or non-existent."	See section 3.3.2.1 of the EIS for an analysis of the Transco Alternative.

IND-19	Katie Whitehead	
IND-19f	FERC does not investigate any of these options. The only Transco option FERC imagines is one contorted to mimic MVP Southgate, which it then dismisses out of hand as having essentially the same environmental impacts. Quoting Hadwin once again, describing one Transco alternative, "Transco could transport the gas to North Carolina and provide appropriate capacity additions to PSNC whenever they are actually needed via existing or upgraded connections. This option would avoid the expense of building the Southgate pipeline and would also avoid the high cost of transportation on the MVP. Dominion Energy would avoid burdening its electricity ratepayers in Virginia with over $4 billion in higher energy costs for a pipeline they don't need, and lower the cost of pipeline transportation for the customers of its new subsidiary, PSNC." **Why doesn't FERC ask Transco how it can meet an increase in gas demand in North Carolina if and when such an increase occurs?** In a petition for rehearing and/or reconsideration of the Atlantic Coast Pipeline, Transco stated, "Factually, **Transco has the infrastructure and pipeline in place to serve the Southeast**, including South Carolina, **for many years.** It is obvious Dominion intends to install duplicative infrastructure and pipeline to serve the ratepayers of South Carolina at great monetary expense to the ratepayers of South Carolina." No doubt, the same could be said for MVP Southgate and the ratepayers of North Carolina. **FERC's Southgate Project Draft Environmental Impact Statement makes no sense. It makes no sense to evaluate the potential environmental impacts of MVP Southgate as if it is the best and only solution to a problem that, according to an increasingly large body of evidence*, does not exist. FERC leaves the question of public need to a later determination, dismisses alternatives that could meet any actual public need, accepts the pipeline developer's word that it will comply with best management practices and FERC conditions, and includes no mention of egregious violations by the same developer during construction of the MVP mainline. FERC concludes that approval of the MVP Southgate would, "through implementation of (FERC) recommendations and Mountain Valley's proposed avoidance, minimization, and mitigation measures," result in "less-than-significant" adverse environmental impacts. That's absurd. And disheartening.**	See above IND-19f comment response

IND-28	Maury Johnson	

MY MVP Southgate Draft Comments Please feel free to make comments, suggestions or edits Thanks Maury

September 16, 2019

Ms. Kimberly Bose, Secretary
Federal Energy Regulatory Commission
888 First St, Washington, DC

Dear Ms. Bose,

As a registered inteventor for the Mountain Valley Pipeline Southgate Extension project, FERC Docket CP19-14-000, I wish to have the following complaints and statements placed on the FERC Docket for the DEIS comments.

IND-28a	I have been told by friends in Alamance County, NC that the proposed Mountain Valley Pipeline Southgate extension construction through the northern part of that county would destroy most of the remaining native artifacts, burial mounds left there by ancient Native American cultures. A number of cultures/tribes use to inhabit this area, including the Sissipihaw, Saponi, Shakori, Occaneechi and many more. Unfortunately, the 1986 Alamance County Archaeological Survey Project mentions only a few of the Native American burial sites in Alamance County.	Section 4.10 of the EIS provides a detailed discussion of archaeological surveys and resources identified for the Project.
IND-28b	Legend has it that in early 1700's, settler John Lawson traveled through the Piedmont area of North Carolina. (From Wikipedia -- **John Lawson** (1674? – 1711) was an English explorer, naturalist and writer. He played an important role in exploring the interior of colonial North Carolina, South Carolina and Georgia, publicizing his expeditions in a book. He founded two settlements in North Carolina: Bath and New Bern, both located on rivers in the coastal plain. He was killed by Tuscarora people, who were beginning to resist European encroachment.) You can read more at this link: http://en.wikipedia.org/wiki/John_Lawson_(explorer) Lawson described the land as "extraordinarily rich" and said that no man could have any reason to dislike it. He recorded 27 species of mammals, including buffalo, elk, wolf and panther, which have long vanished from the area. According to Lawson, the Haw River was named for the Sissipahau Indians who lived near and along this stream. Their passage way became known as the Great Trading Path, it ran from Fort Henry (now Petersburg VA) in Virginia to cross the Haw River near the present town of Swepsonville, NC just outside of present day Burlington NC. This is the path that all colonizers and corporate enterprises seem to follow time and time again. The proposed MVP Right-of-Way would largely follow the Native American trading path down the Haw River. It is imperative that the citizens and government agencies protect this historically significant path. Alamance County is named after the Great Alamance Creek which was named by Native Americans. It was called "Alamance" after an old local Native American word used to describe the blue-colored mud in the bottom of the creek. Alamance County is known for its rich Native American history; however, it will not be if the MVP Southgate is allowed to destroy that rich history. It will be known as the county that let the MVP destroy its history and FERC will be complicit in that destruction, to the benefit of an out of state corporation to build an environmentally destructive, unwanted and unneeded pipeline.	Comment noted.

IND-28	Maury Johnson	
IND-28c	The proposed Mountain Valley Pipeline Southgate FERC DOCKET CP19-14-000, project will disrupt over 230 streams and permanently destroy forests and pristine farmland along its path, while releasing over 100,000 tons of greenhouse gases each year if constructed. That statement alone should be enough to cancel this project. This pipeline is a dangerous and unnecessary pipeline and not only threatens the people of southern VA and North Carolina, but it would help push the climate to the brink of complete catastrophe as we race towards the mark where human life on this planet would not be able to exist.	Impacts to streams are discussed in section 4.3.2; forest impacts are discussed in Section 4.5 and 4.8.1; and farmland impacts are discussed in section 4.8.1. The Project's climate change impacts are discussed in section 4.13.2.9.
IND-28d	Mountain Valley Pipeline (MVP) Docket CP16-10-0000 has already caused over 300 documented water quality violations in Virginia, and at least that many more in West Virginia. I have documented over 150 E & S Failures on a small part of Spread F (mostly over a four mile section in Monroe and Summers County WV). It has received multiple stop-work orders during the construction of its main line in VA and was fined nearly $266,000.00 for water quality violation in WV from April 2018 through November of 2018. Even then they continue to rack up NOVs in WV.. The proposed Southgate project is not needed to meet demands for natural gas in North Carolina or anywhere else, and MVP has proven they cannot build a pipeline without severely impacting the environment and local water supplies.	See response GEN-6 in appendix I.2.
IND-28e	The MVP Southgate will put important water resources at risk, including but not limited to the Jordan Lake, the Dan and Haw Rivers all sources for clean water for many families and farms in Virginia and North Carolina. It also will put lots of family farms and the families who live there at risk to multiple impacts including explosions, tainted water, air and land.	Section 4.3.2 describes the effects of the Projects on surface waterbodies. We recognize that in-stream construction would cause temporary and localized impacts on surface water.
IND-28f	The MVP Southgate extension has significant lengths of the proposed pipeline route running over karst terrain with potential cave systems and steep slopes. It will run through watersheds prone to flash flooding. The DEIS makes it clear that the pipeline is at risk of failure due to sinkholes, landslides, and flooding. Even worse, the DEIS points out that the extensive blasting of bedrock during construction will increase the risk of landslides. Blasting poses a threat to private residents and the pipeline itself.	As stated in section 4.1.4.5, no karst features (e.g., caves, sinkholes) were identified.
IND-28g		See response SURF-7 in appendix I.2.
IND-28h		See response GEO-2 in appendix I.2.
IND-28i	Construction of the pipeline is will cause heavy erosion, leading to the pollution of local waterways. MVP construction on the mainline in WV and VA has caused hundreds of documented E & S control failures, with probably thousands of undocumented failures, there is no reason to believe that anything will be different on the Southgate extension. FERC's assumption in the DEIS that the developer will comply with standard water protection measures and uphold water quality standards is misguided and has no basis in reality.	See response GEN-6 in appendix I.2.
IND-28j	MVP Southgate will cross more than water bodies, 3 of which are major water bodies, including designated water supply, high quality, and/or nutrient sensitive water bodies. In addition, MVP is requesting to run the pipeline parallel and within 15 feet of a waterbody in 28 locations, even though FERC standard is greater than 15 feet. Allowing for less than a 50 foot setback is also against the Jordan Lake Rules which are in place to protect streams from nutrient and sediment impairment. Erosion and sedimentation is an ongoing concern in the Haw River basin, and many of our streams are impaired due to poor benthic life. Sedimentation, erosion, and increases in stormwater velocity, has left many creeks with steep, inaccessible banks, void of healthy aquatic habitat. Cutting forested streamside buffers and wetlands increases the risks of erosion and sedimentation, making the water muddier and impacting aquatic life.	See responses SURF-1, SURF-2, and SURF-3 in appendix I.2.
IND-28k	Much of the pipeline is in the flood zone of the Haw River, which has seen record flooding the past two years. This volume and velocity of water will be increased with less buffer protection and compacted soils from heavy machinery. The Haw River watershed has extremely flashy flow tendencies. The high and low flow points have not been factored into this review..	See response SURF-7 in appendix I.2.

IND-28	Maury Johnson	
IND-28l	Blasting and heavy equipment can damage infrastructure and make well water unsafe. Landowner well surveys have not been completed and locations of wells and springs are unknown and therefore impacts cannot be assessed. This is vitally important due to the fact that MVP construction in WV and VA has tainted numerous springs, wells and other water sources.	See response GW-1 in appendix I.2.
IND-28m	Being an impacted landowner and citizen monitor on the MVP mainline (FERC DOCKETCP16-10-0000), I have seen firsthand the work MVP contractors have done on the mainline and have little faith that the requirements of the erosion and sediment control plan will be met at all. Including clauses/statements like "when practicable" leaves too much subjectivity to MVP Southgate contractors. There are over 600 documented water quality and erosion and sediment erosion control violations on the mainline done by the same teams. However, leaving so much subjectivity in what is or what is not practicable allows MVP Southgate to argue the bare minimum is all that is necessary. There are sensitive watersheds along the MVP Southgate and this project and the MVP developers have demonstrated that they are incapable of completing this project in a way that prevents serious watershed or environmental degradation.	See response GEN-6 in appendix I.2.
IND-28n	The construction of the MVP Southgate pipeline extension will have a long term impact on over 25 acres of wetlands. In addition to the pipeline construction, Mountain Valley is asking for a waiver of FERC's wetland protection setbacks and plans to locate 23 additional temporary workspaces within 50 foot wetlands. This is not protective of the sensitive watersheds and should not be allowed. Furthermore,	See response WET-1 in appendix I.2.
IND-28o	construction of the pipeline would have long-term, permanent impacts to 615 acres of forested uplands, 10 acres of forested wetlands and nearly 12 acres of protected riparian forested lands in the Jordan Lake Watershed. These habitats require decades to recover from the kind of blasting, demolition and construction contemplated for this project.	Section 4.5 of the EIS discusses impacts to forests and other vegetation types.
IND-28p	Constructing this project would disturb about 1,439 acres of wildlife habitat, much of which would be permanently destroyed by the project. The project would also cross 21 perennial waterbodies containing fisheries of special concern such as the James River Spiney Mussell and the Roanoke Log Perch, which is one of the Endangered Species that has caused the USFWS to reinitiate consultation on the MVP mainline project and may lead to a loss of the ESA Permit.	Federal agency compliance for the Endangered Species Act (ESA) Section 7 is described in section 4.7.1 of the EIS.
IND-28q	The U.S. Fish & Wildlife Service told Mountain Valley to minimize impacts to vulnerable migratory bird species which uses the project area such as bald eagles, northern bobwhite, and red-headed woodpecker by avoiding clearing vegetation during the peak migratory bird nesting season (March 15 - August 15 in Virginia and April 1 - August 31 in North Carolina). Mountain Valley has defied the agency's guidance and has proposed clearing vegetation during peak nesting season, from March 15 – April 30 and from August 16-31. FERC's DEIS (CP19-14-000) ignored the obvious impacts to migratory birds that would result from this reckless activity.	Section 4.6.3.2 of the EIS discusses impacts on migratory birds.
IND-28r	As mentioned earlier construction of the Southgate extension would harm numerous aquatic species, including the Roanoke logperch, James River Spiney Mussel. It would also put in danger the Atlantic Pigtoe and smooth coneflower which is listed on the Endangered Species list or under consideration for listing, ie the Atlantic Pigtoe.	See response IND-28p
IND-28s	The construction of the MVP Southgate would leave a 72-mile long, 100-foot wide scar across VA and NC for a needless project. It would be a visual blight on the landscape and degrade the lands along its path.	Visual impacts are discussed in section 4.8.4 of the EIS.

IND-28	Maury Johnson	
IND-28t	Residents, landowners and visitors/tourist to the area would be stuck looking at the pipeline every day. It would continue the destruction of the visual impacts to the region and the loss of the use of the land by landowners, much like it already has on over 300 miles of the MVP mainline. Residents will lose the privacy and visual screens of large trees and hedgerows to construction; the pipeline and its numerous new roads that would needed to be built and operated directly next to scores of homes – and will pass right through one home; construction will render many property owners' land unusable for farming, habitation or other uses. Even so, the DEIS make the dubious claim that there will be no impacts on local property values.	See response LU-1 in appendix I.2.
IND-28u	The pipeline would also impact the experiences of countless recreational users of public parks, recreation and conservation areas by generating dust and noise pollution, scaring off wildlife, and disrupting public access during construction. Users of National Wild & Scenic River candidates like the Dan and Haw Rivers; future designated recreational water trails like the Banister River; and public trails like the Mountains-to-Sea Trail and a planned public trail in Alamance County would all be affected. The project would also clear trees within view of the Colonial Heritage Byway (Route 150 in Rockingham County), causing permanent impacts.	Impacts on recreational and special use lands are discussed in section 4.8.4 of the EIS
IND-28v	Construction of the project will cause long term impacts to the environment, yet it is unlikely to provide any positive long term effects to local unemployment rates. FERC found that any potential benefits to local economies would be temporary and minor. Long term operation of the project would create about 6 permanent jobs in each state of Virginia and North Carolina. In addition, construction schedule would overlap with peak tourism season, potentially negatively impacting the tourism economy in the area. Local employment will not be increased, property values will decrease, and any positive impacts to the surrounding economy will be short lived while the long term damage will take decades to overcome, if at all.	See section 4.9.1 of the EIS for discussion of employment. See also responses SOCIO-1, SOCIO-2, and SOCIO-8 in appendix I.2.
IND-28w	In the DEIS, FERC states they have "not yet completed the process of complying with the National Historic Preservation Act" and that miles of the proposed Southgate pipeline route are still not surveyed for cultural resources that could be damaged. In numerous instances for potential archeological sites and historic structures, FERC referenced mitigation as a solution however nowhere in the DEIS does FERC explain what mitigation measures must be or the timeline they must be completed. FERC should pursue communications with the interested indigenous tribes and should complete the process to comply with the National Historic Preservation Act before taking any additional steps on the approval process for the Southgate project. This rush to start the MVP Southgate is unnecessary as the MVP mainline currently under construction has been seriously delayed by loss of permits and other legal challenges and its completion is in doubt. Therefore MVP Southgate extension should not be approved until all legal challenges to the MVP mainline has been resolved and its future has been determined.	See response CULT-1 in appendix I.2.
IND-28x	The Lambert compressor station has the potential to emit 125,000 tons of greenhouse gases, 3.5 tons of formaldehyde each year and over 10 tons of particulate matter each year, putting nearby communities at risk for cardiovascular issues and asthma. The compressor station will be built in proximity to two Transco compressor stations already in operation. Cumulative impacts and the potential to impact human health with two minor source polluting facilities and one Title V facility (pending FERC approval) have not been adequately evaluated to assume that human and environmental health will not be adversely impacted. The added GHG emissions alone should disqualify this project from being approved. If approved it will be the cause of future litigation and probable cancelation of the project as we simply cannot continue down this path and survive as a species in the face of global climate change, largely caused by GHG emissions.	See response AIR-2 and CI-4 in appendix I.2.

IND-28	Maury Johnson	
IND-28y	The DEIS merely states that pipeline developers would comply with minimum construction and operation standards. The developers have not exhibited that they can construct the mainline in an environmentally friendly manner. There is no indication they would change their methods to construct the Southgate any differently. Why would you think the operation or construction of Southgate extension would be any different? Therefore, it gives no reason for people living within the blast radius of either project to feel safe. The National Transportation Safety Board documents interstate pipeline accidents, and its database includes numerous recent natural gas pipeline ruptures, leaks, and explosions. Moreover, studies show a spike in accidents involving new pipelines in recent years. The majority of the pipeline would be in Class 1 population density areas, meaning it would mandate the lowest safety standards and put those living near the pipeline at an even greater risk.	See response SAFE-1 in appendix I.2.
IND-28z	FERC states that impacts from construction and operation of the pipeline will be temporary and localized. However, this assessment failed to take into account the long term cumulative impacts that will occur across the region. The impacts to forest, water resources and visual degradation would most likely be severe. This is borne out by what has already happened on the MVP mainline in WV and VA. The nearly three miles of in stream work paired with the removal of vegetation along streams will have long term negative impacts to already impacted water resources.	See response CI-1 in appendix I.2.
IND-28aa	FERC is being naïve at best and ignoring the significant impacts of this project. The DEIS describes widespread, permanent impacts like the long-lasting or permanent destruction of hundreds of acres of forests and wetlands, but then turns around and says that impacts won't be significant because mitigation measures will be used during construction. Mitigation cannot prevent the significant impacts that permanent forest and wetland destruction cause. Mitigation simplify cannot be done, once these impacts have occurred, they are forever. The DEIS' reliance on mitigation measures to argue that the project will cause no significant impacts falls short because many of the mitigation measures proposed to prevent significant impacts to local resources are unknown. In many instances, the DEIS instructs Mountain Valley Pipeline to come up with mitigation measures that are currently not defined. FERC cannot claim that unknown measures will prevent significant environmental impacts. One only has to examine the MVP mainline construction In WV and VA to see that the above assessment by FERC is totally false and nowhere close to reality on the ground.	See response GEN-9 in appendix I.2.
IND-28bb	Finally the conclusion by FERC that no significant environmental impacts would be inflicted by this project while lacking the necessary information to even assess what those impacts might be is disingenuous. For example, Archaeological surveys have not been completed for the project area, preventing analysis of impacts to cultural resources. Impacted streams a site where imperiled aquatic species are suspected to live need further studies and consultation with the USFWS per the recently litigation concerning ESA permit along the MVP mainline. FERC acknowledges that MVP will use 5.9 million gallons of water in constructing the project, but has no idea where MVP will get that water from, preventing FERC from assessing the environmental impact of those water withdrawals.	See response GEN-4 in appendix I.2.

IND-30	Christopher Lish

Monday, September 16, 2019

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

Subject: Reject the Proposed Mountain Valley Pipeline and Southgate Extension -- Draft Environmental Impact Statement for the Southgate Project (CP19-14-000)

To Federal Energy Regulatory Commission (FERC) Chairman Neil Chatterjee:

IND-30a	The Mountain Valley Pipeline (MVP) Southgate Project is not in the public interest and the Federal Energy Regulatory Commission's draft environmental impact statement (DEIS) for the MVP Southgate Extension is woefully inadequate. The DEIS fails to provide adequate information for public comment, does not properly assess climate-altering greenhouse gas emissions or the effect of those emissions on the environment, and fails to fully account for all of the environmental threats posed by the MVP extension. It also minimizes the risk of impacts to private well owners' water quality. Blasting and heavy equipment can damage infrastructure and make well water unsafe. This is not a risk that affected communities and landowners should be forced to bear.	See responses GEN-2 and GEN-4 in appendix I.2.
IND-30b	*"Our duty to the whole, including to the unborn generations, bids us to restrain an unprincipled present-day minority from wasting the heritage of these unborn generations. The movement for the conservation of wildlife and the larger movement for the conservation of all our natural resources are essentially democratic in spirit, purpose and method."* *-- Theodore Roosevelt*	Section 4.3.1 of the EIS includes a detailed discussion of the potential impacts water supply wells. The EIS discusses blasting and associated impacts in section 4.3.1.2. Mountain Valley would adhere to its General Blasting Plan to minimize impacts from blasting.
IND-30c	Not only will the Southgate Project create permanent adverse impacts on the local environment, it will also contribute to several more decades of global climate pollution. Studies show that existing gas infrastructure is more than sufficient to meet regional energy needs for residents and industry. Therefore, the primary beneficiaries of the pipeline will be private companies. This is deeply concerning, given that a Certificate of Public Convenience and Necessity would allow the taking of private property for this project.	See response GEN-2 in appendix I.2.
IND-30d		See response GEN-7 in appendix I.2.

IND-30	Christopher Lish	
IND-30e	*"It is horrifying that we have to fight our own government to save the environment."* *-- Ansel Adams* Construction of the pipeline is expected to cause heavy erosion and consequent sedimentation of local waterways. Yet the DEIS assumes that if MVP complies with FERC's Mountain Valley Pipeline Project Erosion and Sediment Control Plan, it would adequately avoid or minimize damage to surface waters. But current construction of the MVP main line has proven these plans and procedures are inadequate, and that MVP is	See responses SURF-2 in appendix I.2.
IND-30f	unwilling to comply. In Phase I of this project, MVP has already violated commonsense water quality protections over 300 times in West Virginia and Virginia, and is being sued by Virginia's Attorney General. Time after time, pollution and mudslides have run off their worksites and into streams, waterways, and even the homes of people living nearby. FERC's assumption in the DEIS that the developer will comply with standard water protection measures and uphold water quality standards is misguided and undermines the credibility of the DEIS' environmental analysis. If MVP has had so many problems with the first phase of this project, why should we expect that construction of this extension will be any less damaging? *"Our government is like a rich and foolish spendthrift who has inherited a magnificent estate in perfect order, and then has left his fields and meadows, forests and parks to be sold and plundered and wasted."* *-- John Muir*	See response GEN-6 in appendix I.2.
IND-30g	Erosion and sedimentation is an ongoing concern in the Haw River basin, and many of the streams are impaired due to poor aquatic life. Sedimentation, erosion, and increases in stormwater velocity have left many creeks with steep, inaccessible banks which are devoid of healthy aquatic habitat. Cutting forested streamside buffers and wetlands increases the risks of erosion and sedimentation, increasing turbidity levels and impacting aquatic life. Much of the pipeline is in the flood zone of the Haw River, which has seen record flooding during the past two years. This volume and velocity of water will be increased with less buffer protection and compacted soils from heavy machinery. The Haw River watershed has extremely variable high flow tendencies. The high and low flow points have not been factored into this review. *"If some are prosecuted for abusing children, others deserve to be prosecuted for maltreating the face of nature committed to their care."* *-- Henry David Thoreau*	See response SURF-2 and SURF-7 in appendix I.2.

IND-30	Christopher Lish	
IND-30h	Adjacent communities already face contaminated drinking water sourced from the Dan River, Haw River, and surface water reservoirs. Additional public water supply intakes are located downstream of these stream crossings. Though these intakes are further downstream than the DEIS assessment limit of three miles, many of the contaminants that could impact drinking water quality do not break down, and, therefore, the three mile limit for downstream impacts is arbitrary and does not provide an accurate assessment of the full scope of impacts. *"An unwritten compact between the dead, the living and the unborn requires that we leave the unborn something more than…depleted natural resources."* *-- A Washington State Court decision*	See response SURF-4 in appendix I.2 and SA-2a-2 in appendix I.3. See also section 4.3.2.1 of the EIS for discussion of public water supply intakes.
IND-30i	The work MVP contractors have done on the mainline is wholly inadequate and no one should have any faith that the requirements of the erosion and sediment control plan will be met at all. Including clauses like "when practicable" leaves too much subjectivity to MVP Southgate contractors. However, leaving so much subjectivity in what is or what is not practicable allows MVP Southgate to argue that the bare minimum is all that is necessary. This is a sensitive watershed, and this project cannot be completed in a way that prevents serious watershed degradation. *"The ultimate test of a moral society is the kind of world that it leaves to its children."* *-- Dietrich Bonhoeffer*	See response GEN-6 in appendix I.2.
IND-30j	FERC is ignoring other significant impacts of this project. The DEIS describes widespread, permanent impacts--like the long-lasting or permanent destruction of 615 acres of forested uplands, ten acres of forested wetlands and nearly twelve acres of protected riparian forested lands in the Jordan Lake Watershed--but then turns around and says that these impacts won't be significant because mitigation measures will be used during construction. Mitigation cannot prevent or repair the significant impacts of permanent forest and wetland destruction and these habitats will require decades to recover from the kind of blasting, demolition, and construction contemplated for this project. *"As we peer into society's future, we—you and I, and our government—must avoid the impulse to live only for today, plundering for our own ease and convenience the precious resources of tomorrow. We cannot mortgage the material assets of our grandchildren without risking the loss also of their political and spiritual heritage. We want democracy to survive for all generations to come, not to become the insolvent phantom of tomorrow."* *-- Dwight D. Eisenhower*	See response GEN-4 and GEN-9 in appendix I.2.

IND-30	Christopher Lish	
IND-30k	The DEIS' reliance on mitigation measures to argue that the project will cause no significant impacts is inadequate because many of the mitigation measures proposed to prevent significant impacts to local resources are unspecified. In many instances, the DEIS instructs MVP to come up with mitigation measures that are currently not defined. It's disingenuous for FERC to claim that unknown measures will prevent significant environmental impacts. *"Every man who appreciates the majesty and beauty of the wilderness and of wild life, should strike hands with the farsighted men who wish to preserve our material resources, in the effort to keep our forests and our game beasts, game-birds, and game-fish—indeed, all the living creatures of prairie and woodland and seashore—from wanton destruction. Above all, we should realize that the effort toward this end is essentially a democratic movement."* *-- Theodore Roosevelt*	See response GEN-9 in appendix I.2.
IND-30l	FERC concluded that no significant environmental impacts would be inflicted by this project while lacking the necessary information to assess what the impacts to various environmental resources would be. For example, MVP has yet to provide FERC with its feasibility studies for its plan to cross Deep Creek with the pipeline, a site where imperiled aquatic species are suspected to live. FERC acknowledges that MVP will use 5.9 million gallons of water in constructing the project, but MVP has not identified where	Mountain Valley provided feasibility studies and crossing plans for each of the waterbodies to be crossed by HDD or conventional bore. We have updated section 4.3.2.2 of the EIS with this information.
IND-30m	it will source that water, preventing FERC from assessing the environmental impact of those water withdrawals. Lastly, archaeological surveys have not been completed for the project area, preventing analysis of impacts to cultural resources. *"Do not suffer your good nature, when application is made, to say 'Yes' when you should say 'No'. Remember, it is a public not a private cause that is to be injured or benefited by your choice."* *-- George Washington* I urge FERC to reject MVP's request for a certificate of public convenience and necessity. This dirty, dangerous fracked gas pipeline is a serious threat to the water we drink, the air we breathe, and the fabric of our communities. The record of MVP has proven there's no safe way to build this pipeline. *"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."* *-- Aldo Leopold* Thank you for your consideration of my comments. Please do NOT add my name to your mailing list. I will learn about future developments on this issue from other sources. Sincerely, Christopher Lish San Rafael, CA	See response SURF-6 in appendix I.2.

IND-36	Katie Whitehead	
IND-36a	**Docket No. CP19-14-000** **Specific Comments Regarding the MVP Southgate Project** **Draft Environmental Impact Statement** **Submitted September 16, 2019 by Katie Whitehead** Commenting on specific aspects of the proposed MVP Southgate Extension Project is difficult. FERC's Southgate Project DEIS doesn't stand alone. I feel sure that I have not found all the references to my family's property in Mountain Valley's November 2018 application, FERC's repeated requests for more information, and Mountain Valley's multiple responses, supplemental materials, and comments submitted up through just last week. Coded names for land, property owners, access roads, workspaces, streams, etc. are hard to decipher and keep track of. Multiple submissions referencing, changing and amending earlier documents make it almost impossible to know whether I am addressing the current plan. For example, the November 2018 application seems to be the only place to find the proposed route broken down by mileposts, and even that is on a scale too small to show what happens on a particular property. Has the plan for my family's property changed since then? I don't know. Where there is different information within a document or between two documents, does it represent a change or a sloppy inconsistency? There is no one place to look to confirm what is being proposed. Consequently, my comments may not be entirely up to date. I have made my best effort in the time available. I would appreciate more time. Among my primary concerns is the lack of close attention given by Mountain Valley or FERC to the co-location of Southgate with the existing Williams Transco right of way. There is no evidence that Williams Transco, which already delivers gas to Dominion Energy North Carolina, cannot continue to provide the needed gas reliably. There is also no evidence that anyone has recognized and acknowledged the fact that the Williams Transco ROW has ample space for another gas pipeline. Mountain Valley's maps are inconsistent in whether any Williams Transco pipelines are shown; yet, typically, if one is shown, it is drawn at the ROW boundary line, not its actual location, which, on our property is forty feet away.	The most recent information regarding the proposed Project design and layout is available from the FERC eLibrary using accession numbers 20191023-5022 and current alignment sheets are available using accession number 20191220-5298.
IND-36b		See section 3.3.2.1 of the EIS for an analysis of the Transco Alternative.
IND-36c		The existing pipeline right-of-way may or may not be defined on any given parcel. In some circumstances, the right-of-way is defined off the exact location of a specific pipeline per the easement with the landowner and additionally, the maintained right-of-way that is visible on the alignment sheets and in the field may not represent the actual width of the easement. Mountain Valley is utilizing the best available information to route the pipeline, providing 50 feet of spacing from the estimated location of the closest Williams pipeline and the centerline of the pipeline easement, which is an Interstate Natural Gas Association of America (INGAA) standard for parallel facilities. Mountain Valley continues to coordinate with Williams on the location of its pipelines and extent of its easements and anticipates that line locating will take place prior to the start of construction.
IND-36d	Another concern is presumed need for a 100' construction easement. Southern Virginia is not steep terrain. In 2007 Williams Transco was able to install a 42" line from, for the most part, a 40-foot cleared area on one side and piled dirt and rock on the other side – over an existing pipeline. Installing a 24" line alongside should not require clearing 100' of trees.	In its application and as described in the final EIS, Mountain Valley has adequately justified the need for proposed construction workspace.

IND-36	Katie Whitehead	
IND-36e	As I have told FERC staff repeatedly in person, by telephone, and through written comment, my family's land is a tree farm. To use your terminology, our land is in a timber management program; it is a pine plantation; it is silviculture. The proposed Southgate route on our land is through loblolly pines and hardwoods – all of which are growing for production. I see no evidence in any documents that this land use is recognized, much less the impact of Southgate on our trees.	Section 4.8.1.1 discusses impacts to silviculture lands. The section has been updated to clarify that this would include loblolly pines and hardwoods grown for production.
IND-36f	Below I try to show in graphic detail the proposed co-location of Southgate with Williams Transco. As proposed, there is no benefit to co-location. I also show what would be possible if FERC and Mountain Valley and Williams Transco actually look at the existing ROW, the proposed route for a 24" Southgate pipe and cooperate to minimize the impact on the environment and landowners. I use the layout on my family's property; however, I feel sure this situation exists more generally. The entire co-location route should be analyzed and revised.	Comment noted.
IND-36g	Below I also address mistakes regarding proposed Mountain Valley temporary workspaces and an access road on the Williams Transco ROW. This is all I have time for. There's more. I intend to provide additional specific comments.	The EIS has been updated as appropriate.

IND-37	Jeannie Ambrose

Draft Environmental Impact Statement [DEIS] for the Mountain Valley Pipeline-Southgate Project
Docket No. CP19-14-000

Public Comments
September 16, 2019

GENERAL COMMENT.

On August 22nd, 2019, I attended the scoping hearing at the Vailtree Conference Center, Haw River. Unfortunately, no MVP-SG engineer was available at this meeting to answer a few questions that I had. The MVP staffers suggested that I speak to a FERC representative. The FERC personnel were able to direct me to some information in the tables in the appendices.

THE MVP-SG PROJECT IS NOT NECESSARY AND, CERTAINLY, NOT IN THE PUBLIC INTEREST.

IND-37a	I have serious concerns that the adverse impacts to natural resources and public health and personal wealth posed by the construction and operation of the proposed Southgate extension project would outweigh any real benefits to the communities along the pipeline route. The potential risks are especially troubling since the need for the Project is unsubstantiated. According to the NC Department of Environmental Quality and other stakeholders, the existing and upgraded natural gas infrastructure is adequate to handle current and projected regional energy demands. The transition in NC from a 24-inch to 16-inch diameter natural gas transmission pipeline running from the Eden area to Graham seems to indicate the possible lack of demand for extra gas from any new commercial and industrial end user in central NC other than PSNC. The smaller diameter pipeline, currently proposed, no longer required the proposed construction of the Russell Compressor in NC. In addition, the processing of some of the compliance requirements from state and federal cooperating agencies is incomplete. There were items missing in different sections of the draft as noted in bold face. This made it difficult to determine if the applicant adequately satisfied the criteria required for FERC's issuance of a Certificate of Public Convenience and Necessity.	See response GEN-2 in appendix I.2.
IND-37b		See response GEN-4 in appendix I.2.

4.1. GEOLOGY.

IND-37c	Along with soil type, the topography and drainage of the river basins can lead to flash flooding with high velocity flows creating erosion and sedimentation problems.	See response SURF-7 in appendix I.2.
IND-37d	Blasting hard bedrock at some stream crossings during excavation can cause additional erosion.	See response GEO-2 in appendix I.2.

4.2. SOILS.

IND-37e	The proposed pipeline traverses 20 miles of erodible soil in Alamance Co. Erosion and sediment from land-disturbing construction activities is a serious problem. Bare and unprotected soil surfaces are more susceptible to moderate to severe erosion. This is made worse by heavy machinery compacting the soil during construction.	Impacts on soils are discussed in section 4.2.2 of the EIS.

IND-37	Jeannie Ambrose	
IND-37f	**4.3. WATER RESOURCES.** • 81 stream crossings 1. The Haw River and Jordan Lake already have nutrient and sedimentation problems from runoff and erosion that impair aquatic life. 2. Locating pipelines within 15 feet of a water body in 28 locations, including within the Jordan Lake watershed, essentially eliminates the effectiveness of riparian buffers to control water pollution and stabilize the streambank. Less stream buffer protection and more deforestation increases the potential to accelerate erosion and sediment flow and transport. Runoff of sediments into waterways increases turbidity that impairs aquatic life. Water with more suspended particles heats up more than clear water. Nutrient laden runoff and warmer water encourage oxygen-depleting blue-green algal [cyanobacteria] blooms as they decompose.	Section 4.3.2 describes the effects of the Projects on surface waterbodies.
IND-37g	2. Construction and operation of the proposed Project in the flood zone of the Haw River could further degrade water quality in the watershed and disrupt functioning ecosystem services provided by wetlands. Surface and subsurface disturbances from excavation, re-routing of the watercourse, and blasting of stream bedrock could alter pathways of groundwater. The full impacts to land owners who rely on water wells and springs for domestic and agricultural water supplies are unknown since the location of all these water sources have not been completed.	See response SURF-7, GEO-2, and GW-1 in appendix I.2.
IND-37h	3. The construction of the Project will require 5.9 M gallons of water. The potential environmental impacts cannot be determined since the source(s) of the water withdrawal is unknown.	Water sources are addressed in 4.3.2.6 of the EIS.
IND-37i	4. PFAS-related chemicals and 1,4-Dioxane, two of the emerging chemicals of concern, are detectable in our drinking water and agricultural fields. Chemical pollution from the application of Earth Guard Edge, an erosion control product used in West Virginia, and the breakdown of toxic chemicals from exterior, epoxy pipe coating exposed to soil moisture and groundwater could contribute to further environmental degradation. All of these contamination problems affect communities downstream.	See response IND-4f in appendix I.3. EarthGuard Edge pellets contain linear polyacrylamide (PAM) which is synthetic soil stabilizer. According to the VADEQ Erosion and sediment Control Handbook and NCDEQ Erosion and Sediment Control Planning and Design Manual, synthetic soil stabilizers are identified as an option for use in conjunction with mulch as a best management practice for soil stabilization. According to the manufacturer, EarthGuard Edge is non-toxic, 100 percent biodegradable, and meets National Sanitation Foundation (NSF) drinking-water standards.
IND-37j	5. A decision on the 404 permit for dredged or fill material into waters of the U.S. is forthcoming.	Comment noted. Mountain Valley would be required to acquire all necessary federal permits prior to commencing construction.
IND -37k	**4.4. WETLANDS.** • Permanent impact to 10 acres of forested wetlands We cannot afford to lose more wetlands. Intact wetlands are important for biodiversity and provide benefits that improve water quality by slowing water flow, act as a carbon sink, filter pollution, and can be a destination for wildlife enthusiasts that enjoy being in nature.	Comment noted. Section 4.4.2 discusses impacts to wetlands.

IND-37	Jeannie Ambrose	
IND-37l	**4.5. VEGETATION.** Permanent impacts: • 615 acres of forested upland • ~12 acres of protected riparian forested lands in the Jordan Lake 1. As stated in the DEIS, ~39 miles of the pipeline route would be constructed adjacent to existing rights-of-ways. Over a 1/3 of the ~74 mile-long pipeline route is forested. Green field construction would lead to deforestation and destruction of natural habitats. Loss of vegetation can increase the speed of water flowing across surfaces into waterways. 2. Habitat fragmentation can result in the loss of natural plant communities that support wildlife.	Interior forests, habitat fragmentation, and impact to wildlife are discussed in detail in section 4.5.4.3 and 4.6.1.1of the EIS.
IND-37m	3. Easements can act as corridors for dispersal and spread of invasive species. Routine maintenance to control growth of weeds and trees in R-O-Ws may require toxic chemical application that can contaminate the water and/or the soil.	As detailed in section 4.5.4.1, Mountain Valley would follow measures outlined in its Exotic and Invasive Plant Species Control Plan.
IND-37n	**4.6. WILDLIFE AND FISHERIES.** • 1,439 acres of wildlife habitat will be disturbed. 1. Parts of the NC Forest Legacy Areas, Piedmont Land Conservancy Easements in NC, and Virginia Forest Bloc Complex Important Bird Area could be affected. 2. Pipeline crossings occur at 21 perennial water bodies with fisheries of special concern with 8 in Virginia and 13 in NC	Impacts and mitigation to wildlife and fisheries are described throughout section 4.6 of the EIS.
IND-37o	**4.7. THREATENED, ENDANGERED, AND OTHER SPECIES.** 1. Greater riparian buffers are needed if rare species are present. 2. The constant noise and light of a compressor station, running 24/7, negatively affects both people and wildlife populations especially in rural areas. 3. As many as 20 threatened and endangered species of birds like the bald eagle and northern bobwhite. The Roanoke logperch and other fish, mussels and plants could be affected by land disturbance and loss of habitat.	See section 4.7 of the EIS for a discussion of impacts to listed species. See also response T&E-1, T&E-2, and NOISE-1 in appendix I.2.
IND-37p	**4.8. LAND USE, SPECIAL INTEREST AREAS, AND VISUAL IMPACTS.** • 1,300 acres of land disturbance during construction • 452 acres for pipeline operation 1. There may be limited/restricted practical land use for landowners along clear-cut 125-feet easements. 2. The future use of property passed to heirs may be limited.	See response LU-1 in appendix I.2.
IND-37q	**4.9. SOCIOECONOMICS.** *Our streams are too important to our economy & community to risk them to polluting companies.* 1. The economic benefits from any jobs and spending are often short-term gains, ending after the construction phase is completed. It is expected that as few as six permanent jobs in each state of VA & NC will be created. 2. Property values will be reduced by over 10% along the proposed pipeline route. 3. Local governments and residents may eventually bear the brunt of remediation costs for any damages and cleanups not covered by the company. 4. Utility customers should not end up paying for the buildup of unneeded utility infrastructure. MVP should be held accountable for stranded assets. 5. Communities have invested in marketing outdoor recreation to increase tourism. Construction along water bodies detracts from the natural beauty and aesthetics that visitors want to experience.	Socioeconomics are discussed in section 4.9 o f the EIS. See also responses SOCIO-1, SOCIO-6, and SOCIO-2 in appendix I.2.

IND-37	Jeannie Ambrose	
IND-37r	**4.10. CULTURAL RESOURCES.** To protect their natural and cultural resources from potential risks, the Alamance Co. commissioners unanimously voted in 2018 on a resolution against the proposed 20-mile extension into their county. 1. While the survey process for culture resources is being completed, damage to potential archeological sites and historic structures could occur. 2. What mitigation measures would be taken and when would they be completed?	See response CULT-1 in appendix I.2. Section 4.10 of the EIS has been updated with additional information regarding cultural resource surveys and consultations.
IND-37s	**4.11. AIR QUALITY AND NOISE.** Poor air quality is a significant global public health concern. CO, NO_X, volatile organic compounds, coarse and fine particulates, hazardous air pollutants and greenhouse gases are emitted from diesel engines and released from the proposed compressor station. Human exposure to these harmful air pollutants can exacerbate pre-existing health conditions in certain sensitive populations and cause cardiovascular and respiratory problems over time in others.	See response AIR-2 in appendix I.2.
IND-37t	**4.12. RELIABILITY AND SAFETY.** 1. The event of a pipeline emergency may be rare but it can be catastrophic when pipelines rupture, leak, or explode causing loss of life and property [as in Durham, NC, this year]. The pipeline route would mostly run through Class 1 population density areas. Lower safety standards are specified for Class 1: thinner walled pipes and fewer shut-off valves or manual shut-off valves. I live in close proximity to the boundary of the "blast" or "incineration" zone and receive periodic leak recognition and response safety notices. When the gas transmission pipeline was installed in our rural area decades ago, we were classified as Class 1. Since that time, the density of residential homes has increased but I have not been notified of any pipeline upgrades. Are we now at greater risk as this buried pipeline ages? Does the local emergency response team have the expertise and equipment to safely handle a hazardous pipeline accident? Currently, the local fire department has been able to contain but not extinguish a smoldering fire in a nearby development. 2. FERC's DEIS for the MVP-SG assumes that the adverse impacts of pipeline construction will have on natural and cultural resources can be minimized or avoided by following its recommended mitigation plans or procedures. There is no assurance that this is likely based on the hundreds of state and federal water quality violations already reported for the construction work done by the Mountain Valley Pipeline contractors in Virginia and West Virginia. 3. Restoring and maintaining the health of the environment "when practical" are unacceptable responses from the contractors.	See section 4.12 of the EIS for discussion on reliability and safety. See also SAFE-1, SAFE-2, SAFE-3, and GEN-6.
IND-37u	**4.13. CUMULATIVE IMPACTS.** There are information gaps from cooperating federal and state agencies that are not able to submit their survey findings until after the public comment period. Their results would add more evidence for all the environmental threats this pipeline extension poses. This documentary material is needed to fully assess cumulative environmental impacts. Land disturbances can contribute to cumulative impacts associated with the Project's pipeline construction that are detrimental to natural ecosystems and future land use.	See response CI-1 in appendix I.2.

IND-37	Jeannie Ambrose	
	5.0. CONCLUSIONS OF THE DEIS. *We conclude that approval of the Project would result in some adverse environmental impacts, but these impacts would be reduced to less-than-significant levels through implementation or our recommendations and Mountain Valley's proposed avoidance, minimization, and mitigation measures.*	
IND-37v	1. What are these mitigation measures? 2. How will these measures prevent significant environmental impacts?	See response GEN-9 in appendix I.2.
IND-37w	**POINTS NOT INCLUDED IN DEIS.** 1. DEIS fails to fully assess all the environmental threats to our natural resources from the construction and operation of the proposed Southgate project.	See response GEN-4 in appendix I.2.
IND-37x	2. A review of a no-action alternative is missing. For example, what economic benefits could come from improving the energy efficiency of the existing infrastructure? Are there safer and more cost-effective ways to meet our energy needs that can both reduce our dependence on fossil fuels and provide more permanent jobs in our communities.	Section 3.2 discusses the No Action Alternative. See also response ALT-2 in appendix I.2.
IND-37y	3. Assessment of environmental justice issues and demographics on health disparities from pollution exposure in local communities are not provided (e.g. Green Level's Black community). 4. Methane is a component of natural gas and a more potent greenhouse gas than carbon dioxide contributing to the global climate crisis. The assumption that another pipeline is needed to transport fracked gas produced in the Marcellus and Utica shale regions to meet energy demands in NC is questionable. We face an uncertain future if GHG emissions continue at the current rate or begin to accelerate even faster. The rising economic cost of more frequent and intense weather extremes are already being felt. Investing in natural gas infrastructure prolongs our dependence on fossil fuels and away from a sustainable future. The burning of fossil fuels is emerging as a driving force in altering the Earth's atmospheric chemistry.	The Green Level Community is not crossed by the Project. Air quality impacts on public health are discussed in detail in section 4.11.1.7. Additionally, potential air quality impacts on vulnerable populations are discussed in section 4.9.8 of the EIS. See the revised Socioecomic section 4.9.8 for further information on Environmental justice
IND-37z	Reject the MVP's application request for the Southgate expansion for all these reasons. Thank you for the opportunity to submit public comments to communicate our concerns. Jeannie Ambrose Pittsboro, NC 27312	Climate change and greenhouse gas impacts are discussed in section 4.13.2.9. See also response CI-1 in appendix I.2.

IND-41	Katie Whitehead

Docket No. CP19-14-000 - MVP Southgate Project Draft Environmental Impact Statement

Follow-up Comments (per FERC staff recommendation)

Regarding Co-location of the Proposed MVP Southgate Pipeline and Existing Williams Transco Pipelines

Submitted November 17, 2019 by Katie Whitehead

It's generally understood that FERC Commissioners are responsible for determining whether a proposed interstate pipeline project meets a critical public need that justifies taking private land. But Commissioners should also be accountable for what land along a proposed pipeline route is truly needed. Pipeline companies should not be granted the power of eminent domain and the authority to impose damaging environmental impacts on any more land than is necessary for pipeline construction and maintenance. Companies routinely tout the benefits of co-location, as if co-location automatically minimizes environmental impact. As currently proposed, MVP Southgate does not use co-location to minimize environmental impact.

In response to my September 16 comment on the DEIS, FERC asked Mountain Valley for additional information on Resource Report 10 - Alternatives 49.a. and referred Mountain Valley to my comment. Mountain Valley responded, but only partially. When I pointed this out to FERC project manager Amanda Mardiney, she recommended that I submit a follow-up comment to the FERC docket restating my requests and concerns and clarifying that my comment applies beyond one alignment sheet and my family's property. Due diligence requires that FERC address co-location on all affected properties and revisit the temporary workspace width on all properties.

The alignment sheet copied below, showing the proposed MVP Southgate route and construction areas on my family's tree farm, is an example of co-location of MVP Southgate with the existing Williams Transco right of way through Pittsylvania County, VA and into Rockingham County, NC. We would appreciate further efforts by FERC to minimize environmental impact on our family's tree farm. The same effort should be applied to all properties targeted for co-location on the MVP Southgate route.

Location of Williams Transco Pipelines

If one zooms in to about 300% on the alignment sheet on page four below, one may be able to make out the small print and thin lines identified in the legend.

The map shows the "EXISTING PIPELINE" (labeled "Williams Transco Pipeline") as a single broken black line with vertical bars located near the proposed "WORK SPACE LIMITS" indicated by a broken red line. The single broken black line with vertical bars, in fact, marks the SE boundary of the Williams Transco ROW, a 155' corridor containing four pipelines, a fiber optic cable, and an electric cable. The nearest Williams Transco Pipeline (D-Line) is 40' from the line shown on the map. Not all co-location properties have four Williams Transco pipelines (some have three) or a 155' ROW (many are undefined); nevertheless, the same error occurs on other alignment sheets: the single broken black line with vertical bars is far from the actual location of the closest Williams Transco gas line.

The red cloud-like outline along the bottom of the map appears to indicate an access road on the Williams Transco ROW and work area that were eliminated from the project on our property. We are grateful that Mountain Valley cancelled this part of its plan.

Width of Temporary Workspace

According to MVP's October 18 response, "The Project offers to reduce temporary workspace from 100 feet to 75 feet for the entire distance on this property due to the sensitivity of tree clearing." We are grateful for this offer. Such a reduction would seem appropriate for other properties on the MVP Southgate route, as well. We encourage FERC scrutiny of the full length of the Southgate project.

Need for Metes and Bounds - Where does Mountain Valley propose locating the Southgate pipeline?

In its response to FERC, Mountain Valley did not respond to my inquiry and request regarding where the company proposes locating the Southgate pipeline. Mountain Valley has never indicated precisely where its proposed temporary or permanent ROWs would be located on the ground and in relation to the Williams Transco gas lines. As far as I can tell, **no metes and bounds are provided on the alignment sheets or anywhere else.** This concern relates to my family's property and to all other properties targeted for co-location.

IND-41a	See response IND-36c.
IND-41b	Mountain Valley was able to make this adjustment due to the route, topography, and presence of other environmental features specific to this property. Mountain Valley has reduced workspace in many other locations along the project for multiple reasons, including per the request of landowners through collaborative negotiations.
	Information such as metes as bounds would be included in exhibits prepared for the easement package for land acquisition.

IND-41	Katie Whitehead	
IND-41d	**Distance between Pipelines – What does Mountain Valley propose?** Mountain Valley originally proposed a distance of 80' between the two companies' gas lines and a 15' permanent gap between the two companies' ROWs on our land. (!) Mountain Valley's offer "to reduce temporary workspace from 100 feet to 75 feet for the entire distance on this property" provides no information about the distance between the pipelines or the distance (if any) between the two companies' permanent ROWs. **True Co-location – FERC's Responsibility** My September 16 comment pointed to the appropriateness of reducing the space between the Williams Transco D-Line and the proposed MVP Southgate line to the minimum necessary for safety purposes. **Please ask Mountain Valley to locate its pipeline the standard 25' minimum distance from the existing pipeline, measured from the center of Williams Transco D-Line as illustrated on page five.** • There is approximately 25' between the existing Williams Transco pipelines and cables, which I understand is standard industry practice. • There is no need for more than 25' between the nearest existing Williams Transco line and the MVP Southgate line. I understand that some large gas pipelines are 15' apart. • Williams Transco has a 40' buffer next to its existing D-Line on my family's land. Though this might appear to be space Williams Transco could reserve for a fifth line, it isn't – because the company does not have comparable space on other properties. • I've been told that neither Williams Transco nor Mountain Valley would want the other company to install a pipeline between the existing Williams Transco line and the Southgate line. If there were 25' between the two lines, this would not be an issue. Both companies would be protected. • Using the UNUSED portion of the Williams Transco ROW would significantly reduce environmental impact of MVP Southgate and preserve silviculture. Reducing Mountain Valley's originally proposed 80' distance between the pipelines to 25' would greatly reduce the number of trees to be clear-cut and the permanent loss of silviculture. True co-location could greatly reduce environmental, economic, and other impacts on landowners - both during construction and long-term. FERC Commissioners cannot claim that taking private land is justified if they fail to require true co-location.	See response IND-36c. Alignment sheets note a distance of 50 feet between Transco's pipeline and the proposed Southgate pipeline. placing separate pipelines from differing operators less than 50 feet from one another creates safety concerns and operational difficulties. 50 feet of spacing is the INGAA standard for parallel pipeline facilities. Mountain Valley would use workspace within the Transco permanent right-of-way easement temporarily for spoil storage during construction based on arrangements with Transco. Typical drawings of the Project configuration are provided in Appendix B.2 of the EIS. Standard distances between utilities have been maintained by Mountain Valley as depicted in the Project alignment drawings.
IND-41e	**Spillway – Not Mentioned in Previous Comment** I did not mention in my September 16 comment the mislabeling of a "stream," visible on the alignment sheet at approximately MP4.8. The Williams Transco ROW crosses the spillway for the small lake shown in the aerial view. With the heavy rains of 2018 the spillway was, at times, a stream. We are in negotiation with Williams Transco regarding restoration and maintenance of the spillway.	The spillway is identified as S-E18-4, a surface water feature with intermittent flow on the alignments and in appendix B.5. This feature would be treated as a surface water crossing during construction.

APPENDIX J

Southgate Project Keyword Index

KEYWORD INDEX

Document Content(s)

Appendix E

Federal Energy Regulatory Commission

Certificate of Public Convenience and Necessity

(June 18, 2020)

171 FERC ¶ 61,232
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;
Richard Glick, Bernard L. McNamee,
and James P. Danly.

Mountain Valley Pipeline, LLC Docket No. CP19-14-000

ORDER ISSUING CERTIFICATE

(Issued June 18, 2020)

1. On November 6, 2018, Mountain Valley Pipeline, LLC (Mountain Valley) filed an application pursuant to section 7(c) of the Natural Gas Act (NGA)[1] and Part 157 of the Commission's regulations[2] for authorization to construct and operate approximately 75.1 miles of natural gas pipeline and associated aboveground facilities in Pittsylvania County, Virginia, and Rockingham and Alamance Counties, North Carolina (Southgate Project). The Southgate Project is designed to provide up to 375,000 dekatherms (Dth) per day of firm transportation service.

2. For the reasons discussed below, we will grant the requested authorizations, subject to the conditions described herein.

I. Background

3. Mountain Valley,[3] a Delaware limited liability company, does not currently provide any services subject to the Commission's jurisdiction. On October 13, 2017, the Commission issued a certificate of public convenience and necessity authorizing Mountain Valley to construct and operate a new 303.5-mile-long, 42-inch-diameter interstate pipeline system to provide up to 2,000,000 Dth per day of firm natural gas transportation service from Wetzel County, West Virginia, to an interconnection with Transcontinental Gas Pipe

[1] 15 U.S.C. § 717f(c) (2018).

[2] 18 C.F.R. pt. 157 (2019).

[3] Five companies own Mountain Valley: (1) EQM Midstream Partners, LP (45.5%); (2) NextEra Energy (31%); (3) Con Edison Transmission, Inc. (12.5%); (4) WGL Midstream (10%); and (5) RGC Midstream, LLC (1%).

Line, LLC's (Transco) Compressor Station 165 in Pittsylvania County, Virginia (Mainline System).[4]

4. In early 2018, Commission staff authorized Mountain Valley to commence construction of the Mainline System, and, in February 2018, Mountain Valley commenced construction.[5] On July 27, 2018, the U.S. Court of Appeals for the Fourth Circuit issued an order vacating authorizations issued by the Department of the Interior's Bureau of Land Management (BLM) and the Department of Agriculture's Forest Service (Forest Service) for the Mainline System.[6] Thereafter, on August 3, 2018, Commission staff issued a Notification of Stop Work Order for the Mainline System.[7] Subsequently, on August 29, 2018, Commission staff authorized partial construction to resume based on staff's assessment that completing construction and restoration as quickly as possible would best protect the environment.[8]

5. On October 3, 2018, Mountain Valley informed the Commission that the U.S. Court of Appeals for the Fourth Circuit had issued an order vacating the U.S. Army Corps of Engineers (Army Corps) Huntington District's Nationwide Permit 12 for the project, and that it was suspending construction in waters of the United States in the

[4] *Mountain Valley Pipeline, LLC*, 161 FERC ¶ 61,043 (2017), *order on reh'g*, 163 FERC ¶ 61,197 (2018) (*Mountain Valley*), *aff'd sub nom.*, *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199 (D.C. Cir. Feb. 19, 2019).

[5] *See* Mountain Valley's Weekly Status Report Nos. 14 and 15 (filed February 7 and 15, 2018, respectively, in Docket No. CP16-10-000) (construction did not commence until after February 2, 2018).

[6] *Sierra Club, Inc. v. U.S. Forest Serv.*, 897 F.3d 582 (4th Cir. 2018) (vacating the permit for the pipeline to cross 3.6 miles of the Jefferson National Forest in West Virginia and Virginia).

[7] *Mountain Valley Pipeline, LLC*, Notification of Stop Work Order, Docket No. CP16-10-000 (August 3, 2018) (delegated order).

[8] *Mountain Valley Pipeline, LLC*, Partial Authorization to Resume Construction, Docket No. CP16-10-000 (August 29, 2018) (delegated order) (allowing construction except for the area containing the 3.5 miles of pipeline route across the Jefferson National Forest, in Monroe County, West Virginia and Giles County, Virginia, between milepost 196.0 and milepost 221.0).

Army Corps' Huntington District.[9] Subsequently, Mountain Valley notified the Commission that the Army Corps' Norfolk and Pittsburgh Districts had suspended their nationwide permits issued for the Mainline System, and that, consequently, Mountain Valley was suspending construction in waters of the United States in those Army Corps districts as well.[10]

6. On August 15, 2019, Mountain Valley voluntarily suspended new construction activities in certain watersheds to avoid potential impacts on listed threatened and endangered aquatic species.[11] On August 28, 2019, the Commission requested that the U.S. Fish and Wildlife Service (FWS) reinitiate consultation under section 7 of the Endangered Species Act (ESA) with respect to the Mainline System project.

7. On October 11, 2019, the United States Court of Appeals for the Fourth Circuit issued an order granting a stay of the FWS's 2017 Biological Opinion and Incidental Take Statement (Biological Opinion) issued for the Mainline System and granting the Department of the Interior's motion to hold the litigation in abeyance until completion of reinitiated ESA consultation.[12] In response to the court's stay of the 2017 Biological Opinion, the Director of the Office of Energy Projects notified Mountain Valley that it

[9] Mountain Valley's October 3, 2018 Letter, Docket No. CP16-10-000 (providing opinion of the U.S. Court of Appeals for the Fourth Circuit, *Sierra Club v. U.S. Army Corps of Eng'rs*, 905 F.3d 285 (4th Cir. 2018)).

[10] Mountain Valley's October 9 and 22, 2018 Letters, Docket No. CP16-10-000 (providing the Army Corps' Norfolk and Pittsburg Districts' notices suspending authorization, respectively).

[11] Mountain Valley's August 15, 2019 Voluntary Suspension Letter, Docket No. CP16-10-000 (suspending work within mileposts 107.5-122.5, 196.3-201.8, and 218.6-293.3). The FWS issued a Biological Opinion for the Mainline System on November 21, 2017. Since issuance of the Biological Opinion, the candy darter, which is known to inhabit streams in the project area, was listed as endangered by the FWS. New information on the possible effects of the Mainline System on certain species covered by the Biological Opinion (i.e., Roanoke logperch, Indiana bat, and Northern long-eared bat) has also been identified in the interim (e.g., new information regarding impacts from sedimentation and slips).

[12] *Wild Virginia v. Department of the Interior*, Order, 4th Cir. No. 19-1866 (Oct. 11, 2019) (order granting stay and holding case in abeyance). On September 11, 2019, the FWS accepted the Commission's August 28, 2019 request to reinitiate consultation pursuant to section 7 of the ESA regarding impacts to certain species covered in the 2017 Biological Opinion (i.e., the candy darter, Roanoke logperch, Indiana bat, and Northern long-eared bat).

must cease all construction activity along the entirety of the Mainline System and in all work areas except for restoration and stabilization activities.[13] At that time, Mountain Valley had completed construction (trenched, installed, and backfilled the pipeline) on about 78% of the Mainline System right-of-way and final restoration on about 51% of the Mainline System.

8. Currently, Mountain Valley is not authorized to recommence construction of the Mainline System, as reinitiated ESA consultation is ongoing. In addition, Mountain Valley cannot construct the portion of the Mainline System that crosses the Jefferson National Forest in West Virginia and Virginia, or that is in waters of the United States subject to the Army Corps' Nationwide Permit 12.

9. While we are authorizing the Southgate Project with this order, we are directing the Office of Energy Projects to not issue any notice to proceed with construction[14] of the Southgate Project until Mountain Valley receives the necessary federal permits for the Mainline System, and the Director of the Office of Energy Projects, or the Director's designee, lifts the stop-work order and authorizes Mountain Valley to continue constructing the Mainline System.

10. Upon commencing operations on its Mainline System, Mountain Valley will become a natural gas company within the meaning of section 2(6) of the NGA.[15]

II. Southgate Project Proposal

11. Mountain Valley proposes to construct and operate the Southgate Project to provide up to 375,000 Dth per day of firm transportation service from an interconnect approximately 0.1 mile upstream of the terminus of the Mainline System in Pittsylvania County, Virginia, to Dominion Energy North Carolina's (Dominion)[16] local distribution

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[13] *Mountain Valley Pipeline LLC*, Cessation of Certain Activities, Docket No. CP16-10-000 (October 15, 2019) (delegated order).

[14] Construction activities include tree-clearing. *See, e.g.*, *PennEast Pipeline Co., LLC*, 164 FERC ¶ 61,098, n.136 (2018) ("PennEast is prohibited from commencing construction, including any tree clearing activities . . . .").

[15] 15 U.S.C. § 717(a)(6) ("a 'natural gas company' means a person engaged in the transportation of natural gas in interstate commerce . . . .").

[16] Dominion is a local distribution company primarily engaged in the purchase, transportation, distribution, and sale of natural gas to customers in North Carolina. Following a January 2, 2019 merger, Dominion Energy, Inc. acquired the Public Service Company of North Carolina and changed the company name to Dominion Energy North

facilities, via the Dan River Interconnect and the Haw River Interconnect in Rockingham and Alamance Counties, North Carolina, respectively. The proposed project will provide Dominion access to natural gas produced in the Marcellus and Utica shale regions, and a connection to East Tennessee Natural Gas, LLC's (East Tennessee) pipeline system.[17] Specifically, Mountain Valley proposes to construct:

- approximately 0.5 mile of 24-inch-diameter natural gas pipeline in Pittsylvania County, Virginia;
- approximately 30.7 miles of new 24-inch-diameter natural gas pipeline in Pittsylvania County, Virginia, and Rockingham County, North Carolina;
- approximately 43.9 miles of new 16-inch-diameter natural gas pipeline in Rockingham and Alamance Counties, North Carolina;
- one new 28,915-horsepower compressor station, including two natural gas-fired turbine-driven compressor units, in Pittsylvania County, Virginia (Lambert Compressor Station);
- four new interconnects and associated meter stations, enabling the Southgate Project to receive natural gas from Mountain Valley's Mainline System (Mainline Interconnect) and East Tennessee's LN 3600 (East Tennessee Interconnect),[18] and to deliver natural gas to Dominion's T-15 Dan River facilities (Dan River Interconnect) and T-21 Haw River facilities (Haw River Interconnect); and

Carolina. For ease of reference, we will refer to the project shipper as Dominion throughout.

[17] Currently, Dominion accesses gas it stores in Spectra Energy Partner's Saltville Storage facility, which is located on East Tennessee's pipeline system, through secondary firm backhaul transportation on Transco's pipeline system to Dominion's local distribution system. The Southgate Project would provide Dominion with a primary receipt and delivery forward haul transportation path between East Tennessee's system and Dominion's local distribution system.

[18] The project will provide for the receipt of 250,000 Dth per day of natural gas from the Mainline System and 50,000 Dth per day of natural gas from the East Tennessee Interconnect.

- ancillary facilities including pig launchers and receivers,[19] mainline block valves, and cathodic protection beds.

Mountain Valley estimates that the Southgate Project will cost approximately $468 million.[20]

12. Mountain Valley conducted a binding open season for firm transportation service from April 11 through May 11, 2018. As a result, Mountain Valley executed a binding precedent agreement with Dominion for 300,000 Dth per day of firm transportation on the project. The precedent agreement requires Dominion to execute a 20-year term firm transportation service agreement. Dominion has elected to pay negotiated rates.

13. Mountain Valley proposes to provide Firm (Rate Schedule FTS), Interruptible (Rate Schedule ITS), and Interruptible Parking and Lending (Rate Schedule ILPS) transportation services under a separate rate zone called the Southgate System.

III. Procedural

A. Notice, Interventions, Protests, and Comments

14. Notice of Mountain Valley's application was published in the *Federal Register* on November 26, 2018.[21] A number of timely motions to intervene were filed.[22] Robert McNutt, Mark Ruffin, Renee Womack, the Sappony Tribe, and the Monacan Indian Nation filed late motions to intervene, which were granted by notice issued on April 23, 2019. On January 31, 2020, Transco filed a late motion to intervene, which was denied by notice issued on April 6, 2020.[23]

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[19] A "pig" is a device used to clean or inspect the interior of a pipeline.

[20] Mountain Valley's November 6, 2018 Application, Exhibit K at 1 (Application).

[21] 83 Fed. Reg. 60,420 (Nov. 26,2018).

[22] Timely, unopposed motions to intervene and notices of intervention are granted by operation of Rule 214 of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.214(c)(1) and 385.214(a)(2) (2019). Timely motions to intervene include those filed dealing with environmental issues during the comment period for the draft environmental impact statement (EIS). *See id*. § 380.10(a)(1)(i). Because Bobby Pulliam, Eleanor Amidon, Food and Water Watch, and the City of Burlington filed motions to intervene during the comment period for the draft EIS, their motions are deemed timely.

[23] Mountain Valley filed an answer in opposition to Transco's request to intervene out-of-time on February 14, 2020. On February 28, 2020, Transco filed an answer to Mountain Valley's answer. Because Transco's motion to intervene late was denied, we

15. The North Carolina Utilities Commission (North Carolina Commission) protests Mountain Valley's proposed recourse rates for the Southgate Project because it contends that the two largest components of the proposed rates – the return on equity (ROE) and the depreciation rate – are not adequately supported.[24] The Appalachian Mountain Advocates, Appalachian Voices, the Center for Biological Diversity, the Chesapeake Climate Action Network, the Haw River Assembly, and the Sierra Club (collectively, Appalachian Mountain Advocates) jointly filed a protest in opposition to the project in its entirety, asserting that the project is not needed and is likely to adversely impact a range of environmental resources.[25] We will discuss the merits of these protests below.[26]

16. Numerous entities, including landowners and individuals, filed comments raising concerns over the environmental impacts of the project. These comments are addressed in the final Environmental Impact Statement (EIS) and, as appropriate, below. In addition, the North Carolina Economic Development Association and the North Carolina Chamber filed comments in support of the Southgate Project based on the project's job creation benefits; the final EIS addressed these comments.

B. Answers

17. Mountain Valley and Dominion filed answers to the North Carolina Commission's and the Appalachian Mountain Advocates' protests.[27] Although the Commission's Rules of Practice and Procedure do not permit answers to protests or answers to answers, we find good cause to waive our rules and accept the answers because they provide information that has assisted in our decision-making process.[28]

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consider Transco's filings as comments and Mountain Valley's response as an answer to them; accordingly, concerns raised in the filings are addressed below in the environmental analysis section.

[24] North Carolina Commission's December 10, 2018 Notice of Intervention and Protest at 4 (North Carolina Commission Protest).

[25] Appalachian Mountain Advocates' December 10, 2018 Motion to Intervene and Protest at 7-8 (AMA Protest).

[26] *See infra* PP 29-51 (project need) and 53-64 (recourse rates).

[27] Dominion's December 28, 2018 Answer (Dominion Answer); Mountain Valley's January 8, 2019 Answer (Mountain Valley Answer).

[28] *See* 18 C.F.R. § 385.213(a)(2).

C. Requests for Formal Hearing

18. The North Carolina Commission and Appalachian Mountain Advocates request a formal hearing on Mountain Valley's Southgate Project application that would address, respectively, whether Mountain Valley's proposed recourse rates comply with Commission policy,[29] and whether the project is needed.[30]

19. An evidentiary, trial-type hearing is necessary only where there are material issues of fact in dispute that cannot be resolved on the basis of the written record.[31] Neither the North Carolina Commission nor Appalachian Mountain Advocates have raised a material issue of fact that the Commission cannot resolve on the basis of the written record. As demonstrated by the discussion below, the existing written record provides a sufficient basis to resolve the issues relevant to this proceeding. The Commission has satisfied the hearing requirement by giving all interested parties a full opportunity to participate through evidentiary submission in written form.[32] Therefore, we will deny the North Carolina Commission's and the Appalachian Mountain Advocates' requests for a formal hearing.

D. Request for Technical Conference

20. In comments filed March 27, 2020, Transco requests a technical conference to allow it to explain "its safety, integrity, and operational concerns" regarding the portion of the proposed Southgate Project that would be collocated with Transco's existing pipeline right-of-way.[33] In a response filed May 8, 2020, Mountain Valley asserts that a technical conference is not necessary where, as is the case here, the questions raised can be resolved through the written record.[34] Mountain Valley responds to Transco's general concerns regarding construction practices in the collocated segments, and maintains it is more appropriate for Mountain Valley and Transco to work together to discuss and

[29] *See* North Carolina Commission Protest at 16-17.

[30] *See* AMA Protest at 15-16.

[31] *See, e.g., Southern Union Gas Co. v. FERC*, 840 F.2d 964, 970 (D.C. Cir. 1988); *Dominion Transmission, Inc.,* 141 FERC ¶ 61,183, at P 15 (2012).

[32] *Moreau v. FERC*, 982 F.2d 556, 568 (D.C. Cir. 1993).

[33] *See* Transco's March 27, 2020 Comments at 3.

[34] *See* Mountain Valley's May 8, 2020 Comments at 1-2.

resolve engineering and technical issues related to construction and operation of their collocated pipelines than to hold a conference.[35]

21. Because the merits of this matter can be adequately addressed based on the information in the record in this proceeding, we find no need to convene a technical conference. Transco's concerns regarding collocation of the Southgate Project pipeline with Transco's existing right-of-way are discussed further in the environmental section of this order.[36]

IV. Discussion

22. Because the proposed facilities will be used to transport natural gas in interstate commerce, subject to the jurisdiction of the Commission, the construction and operation of the facilities are subject to subsections (c) and (e) of the NGA.

A. Application of the Certificate Policy Statement

23. The Certificate Policy Statement provides guidance for evaluating proposals to certificate new construction.[37] The Certificate Policy Statement establishes criteria for determining whether there is a need for a proposed project and whether the proposed project will serve the public interest. The Certificate Policy Statement explains that, in deciding whether to authorize the construction of new pipeline facilities, the Commission balances the public benefits against the potential adverse consequences. The Commission's goal is to appropriately consider the enhancement of competitive transportation alternatives, the possibility of overbuilding, subsidization by existing customers, the applicant's responsibility for unsubscribed capacity, avoidance of unnecessary disruptions of the environment, and the unneeded exercise of eminent domain in evaluating new pipeline construction.

24. Under this policy, the threshold requirement for existing pipelines proposing new projects is that the pipeline must be prepared to financially support the project without relying on subsidization from existing customers. The next step is to determine whether the applicant has made efforts to eliminate or minimize any adverse effects the project might have on the applicant's existing customers, existing pipelines in the market and their captive customers, or landowners and communities affected by the proposed route

[35] *See id*. at 2.

[36] *See infra* PP 127-133.

[37] *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227; *corrected,* 89 FERC ¶ 61,040 (1999), *clarified*, 90 FERC ¶ 61,128; *further clarified*, 92 FERC ¶ 61,094 (2000) (Certificate Policy Statement).

or location of the new pipeline facilities. If residual adverse effects on these interest groups are identified after efforts have been made to minimize them, the Commission will evaluate the project by balancing the evidence of public benefits to be achieved against the residual adverse effects. This is essentially an economic test. Only when the benefits outweigh the adverse effects on economic interests will the Commission proceed to complete the environmental analysis where other interests are considered.

1. Subsidization and Impacts on Existing Customers

25. As discussed above, the threshold requirement is that the applicant must be prepared to financially support the project without relying on subsidization from its existing customers. Mountain Valley proposes to establish a separate rate zone for service on the Southgate Project. The design of the Southgate Project allows only for the physical flow of gas from the Mainline System to the Southgate Project facilities. [38] Thus, the Southgate System rates will apply to all facilities downstream of the Mainline System (i.e., the Lambert Compressor Station, the Mainline Interconnect, the East Tennessee Interconnect, the Haw River Interconnect, and the Dan River Interconnect). Mountain Valley has designed the initial recourse rates for the Southgate System as a separate rate zone to ensure that the cost of the project, and the risks inherent in it, are borne by Mountain Valley and the Southgate Project customers, and not its Mainline System customers. Therefore, once operation of the Mainline System commences, there would be no risk that existing Mainline System customers would be subsidizing service on the Southgate Project, and no degradation of service to those customers.

2. Existing Pipelines and Their Customers

26. We find that there will be no adverse impact on other pipelines in the region or their captive customers. The Southgate Project will provide up to 375,000 Dth per day of incremental firm transportation service in North Carolina and southern Virginia. No transportation service provider or captive customer has protested this project.[39] Therefore, we find that the Southgate Project will have no adverse impact on existing pipelines or their captive customers.

3. Landowners and Communities

27. We are satisfied that Mountain Valley has taken appropriate steps to minimize adverse impacts on landowners. As discussed in greater detail in the final EIS and below, Mountain Valley's proposed project will disturb approximately 1,466 acres of land

[38] Application at 15.

[39] In PP 128–133 below, we address Transco's comments regarding the collocation of the Southgate pipeline with Transco's mainline.

during construction, and approximately 450 acres of land during operation.[40] Mountain Valley participated in the Commission's pre-filing process and has actively worked with local stakeholders, including homeowners and landowners, as well as with federal and state agencies, to develop the proposed pipeline route, culminating in more than 190 route adjustments and the elimination of a second compressor station that had originally been proposed in pre-filing to be located near milepost 26 in North Carolina.[41] Mountain Valley obtained permission to survey, and completed field surveys of, approximately 96% of the route[42] and has committed to minimizing the use of eminent domain to the greatest extent possible by negotiating easement agreements for the permanent and temporary easements necessary to construct and operate the project.[43] Approximately 49% (i.e., 36.8 miles) of the proposed pipeline route would be collocated with existing utility corridors and rights-of-way.[44]

28. Several commenters question the appropriateness of granting private pipeline companies the power of eminent domain, and request that the Commission not grant Mountain Valley that authority. The Commission itself does not confer the right of eminent domain. Under NGA section 7, the Commission has jurisdiction to determine if the construction and operation of proposed interstate pipeline facilities are in the public convenience and necessity. Once the Commission makes that determination, NGA section 7(h) authorizes a certificate holder to acquire the necessary land or property to construct the approved facilities by exercising the right of eminent domain if it cannot

[40] Final EIS at 4-114 (Table 4.8-1).

[41] Application at 12.

[42] Final EIS at 1-3.

[43] Application at 11.

[44] Final EIS at 2-3.

acquire the easement by an agreement with the landowner.[45] Thus, the NGA, not the Commission, grants certificate holders the right to take property by eminent domain.[46]

4. Need for the Project

29. Mountain Valley has entered into a long-term, firm precedent agreement with Dominion for 300,000 Dth per day of firm transportation service, 80% of the project capacity.

30. Appalachian Mountain Advocates, the North Carolina Department of Environmental Quality (North Carolina DEQ), Friends of the Central Shenandoah, and various commenters challenge the need for the Southgate Project on several grounds. These parties and commenters maintain that existing infrastructure is available to meet the demand for natural gas in North Carolina, a demand which they believe Mountain Valley overstates, and ask the Commission to evaluate new pipeline infrastructure projects on a regional basis. They also seek heightened scrutiny of Mountain Valley's precedent agreement with the project shipper, Dominion, due to Dominion's former affiliate status.[47]

a. Ability of Existing Infrastructure to Meet Demand

31. Appalachian Mountain Advocates assert that a surplus of pipeline capacity exists when existing pipelines, projects under construction, and applications in the regulatory

[45] 15 U.S.C. § 717f(h) ("When *any holder of a certificate of public convenience and necessity* cannot acquire by contract, or is unable to agree with the owner of property to the compensation to be paid for, the necessary right-of-way . . . it may acquire the same by the exercise of the right of eminent domain . . . .") (emphasis added); *see also Midcoast Interstate Transmission, Inc. v. FERC*, 198 F.3d 960, 973 (D.C. Cir. 2000) (holding that the Commission does not have the discretion to deny a certificate holder the power of eminent domain); *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199 at *2 (noting that eminent domain power is conferred to the certificate holder under section 7(h) of the NGA).

[46] *Islander East Pipeline Co.*, 102 FERC ¶ 61,054, at PP 124-31 (2003).

[47] *Compare* Application at 4 (explaining that on November 6, 2018, Dominion's predecessor owned a 30% interest in the Southgate Project's Series B ownership structure) *and* Mountain Valley's December 20, 2018 Change in Ownership Notification (notifying the Commission that Dominion "no longer has any equity interest in the Southgate Project").

queue are considered as a whole.[48] As in previous Commission proceedings,[49] commenters, including Appalachian Mountain Advocates, Friends of the Central Shenandoah, Blue Ridge Environmental Defense League, and Katie Whitehead, cite to a study by Synapse Energy Economics, Inc. (Synapse Study) that Southern Environmental Law Center and Appalachian Mountain Advocates commissioned, which asserts that existing gas pipeline capacity, existing storage in Virginia and the Carolinas, and the future operation of Transco's Atlantic Sunrise Project and Columbia's WB Xpress Project can satisfy the growing peak demand in that region.[50] The Synapse Study concludes that the natural gas infrastructure capacity of the Virginia and the Carolinas region is more than sufficient to meet expected future peak demand. Appalachian Mountain Advocates and Katie Whitehead also cite to a study by the Institute for Energy Economics and Financial Analysis (IEEFA), which argues, in part, that interstate pipeline infrastructure constructed to ship natural gas from the Marcellus and Utica region is overbuilt.[51] Finally, Appalachian Mountain Advocates cites a Department of Energy

[48] AMA Protest at 11.

[49] *See Atl. Coast Pipeline, LLC*, 161 FERC ¶ 61,042, at P 30 (2017), *order on reh'g*, 164 FERC ¶ 61,100, at PP 53-44 (2018); *Mountain Valley*, 161 FERC ¶ 61,043 at P 37, *order on reh'g*, 163 FERC ¶ 61,197 at PP 45-47.

[50] Synapse Energy Economics, Inc., *Are the Atlantic Coast Pipeline and the Mountain Valley Pipeline Necessary*? An examination of the need for additional pipeline capacity into Virginia and Carolinas, (2016) (filed as Exhibit A of AMA Protest) (Synapse Study). The Commission previously considered the findings of the Synapse Study and found that the study makes an unlikely assumption that all gas is flowed by primary customers along their contracted paths, and fails to consider the use of regional pipeline capacity by shippers outside of Virginia and the Carolinas through interruptible service or capacity release. *Mountain Valley*, 161 FERC ¶ 61,043 at P 41 n.47, *order on reh'g*, 163 FERC ¶ 61,197 at P 47.

[51] Institute for Energy Economics and Financial Analysis, *Risks Associated With Natural Gas Expansion in Appalachia*, *Proposed Atlantic Coast and Mountain Valley Pipelines Need Greater Scrutiny* (Apr. 2016) (filed as Exhibit E of AMA Protest) (IEEFA Study). The Commission previously considered the findings of the IEEFA Study and determined that the study "speaks in generalities" and suggests that pipelines like the proposed project may serve to aid in the delivery of lower-priced natural gas to higher-priced markets – a result which would serve the public interest. *Mountain Valley*, 163 FERC ¶ 61,197 at P 47.

study in support of its argument that, through 2022, pipeline capacity will exceed by over 50% production capacity in the Appalachian Basin.[52]

32. North Carolina DEQ and Appalachian Mountain Advocates argue that, even if capacity needs increase alongside projected population growth, Dominion's capacity needs can be met through its existing contracted capacity.[53] In support of its claim that natural gas demand will only experience a nominal increase in the future, Appalachian Mountain Advocates point to Energy Information Administration (EIA) forecasts that residential use of natural gas will decline by 0.6% per year over the next two decades, while commercial and industrial uses will respectively increase 0.4% and 0.6% per year.[54]

33. Mountain Valley filed its own market demand study (Wood Mackenzie Study),[55] estimating that demand growth for natural gas capacity in the Southeast will reach 8.3 billion cubic feet (Bcf) per day[56] by 2030.[57] The study also posits that much of the gas needed to meet this demand would be from the Marcellus and Utica shale regions, thus requiring additional pipeline capacity.[58] Appalachian Mountain Advocates, Friends

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[52] AMA Protest at 12 n.4 (quoting U.S. Dep't of Energy, Natural Gas Infrastructure Implications of Increased Demand from the Electric Power Sector (Feb. 2015), http://energy.gov/epsa/downloads/report-natural-gas-infrastructure-implications-increased-demand-electric-power-sector) (DOE Study). The Commission previously considered the findings of the DOE Study and concluded that although the study notes that natural gas companies are increasingly using underutilized capacity on existing pipelines, re-routing natural gas flows, and expanding existing pipeline capacity, the study does not contend that this supplants the need to build new infrastructure. *Mountain Valley*, 161 FERC ¶ 61,043 at P 40 n.47, *order on reh'g*, 163 FERC ¶ 61,197 at P 47.

[53] AMA Protest at 13-14; North Carolina DEQ's November 5, 2018 Comments in Docket PF18-4-000 at 4-5 (North Carolina DEQ's November 5, 2018 Comments).

[54] AMA Protest at 13-14.

[55] Wood Mackenzie, Inc., Southeast U.S. Natural Gas Market Demand in Support of the Mountain Valley Pipeline Project (Jan. 2016) (filed as Exhibit I of Mountain Valley's Application) (Wood Mackenzie Study).

[56] A volumetric capacity of 8.3 Bcf per day is equivalent to 8,300,000,000 Dth per day.

[57] Wood Mackenzie Study at 6.

[58] *See id.* at 20-21.

of the Central Shenandoah, and other commenters question the usefulness of the Wood Mackenzie Study because it covers a seven-state region in the Southeast, while the Southgate Project will only serve a portion of central North Carolina.

34. Appalachian Mountain Advocates submitted an analysis performed by the Applied Economics Clinic (AEC Report)[59] to counter Mountain Valley's projections showing increasing natural gas demand in the future. As Mountain Valley has not indicated that gas delivered by the project will be used for electric generation,[60] Appalachian Mountain Advocates explains that the AEC Report focuses on gas demand for residential, commercial, and industrial end-use customers.[61] Specifically, the AEC Report takes issue with Mountain Valley's (i) reliance on a nationwide, rather than regional, projection of gas demand;[62] (ii) failure to exclude gas consumption for electric generation from North Carolina's expected annual growth in gas demand; [63] and (iii) use of a purportedly inflated projection of future population growth in North Carolina and failure to consider the steady downward trend in per capita gas consumption attributed to increased energy efficiency and other advances.[64]

35. Commenters contend that the Commission must conduct an independent evaluation of actual market demand.[65] As part of this independent evaluation of whether expected gas demand can be met by existing pipeline capacity, Appalachian Mountain Advocates asserts that the Commission should evaluate the potential for production

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[59] Elizabeth A. Stanton, PhD and Eliandro Tavares, *Analysis of the Mountain Valley Pipeline Southgate Project* (Jul. 2019) (filed as Exhibit A of Appalachian Mountain Advocates' September 16, 2019 Comments on Draft EIS) (AEC Report).

[60] Mountain Valley states that the natural gas transported by the Southgate Project will be used to make bundled gas sales primarily to residential and small- and medium-sized commercial customers for heating, cooking, and other end-uses typical of natural gas local distribution company customers. Mountain Valley's March 15, 2019 Data Request Response at 3.

[61] Appalachian Mountain Advocates' September 16, 2019 Comments on Draft EIS at 6 (AMA's September 16, 2019 Comments).

[62] AEC Report at 8.

[63] *Id*. at 9-11.

[64] *Id*. at 9.

[65] *See, e.g.*, North Carolina DEQ's November 5, 2018 Comments at 5; AMA Protest at 15; Friends of the Central Shenandoah's April 1, 2019 Comments at 9.

decline in the Marcellus and Utica shale formations.[66] Commenters further suggest that the Commission should assess the ability of renewable energy sources and energy efficiency to meet electric demand over the life of the proposed pipelines.[67] Noting that market forces indicate that LNG exports will increase in future years, Blue Ridge Environmental Defense League argues that the Mountain Valley's statements that it has no plans to export natural gas and the draft EIS's observation that there is no direct connection from the Southgate Project's terminus to Cove Point LNG – the nearest export terminal located approximately 190 miles away in Calvert County, Maryland – are an insufficient guarantee that LNG exports are not necessary to financially sustain the project.[68]

36. Finally, Appalachian Mountain Advocates and Friends of the Central Shenandoah recommend that the Commission evaluate the need for new pipeline infrastructure on a regional basis because failure to do so will lead to the development of unnecessary pipelines.[69]

37. In its January 8, 2019 answer, Mountain Valley asserts that Dominion's binding, 20-year precedent agreement for 80% of the Southgate Project's capacity is "significant evidence of demand for [a] project."[70] Mountain Valley notes that the Commission previously evaluated the Synapse and U.S. Department of Energy studies submitted by Appalachian Mountain Advocates and observed that commenter depictions of the

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[66] AMA's September 16, 2019 Comments at 4.

[67] *See, e.g.*, AMA's September 16, 2019 Comments at 4; Friends of the Central Shenandoah's April 1, 2019 Comments at 5; Southern Environmental Law Center's September 16, 2019 Comments on the Draft EIS at 2-3 (SELC's September 16, 2019 Comments).

[68] Blue Ridge Environmental Defense League's September 16, 2019 Comments on the Draft EIS at 12-13 (Defense League's September 16, 2019 Comments).

[69] AMA's September 16, 2019 Comments at 3-4; Friends of the Central Shenandoah's April 1, 2019 Comments at 22. In addition, the Synapse Study asserts that considering each new pipeline proposal in isolation ignores important alternatives, such as upgrades to existing pipelines and storage facilities, which would increase regional natural gas supply capacity and avoid the adverse impacts on communities or the environment. Synapse Study at 4. Similarly, the IEEFA Study argues that the Commission should evaluate regional requirements for additional pipeline capacity similar to other infrastructure programs such as electric transmission and highways. IEEFA Study at 6-7.

[70] Mountain Valley Answer at 10 (quoting Certificate Policy Statement, 88 FERC at 61,744).

findings of the studies were overstated.[71] Mountain Valley counters that the Wood Mackenzie Study forecasts that local distribution company and other non-electric generation gas usage in the Southeast will expand at a 1.6% annual growth rate[72] and further contends that Dominion needs the project's additional pipeline capacity to meet its design-day requirements, which are expected to increase 11% as a result of population growth in North Carolina.[73]

38. Mountain Valley argues that the Southgate Project will: (i) provide North Carolina and southern Virginia access to new natural gas supplies in the Marcellus and Utica shale regions; (ii) provide the opportunity to serve commercial and industrial load in Virginia and North Carolina not currently served by natural gas; (iii) provide new interconnects that improve the interstate grid and increase reliability and resiliency of North Carolina's gas infrastructure; (iv) eliminate a bottleneck by allowing Dominion to transport gas received from East Tennessee on a firm forward haul basis, rather than relying on backhauls on Transco's system; and (v) introduce a new entrant into the North Carolina interstate pipeline market, which may foster competition and lower consumer costs.[74] The company states that the North Carolina Commission has recognized the public benefits of the Southgate Project and has authorized payment under Dominion's precedent agreement with Mountain Valley.[75] Mountain Valley argues that the North Carolina Commission's approval warrants deference and "boosts the [precedent agreement's] probative value."[76]

39. It is well established that precedent agreements are significant evidence of demand for a project.[77] As the court stated in *Minisink Residents for Environmental Preservation*

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[71] *Id*. at 12 (citing *Mountain Valley*, 161 FERC ¶ 61,043 at P 41 n.47, *order on reh'g*, 163 FERC ¶ 61,197 at P 47).

[72] *Id*. at 12-13.

[73] *Id*. at 13.

[74] Mountain Valley Answer at 13-14 (citing Application at 13-14).

[75] *Id*. at 14-15; *see infra* note 94.

[76] *Id.* at 15 (citing *NEXUS Gas Transmission, LLC*, 160 FERC ¶ 61,022 (2017), *order on reh'g*, 164 FERC ¶ 61,054, at P 39 n.102 (2018) (*NEXUS*), *aff'd in relevant part*, *City of Oberlin v. FERC*, 937 F.3d 599 (D.C. Cir. 2019)).

[77] Certificate Policy Statement, 88 FERC at 61,748 (precedent agreements, though no longer required, "constitute significant evidence of demand for the project"); *Sierra Club v. FERC*, 867 F.3d 1357, 1379 (D.C. Cir. 2017) (*Sabal Trail*) (affirming Commission reliance on preconstruction contracts for 93% of project capacity to demonstrate market

& Safety v. FERC (*Minisink Residents*), and again in *Myersville Citizens for a Rural Community, Inc., v. FERC*, nothing in the Certificate Policy Statement or in any precedent construing it suggest that the policy statement requires, rather than permits, the Commission to assess a project's benefits by looking beyond the market need reflected by the applicant's precedent agreements with shippers.[78] Given the substantial financial commitment required under these agreements by project shippers, we confirm that precedent agreements are the best evidence that the service to be provided by the project is needed in the markets to be served.[79] Moreover, it is current Commission policy to not look beyond precedent or service agreements to make judgments about the needs of individual shippers.[80]

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need); *Twp. of Bordentown v. FERC*, 903 F.3d 234, 263 (3d Cir. 2018) ("As numerous courts have reiterated, FERC need not 'look[] beyond the market need reflected by the applicant's existing contracts with shippers.'") (quoting *Myersville Citizens for a Rural Cmty., Inc., v. FERC*, 783 F.3d 1291, 1301, 1311 (D.C. Cir. 2015)); *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199 at *1 (precedent agreements are substantial evidence of market need); *see also Midship Pipeline Co., LLC*, 164 FERC ¶ 61,103, at P 22 (2018) (long-term precedent agreements for 64% of the system's capacity is substantial demonstration of market demand); *PennEast Pipeline Co., LLC*, 164 FERC ¶ 61,098 at P 16 (affirming that the Commission is not required to look behind precedent agreements to evaluate project need); *NEXUS*, 160 FERC ¶ 61,022 at P 41, *order on reh'g*, 164 FERC ¶ 61,054, *aff'd in relevant part*, *City of Oberlin*, 937 F.3d at 605 (finding need for a new pipeline system that was 59% subscribed).

[78] *Minisink Residents*, 762 F.3d 97, 110 n.10 (D.C. Cir. 2014); *see also Myersville Citizens*, 783 F.3d at 1311. Further, Ordering Paragraph (C)(4) of this order requires that Mountain Valley file a written statement affirming that it has executed contracts for service at the levels provided for in their precedent agreements prior to commencing construction.

[79] *See, e.g., Adelphia Gateway, LLC*, 169 FERC ¶ 61,220, at P 35 (2019), *order denying reh'g*, 171 FERC ¶ 61,049, at P 12 (2020); *Tenn. Gas Pipeline Co., L.L.C.*, 169 FERC ¶ 61,230, at P 19 (2019), *order denying reh'g*, 170 FERC ¶ 61,142, at P 10 (2020). In addition to precedent agreements, applicants may rely on a variety of relevant factors to demonstrate need. Certificate Policy Statement, 88 FERC at 61,747. These factors might include, but are not limited to, demand projections, potential cost savings to consumers, or a comparison of projected demand with the amount of capacity currently serving the market. *Id.* at 61,747.

[80] *Id.* at 61,744 (citing *Transcon. Gas Pipe Line Corp.*, 82 FERC ¶ 61,084, at 61,316 (1998)).

40. Here, Mountain Valley has entered into a long-term, firm precedent agreement with Dominion for 300,000 Dth per day of firm transportation service – 80% of the project's design capacity.[81] To further confirm this showing of need, Ordering Paragraph (C)(4) of this order requires that Mountain Valley file a written statement affirming that it has executed contracts for service at the levels provided for in its precedent agreements prior to commencing construction. Dominion, the sole project shipper, is a local distribution company that has determined, based on its assessment of the long-term needs of its customers and market, that there is a market for the natural gas to be transported and that the Southgate Project is the preferred means for delivering or receiving that gas. In addition, the project's interconnect with East Tennessee will allow Dominion to access gas it stores in the Saltville Storage facility on a more reliable firm forward haul basis. We find that Mountain Valley has sufficiently demonstrated that there is market demand for its project.

41. We disagree with commenters' assertion that the Commission should examine the need for pipeline infrastructure on a region-wide basis. Commission policy is to examine the merits of individual projects and assess whether each project meets the specific need demonstrated. While the Certificate Policy Statement permits the applicant to show need in a variety of ways, it does not suggest that the Commission should examine a group of projects together and pick which project(s) best serve an estimated future regional demand. Projections regarding future demand often change and are influenced by a variety of factors, including economic growth, the cost of natural gas, environmental regulations, and legislative and regulatory decisions by the federal government and individual states. Given the uncertainty associated with long-term demand projections, including those presented in the studies noted by commenters and applicant above, where an applicant has precedent agreements for long-term firm service, the Commission deems the precedent agreements to be the better evidence of demand.[82] The Commission evaluates individual projects based on the evidence of need presented in each proceeding. Where, as here, it is demonstrated that specific shippers have entered into precedent agreements for project service, the Commission places substantial reliance on those agreements to find that the project is needed.

42. Nor are we persuaded by commenters' contention that there is insufficient supply in the Appalachian Basin to support the pipeline. Although Mountain Valley has stated that the intended source of supply for the Southgate Project will be production in the

[81] Prior to the Certificate Policy Statement, the Commission required a new pipeline project to have contractual commitments for at least 25% of the proposed project's capacity. *See* Certificate Policy Statement, 88 FERC at 61,743. Mountain Valley would have satisfied this prior, more stringent, requirement.

[82] *Atl. Coast Pipeline, LLC*, 161 FERC ¶ 61,042 at P 56; *Mountain Valley*, 161 FERC ¶ 61,043 at P 42, *order on reh'g*, 163 FERC ¶ 61,197 at PP 46-47.

Appalachian Basin, the Southgate Project is also connected to other interstate pipelines, such as East Tennessee and – by virtue of its connection with the Mainline System – Equitrans, which could potentially supply gas to the project from other areas of supply. Additionally, because the amount of gas that will be produced from the region is reflective of, among other things, the price of natural gas, projections regarding the amount of gas available for the Southgate Project are speculative.

43. Allegations that the project is not needed because gas that is transported by it may be exported through an LNG terminal are not persuasive. There is no evidence in the record that indicates that the project will be used to transport natural gas for export. The project shipper is a local distribution company, which will locally distribute gas to residential, commercial, and industrial end-use customers. Thus, even if there was evidence that some of the gas would be exported, that fact would not undercut our finding here that the project is necessary for the transportation of natural gas in interstate commerce.[83]

44. We also disagree with commenters' claim that the project is not needed because of the availability of existing capacity on other pipelines or due to the Commission's approval of the Atlantic Coast Pipeline Project (ACP Project). The EIS analyzed whether existing natural gas transmission pipelines in the project area, including the authorized ACP Project, could possibly be used as system alternatives for the Southgate Project.[84] The EIS concluded that these existing pipeline systems are fully subscribed and cannot provide firm transportation of the required volumes of gas to the area that Mountain Valley is proposing to serve.[85] Thus, contrary to commenters' assertions, we are not persuaded that authorization of the Southgate Project would lead to the overbuilding of pipeline infrastructure. The EIS further found that expansion of these systems would likely result in environmental impacts similar to the Southgate Project's anticipated impacts.[86] Therefore, the EIS concluded that utilization of existing pipeline systems would not offer a significant environmental advantage.[87]

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[83] Moreover, no gas can be exported from the United States without a finding by the Secretary of Energy that such export is not inconsistent with the public interest. *Sierra Club v. FERC*, 827 F.3d 36, 40 (D.C. Cir. 2016) (*Freeport LNG*) (citing 15 U.S.C. § 717b(a)).

[84] Final EIS at 3-3 to 3-6.

[85] *Id*. at 5-14.

[86] *Id*.

[87] *See id*. at 3-3 to 3-6.

45. Additionally, renewable energy sources would not accomplish the project purpose of providing natural gas transportation service.[88] The Commission cannot require individual energy users to use different or specific energy resources.[89]

b. Precedent Agreement with Affiliated Shipper

46. Appalachian Mountain Advocates and North Carolina DEQ argue that because Dominion is affiliated with Mountain Valley, the Commission should exercise heightened scrutiny in reviewing whether there is actual market demand for the project. Appalachian Mountain Advocates assert that Mountain Valley's precedent agreement with Dominion should be viewed with skepticism, and afforded less weight, because Dominion had acquired a 30% ownership interest in Mountain Valley after executing the precedent agreement.[90]

47. In response, Mountain Valley points to its December 2018 filing, notifying the Commission that Dominion "no longer has any equity interest in the Southgate Project," and is "no longer an affiliate of Mountain Valley."[91] Thus, Mountain Valley contends, any concerns regarding Dominion's affiliate status are moot.

48. In its December 28, 2018 answer, Dominion confirmed that it is no longer affiliated with Mountain Valley.[92] Additionally, Dominion put into the record testimony

[88] *See id*. at 3-2 (concluding that generation of electricity from renewable energy sources or the gains realized from increased energy efficiency and conservation are not transportation alternatives and cannot function as a substitute for the proposed project); *see also Columbia Gas Transmission, LLC*, 164 FERC ¶ 61,036, at P 65 and n.147 (2018), *order denying reh'g*, 170 FERC ¶ 61,247 (2020) ("As we have concluded with respect to other natural gas transportation infrastructure projects, we do not find that the potential for energy conservation and renewable energy sources to be practical alternatives."); *Mountain Valley*, 161 FERC ¶ 61,043 at P 43 (recognizing that "renewable energy is not a comparable replacement for the transportation of natural gas").

[89] *RH energytrans, LLC*, 165 FERC ¶ 61,218, at P 21 (2018).

[90] AMA Protest at 14-15; North Carolina DEQ's December 10, 2018 Intervention at 3.

[91] Mountain Valley Answer at 11 (citing Mountain Valley's December 20, 2018 Change in Ownership Notification).

[92] Dominion Answer at 3.

and pleadings from two proceedings before the North Carolina Commission,[93] which Dominion offers as evidence that the North Carolina Commission has authorized Dominion's payment of compensation to Mountain Valley under a service agreement for the Southgate Project.[94] Dominion explains that the 2018 North Carolina Commission testimony states that "[Dominion] projects that by the winter of 2019-20 it will need additional interstate capacity to serve expected peak-day requirements," and includes a table showing the forecasted peak-day demand requirements for winter seasons from 2017-18 through 2022-23.[95] Dominion further explains that the table shows a deficit of 7,710 Dth per day beginning in 2019-20, increasing to 62,111 Dth per day by 2022-23.[96] Additionally, Dominion notes, a significant amount of the subscribed capacity reflected in the table is for secondary firm service as backhaul,[97] which has a lower scheduling priority than the capacity that would be provided by the Southgate Project.[98] According to Dominion, the secondary nature of this capacity "takes on greater significance as flows become increasingly bidirectional on the pipelines that [Dominion] uses."[99]

49. As Dominion "no longer has an equity interest in the Southgate Project,"[100] we agree with Mountain Valley that the affiliate concerns are moot. In any event, the fact that a project shipper is affiliated with a project sponsor does not require the Commission to look behind the precedent agreements to evaluate project need.[101] As the court

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[93] *Id*. (Exhibits A-D).

[94] *Id.* at Exhibit D (*Order Accepting Affiliated Agreements for Filing and Permitting Operation Thereunder Pursuant to N.C. Gen. Stat. §62-153*, Docket No. G-5, SUB 593 (N.C. Util. Comm'n Oct. 9, 2018)) (also filed as Exhibit Z-1 of Mountain Valley's Application).

[95] *Id*. at 3-4.

[96] *Id*. at 4.

[97] Backhaul refers to transportation service where a shipper's delivery point is upstream of the receipt point.

[98] Dominion Answer at 4.

[99] *Id*. at 4.

[100] Mountain Valley's December 20, 2018 Change in Ownership Notification.

[101] *Millennium Pipeline Co., L.P.*, 100 FERC ¶ 61,277, at P 57 (2002) ("as long as the precedent agreements are long-term and binding, we do not distinguish between pipelines' precedent agreements with affiliates or independent marketers in establishing the market need for a proposed project"); *see also* Certificate Policy Statement,

affirmed in *Minisink Residents*, the Commission may reasonably accept the market need reflected by the applicant's existing contracts with shippers and not look behind those contracts to establish need.[102] And in *Appalachian Voices v. FERC*, the court affirmed the Commission's determination that "[a]n affiliated shipper's need for new capacity and its obligation to pay for such service under a binding contract are not lessened just because it is affiliated with the project sponsor."[103] When considering applications for new certificates, the Commission's primary concern regarding affiliates of the pipeline as shippers is whether there may have been undue discrimination against a non-affiliate shipper.[104] Here, no such allegations have been made, nor have we found that the project sponsor engaged in any anticompetitive behavior. As discussed above, Mountain Valley held a binding open season for capacity on the project and all potential shippers had the opportunity to contract for service.

50. Finally, commenters question the probative value of the contract between Mountain Valley and Dominion, arguing that, as a regulated utility, Dominion will seek recovery of its Southgate Project-related costs from "captive ratepayers," resulting in guaranteed rates, and the ability to reallocate the financial risk of the Southgate Project from the project owner to captive ratepayers.[105] However, this argument glosses over the important role of the North Carolina Commission, which is responsible for setting retail rates for Dominion. The North Carolina Commission will disallow costs that are not justified according to North Carolina state law after considering, in the judgment of the

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88 FERC at 61,748 (explaining that the Commission's policy is less focused on whether the contracts are with affiliated or unaffiliated shippers and more focused on whether existing ratepayers would subsidize the project) and at 61,744 (the Commission does not look behind precedent agreements to question the individual shippers' business decisions to enter into contracts) (citing *Transcon.*, 82 FERC ¶ at 61,316).

[102] *Minisink Residents* ,762 F.3d at 110 n.10; *see also Sabal Trail*, 867 F.3d at 1379 (finding that pipeline project proponent satisfied Commission's "market need" where 93% of the pipeline project's capacity has already been contracted for).

[103] *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199, at *1 (quoting *Mountain Valley*, 161 FERC ¶ 61,043 at P 45).

[104] *See* 18 C.F.R. § 284.7(b) (2019) (requiring transportation service to be provided on a non-discriminatory basis).

[105] *See, e.g.*, AMA Protest at 14-15; Friends of the Central Shenandoah's April 1, 2019 Comments at 22-23. As we previously noted, Dominion is no longer affiliated with Mountain Valley; however, commenters warn that Dominion could purchase a portion of the Southgate Project following certificate issuance.

North Carolina Commission, the interests of North Carolina ratepayers.[106] Matters relating to Dominion's retail rates are for the North Carolina Commission and are not within the Commission's jurisdiction.[107] Therefore, it is reasonable for the Commission to rely on the contract between Mountain Valley and Dominion as evidence of need to conclude that the project is in the public interest.[108]

51. In conclusion, we find that the precedent agreement signed by Dominion for approximately 80% of the Southgate Project's capacity adequately demonstrates that the project in needed.

5. Certificate Policy Statement Conclusion

52. The proposed project will enable Mountain Valley to provide 375,000 Dth per day of incremental firm transportation service, of which 80% is subscribed. We find that Mountain Valley has demonstrated a need for the Southgate Project and further, that the project will not have adverse economic impacts on existing shippers or other pipelines and their existing customers, and that the project's benefits will outweigh any adverse economic effects on landowners and surrounding communities. Therefore, we conclude that the project is consistent with the criteria set forth in the Certificate Policy Statement and analyze the environmental impacts of the project below.[109]

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[106] The North Carolina Commission has the jurisdiction to regulate the sale and transportation of natural gas within North Carolina, including regulating Dominion, the sole entity that has contracted to take service on the Southgate Project. *See* North Carolina Commission Protest at 2-3.

[107] *NEXUS,* 164 FERC ¶ 61,054 at P 39.

[108] The North Carolina Commission's approval of the contract boosts its probative value. *See Guardian Pipeline, L.L.C*, 91 FERC ¶ 61,285, at 61,966-67 (2000) ("It is also the Commission's preference not to second guess the business decisions of end users or challenge the business decision of an end user on whether it is economic to undertake direct service from a pipeline supplier, *particularly when that decision has been approved by the appropriate state regulatory body*.") (emphasis added) (citing *Southern Natural Gas Co.*, 76 FERC ¶ 61,122, at 61,635 (1996)).

[109] *See* Certificate Policy Statement, 88 FERC at 61,745-46 (explaining that only when the project benefits outweigh the adverse effects on the economic interests will the Commission then complete the environmental analysis).

B. Rates

1. Initial Recourse Rates

53. Mountain Valley proposes to provide firm (Rate Schedule FTS), interruptible (Rate Schedule ITS), and interruptible lending and parking (Rate Schedule ILPS) transportation services under a separate rate zone called the Southgate System. Mountain Valley developed its proposed cost of service utilizing a capital structure of 50% debt and 50% equity, a proposed cost of debt of 6%, an ROE of 14%, and a 5% depreciation rate based on the 20-year contract life of the executed agreement with Dominion. Mountain Valley utilizes a straight fixed-variable rate design to derive its rates based on the full project design capacity of 375,000 Dth per day and a first-year cost of service of $84,889,100.[110] In its revised Exhibit P, Mountain Valley calculates a maximum monthly firm reservation recourse charge of $18.7651 per Dth and a firm usage charge of $0.0033 per Dth.[111] Mountain Valley proposes a maximum daily interruptible and interruptible lending and parking recourse charge of $0.6202 per Dth based on the maximum daily Rate Schedule FTS reservation charge plus the Rate Schedule FTS usage charge.

54. We have reviewed Mountain Valley's proposed cost of service and rates and find that they reasonably reflect current Commission policy, as modified below.

a. Return on Equity

55. On December 10, 2018, the North Carolina Commission filed a protest stating that Mountain Valley failed to provide substantial evidence to justify its proposed 14% ROE. The North Carolina Commission notes that Mountain Valley's only support are the facts that the Commission approved a 14% ROE for the Mountain Valley Mainline System and that a 14% ROE is consistent with the Commission's policy with respect to greenfield pipelines.[112] The North Carolina Commission states that simply citing cases where the Commission has allowed the use of a 14% ROE is inadequate and conflicts with the statutory requirement that an applicant demonstrate that its recourse rates are in the public convenience and necessity.[113] The North Carolina Commission states that

[110] In its August 22, 2019 Data Request Response, Mountain Valley submitted a revised Exhibit P with a corrected operating and maintenance expense calculation.

[111] In its revised Exhibit P, Schedule 2, Mountain Valley breaks down the total cost of service into $84,443,026 for fixed costs and $446,074 for variable costs.

[112] North Carolina Commission Protest at 8.

[113] *Id.* at 9.

Mountain Valley has failed to provide any analysis of current financial markets or current investor expectations, nor has Mountain Valley provided an analysis of the specific risks the pipeline faces. In addition, the North Carolina Commission questions whether the proposed rates, based on an ROE not supported by current market data, provided the necessary check on the potential exercise of market power at the time Mountain Valley entered into the negotiated rate agreement with Dominion, as required by the Commission's Alternative Rates Policy Statement.[114]

56. In its January 8, 2019 answer, Mountain Valley states that because the Mountain Valley Mainline System is not yet in service and Mountain Valley is not yet an established pipeline company with an existing revenue base, the Southgate Project is more akin to a new greenfield project than to the expansion of an existing system, given the business risks associated with the project.[115] Mountain Valley states that a 14% ROE for a new pipeline project is not only consistent with Commission precedent, but has also been upheld by the U.S. Court of Appeals for the District of Columbia Circuit in *Sierra Club vs. FERC*.[116] In addition, Mountain Valley states that its proposed ROE is consistent with Commission precedent, citing *Rockies Express Pipeline, LLC*, where the Commission allowed the company to use the same 13% ROE approved as part of its greenfield certificate application for two expansion projects.[117] Mountain Valley argues that it did not exercise any alleged market power when signing an agreement with Dominion at a negotiated rate and that the parties negotiated based on an estimated recourse rate dependent on numerous factors and Dominion's independent research of marketplace rates for similar capacity.[118]

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[114] *Id*. at 11-12 (citing *Alternatives to Traditional Cost-of-Service Ratemaking for Natural Gas Pipelines; Regulation of Negotiated Transportation Services of Natural Gas Pipelines*, 74 FERC ¶ 61,076, *order granting clarification*, 74 FERC ¶ 61,194, *order on reh'g and clarification*, 75 FERC ¶ 61,024, *reh'g denied*, 75 FERC ¶ 61,066, *reh'g dismissed*, 75 FERC ¶ 61,291 (1996), *petition denied sub nom. Burlington Res. Oil & Gas Co. v. FERC*, 172 F.3d 918 (D.C. Cir. 1998) (Alternative Rate Policy Statement)).

[115] Mountain Valley Answer at 5.

[116] *Id*. (citing *Sabal Trail*, 867 F.3d 1357).

[117] *Id*. (citing *Rockies Express Pipeline LLC,* 116 FERC ¶ 61,272*,* at P 44 (2006) (addressing preliminary non-environmental issues for REX-West expansion); *Rockies Express Pipeline LLC,* 119 FERC ¶ 61,069 (2007) (certificating REX-West expansion)*; Rockies Express Pipeline LLC,* 123 FERC ¶ 61,234, at P 55 (2008) (certificating REX-East expansion)).

[118] Mountain Valley Answer at 9.

57. We will approve Mountain Valley's proposed 14 ROE. Though the Southgate Project is an extension from the previously certificated Mountain Valley Mainline System, the Mainline System is not in service. Thus, just as was the case when it proposed its initial Mainline System, Mountain Valley is not an established pipeline company and has no existing revenue base. Without cash flows from existing operations and a proven track record, we find that, with respect to the Southgate Project, Mountain Valley faces a capital funding outlook similar to other companies constructing new pipeline systems. The reasoning the Commission has relied upon in other instances for authorizing lower ROEs for extension of existing pipeline systems is not applicable under this fact pattern, as those pipelines obtained revenues for service on their existing systems. Therefore, for purposes of establishing initial rates, we believe it is appropriate to treat Mountain Valley, whose Mainline System is not in service, in the same manner as we would an applicant proposing its initial greenfield system, because there are no established operations or revenue streams that would reduce the risk to the level experienced by natural gas companies whose existing systems are in service.

b. Depreciation

58. The North Carolina Commission protests Mountain Valley's proposed five percent depreciation rate for the Southgate Project, which is based on the 20-year term of Mountain Valley's contract with Dominion. The North Carolina Commission recognizes that there have been instances where the Commission has found it appropriate to base the depreciation rate for new, incremental projects on contract life but explains that those instances involve delivery laterals built on behalf of specific customers.[119] Noting that Dominion has only contracted for 300,000 of the 375,000 Dth per day of capacity to be created by the Southgate Project and that Mountain Valley anticipates executing agreements with other potential shippers for additional capacity in the future, the North Carolina Commission asserts "there is no basis to presume that the useful life of the facilities will end when the primary contract term ends."[120] Mountain Valley responds that the five percent depreciation rate is appropriately based on a 20-year life of the project because, while it continues to market unsubscribed capacity, a primary purpose of the Southgate Project is to serve Dominion's needs.[121] According to Mountain Valley, the North Carolina Commission overstates Commission precedent by suggesting the Commission only approves contract life depreciation rates for delivery laterals, but rather that the Commission has approved contract life depreciation rates for incrementally-

[119] North Carolina Commission Protest at 14.

[120] *Id*.

[121] Mountain Valley Answer at 7.

priced projects like the Southgate Project.[122] Specifically, Mountain Valley notes that in *Equitrans, L.P.* (*Equitrans*),[123] the Commission approved depreciation rates based on the life of the contract for an expansion project that was integrated with the rest of Equitrans's mainline system.

59. The Commission's general policy with respect to depreciation for pipeline expansions is to use the pipeline's last approved depreciation rate.[124] Although the Commission has deviated from this general policy and allowed the depreciation rate to be based on the life of the contract with respect to delivery laterals built on behalf of specific customers,[125] we do not find Mountain Valley's use of a five percent depreciation rate based on its 20-year contract term with Dominion appropriate. In addition to serving the needs of Dominion, Mountain Valley states that the purpose of the Southgate Project is to "provide North Carolina and southern Virginia with direct pipeline access to the Marcellus and Utica gas regions in West Virginia, Ohio and southwestern Pennsylvania," and to "meet the growing needs of natural gas users in the southeastern U.S."[126] Mountain Valley designed the Southgate Project so that it will have the ability to provide additional capacity to other potential shippers at or prior to the Dan River Interconnect[127] and states that it has engaged in discussions with additional potential shippers and anticipates that it will execute agreements for the additional 75,000 Dth per day of available capacity in the future.[128] Thus, this mainline expansion will not function merely as a delivery lateral to serve Dominion, but instead will have the potential to meet increased demand and serve other customers.

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[122] *Id*.

[123] *Id*. at 7-8 (citing *Equitrans, L.P.*, 153 FERC ¶ 61,381, at P 17 (2015), *reh'g denied*, 155 FERC ¶ 61,194 (2016)).

[124] *See, e.g.*, *Cheyenne Connector,* 168 FERC ¶ 61,180 at PP 50-54 (approving an expansion project depreciation rate equivalent to the rate approved in the initial certificate where no NGA section 4 rate filing had been made in the interim); *see also Gulf South*, 163 FERC ¶ 61,124 at P 22, *order on reh'g,* 166 FERC ¶ 61,089 at P 30, *aff'd in part*, *Gulf South Pipeline Co., LP v. FERC*, No. 19-1074, slip op. at 22-24 (D.C. Cir. Apr. 10, 2020)*; Wyoming Interstate Co., Ltd.,* 119 FERC ¶ 61,251, at P 22 (2007).

[125] *See, e.g., Transcon. Gas Pipe Line Co*., 147 FERC ¶ 61,102 (2014); *Gas Transmission NW, LLC,* 142 FERC ¶ 61,186 (2013).

[126] Application at 2.

[127] *Id*. at 9.

[128] *Id*. at 2.

60. We acknowledge that in *Equitrans* the Commission authorized Equitrans to extend its mainline system and approved the pipeline's proposed depreciation rate based on the life of the shipper's 20-year contract term.[129] However, the Commission did so without explanation, and that case is inconsistent with our general policy, discussed above. We note that in *Tennessee Gas Pipeline Co., L.L.C.*,[130] the Commission recently reaffirmed its policy to use the last stated and approved depreciation rate for incremental expansion projects.

61. In sum, we find that Mountain Valley has not shown that its 20-year contract term with Dominion is determinative of the useful life of the Southgate Project facilities. Accordingly, we direct Mountain Valley to revise its rates for the Southgate System using the 2.5% depreciation rate underlying its currently-approved Mainline System rates.

c. Section 7 Recourse Rate Review

62. In its protest, the North Carolina Commission argues that the Commission has repeatedly erred in relying on *Atlantic Refining Co. v. Pub. Serv. Comm'n of N.Y.*[131] a case regarding the Commission's discretion in NGA section 7 proceedings to approve initial rates that will "hold the line" until just and reasonable rates are adjudicated under sections 4 or 5 of the NGA.[132] The North Carolina Commission claims that, by declining to do a more thorough review of proposed recourse rates in a section 7 proceeding and deferring to a section 4 proceeding to ensure that the rates are just and reasonable, the Commission fails to ensure that the recourse rates available to Dominion when it negotiated its precedent agreement provided the necessary check on the exercise of market power by the pipeline at the time those negotiations occurred.[133] The North Carolina Commission also argues that the "hold the line" approach affirmed in *CATCO* was only found to be warranted because the Commission had ensured that the consuming public would be protected while awaiting adjudication of just and reasonable rates. The North Carolina Commission asserts that in the instant project proposal, given that the two

[129] *See Equitrans L.P.,* 153 FERC ¶ 61,381, at P 17 n.18.

[130] 169 FERC ¶ 61,230, at PP 33-34 (2019).

[131] 360 U.S. 378 (1959) (*CATCO*).

[132] North Carolina Commission Protest at 15.

[133] *Id.*

largest cost-of-service elements are significantly overstated, there are no assurances that the consuming public will be protected from excessive rates.[134]

63. We disagree with the North Carolina Commission's assertion that the Commission's reliance on the *CATCO* decision is in error. The existence of negotiated rates does not negate the Commission's discretion to approve initial rates in this proceeding under the public convenience and necessity standard, pending the adjudication of just and reasonable rates in Mountain Valley's next general NGA section 4 rate case. In *CATCO*, the Court compared the less rigorous public convenience and necessity standard of review employed under section 7 to assess initial rates for new service or facilities with the just and reasonable standard of review for rate changes under sections 4 and 5.[135] The less exacting standard used in a section 7 certificate proceeding is intended to mitigate the delay associated with a full evidentiary rate proceeding, and, as here, the Commission has discretion to approve initial rates that will "hold the line" while awaiting the adjudication of just and reasonable rates.[136]

64. As explained above, we are requiring Mountain Valley to revise its proposed recourse rates to reflect a reduction to its depreciation rate as requested by the North Carolina Commission. Subject to Mountain Valley making that change addressed above, we will approve Mountain Valley's rates for the Southgate Project.

2. Fuel

65. Mountain Valley states that it will implement a retainage factor to track and recover actual experienced fuel and lost and unaccounted for gas on the Southgate System. The company states that the initial retainage factor for the Southgate System will be 1.66%, based on the submitted fuel study, and that it will adjust the Retainage Factor quarterly to reflect actual fuel and lost and unaccounted for gas. We approve Mountain Valley's proposed initial fuel retainage percentage of 1.66% for the Southgate Project.

3. Reporting Incremental Costs

66. We will require Mountain Valley to keep separate books and accounting of costs and revenues attributable to the proposed services and capacity created by the Southgate

[134] *Id.* at 16.

[135] *See CATCO*, 360 U.S. at 390-91.

[136] *Transcon. Gas Pipe Line Co., LLC*, 169 FERC ¶ 61,051, at P 35 (2019) (citing *Transcon. Gas Pipe Line Co., LLC*, 161 FERC ¶ 61,212, at P 6 (2017)).

Project, as required by section 154.309 of the Commission's regulations.[137] The books should be maintained with applicable cross-reference and the information must be in sufficient detail so that the data can be identified in Statements G, I, and J in any future NGA section 4 or 5 rate case, and the information must be provided consistent with Order No. 710.[138]

4. Negotiated Rate Agreements

67. Mountain Valley proposes to provide service to the project shipper under a negotiated rate agreement. Mountain Valley must file either its negotiated rate agreement or tariff records, setting forth the essential terms of the agreement associated with the Project, in accordance with the Alternative Rate Policy Statement[139] and the Commission's negotiated rate policies.[140] Mountain Valley must file the negotiated rate agreement or tariff record no earlier than 60 days and no later than 30 days prior to the proposed effective date for such rates.[141]

5. *Pro Forma* Tariff Records

68. Mountain Valley included in Exhibit P *pro forma* tariff records reflecting the addition of the separate Southgate System rate zone. We approve the *pro forma* tariff records included in Exhibit P, except as detailed above, and direct Mountain Valley to file the tariff records no earlier than 60 days and no later than 30 days prior to the in-service date of the facilities.

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[137] 18 C.F.R. § 154.309 (2019).

[138] *See Revisions to Forms, Statements, and Reporting Requirements for Natural Gas Pipelines,* Order No. 710, 122 FERC ¶ 61,262, at P 23 (2008).

[139] Alternative Rate Policy Statement, 74 FERC ¶ 61,076, *order granting clarification*, 74 FERC ¶ 61,194.

[140] *Natural Gas Pipeline Negotiated Rate Policies and Practices; Modification of Negotiated Rate Policy*, 104 FERC ¶ 61,134 (2003), *order on reh'g and clarification*, 114 FERC ¶ 61,042, *dismissing reh'g and denying clarification*, 114 FERC ¶ 61,304 (2006).

[141] Pipelines are required to file any service agreement containing non-conforming provisions and to disclose and identify any transportation term or agreement in a precedent agreement that survives the execution of the service agreement. *See* 18 C.F.R. § 154.112(b) (2019); *see also, e.g.*, *Texas Eastern Transmission, LP*, 149 FERC ¶ 61,198, at P 33 (2014).

C. Environmental Analysis

1. Pre-filing Review

69. On May 18, 2018, Commission staff granted Mountain Valley's request to use the pre-filing process in Docket No. PF18-4-000. As part of the pre-filing review, on August 9, 2018, the Commission issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned MVP Southgate Project, and Request for Comments on Environmental Issues, and Notice of Public Scoping Sessions* (NOI). The NOI was published in the *Federal Register* on August 15, 2018[142] and sent to more than 1,100 interested parties, including representatives of federal, state, and local agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners; concerned citizens; and local libraries and newspapers. The NOI announced the date, time, and location of three public scoping sessions, and established September 10, 2018, as the deadline for public comments on the project.

70. A total of 68 people provided oral comments at the public scoping sessions.[143] In addition, we received 69 written or electronically-filed comment letters and 65 form letters during the public scoping period.[144]

2. Application Review

71. On November 6, 2018, following the pre-filing process, Mountain Valley filed an application for authorization to construct and operate the Southgate Project.

72. To satisfy the requirements of the National Environmental Policy Act of 1969 (NEPA),[145] Commission staff evaluated the proposed project's potential environmental impacts in an EIS, with respect to which the Army Corps and the FWS's Virginia and North Carolina Field Offices participated as cooperating agencies.

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[142] 83 Fed. Reg. 40,509 (Aug. 15, 2018).

[143] Between August 20-23, 2018, Commission staff held public scoping sessions in Reidsville, North Carolina; Chatham, Virginia; and Haw River, North Carolina. Transcripts for the public comment sessions were placed in the public record for the proceeding.

[144] Table 1.3-1 of the final EIS provides a detailed and comprehensive list of issues raised during scoping.

[145] 42 U.S.C. §§ 4321 *et seq.* (2018). *See also* the Commission's NEPA-implementing regulations at Title 18 of the Code of Federal Regulations, Part 380.

73. On July 26, 2019, Commission staff issued a draft EIS addressing the issues raised during the scoping period and including staff's independent analysis of the project's environmental impacts. Notice of the draft EIS was published in the *Federal Register* on August 2, 2019, establishing a 45-day public comment period that ended on September 16, 2019.[146] Commission staff held three public comment sessions between August 19-22, 2019, to receive comments on the draft EIS.[147] Approximately 65 people provided oral and written comments at the public comment sessions. Transcripts of the public comment sessions were placed in the Commission's public record for this proceeding. In addition, we received 77 written or electronically-filed comments.[148]

74. In October 2019, after issuance of the draft EIS, Mountain Valley filed a number of minor route modifications to reduce environmental and cultural resources impacts, to accommodate landowner requests, or for constructability reasons. On November 15, 2019, Commission staff mailed letters to 24 landowners affected by the route modifications (including 14 newly affected landowners), requesting comments on the route modifications during a supplemental comment period that ended December 15, 2019. None of the landowners affected by these route modifications filed comments.

75. On February 14, 2020,[149] Commission staff issued the final EIS for the project, addressing all of the substantive environmental comments received on the draft EIS.[150] The final EIS addresses geology; soils; water resources; wetlands; vegetation; wildlife and fisheries; threatened, endangered, and other special status species; land use, recreation and visual resources; socioeconomics; cultural resources; air quality and noise; reliability and safety; cumulative impacts; and alternatives. In addition to the environmental comments, several commenters raised concerns about the scope of the analysis in the EIS and the NEPA process generally.

76. The final EIS concludes that if the Southgate Project is constructed and operated in accordance with applicable laws and regulations, the project will result in limited adverse environmental impacts; however, these impacts would be reduced to less-than-significant

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[146] 84 Fed. Reg. 37,859 (Sept. 16, 2019).

[147] Commission staff held public comment meetings on the draft EIS in Wentworth and Haw River, North Carolina and Chatham, Virginia.

[148] The Commission received additional comments on the draft EIS after the close of the comment period, which were addressed in the final EIS to the extent possible.

[149] Notice of the final EIS was issued in the *Federal Register* on February 26, 2020. 85 Fed. Reg. 11,064 (Feb. 26, 2020).

[150] Final EIS at Appendices I.1, I.2, and I.3.

levels with the implementation of Mountain Valley's proposed and Commission staff's recommended avoidance, minimization, and mitigation measures, which are included as conditions in the appendix to this order.

77. Between issuance of the final EIS and May 31, 2020, the Commission received comments on the final EIS from the applicant, the U.S. Environmental Protection Agency (EPA), Transco, the Monacan Indian Nation and the Sappony Tribe, Roger Sisson, Katie Whitehead, and the Blue Ridge Environmental Defense League. To the extent they raise substantive issues, these comments are discussed below.

3. Comments on the Scope of Analysis in the EIS

a. Completeness of Draft EIS and Requests for Revised or Supplemental Draft EIS

78. Some entities requested an extension of the draft EIS comment period.[151] The Commission's standard draft EIS comment period is 45 days, which is consistent with the Council for Environmental Quality's (CEQ) regulations implementing NEPA.[152] Moreover, in preparing the final EIS, Commission staff considered late-filed comments on the draft EIS to the extent practicable.[153] In addition, due to route modifications submitted by Mountain Valley in October 2019, Commission staff initiated a supplemental 30-day comment period to allow landowners affected by the route modifications (including 14 newly affected landowners) the opportunity to comment and to file motions to intervene in the proceeding. This supplemental comment period closed on December 15, 2019, nearly 90 days following Commission staff's issuance of the draft EIS. Any substantive comments filed during this time, regardless of whether the commenter was a newly affected landowner, were considered and addressed in the final EIS.

79. Some commenters allege that the draft EIS contained "substantial deficiencies"[154] that precluded meaningful public participation in the NEPA process, including a failure to evaluate the need for the Southgate Project, insufficient information about the project's

[151] *See, e.g.*, Defense League's September 16, 2019 Comments at 3; Katie Whitehead's August 8, 2019 Comments.

[152] 40 C.F.R. § 1506.10(c) (2019).

[153] *See supra* note 148.

[154] Sierra Club's January 28, 2020 Request for Revised or Supplemental Draft EIS (Sierra Club's January 28, 2020 Comments).

environmental impacts, and incomplete or draft plans regarding mitigation.[155] In addition, Sierra Club argues that Commission staff issued the draft EIS prematurely, pointing to environmental information requests issued by Commission staff following issuance of the draft EIS and additional information submitted by Mountain Valley providing information responsive to these information requests.[156] For these reasons, Sierra Club and others argue that a revised or supplemental draft EIS should have been issued for comment.[157]

80. We find that a revised or supplemental draft EIS was not warranted because the draft EIS was adequate and allowed for meaningful analysis. The draft EIS is a draft of the agency's proposed final EIS and, as such, its purpose is to elicit suggestions for change. A draft is adequate when it allows for "meaningful analysis" and "make[s] every effort to disclose and discuss" major points of view on the environmental impacts.[158] NEPA does not require a complete mitigation plan be actually formulated at the onset, but only that the proper procedures be followed for ensuring that the environmental consequences have been fairly evaluated.[159] In addition, NEPA does not require every study or aspect of an analysis to be completed before an agency can issue a final EIS, and

[155] *See, e.g.*, *id.* at 5.

[156] *See id.* at 6-7. In particular, Sierra Club takes issue with staff's November 15, 2019 additional information request that accompanied a revised notice of schedule for completion of the environmental review for the Southgate Project. This additional information request, and the revised schedule, were appropriate and timely responses to Mountain Valley's October 2019 submittal of minor route modifications. These minor route modifications, and any related environmental impacts, were fully disclosed and analyzed in the final EIS.

[157] *See, e.g.*, Sierra Club's January 28, 2020 Comments; SELC's September 16, 2019 Comments at 6, 13.

[158] 40 C.F.R. § 1502.9(a) (2019); *see also Nat'l Comm. for the New River, Inc. v. FERC*, 373 F.3d 1323, 1328 (D.C. Cir. 2004) (*Nat'l Comm. for the New River*) (holding that FERC's draft EIS was adequate even though it did not have a site-specific crossing plan for a major waterway where the proposed crossing method was identified and thus provided "a springboard for public comment") (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989) (*Methow Valley Citizens Council*)).

[159] *See Methow Valley Citizens Council*, 490 U.S. at 352-53.

the courts have held that agencies do not need perfect information before taking any action.[160]

81. The draft EIS identified baseline conditions for all relevant resources. To ensure that the final EIS included the most up to date information, the draft EIS recommended the filing of supplemental information prior to the end of the draft EIS comment period. However, as stated in section 5.2 of the draft EIS, Commission staff did not expect that the updated information and documents would materially change any of the conclusions in the draft EIS. Final mitigation plans will not present new environmentally significant information nor pose substantial changes to the proposed action that would otherwise require a supplemental EIS.

82. We also disagree that there was a need to issue a revised draft EIS. CEQ regulations require agencies to prepare a supplement to either a draft or final EIS if: (i) the agency makes substantial changes to the proposed action that are relevant to environmental concerns; or (ii) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact.[161] Here, the final EIS, which incorporates comments filed on the draft EIS, contains ample information for the Commission to fully consider and address the environmental impacts associated with the Southgate Project. As discussed further below, the final EIS recommends, and we require in this order, that Mountain Valley not

[160] *U.S. Dep't of the Interior v. FERC*, 952 F.2d 538, 546 (D.C. Cir. 1992); *Alaska v. Andrus*, 580 F.2d 465, 473 (D.C. Cir. 1978), *vacated in part sub nom. W. Oil & Gas Ass'n v. Alaska*, 439 U.S. 922 (1978) ("NEPA cannot be 'read as a requirement that [c]omplete information concerning the environmental impact of a project must be obtained before action may be taken.'") (quoting *Jicarilla Apache Tribe of Indians v. Morton*, 471 F.2d 1275, 1280 (9th Cir. 1973)).

[161] 40 C.F.R. § 1502.9(c).

commence construction of the Southgate Project until it provides specified information[162] and confirms it has received all applicable authorizations required under federal law.[163]

b. Project Purpose and Need, and Range of Alternatives

83. Several commenters contend that the EIS defined the purpose and need of the project too narrowly, which led to an insufficient analysis of the project alternatives.[164] An agency's environmental document must include a brief statement of the purpose and need to which the proposed action is responding.[165] An agency uses the purpose and need statement to define the objectives of a proposed action and then to identify and consider legitimate alternatives.[166] CEQ has explained that "[r]easonable alternatives include those

[162] *See, e.g.*, Environmental Conditions 13-16. Environmental Condition 14, for example, requires Mountain Valley to file with the Commission the locations of all private water wells and springs identified within 150 feet of the project work areas. This submittal must identify the status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts for each private water well or spring identified. Environmental Condition 16 requires Mountain Valley to file for Commission approval a final list of water sources to be used for project purposes (e.g., dust control, hydrostatic testing, and horizontal directional drill operations), which identifies intake location, waterbody name, withdrawal rate and method, and measures to minimize aquatic species entrainment.

[163] *See* Environmental Condition 10. Further, as stated above, we are directing the Office of Energy Projects to not issue any notice to proceed with construction of the Southgate Project until Mountain Valley receives the necessary federal permits for the Mainline System, and the Director of the Office of Energy Projects lifts the stop-work order and authorizes Mountain Valley to continue construction on the Mainline System. *See supra* P 9.

[164] *See, e.g.*, Sierra Club's January 28, 2020 Comments at 3-5; EPA's September 23, 2019 Comments at 3; North Carolina DEQ's September 16, 2019 Comments at 2-4; AMA's September 16, 2019 Comments at 1-7; Defense League's September 16, 2019 Comments at 5-8; SELC's September 16, 2019 Comments at 2-3.

[165] *See* 40 C.F.R. § 1508.9 (2019) (for an Environmental Assessment); 40 C.F.R. § 1502.13 (2019) (for an EIS).

[166] *See Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1175 (10th Cir. 1999).

that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant."[167]

84. Courts have upheld federal agencies' use of applicants' project purpose and need as the basis for evaluating alternatives.[168] When an agency is asked to consider a specific plan, the needs and goals of the parties involved in the application should be taken into account.[169] We recognize that a project's purpose and need should not be so narrowly defined as to preclude consideration of what may actually be reasonable alternatives.[170] Nonetheless, an agency need only consider alternatives that will bring about the ends of the proposed action, and the evaluation is "shaped by the application at issue and by the function that the agency plays in the decisional process."[171]

85. For the Southgate Project, the EIS appropriately relied on the applicant's stated purpose and need. We find that doing so did not predetermine from the outset the results of the alternatives analysis for the Southgate Project.[172] In fact, Commission staff identified numerous reasonable alternatives to the project, which were evaluated in the EIS.[173] Staff concluded that none of the alternatives analyzed would meet the project's purpose and need, be technically feasible, and offer a significant environmental advantage.[174]

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[167] *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, 46 Fed. Reg. 18,026-27 (Mar. 23, 1981).

[168] *E.g., City of Grapevine v. U.S. Dep't of Transp*., 17 F.3d 1502, 1506 (D.C. Cir. 1994).

[169] *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991).

[170] *Id.* at 196.

[171] *Id.* at 199; *see also Sierra Club v. U.S. Forest Serv.*, 897 F.3d 582 (finding the statement of purpose and need for a Commission-jurisdictional natural gas pipeline project that explained where the gas must come from, where it will go, and how much the project would deliver, allowed for a sufficiently wide range of alternatives but was narrow enough that there were not an infinite number of alternatives).

[172] *See* North Carolina DEQ's September 16, 2019 Comments at 4.

[173] *See* final EIS at 3-1 to 3-45.

[174] *See id.* at 3-45.

86. We also reject the Southern Environmental Law Center's (SELC) argument that because the EIS "only considered alternatives that transport natural gas, the [Commission] has not taken a hard look at the No Action Alternative—or the possibility that the project is not constructed, as required by NEPA."[175] Contrary to SELC's contention, the EIS states that under the no-action alternative the Southgate Project would not be constructed, and that the environmental impacts associated with the project would not occur.[176] Moreover, the resource-by-resource discussion in section 4 of the final EIS first details the existing state of each resource and then describes the environmental impacts of the preferred alternative.[177] Section 5 of the final EIS summarizes staff's conclusions about those impacts.[178] By providing a description of the existing state of each resource and a description of the environmental impacts of the preferred alternative, the EIS provides the Commission with a meaningful comparison of the harm to be avoided under a no-action alternative.

87. Some commenters state that the EIS failed to evaluate the public benefit or market need for the project. These commenters conflate the balancing of economic benefits (market need) and effects under the Certificate Policy Statement with the description of the purpose and need in the EIS.[179] The purpose and need statement in the final EIS complied with CEQ's regulations, which provide that this statement "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed actions" for purposes of its environmental analysis.[180] The public interest determination, including market need, for the pipeline lies with the Commission. Neither NEPA nor the NGA requires the Commission to make its determination of whether a project is required by the public convenience and necessity before its final order. The final EIS appropriately explained that the determination of

[175] *See* SELC's September 16, 2019 Comments at 2-3.

[176] Final EIS at 3-2.

[177] *Id*. at 4-1 to 4-264.

[178] *Id.* at 5-1 to 5-14.

[179] *See, e.g.*, Sierra Club's January 28, 2020 Comments at 3-5; North Carolina DEQ's September 16, 2019 Comments at 2; SELC'S September 16, 2019 Comments at 2-3.

[180] 40 C.F.R. § 1502.13 (2019).

whether the Southgate Project satisfied a showing of market need according to the Certificate Policy Statement was beyond the scope of the environmental document.[181]

c. Segmentation

88. Some commenters argue that the Commission impermissibly segmented its NEPA review of the Southgate Project by failing to consider Mountain Valley's Mainline System and Southgate Project in a single EIS.[182] Appalachian Mountain Advocates assert that the Southgate Project and the Mainline System are "connected actions," and argues that the Commission's failure to evaluate the two projects in a single EIS renders the Commission's significance findings incomplete.[183]

89. CEQ regulations require the Commission to include "connected actions," "cumulative actions," and "similar actions" in its NEPA analyses. An agency impermissibly 'segments' NEPA review when it divides connected, cumulative, or similar federal actions into separate projects and thereby fails to address the true scope and impact of the activities that should be under consideration.[184] "Connected actions" include actions that: (a) automatically trigger other actions, which may require an EIS; (b) cannot or will not proceed without previous or simultaneous actions; or (c) are interdependent parts of a larger action and depend on the larger action for their justification.[185]

90. Assertions that we segmented our environmental review by not re-examining the Mainline System's impacts alongside the Southgate Project's impacts in a single EIS are misplaced. The Commission's consideration of Mountain Valley's two projects did not overlap. The Commission completed a comprehensive analysis of the environmental impacts of Mountain Valley's Mainline System between 2016 and 2017, culminating in the issuance of a final EIS in June 2017 and certificate authorization in October 2017. Commission staff's review of the environmental impacts of the Southgate Project began during the pre-filing process in mid-2018, continuing with Mountain Valley's filing of an

[181] *See* final EIS at ES-2, 1-2, I.2-1 (Appendix I.2), and I.3-37 (Appendix I.3).

[182] *See, e.g.*, AMA's September 16, 2019 Comments at 8-10; Defense League's September 16, 2019 Comments at 3-5.

[183] AMA's September 16, 2019 Comments at 10.

[184] *Del. Riverkeeper Network v. FERC*, 753 F.3d 1304, 1313 (D.C. Cir. 2014).

[185] 40 C.F.R. § 1508.25(a)(1) (2019).

application for the Southgate Project in November 2018, and culminating in staff's issuance of the final EIS in February 2020.

91. The final EIS for the Mainline System fully analyzed the environmental impacts of Mountain Valley's mainline pipeline as originally proposed. Issued over two and a half years later, the final EIS for the Southgate Project fully analyzed the environmental impacts of Mountain Valley's proposed expansion of its mainline system. Moreover, the Southgate Project's EIS thoroughly examined whether the Southgate Project's impacts would result in a cumulative impact on the environment when combined with the impacts of other past, present, and reasonably foreseeable future projects, including Mountain Valley's Mainline System.[186]

92. CEQ defines cumulative impacts as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."[187] A cumulative environmental impact results from the effect of the current project along with any other actions "*in the same geographic area* as the project under review."[188]

93. The EIS disclosed impacts associated with the Southgate Project and identified the geographic scope of the cumulative impacts analysis based on the resources affected by project construction and operation. Specifically, Commission staff defined resource-specific geographic scopes for its cumulative impacts analysis to include projects or actions within 0.25 mile of construction activities for impacts to air quality and noise; within the same HUC-12 watershed area[189] for impacts to groundwater, wetlands, vegetation, and wildlife; and within the same HUC-10 watershed for impacts to surface water, fisheries and aquatic resources.[190] The EIS explained that only a small portion of the Mainline System's southern terminus falls within the Southgate Project's resource-specific geographic scopes.[191] Accordingly, the EIS evaluated the cumulative impacts of

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[186] *See* final EIS at 4-225 to 4-264.

[187] 40 C.F.R. § 1508.7 (2019).

[188] *Freeport LNG*, 827 F.3d at 47 (citations omitted); *see also* 40 C.F.R. § 1508.7.

[189] A HUC is the acronym for Hydrologic Unit Code, designated by the U.S. Geological survey, which identifies hydrological features, such as a drainage basin or watershed. HUC-10 refers to a watershed typically 40,000-250,000 acres in area, while HUC-12 refers to more local sub-watershed, typically ranging from 10,000 to 40,000 acres.

[190] Final EIS at 4-227 to 4-229 (Table 4.13-1).

[191] *Id*. at 4-236.

Mountain Valley's Southgate Project and Mainline System across all resource areas. The final EIS concluded that – when added to the impacts of other past, present, and reasonably foreseeable future actions, including Mountain Valley's Mainline System – the Southgate Project's impacts would not result in any significant cumulative impacts on environmental resources within the geographic scopes affected by the Southgate Project.[192]

94. For these reasons, the concerns central to a segmented NEPA review, namely the dividing of one project into several in order to reduce the true scope of a project's environmental impacts, are not present here. Thus, the Commission appropriately did not consider the impacts of the Mainline System and Southgate Project in a single NEPA document.

d. Greenhouse Gas Emissions and Climate Change Impacts

95. Appalachian Mountain Advocates and others argue that we did not take a hard look at the Southgate Project's greenhouse gas (GHG) emissions and climate impacts. In support of this claim, Appalachian Mountain Advocates points to the EIS's failure to provide estimates of the project's upstream[193] and downstream[194] GHG emissions. Appalachian Mountain Advocates argues that the EIS's failure to assess the project's indirect GHG emissions "is contrary to NEPA's goals of informed decisionmaking and informed public comment" and undermines the Commission's environmental analysis.[195] Last, Appalachian Mountain Advocates asserts that the EIS fails to assess the significance of the Southgate Project's GHG emissions on climate change, in violation of the NEPA requirements.[196]

96. NEPA requires agencies to consider indirect effects or impacts that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[197] With respect to causation, "NEPA requires 'a reasonably close causal relationship' between the environmental effect and the alleged cause"[198] in order "to

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[192] *Id*. at 5-13 to 5-14.

[193] AMA's September 16, 2019 Comments at 11-13.

[194] *Id*. at 13-15.

[195] *Id*. at 23.

[196] *Id.* at 15-24.

[197] 40 C.F.R. § 1508.8(b) (2019).

[198] *U.S. Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 767 (2004) (*Pub. Citizen*)

make an agency responsible for a particular effect under NEPA."[199] As the Supreme Court has explained, "a 'but for' causal relationship is insufficient [to establish cause for purposes of NEPA]."[200] Thus, "[s]ome effects that are 'caused by' a change in the physical environment in the sense of 'but for' causation," will not fall within NEPA if "the causal chain is too attenuated."[201] Further, the Court has stated that "where an agency has no ability to prevent a certain effect due to its limited statutory authority over the relevant actions, the agency cannot be considered a legally relevant 'cause' of the effect."[202] Regarding reasonable foreseeability, courts have found that an impact is reasonably foreseeable if it is "sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision."[203] Although courts have held that NEPA requires "reasonable forecasting,"[204] an agency "is not required to engage in speculative analysis"[205] or "to do the impractical, if not enough information is available to permit meaningful consideration."[206]

97. As we have previously concluded in other natural gas infrastructure proceedings and affirm with respect to the Southgate Project, the environmental effects resulting from natural gas production are generally neither caused by a proposed pipeline project nor are they reasonably foreseeable consequences of our approval of an infrastructure project, as

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(quoting *Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983) (*Metro. Edison Co.*)).

[199] *Pub. Citizen*, 541 U.S. at 767.

[200] *Id.*

[201] *Metro. Edison Co.*, 460 U.S. at 774.

[202] *Pub. Citizen*, 541 U.S. at 770. *See generally Transcontinental Gas Pipe Line Co., LLC*, 171 FERC ¶ 61,032 (2020) (*Transco*) (McNamee, Comm'r, concurrence).

[203] *EarthReports, Inc. v. FERC*, 828 F.3d 949, 955 (D.C. Cir. 2016) (citations omitted); *see also Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992).

[204] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (quoting *Selkirk Conservation Alliance v. Forsgren*, 336 F.3d 944, 962 (9th Cir. 2003)).

[205] *Id*. at 1078.

[206] *Id.* (quoting *Envtl. Prot. Info. Ctr. v. U.S. Forest Serv.*, 451 F.3d 1005, 1014 (9th Cir. 2006)).

contemplated by CEQ regulations, where the supply source is unknown.[207] Because the Southgate Project will receive natural gas from other interstate pipelines (Mountain Valley's Mainline System and East Tennessee's system), the specific source of natural gas to be transported via the project is currently unknown and will likely change throughout the project's operation. Moreover, there is no evidence in the record that would help the Commission determine the origin of the natural gas that will be transported on the Southgate Project, let alone predict the number and location of any additional wells that would be drilled as a result of any production demand associated with the project. Nor is there evidence that, absent approval of the Southgate Project, this gas would not be brought to the market by other means. Therefore, we conclude that the environmental impacts of upstream natural gas production are not an indirect effect of the project.[208] Last, where there is not even an identified general supply area for the gas that will be transported on the project, any analysis of production impacts would be so generalized it would be meaningless.[209]

98. As to downstream emissions from gas consumption, the U.S. Court of Appeals for the D.C. Circuit in *Sierra Club v. FERC* held that where it is known that the natural gas transported by a project will be used for a specific end-use combustion, the Commission should "estimate[] the amount of power-plant carbon emissions that the pipelines will

[207] *See, e.g., Central New York Oil and Gas Co., LLC*, 137 FERC ¶ 61,121, at PP 81-101 (2011), *order on reh'g*, 138 FERC ¶ 61,104, at PP 33-49 (2012), *petition for review dismissed sub nom. Coal. for Responsible Growth v. FERC*, 485 F. App'x. 472, 474-75 (2d Cir. 2012) (unpublished opinion); *see also Adelphia Gateway, LLC*, 169 FERC ¶ 61,220, at P 243 (2019), *order on reh'g*, 171 FERC ¶ 61,049, at P 89 (2020).

[208] *Birckhead v. FERC*, 925 F.3d 510, 518 (D.C. Cir. 2019) (holding the Commission did not violate NEPA in not considering upstream impacts where there was no evidence to predict the number and location of additional wells that would be drilled as a result of a project). *See generally Transco,* 171 FERC ¶ 61,032 (2020) (McNamee Comm'r concurrence) (elaborating on the purpose of the NGA and that one of its purposes is to facilitate the development of and access to natural gas; as well as an analysis of consideration of indirect effects under NEPA).

[209] *See Sierra Club v. U.S. Dep't of Energy*, 867 F.3d 189, 198-99 (D.C. Cir. 2017) (accepting Department of Energy's "reasoned explanation" as to why the indirect effects pertaining to induced natural gas production were not reasonably foreseeable where the Department noted the difficulty of predicting both the incremental quantity of natural gas that might be produced and where at the local level such production might occur, and that an economic model estimating localized impacts would be far too speculative to be useful).

make possible."[210] However, in *Birckhead v. FERC* (*Birckhead*), a case that did not involve a known specific end use, the D.C. Circuit stated that "emissions from downstream gas combustions are [not], as a categorical matter, always a reasonably foreseeable indirect effect of a pipeline project."[211] The court in *Birckhead* also noted that "NEPA . . . requires the Commission to at least attempt to obtain the information necessary to fulfill its statutory responsibilities," but, citing to *Delaware Riverkeeper Network*, the court acknowledged that NEPA does not "demand forecasting that is not meaningfully possible."[212]

99. In this case, because the end-use of the contracted for volumes is unknown, any potential GHG emissions associated with the ultimate combustion of the transported gas are not reasonably foreseeable, and therefore, not an indirect impact of the Southgate Project. The Commission requested information from Mountain Valley about the ultimate end use of the gas to be transported by the Southgate Project.[213] However, as discussed in the final EIS, most of the gas will serve North Carolina end-users, primarily by residential and small and medium-sized commercial customers, and that some volumes will go to North Carolina and Virginia, but that the end-use of the gas is unknown.[214] Beyond serving North Carolina end-users, we do not know how Dominion will be utilizing the gas, and there remains a range of possible uses for the gas to be delivered by the project. Accordingly, we find this generalized information insufficient to render the emissions associated with any consumption of the gas to be transported a reasonably foreseeable indirect effect of the project.

100. In any event, since the Southgate Project will receive gas from the Mainline System and East Tennessee's system, Mountain Valley contends it is not necessary to provide an estimate of the GHG emissions associated with the end use combustion of the gas to be transported on the project.[215] Mountain Valley points out that the Commission previously quantified the GHG emissions that could result from the end use consumption of the volumes transported on Mountain Valley's Mainline System, and previously

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[210] *Sabal Trail*, 867 F.3d at 1371.

[211] 925 F.3d at 519 (citing *Calvert Cliffs' Coordinating Comm., Inc. v. U.S. Atomic Energy Comm'n*, 449 F.2d 1109, 1122 (D.C. Cir. 1971)).

[212] *Id.* at 520 (quoting *Del. Riverkeeper Network*, 753 F.3d at 1310).

[213] *See* Commission staff's March 5, 2019 Data Request.

[214] Final EIS at 4-263; *see also* Mountain Valley's March 15, 2019 Data Request Response.

[215] Mountain Valley's March 31, 2020 Comments at 1-2.

evaluated the environmental impacts associated with the volumes transported on East Tennessee's system.[216] Thus, Mountain Valley asserts, quantifying the downstream GHG emissions associated with the Southgate Project would lead to "double counting" of emissions.[217] We note that the final EIS for the Mountain Valley Mainline System, which is expected to source approximately 80% of the gas transported on the Southgate Project facilities, conservatively estimated the GHG emissions associated with the full combustion of the volume of natural gas transported on its mainline system.[218] This underscores the point that, given the connected nature of the interstate pipeline system, the transportation capacity associated with a new pipeline does not necessarily represent, on a national level, incremental capacity. It further underscores our determination that providing upper bound estimates of downstream GHG emissions on individual pipelines may be misleading and does not provide meaningful information regarding a pipeline project's impact on GHG emissions and climate change.

101. Some commenters assert that the Commission's NEPA analysis is flawed because the EIS does not use the Social Cost of Carbon, or a similar tool, to evaluate climate change impacts.[219] Appalachian Mountain Advocates, the Institute for Policy Integrity at New York University School of Law, and others assert that the Commission erroneously claims there is no reliable method for evaluating climate impacts.[220] Commenters further argue that the Commission's failure to use the Social Cost of Carbon or a similar methodology renders NEPA's "hard look" requirement unmet.[221]

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[216] *Id.* at 2.

[217] *Id.*

[218] *Mountain Valley*, 161 FERC ¶ 61,043 at P 293. The Commission noted that this estimate represents an upper bound for the amount of end-use combustion that could result from the gas transported by these projects and we reiterate that providing upper bound estimates of downstream effects using worst-case scenarios of peak use does not meaningfully inform its decision. *See Columbia Gas Transmission*, 170 FERC ¶ 61,246, at P 47 (2020).

[219] *See, e.g.*, AMA's September 16, 2019 Comments at 11-24; Institute for Policy Integrity at New York University School of Law's September 16, 2019 Comments (Institute for Policy Integrity's September 16, 2019 Comments).

[220] AMA's September 16, 2019 Comments at 18-22; Institute for Policy Integrity's September 16, 2019 Comments at 1.

[221] *See, e.g.*, AMA's September 16, 2019 Comments at 11.

102. The Social Cost of Carbon has been described as an estimate of the monetized climate change damage associated with an incremental increase in carbon dioxide (CO_2) emissions in a given year.[222] The Commission has provided extensive discussion on why the Social Cost of Carbon is not appropriate in project-level NEPA review, and cannot meaningfully inform the Commission's decisions on natural gas infrastructure projects under the NGA.[223] We adopt that reasoning here. As the Commission has previously explained, the Social Cost of Carbon is not appropriate for use in any project-level NEPA review for the following reasons:

(1) the EPA states that "no consensus exists on the appropriate [discount] rate to use for analyses spanning multiple generations"[224] and consequently, significant variation in output can result;[225]

(2) the tool does not measure the actual incremental impacts of a project on the environment; and

[222] Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Support Document – Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866* at 3 (Aug. 2016), https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf

[223] *Mountain Valley*, 161 FERC ¶ 61,043 at P 296, *order on reh'g*, 163 FERC ¶ 61,197, at PP 275-297, *aff'd sub nom., Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199 at *2 ("[The Commission] gave several reasons why it believed petitioners' preferred metric, the Social Cost of Carbon tool, is not an appropriate measure of project-level climate change impacts and their significance under NEPA or the Natural Gas Act. That is all that is required for NEPA purposes.").

[224] *See* EPA, Fact Sheet: *Social Cost of Carbon* (November 2013), https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html.

[225] Depending on the selected discount rate, the tool can project widely different present-day cost to avoid future climate change impacts. *See generally Transco,* 171 FERC ¶ 61,032 (2020) (McNamee, Comm'r, concurring at n.142) ("The Social Cost of Carbon produces wide-ranging dollar values based upon a chose discount rate, and the assumptions made. The Interagency Working Group on Social Cost of Greenhouse Gases estimated in 2016 that the Social Cost of one ton of carbon dioxide for the year 2020 ranged from $12 to $123.").

(3) there are no established criteria identifying the monetized values that are to be considered significant for NEPA reviews.[226]

Moreover, the Commission has explained it does not use monetized cost-benefit analyses as part of its NEPA review.[227] In any event, there is no universally accepted methodology for evaluating the Southgate Project's impacts on climate change. As the Commission has previously concluded, it cannot determine a project's incremental physical impacts on the environment caused by GHG emissions.[228] We have also previously concluded the Commission cannot determine whether an individual project's contribution to climate change would be significant.[229] That situation has not changed.

4. Comments Received After Issuance of Final EIS

103. As noted above, between issuance of the final EIS and May 31, 2020, the Commission received substantive comments on the final EIS from the applicant, the EPA, Transco, the Monacan Indian Nation and the Sappony Tribe, Roger Sisson, Katie Whitehead, and the Blue Ridge Environmental Defense League.[230] We address the issues raised in these comments below.

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[226] *See generally Transco*, 171 FERC ¶ 61,032 (2020) (McNamee, Comm'r, concurring at P 66) ("When the Social Cost of Carbon estimates that one metric ton of CO_2 costs $12 (the 2020 cost for a discount rate of five percent), agency decision-makers and the public have no objective basis or benchmark to determine whether the cost is significant. Bare numbers standing alone simply *cannot* ascribe significance.") (emphasis in original) (footnote omitted).

[227] *See Florida Southeast Connection, LLC*, 162 FERC ¶ 61,233, at PP 39-44 (2018).

[228] *Dominion Transmission, Inc.,* 163 FERC ¶ 61,128, at PP 67-70 (2018) (LaFleur, Comm'r, *dissenting in part*; Glick, Comm'r, *dissenting in part*); *see generally Transco* 171 FERC ¶ 61,032 (2020) (McNamee, Comm'r, concurring at PP 63-74) (explaining that the Commission has no standard for determining whether GHG emissions significantly affect the environment, elaborating on why the Social Cost of Carbon is not a useful tool for determining whether GHG emissions are significant, and explaining that the Commission has no authority or reasoned basis to establish its own framework).

[229] *Id*.

[230] We received a few comments raising general concerns about the Novel Coronavirus Disease (COVID-19) pandemic. Because the comments do not raise project-specific concerns we do not address them herein. However, the Commission

a. Applicant's Final EIS Clarifications and Supplemental Filing

104. In its comments on the final EIS, Mountain Valley provided some minor clarifications responding to information contained in the final EIS. Mountain Valley's clarifications addressed its proposed construction schedule and work hours, and its proposed construction corridor for certain wetland crossings.[231]

105. Mountain Valley states that in section 2.5 of the final EIS, *Construction Schedule and Workforce*, the construction schedule description should be clarified to note that Mountain Valley anticipates conducting construction work seven days per week.[232] Mountain Valley's application and residential construction plans both contemplated construction occurring six days per week. This was the schedule reviewed and recommended in the final EIS and this is the schedule approved herein. Although we have, on a case-by-case basis, approved construction schedules where an applicant has demonstrated a need to perform limited construction activities seven days per week,[233] Mountain Valley has not provided a sufficient demonstration here. Therefore, we are not revising the authorized construction schedule.

106. Referencing section 2.4 of the final EIS, *Construction Procedure*s, Mountain Valley clarifies that its *Wetland and Waterbody Construction and Mitigation Procedures*[234] requested a greater than 75-foot-wide construction corridor at five wetland locations, rather than four.[235] Although the final EIS stated that "[t]here are four locations where Mountain Valley is requesting a greater than 75-foot-wide construction corridor in wetlands," the final EIS analyzed all five individual wetlands where Mountain

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continues to closely monitor the situation and is committed to ensuring the health and safety of the public and the continued reliability of the nation's energy sector.

[231] Mountain Valley's March 31, 2020 Comments at 2-3.

[232] *See* final EIS at 2-29.

[233] *See, e.g.*, *Algonquin Gas Transmission, LLC*, 158 FERC ¶ 61,061, at P 217 (2017) (explaining, in the context of the noise analysis for horizontal directional drill (HDD) construction, that "[w]hile we encourage applicants make reasonable efforts to comply with state and local noise regulations, to the extent practicable, HDD construction is primarily a 24-hour per day activity.").

[234] Mountain Valley's October 23, 2019 Supplemental Filing.

[235] Final EIS at 2-13 (stating that Mountain Valley requested a greater than 75-foot-wide construction corridor at four wetland locations).

Valley requested a greater than 75-foot-wide construction corridor.[236] The final EIS evaluated four locations, one of which included two individual wetland crossings that were considered to be at the same general location due to their proximity, site conditions, and justification provided by Mountain Valley. Accordingly, we grant the requested clarification. Neither of the foregoing clarifications changes the conclusions in the final EIS.

107. On April 21, 2020, Mountain Valley filed changes to the Southgate Project, including slight realignments of the pipeline route at waterbody crossings and minor changes in workspace locations.[237] Because this route modification request was received at such a late stage in the proceeding and because it is not clear that Mountain Valley has obtained landowner approval for the modifications requested, we are not approving the April 21 realignments as part of the pipeline route certificated herein. Should Mountain Valley choose to resubmit these route realignments as part of its Implementation Plan required by Environmental Condition 6 or as part of a variance request in accordance with Environmental Condition 5, which requires landowner approval, Commission staff will review the requested modifications at that time.

b. Agency and Tribal Consultation

108. EPA recommends incorporating in the record of decision the results of the Commission's consultation or coordination efforts related to aquatic resources, endangered species, historic preservation, and tribes.[238] EPA also states that every effort should be made to minimize impacts on tribal interests within the vicinity of the proposed project. On April 27, 2020, Cultural Heritage Partners filed comments on behalf of the Monacan Indian Nation and the Sappony Tribe concerning the Commission's consultation with the tribes. These comments are addressed below.

109. The final EIS, prepared in coordination with cooperating agencies Army Corps and FWS, contains a comprehensive evaluation of the various resource areas identified by EPA and discusses the Commission's consultation efforts through publication of the

[236] *Id*. at 4-57.

[237] Mountain Valley's April 21, 2010 Supplemental Filing.

[238] EPA's March 23, 2020 Comments at 1.

final EIS.[239] Below, we summarize the results of our efforts to consult under the ESA, under the National Historic Preservation Act, and with tribes.

i. Endangered Species Act

110. With respect to consultation under the ESA, the final EIS identifies six species that are federally listed as threatened or endangered (or are identified as proposed for federal listing) and may occur in or near the project area.[240] No critical habitat has been designated in the project area for any of these species.[241] Commission staff determined that the project is *not likely to adversely affect* any proposed or listed species.[242] The final EIS also identifies two federally designated species of concern[243] that could occur in the project area and concludes that the project would not likely impact these species.[244] On March 19, 2020, the FWS's Raleigh Ecological Services Field Office filed a letter concurring with the final EIS's determinations of effect on five of the six federally listed or proposed species that potentially occur in the project area.[245] The final EIS considers the sixth species, the northern long-eared bat, and concludes that there are no known hibernacula or maternity roosts in the survey area and, with the application of FWS's final 4(d) rule,[246] the project *may affect but is not likely to adversely affect* the northern long-eared bat.

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[239] *See* final EIS at sections 4.3 (water resources); 4.7.1 – 4.7.6 (federally listed threatened, endangered, and other species of concern); 4.9.8 (environmental justice); and 4.10.1 (cultural resources and tribal consultations).

[240] *Id*. at 4-97 (Table 4.7-1).

[241] *Id*. at 4-96.

[242] *Id*. at 4-96.

[243] "Species of concern" is an informal term used by FWS to refer to species that have been identified as important to monitor, but do not have endangered, threatened or candidate status and thus receive no legal protection.

[244] *Id*. at 4-97 (Table 4.7-1).

[245] FWS's March 19, 2020 Letter.

[246] In January 2016, the FWS finalized a rule under authority of section 4(d) of the ESA that provides measures that are necessary and advisable to provide for the conservation of the northern long-eared bat. *See* final EIS at 4-98.

111. ESA consultation with the FWS is not yet complete. FWS has not yet responded to staff's request for concurrence with staff's ESA determination that the project is not likely to adversely affect the northern long-eared bat. Further, because access was denied on some properties, a limited number of areas may require surveys following issuance of the certificate. Last, Mountain Valley has indicated that water required for construction and hydrostatic test would be primarily obtained from the Dan River (which contains federally listed species).[247] Environmental Condition 16 requires Mountain Valley to provide written concurrence from the FWS for any water withdrawals from the Dan River. As required by Environmental Condition 19, Mountain Valley may not commence construction activities until it files with the Secretary the results of all outstanding biological surveys, the staff completes ESA consultation with the FWS, and Mountain Valley has received written notification from the Director of OEP, or the Director's designee, that construction or mitigation activity may begin.

ii. National Historic Preservation Act and Tribal Consultation

112. The Commission's consultation efforts in compliance with section 106 of the National Historic Preservation Act (NHPA)[248] and its implementing regulations[249] are documented in the final EIS. As described in section 4.10.3 of the final EIS, Commission staff consulted with the State Historic Preservation Officers (SHPO) of Virginia and North Carolina, interested Indian tribes, and other consulting parties prior to making determinations regarding National Register of Historic Places (NRHP) eligibility and project effects.[250] The final EIS recommends, and we require in Environmental Condition 20, that Mountain Valley not begin construction of facilities or use of any staging, storage, temporary work areas, or new or to-be-improved access roads until: (1) Mountain Valley files with the Commission all remaining cultural resources survey reports, site evaluations, and avoidance or treatment plans for NRHP-listed or eligible sites, as necessary, and comments on those reports and plans from the SHPOs, interested

[247] FWS's March 19, 2020 Letter indicates that additional ESA surveys and consultation may be needed as the result of certain project modifications, such as "changing from municipal water supplies to surface water intakes." FWS's March 19, 2020 Letter at 1. The final EIS explains that Mountain Valley has not yet finalized its water sources to be used for project purposes (e.g., dust control, hydrostatic testing, and horizontal directional drilling) nor has Mountain Valley obtained permission from the FWS for any water withdrawals from the Dan River. *See* final EIS at 4-48.

[248] 54 U.S.C. § 306108 (2018).

[249] 36 C.F.R. pt. 800 (2019).

[250] *See* final EIS at 4-154 to 4-173.

Indian tribes, and other consulting parties; and (2) Commission staff reviews and approves all cultural resources reports, studies, and plans, and notifies Mountain Valley in writing that treatment plans and mitigation measures may be implemented and/or construction may proceed.

113. The final EIS concludes that although construction and operation of the Southgate Project would have adverse effects on historic properties, an agreement document would be developed with the goal of resolving those impacts.[251] On November 14, 2019, Commission staff notified the Advisory Council on Historic Preservation (Advisory Council) that the Southgate Project may have adverse effects on historic properties, and invited the Advisory Council to participate in the resolution of adverse effects through the development of an agreement document. By letter filed December 11, 2019, the Advisory Council declined to participate in the consultation to resolve adverse effects.[252] Commission staff then prepared a draft programmatic agreement that was sent to the SHPOs and other consulting parties on January 8, 2020. After addressing the Virginia and North Carolina SHPOs' comments on the draft agreement, Commission staff sent a final programmatic agreement to the SHPOs and other consulting parties on March 10, 2020. The North Carolina SHPO signed the agreement on March 24, 2020.

114. By letter dated April 1, 2020,[253] the Virginia SHPO requested that the Commission consider comments on the final agreement that the Virginia SHPO stated it received on March 25, 2020, from Cultural Heritage Partners on behalf of the Monacan Indian Nation and the Sappony Tribe.[254] Commission staff responded to these comments in an April 10, 2020 letter to the Virginia SHPO and requested the SHPO's signature on the final agreement. The Virginia SHPO signed the agreement on May 17, 2020. Execution of the programmatic agreement by the Commission, the North Carolina SHPO, and the Virginia SHPO[255] concludes the NHPA section 106 process. The programmatic agreement provides a mechanism for the review of future cultural resources investigations to cover the entire area of potential effect for the undertaking, avoidance or treatment for historic properties, and future consultations among the

[251] *Id*. at 5-11.

[252] Advisory Council's December 11, 2019 Response to Notice of Adverse Effect.

[253] The Virginia SHPO's letter was filed in the public docket on April 9, 2020.

[254] Neither tribe submitted substantive comments on the text of the draft agreement document directly to the Commission.

[255] The executed programmatic agreement was placed into the public record for this proceeding on May 19, 2020.

consulting parties. Environmental Condition 20 requires Mountain Valley to implement the stipulations of the programmatic agreement.

115. On April 24, 2020, Cultural Heritage Partners filed comments on behalf of the Monacan Indian Nation and the Sappony Tribe (collectively, Tribes).[256] The Tribes argue that the Commission process for developing the programmatic agreement "failed to comply with the letter and spirit of Section 106 of the [NHPA] . . . ."[257] The Tribes believe that since they have obligations under the programmatic agreement, they should be recognized as invited signatories to the agreement.

116. Pursuant to the section 106 implementing regulations, the agency must consult with the SHPO and other consulting parties (including interested Indian tribes) to seek ways to avoid, minimize, or mitigate the undertaking's adverse effects.[258] If they agree on how to resolve the adverse effects, the agency and the SHPO must execute an agreement document.[259] By developing and executing an agreement document with the North Carolina and Virginia SHPOs, in order to resolve adverse effects on historic properties affected by the Southgate Project, the Commission has complied with both the letter and spirit of section 106 of the NHPA.

117. The required signatories to a section 106 agreement document include the agency official, the appropriate SHPO, and, if participating in the consultation, the Advisory Council.[260] Generally, if the project were to occur on or affect historic properties on tribal lands, the tribe would also be a signatory to the agreement.[261] That is not the case here. Section 800.6(c)(2) of the section 106 implementing regulations allows, but does not require, the Commission to invite additional consulting parties to be signatories to a

[256] Cultural Heritage Partners also filed comments on the Tribes' behalf commenting on the Commission's development of the programmatic agreement on January 16, and February 7, 2020.

[257] Monacan Indian Nation's and Sappony Tribe's April 27, 2020 Letters at 1.

[258] 36 C.F.R. § 800.6(b)(1)(i) (2019).

[259] *Id.* § 800.6(b)(1)(iv).

[260] *Id.* § 800.6(c)(1). As noted above, the Advisory Council declined to participate in the consultation for the Southgate Project by letter filed December 11, 2019.

[261] *See* 36 C.F.R. §§ 800.6(c)(1) and 800.2(c)(2)(i) (2019).

section 106 agreement document (i.e., "invited signatories").[262] Citing Advisory Council guidance, the Tribes argue that they should be invited signatories because they have obligations under the programmatic agreement.[263] However, the Advisory Council's guidance further underscores that it is within the Commission's discretion to determine whether to invite additional parties to sign an agreement document, explaining that "[f]ederal agencies . . . should weigh the decision carefully, since an invited signatory who actually signs an agreement has the same ability to amend or terminate the agreement as other signatories."[264] Accordingly, the Commission acted within its discretion, and in accord with the NHPA and its implementing regulations, by limiting the signatories to the programmatic agreement to those required under section 800.6(c)(1).[265] Nevertheless, because the Monacan Indian Nation and the Sappony Tribe are considered to be consulting parties, the Commission invited the tribes to sign the agreement as concurring parties. To date, neither tribe has done so.

118. The Tribes also take issue with Commission staff's development of the programmatic agreement, stating that the programmatic agreement was presented as a "done deal" and "appears to be nothing more than a standard FERC template."[266]

119. As described above, a draft programmatic agreement was circulated among consulting parties on January 8, 2020. The purpose of distributing the draft agreement was to elicit substantive comments and edits from the consulting parties. Commission staff made substantial changes to the final programmatic agreement based on comments received from the Virginia and North Carolina SHPOs. Moreover, the use of a common

[262] *Id.* § 800.6(c)(2)(i) ("The agency official *may* invite additional parties to be signatories to a memorandum of agreement.") (emphasis added).

[263] Cultural Heritage Partner's April 27, 2020 Comment at 1 (citing Advisory Council, *Guidance on Agreement Documents: Executing Agreement Documents*, https://www.achp.gov/executing_agreement_documents).

[264] Advisory Council, *Guidance on Agreement Documents: Executing Agreement Documents*, https://www.achp.gov/executing_agreement_documents.

[265] 36 C.F.R. § 800.6(c)(1).

[266] Monacan Indian Nation's and Sappony Tribe's April 27, 2020 Letters at 1.

template for the same type of program or undertaking, such as for natural gas projects, is contemplated by the section 106 implementing regulations.[267]

120. The Tribes assert that the Commission has not engaged in meaningful government to government consultation.[268] They also take issue with certain aspects of Mountain Valley's *Plan for Unanticipated Discoveries of Historic Properties and Human Remains* (Unanticipated Discovery Plan).[269]

121. Commission staff initiated consultation on August 8, 2018, by mailing the NOI for the Southgate Project to a wide variety of stakeholders, including the Virginia and North Carolina SHPOs and potentially interested Indian tribes. On October 16, 2018, staff supplemented the information contained in the NOI by sending individual letters to 25 federally recognized tribes, including the Monacan Indian Nation.[270] In response, staff received comments from five tribes. Commission staff held meetings, in person or via teleconference, with three federally recognized Indian tribes, including a January 17, 2019 meeting with representatives of the Monacan Indian Nation in Richmond, Virginia. On February 21, 2019, Mountain Valley provided the Monacan Indian Nation and the Sappony Tribe copies of the cultural resources investigations reports prepared for the project.[271] Both Tribes commented on the cultural resources reports in July 2019.[272] Both Tribes also commented on the draft EIS. Staff addressed the Tribes' comments in the final EIS.[273]

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[267] *See* 36 C.F.R. § 800.14(b)(4) (2019) (describing the use of a "prototype programmatic agreement" for the "same type of program or undertaking in more than one case or area").

[268] Monacan Indian Nation's and Sappony Tribe's April 27, 2020 Letters at 2.

[269] *Id.*

[270] The Sappony Tribe is a North Carolina state-recognized tribe.

[271] *Id*. at 4-159; *see also* Mountain Valley's March 5, 2019 Information Request Response at 127.

[272] *See* Monacan Indian Nation's July 1, 2019 Comments on Cultural Resources Reports (filed as privileged); Sappony Tribe's July 1, 2019 Comments on Cultural Resources Reports (filed as privileged).

[273] *See* final EIS, Appendix I.3 at I.3-62 to I.3-67 (addressing Sappony Tribe's September 16, 2019 Comments on the draft EIS); I.3-68 to I.3-74 (addressing Monacan Indian Nation's September 16, 2019 Comments on the draft EIS); I.3-75 to I.3-77

122. Section 800.2(a)(4) of the regulations implementing section 106 of the NHPA states that "[t]he [Advisory] Council encourages the agency official to use to the extent possible existing agency procedures and mechanisms to fulfill the consultation requirements of this part."[274] By using our existing procedures, including notices, letters to and from tribes, and meetings between staff and tribal representatives, Commission staff has conducted consultation with Indian tribes. Section 4.10.1.2 of the final EIS provides a detailed account of the Commission's efforts to consult on a government-to-government basis with Indian tribes that may attach religious or cultural significance to sites in the region or may be interested in potential impacts from the Southgate Project on cultural resources.[275]

123. Mountain Valley developed its Unanticipated Discovery Plan[276] in consultation with the Virginia and North Carolina SHPOs. The plan notes that Mountain Valley "is contacting federally-recognized Native American Tribes to solicit their concerns and input regarding potential Project effects to historic properties, tribal resources, and human remains."[277] In addition, the plan sets forth the procedures to which Mountain Valley would adhere if archaeological resources or human remains are discovered during project construction. The plan includes two distinct protocols, the use of which is dependent upon whether or not the discovered cultural resources may involve human remains or funerary objects.[278] Both protocols require Mountain Valley to notify and consult with "Interested Tribes," which Mountain Valley has defined as "tribes that have asked to be

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(addressing Monacan Indian Nation's November 11, 2019 Comments); and I.3-78 to I.3-80 (addressing Sappony Tribe's December 12, 2019 Comments).

[274] 36 C.F.R. § 800.2(a)(4) (2019).

[275] *See also* final EIS, Appendix E-3 (Table 4.10-2).

[276] Mountain Valley's original Unanticipated Discovery Plan was filed as part of its November 8, 2018 Application. *See* Application, Resource Report 4, Appendix 4-C. The Unanticipated Discovery Plan was revised in May 2019. *See* Mountain Valley's May 22, 2019 Supplemental Filing, attachment 5. In its comments on the final EIS, Mountain Valley clarified that the Unanticipated Discovery Plan has not been revised since the May 2019 version filed with the Commission. Mountain Valley's March 31, 2020 Comments at 3.

[277] Unanticipated Discovery Plan, section 3.0.

[278] *Compare* Mountain Valley's Unanticipated Discovery Plan, section 4.2 (Notification and Assessment Procedures – Not Involving Human Remains or Funerary Objects) *and* section 4.3 (Notification and Treatment Procedures – Human Remains or Funerary Objects).

consulted in the event of a discovery"[279] and "tribes that have requested consultation during the FERC review process."[280] Mountain Valley filed a revised Unanticipated Discovery Plan on May 22, 2019, which was subsequently approved by the North Carolina SHPO on August 19, 2019, and the Virginia SHPO on October 18, 2019.[281] We are satisfied that Mountain Valley has developed appropriate protocols for addressing unanticipated discoveries during project construction, and that Mountain Valley will seek input from the Tribes regarding any discoveries, as appropriate.[282] In the event of the unanticipated discovery of human remains, funerary object, sacred objects, or objects of cultural patrimony, Mountain Valley would follow the protocols set forth in the Unanticipated Discovery Plan and the executed programmatic agreement,[283] and has committed to treating any such discovery in a manner guided by the Advisory Council's *Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects* (2007) and any relevant state laws and guidelines.[284]

124. As detailed above, the Commission engaged in meaningful consultation pursuant to our obligations under NHPA section 106 and pursuant to our government-to-government

[279] Unanticipated Discovery Plan, section 3.0.

[280] Mountain Valley's October 18, 2019 Response to Environmental Information Request at 29.

[281] We note that, by letter filed May 19, 2020, the Virginia SHPO requested that Mountain Valley re-open consultation on the Unanticipated Discovery Plan to explore ways in which the Tribes may be more involved in determinations of significance of any discoveries.

[282] If the discovery is determined to be a newly identified and potentially significant archaeological site (i.e., exhibiting archaeological features, intact contacts, or patterned artifact distributions that could provide substantive information concerning prehistory or history), or if it represents information that would alter the understanding of a previously known and cleared archaeological resource, Mountain Valley must notify the Commission, the relevant SHPO, and Interested Tribes within 24 hours of the determination. *See* Unanticipated Discovery Plan, section 4.2.

[283] The programmatic agreement includes Stipulation VI.B, which states in part: "Human remains, funerary objects, sacred objects, and objects of cultural patrimony shall be treated in accordance with the [Unanticipated Discover Plan]; and repatriated to appropriate consulting Indian tribes or reburied after analysis, as determined by consultations among the signatories to this [programmatic agreement]."

[284] *See* Mountain Valley's October 18, 2019 Response to Environmental Information Request at 29.

responsibility to Indian tribes. Execution of the programmatic agreement, and implementation thereof, evidences the Commission's compliance with the section 106 review process.

c. Environmental Justice

125. EPA states that every effort should be made to minimize impacts to environmental justice communities within the vicinity of the project facilities.[285] The final EIS identified potential environmental justice communities (i.e., minority or low-income populations) in the project area consistent with EPA guidance.[286] The project pipeline would cross 35 census block groups, 15 of which contain environmental justice populations.[287] Two environmental justice populations are located within one mile of the proposed Lambert Compressor Station.[288] The EPA does not identify specific impacts to environmental justice communities that the Commission should minimize; however, the final EIS discusses factors that could affect such communities and determined that potentially adverse environmental effects would be minimized and/or mitigated.[289] Based on an evaluation of the project's potential environmental impacts on the identified environmental justice communities and finding that those impacts would be minimized or mitigated, the final EIS concludes that the project would not have a disproportionately high and adverse environmental or human health impact on minority or low-income populations.[290]

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[285] EPA's March 23, 2020 Comments at 1.

[286] *See* final EIS at 4-144 to 4-149 (Table 4.9-7). Potential environmental justice communities include: (1) census block groups that have a minority population of more than 50% or a population that is 10 percentage points higher than their respective county; and (2) census block groups that have a household poverty rate of more than 20% or a household poverty rate that is 10 percentage points higher than their respective county. *Id.* at 4-142.

[287] *Id*. at 4-142.

[288] *Id*.

[289] *Id.* Factors that could affect environmental justice communities include air and noise impacts from construction and operation (section 4.11), visual impacts (section 4.8), and socioeconomic impacts such as traffic, loss of tourism, and crop loss (section 4.9).

[290] *See id*. at 4-153 and 5-11.

d. Hydrostatic Testing

126. EPA reiterates an earlier request for a hydrostatic testing report and recommends that Mountain Valley consider recycling the water used for hydrostatic testing.[291] The final EIS provides a description of Mountain Valley's proposed hydrostatic testing plans, including source and volume of water and discharge procedures.[292] The final EIS also notes that Mountain Valley would test the pipeline in segments, and that the water may be moved through each sequential segment along the route, or the water would be discharged.[293] If the hydrostatic test water is discharged, it would be discharged through sediment filters in vegetated uplands away from waterbodies and wetlands.[294] Prior to construction, Mountain Valley must apply for any applicable permits to discharge hydrostatic test water.

e. Collocation with Transco Pipeline

127. The Southgate Project's proposed pipeline route is adjacent to, or collocated with, Transco's existing system of three and four parallel, natural gas pipelines for approximately 33 miles. Transco and a landowner, Katie Whitehead, filed comments on the final EIS regarding the Southgate Project's proposed collocation.

i. Transco Comments

128. On March 27, 2020, Transco filed comments on the final EIS identifying several issues with collocating portions of the proposed Southgate Project with Transco's pipeline system.[295] Specifically, Transco is concerned with possible interference with Transco's cathodic protection system, the use of Transco's right-of-way for Southgate Project construction purposes (e.g., spoil storage, grading, heavy equipment, timber

[291] EPA's March 23, 2020 Comments at 1.

[292] Final EIS at 4-46 and 4-47.

[293] *Id*. at 2-20.

[294] *Id*.

[295] On January 31, 2020, Transco raised, for the first time, concerns that construction and operation of the Southgate Project would encroach on Transco's existing right-of-way and could potentially adversely affect the safety, integrity, operations, and expandability of Transco's pipeline system. Transco's January 31, 2020 Motion to Intervene Out of Time. The filing noted that Transco and Mountain Valley had executed an agreement on July 1, 2019, that set forth terms for Mountain Valley to cross Transco's right-of-way. *Id.* at 5.

storage, burning of brush, blasting impacts), and Transco's ability to access its right-of-way throughout the Southgate Project construction and restoration phase while erosion and sediment control devices remain on site.

129. On April 6, 2020, in response to staff's data request seeking detailed locations of the Transco pipeline systems, Mountain Valley filed revised alignment sheets showing that, for the majority of the proposed Southgate Project pipeline route, Mountain Valley proposes to place the Southgate Project pipeline at least 50 feet away from Transco facilities, with the exception of seven locations where the Southgate Project pipeline route would cross the Transco right-of-way and one location where the pipe would be horizontally directionally drilled under the Dan River. Mountain Valley states that it continues to coordinate with Transco at these locations. On May 8, 2020, Mountain Valley filed a response to Transco's March 27, 2020 comments.

130. We encourage collocated pipelines to minimize the space between existing and new pipelines in order to reduce the impact on natural resources and to minimize the amount of land that would need to be acquired from landowners. We note that collocated pipelines often use workspace associated with existing pipelines' permanent rights-of-way. Here, Mountain Valley has proposed placing its new pipeline at least 50 feet away from Transco facilities, with a few exceptions. Regarding Transco's safety concerns about the appropriate distances between pipelines, we note that maintaining a 50-foot separation between pipelines is not uncommon and that there are numerous examples of pipelines located less than 50 feet apart, including along Transco's own pipeline system.[296] Mountain Valley has also confirmed that the Southgate Project's proposed construction workspaces do not overlap a Transco pipeline in any location other than where the Southgate Project route would cross Transco's right-of-way. We note that the Interstate Natural Gas Association of America (INGAA) has adopted standard guidance

[296] Mountain Valley points out that Transco has collocated its own pipelines in the same right-of-way, with as little as a 25-foot separation. *See* Mountain Valley's May 8, 2020 Comments (quoting a February 4, 2019 comment filed by Transco in Docket No. CP18-186-000 for Transco's Southeastern Trail Expansion Project, in which Transco stated that "[c]urrent industry best practice is to maintain 25 feet of separation between large diameter, high-pressure natural gas transmission pipeline. This is designed to give the operating company clear access to safely excavate the pipeline for future maintenance activities (if necessary). The proposed 25-foot separation also allows construction to take place without regularly operating heavy equipment over the existing, in-service pipelines.").

calling for a 50-foot separation between pipelines.[297] The Southgate Project alignment along Transco's pipeline system is consistent with this guidance.

131. Regarding Transco's concerns about possible interference with its cathodic protection system, Mountain Valley must design, construct, operate, and maintain the Southgate Project pipeline in accordance with the U.S. Department of Transportation's (DOT) minimum federal safety standards.[298] In compliance with 49 CFR Part 192, subpart I, gas pipelines must be properly coated and have cathodic protection to prevent corrosion. The performance of cathodic protection systems must be monitored regularly with tests performed at least once per year. Records must be maintained for the life of the pipeline. Pipelines that are found to have deficient cathodic protection must be remediated in a timely manner (usually within 12 to 18 months after discovery).

132. We expect Mountain Valley's adherence to these requirements (as well as Transco's) will ensure that the location of Mountain Valley's new pipeline in proximity to Transco's existing pipelines will not result in detrimental impacts to any of the pipelines' cathodic protection systems. If any such impact occurred, the monitoring required by 49 CFR Part 192 would identify it and require remediation. Mountain Valley states that it continues to coordinate with Transco to ensure that the potential for interference and stray current between their cathodic protection systems is eliminated, and that it agrees with Transco that it would be advantageous to develop a plan to mitigate any potential risks to Transco's existing cathodic protection system.[299]

133. Mountain Valley has committed to working with Transco during construction and operation of the Southgate Project to coordinate access to the right-of-way in the event that unplanned issues arise. In response to Transco's concern that Mountain Valley's installation of erosion and sediment control devices would "unduly inhibit Transco's ability to access its right-of-way for operational and safety purposes,"[300] Mountain Valley responds that any controls within Transco's right-of-way can be temporarily removed to allow access.[301] We expect Mountain Valley to continue to coordinate with Transco to

[297] *See, e.g.,* INGAA Foundation, *Building Interstate Natural Gas Transmission Pipelines: A Primer* 87 (Jan. 2013), https://www.ingaa.org/constructionprimer.aspx.

[298] 49 C.F.R. pt. 192 (2019).

[299] *See* Mountain Valley's May 8, 2020 Comments at 2.

[300] Transco's March 27, 2020 Comments at 2.

[301] Mountain Valley's May 8, 2020 Comments at 2.

resolve Transco's collocation and safety concerns. Based on the foregoing, we conclude that the Southgate Project, as proposed, could be constructed and operated safely.

ii. Katie Whitehead Comments

134. On April 8, 2020, landowner Katie Whitehead filed a comment in response to Mountain Valley's April 6 filing. Ms. Whitehead asserts that on the revised alignment sheets the location of Transco's existing pipelines on her property is not correct. Ms. Whitehead claims that the alignment sheets incorrectly depict the location of the Transco pipelines within Transco's right-of-way. Specifically, Ms. Whitehead believes that the Transco pipeline is located at least 40 feet from the edge of its right-of-way; therefore, based on Mountain Valley's pipeline alignment, there would be, at a minimum, a 65-foot separation between the existing Transco pipeline and the proposed Southgate Project pipeline. Ms. Whitehead states that she is unable to negotiate an appropriate easement without accurately knowing the temporary and permanent easement boundaries.[302]

135. On April 28, 2020, Mountain Valley responded that the alignment sheets are correct, based on data obtained from Transco as well as use of pipe locating equipment to determine the location of the Transco pipeline. In its filing, Mountain Valley included additional images of Ms. Whitehead's property to clarify the Transco pipeline locations with respect to the right-of-way and the proposed Southgate pipeline. In response to Ms. Whitehead, Mountain Valley stated that it has offered to make changes to the proposed route to reduce the impact on Ms. Whitehead's property and has stated that it will file the revised alignment sheets reflecting the changes as part of the project's Implementation Plan.[303]

136. On May 11, 2020, Ms. Whitehead responded, raising questions about the easement agreement process. Specifically, Ms. Whitehead's filing requests information related to agreements between Transco and Mountain Valley regarding the joint use of the right-of-way, including Mountain Valley's proposed crossing of a spillway leading from a small lake on her property[304] and Mountain Valley's plan for felled trees.

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[302] Ms. Whitehead is specifically concerned about the excessive removal of trees and the impact on silviculture to accommodate the temporary workspace on her property. *See* Katie Whitehead's September 16, 2019 and November 17, 2019 Comments on the draft EIS.

[303] Final EIS at 3-26, Table 3.4-10 (Mountain Valley would reduce temporary workspace from 100 feet to 75 feet the entire distance on the Whitehead property).

[304] Mountain Valley identified the spillway as a surface water feature with intermittent flow. Final EIS Appendix I.3 at I.3-220. Mountain Valley will treat this

137. Mountain Valley proposes to treat the spillway on Ms. Whitehead's property as a waterbody crossing.[305] Pursuant to Mountain Valley's *Wetland and Waterbody Construction and Mitigation Procedures*, Mountain Valley will be required to restore the spillway after construction. Regarding tree felling, Environmental Condition 17 requires Mountain Valley to remove and dispose of timber and debris from the right-of-way. Mountain Valley must ensure that any timber that is not removed and remains on or adjacent to the right-of-way, as agreed to by the landowner, is located at access points where the landowner can reasonably retrieve the timber without any inadvertent impacts on the restored right-of-way, in accordance with the section III.E of the Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan*.

138. The landowner easement agreement process provides an opportunity for Ms. Whitehead to express her concerns to Mountain Valley and to negotiate site-specific plans to meet her needs.[306] Environmental Condition 5 allows Mountain Valley to make minor adjustments to the route per landowner request so long as the route adjustments do not affect other landowners or sensitive environmental areas. Should Mountain Valley seek to revise its proposal based on easement negotiations with landowners, Environmental Condition 4 of this order requires Mountain Valley to file revised detailed survey alignment maps/sheets prior to the start of construction. Any changes to the approved route would be reflected on these alignment sheets.

f. Sandy Creek Crossing

139. Roger Sisson notes concerns about the Southgate Project's impacts on a spring-fed well on his property. Mr. Sisson is also concerned about the pipeline's crossing of the Sandy Creek riverbed, noting the potential for pipeline shifting and corrosion, due to the wet and sandy nature of the soil, and the possibility of flood damage.

140. Mountain Valley is required to identify all private wells and springs that are used for potable water in the project area. Accordingly, the final EIS recommends, and we

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feature as a surface water crossing during construction, which will include a dry open-cut crossing consisting of either dam and pump or a flume. Final EIS Appendix B.5 at B.5-1.

[305] *See* Final EIS Appendix I.3 at I.3-220 and Appendix B.5 at B.5-1 (waterbody S-E18-4 at milepost 4.8).

[306] We note that NGA section 7(h) provides that a holder of a certificate of convenience and necessity, which this order issues to Mountain Valley, may acquire the needed property rights by exercise of the right of eminent domain. *See generally, Mountain Valley*, 161 FERC ¶ 61,043, at PP 59-62, *order on reh'g*, 163 FERC ¶ 61,197, at PP 48-51, *aff'd sub nom.*, *Appalachian Voices v. FERC*, No., 17-1271, 2019 WL 847199.

require in Environmental Condition 14, that Mountain Valley, prior to construction, file the locations of all private water wells and springs identified within 150 feet of the project work areas – including each water source's status, use, direction, and distance from construction workspace – and any proposed mitigation measures that would minimize or avoid impacts on the private water wells or springs.[307] To address potential impacts on groundwater wells, Mountain Valley will offer to conduct pre- and post-construction water quality testing for all water supply wells located within 150 feet of project workspaces, as described in Mountain Valley's *Water Resources Identification and Testing Plan*.[308]

141. The Southgate Project will cross Sandy Creek at milepost 12.8 in Pittsylvania County, Virginia.[309] To cross Sandy Creek, Mountain Valley will use dry-ditch methods (i.e., dam-and-pump or flume)[310] to minimize in-stream construction and surface water impacts.[311] Regarding Mr. Sisson's concerns about flood damage and risk to the pipeline from shifting in the stream bed, the final EIS explains that, although flooding itself does not generally present a risk to pipeline facilities, bank erosion and/or scour could expose the pipeline or cause sections of pipe to become unsupported. The final EIS states that the pipeline will be installed below scour depth for each waterbody crossed, and that at least four feet of cover would be maintained at waterbody crossings, except in consolidated rock, where there would be a minimum of two feet of cover.[312] The final EIS further states that flooding can also affect the pipeline by increasing buoyancy, causing the pipe to rise toward the land surface where it may become exposed.[313] To minimize and prevent impacts, Mountain Valley would implement mitigation measures such as use of concrete coating, gravel-filled blankets, or concrete weights on the pipeline to maintain negative buoyancy.[314] These measures are included in Mountain Valley's

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[307] Final EIS at 5-3.

[308] *Id.*

[309] *Id.* Appendix B.5 at B.5-3.

[310] The dam-and-pump and flume methods are types of dry-ditch crossings that involve diverting the flow of water across construction work areas using one or more flume pipes, or a series of pumps and hoses, placed in the waterbody. *Id*. at 2-22 to 2-23.

[311] *Id.*

[312] *Id.* at 2-22.

[313] *Id.* at 4-13.

[314] *Id.* at 4-14.

Wetland and Waterbody Construction and Mitigation Procedures and project-specific *Erosion and Sediment Control Plan*, which Mountain Valley is required to follow at all waterbody crossings.

142. Cathodic protection would be installed along the entire length of the pipeline to prevent corrosion.[315] In addition, as described above, Mountain Valley will complete periodic corrosion and leak surveys.[316] Finally, Mountain Valley must design, construct, operate, and maintain the Southgate Project pipeline in accordance with DOT's minimum federal safety standards,[317] including requirements for internal, external, and atmospheric corrosion control.[318]

g. Natural Resources Conservation Service Riparian Area

143. On April 17, 2020, the Blue Ridge Environmental Defense League filed a comment on behalf of landowner Douglas Bryant, who is concerned about a riparian area on his property that would be crossed by the proposed pipeline at milepost 21.5 and that was part of a Natural Resources Conservation Service conservation program. Mr. Bryant requested that the Southgate Project pipeline route avoid this area on his property. Commission staff confirmed, through information provided by the Natural Resources Conservation Service, that this riparian area is no longer under a conservation program and does not warrant special protection. Therefore, there is no need to consider a reroute in the area. In general, to minimize impacts and restore riparian areas affected by the project, Mountain Valley would implement its *Upland Erosion Control, Revegetation and Maintenance Plan*, *Wetland and Waterbody Construction and Mitigation Procedures* and its project-specific *Erosion and Sediment Control Plan*. In addition, Environmental Condition 5 allows for Mountain Valley to make minor adjustments to the route per landowner request so long as the route adjustments do not affect other landowners or sensitive environmental areas.

5. Environmental Analysis Conclusion

144. We have reviewed the information and analysis contained in the final EIS regarding the potential environmental effects of the Southgate Project, as supplemented herein. We agree with the conclusions presented in the final EIS and find that the environmental impacts associated with the project, if constructed and operated as

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[315] *Id.* at 4-218.

[316] *See supra* P 131.

[317] 49 C.F.R. pt. 192.

[318] *Id.* §§ 192.451-192.493 (subpart I); *see also* final EIS at 2-12.

described in the final EIS, are acceptable considering the public benefits that the project will provide. We accept the final EIS's environmental recommendations, as revised herein, and include them as conditions in the appendix to this order.

145. Based on our Certificate Policy Statement determination and our environmental analysis, we find under section 7 of the NGA that the public convenience and necessity requires approval of Mountain Valley's Southgate Project, subject to the conditions in this order.

146. Compliance with the environmental conditions appended to our orders is integral to ensuring that the environmental impacts of approved projects are consistent with those anticipated by our environmental analyses. Commission staff carefully reviews all information submitted and will only issue a notice to proceed with construction when satisfied that the applicant has complied with all applicable conditions. We also note that the Commission has the authority to take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the project, including authority to impose any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the order, as well as the avoidance or mitigation of unforeseen adverse environmental impacts resulting from project construction and operation.

147. Any state or local permits issued with respect to the jurisdictional facilities authorized herein must be consistent with the conditions of this certificate. The Commission encourages cooperation between interstate pipelines and local authorities. However, this does not mean that state and local agencies, through application of state or local laws, may prohibit or unreasonably delay the construction or operation of facilities approved by this Commission.[319]

148. At a hearing held on June 18, 2020, the Commission on its own motion received and made a part of the record in this proceeding all evidence, including the application, as supplemented, and exhibits thereto, and all comments, and upon consideration of the record,

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[319] *See* 15 U.S.C. § 717r(d) (2018) (state or federal agency's failure to act on a permit considered to be inconsistent with Federal law); *see also Schneidewind v. ANR Pipeline Co*., 485 U.S. 293, 310 (1988) (state regulation that interferes with FERC's regulatory authority over the transportation of natural gas is preempted) and *Dominion Transmission, Inc. v. Summers,* 723 F.3d 238, 245 (D.C. Cir. 2013) (noting that state and local regulation is preempted by the NGA to the extent it conflicts with federal regulation, or would delay the construction and operation of facilities approved by the Commission).

The Commission orders:

(A) A certificate of public convenience and necessity is issued to Mountain Valley, authorizing it to construct and operate the proposed facilities, as described and conditioned herein, and as more fully described in the application, and subsequent filings by the applicant, including any commitments made therein.

(B) The construction of the Southgate Project facilities will not commence until Mountain Valley receives the appropriate federal permits for the Mainline System, and the Director of the Office of Energy Projects, or the Director's designee, lifts the stop-work order and authorizes Mountain Valley to continue constructing the remaining portions of the Mainline System.

(C) The certificate authority issued in Ordering Paragraph (A) is conditioned on:

(1) Mountain Valley's completion of construction of the proposed facilities and making them available for service within three years of the date of this order pursuant to section 157.20(b) of the Commission's regulations;

(2) Mountain Valley's compliance with all applicable Commission regulations under the NGA including, but not limited to, Parts 154, 157, and 284, and paragraphs (a), (c), (e), and (f) of section 157.20 of the Commission's regulations;

(3) Mountain Valley's compliance with the environmental conditions listed in the appendix to this order; and

(4) Mountain Valley's filing a written statement affirming that it has executed firm service agreements for volumes and service terms equivalent to those in its precedent agreements, prior to commencing construction.

(D) Mountain Valley's proposed rates for service on the Southgate System are approved, as modified above.

(E) Mountain Valley's proposal to charge an initial retainage factor to recover fuel costs associated with the Southgate System is approved.

(F) Mountain Valley is required to file actual tariff records setting forth rates and the separately-stated fuel rate for the project and other proposed changes to its tariff implementing the project no more than 60 days and no less than 30 days prior to placing the project in service.

(G) Mountain Valley shall notify the Commission's environmental staff by telephone or e-mail of any environmental noncompliance identified by other federal, state, or local agencies on the same day that such agency notifies Mountain Valley. Mountain Valley shall file written confirmation of such notification with the Secretary of the Commission within 24 hours.

(H) The North Carolina Utilities Commission's and the Appalachian Mountain Advocates' requests for a full evidentiary, trial-type hearing are denied.

(I) Transcontinental Gas Pipe Line Company, LLC's request for a technical conference is denied.

By the Commission. Commissioner Glick is dissenting in part with a separate statement attached.
Commissioner McNamee is concurring with a separate statement attached.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

Appendix

Environmental Conditions

As recommended in the final Environmental Impact Statement (EIS) for the Southgate Project (Project) and modified herein, this authorization includes the following conditions:

1. Mountain Valley shall follow the construction procedures and mitigation measures described in its application, supplemental filings (including responses to staff data requests), and as identified in the EIS, unless modified by the Order. Mountain Valley must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary);

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of the Office of Energy Projects (OEP), or the Director's designee, **before using that modification**.

2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the Project. This authority shall allow:

    a. the modification of conditions of the Order;

    b. stop-work authority; and

    c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction,** Mountain Valley shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EIs), and contractor personnel will be informed of the EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Mountain Valley shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Mountain Valley's exercise of eminent domain authority granted under Natural Gas Act Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Mountain Valley's right of eminent domain granted under Natural Gas Act Section 7(h) does not authorize it to increase the size of its natural gas facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Mountain Valley shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, construction support areas, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. All areas must be approved in writing by the Director of OEP, or the Director's designee, **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the Commission's *Upland Erosion Control, Revegetation, & Maintenance Plan* and/or minor field realignments per landowner needs and requirements that do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

   b. implementation of endangered, threatened, or special concern species mitigation measures;

   c. recommendations by state regulatory authorities; and

d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the Certificate and before construction begins**, Mountain Valley shall file its Implementation Plan with the Secretary, for review and written approval by the Director of OEP, or the Director's designee. Mountain Valley must file revisions to its plans as schedules change. The plans shall identify:

a. how Mountain Valley will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;

b. how Mountain Valley will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to on-site construction and inspection personnel;

c. the number of EIs assigned per spread and/or facility, and how Mountain Valley will ensure that sufficient personnel are available to implement the environmental mitigation;

d. company personnel, including EIs and contractors, who will receive copies of the appropriate materials;

e. the location and dates of the environmental compliance training and instructions Mountain Valley will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s);

f. the company personnel (if known) and specific portion of Mountain Valley's organization having responsibility for compliance;

g. the procedures (including use of contract penalties) Mountain Valley will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or Program Evaluation Review Technique (PERT) chart (or similar Project scheduling diagram), and dates for:

1. the completion of all required surveys and reports;
2. the environmental compliance training of on-site personnel;
3. the start of construction; and
4. the start and completion of restoration.

7. Mountain Valley shall employ a team of EIs (i.e., two or more or as may be established by the Director of OEP or the Director's designee) per construction spread. The EIs shall be:

    a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or authorizing documents;

    b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

    c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

    d. a full-time position separate from all other activity inspectors;

    e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

    f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Mountain Valley shall file updated status reports with the Secretary on a **weekly** basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include the following:

    a. an update on Mountain Valley's efforts to obtain the necessary federal authorizations;

    b. the construction status of each spread, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;

    c. a listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

    d. a description of the corrective actions implemented in response to all instances of noncompliance;

    e. the effectiveness of all corrective and remedial actions implemented;

    f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by Mountain Valley from other federal, state, or local permitting agencies concerning instances of noncompliance, and Mountain Valley's response.

9. Mountain Valley shall implement its environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. **Prior to construction**, Mountain Valley shall mail the complaint procedures to each landowner whose property will be crossed by the Project.

   a. In its letter to affected landowners, Mountain Valley shall:

      i. provide a local contact that the landowners should call first with their concerns; the letter shall indicate how soon a landowner should expect a response;

      ii. instruct the landowners that if they are not satisfied with the response, they should call Mountain Valley's Hotline; the letter shall indicate how soon to expect a response; and

      iii. instruct the landowners that if they are still not satisfied with the response from Mountain Valley's Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

   b. In addition, Mountain Valley shall include in its **weekly** status report a copy of a table that contains the following information for each problem/concern:

      i. the identity of the caller and date of the call;

      ii. the location by milepost and identification number from the authorized alignment sheet(s) of the affected property;

      iii. a description of the problem/concern; and

      iv. an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

10. Mountain Valley must receive written authorization from the Director of OEP, or the Director's designee, **before commencing construction of any Project facilities**. To obtain such authorization, Mountain Valley must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

11. Mountain Valley must receive written authorization from the Director of OEP, or the Director's designee, **before placing the Project facilities into service**. Such

authorization would only be granted following a determination that rehabilitation and restoration of the areas affected by the Project are proceeding satisfactorily.

12. **Within 30 days of placing the authorized facilities in-service**, Mountain Valley shall file an affirmative statement with the Secretary, certified by a senior company official:

    a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

    b. identifying which of the conditions of the Order Mountain Valley has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

13. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, a revised *General Blasting Plan* that clarifies it will not bury excess rock fragments generated during trenching or blasting in any location other than where the rock originated. Excess rock fragments not suitable for reburial at the point of origin should be considered construction debris and should be disposed of consistent with our *Upland Erosion Control, Revegetation, & Maintenance Plan* at sections III.E and V.A.3.

14. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, the locations of all private water wells and springs identified within 150 feet of the Project work areas, including the well's or springs' status, use, distance from construction workspace, and any proposed measures to minimize or avoid impacts on the private water wells or springs.

15. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, site-specific plans detailing the enhanced erosion control measures and maintenance requirements for each location where the Project will parallel and remove vegetation within 15 feet of a waterbody.

16. **Prior to construction**, Mountain Valley shall file with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, its final list of water sources to be used for the Project (dust control, hydrostatic testing, and horizontal directional drill operations), including intake location, waterbody name, withdrawal rate and method, and measures to minimize entrainment of aquatic species. Mountain Valley shall also provide written concurrence from the

U.S. Fish and Wildlife Service (FWS) for any water withdrawals from the Dan River.

17. **During construction and prior to any Project in-service approval,** Mountain Valley shall remove and dispose of timber and debris from the right-of-way. Mountain Valley must ensure that any beneficial reuse of timber that is not removed and remains on or adjacent to the right-of-way, as agreed to by the landowner, is located at access points where the landowner can reasonably retrieve timber without any inadvertent impacts on the restored right-of-way, in accordance with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan,* section III.E.

18. In order to identify locations where additional protection measures will be needed, and to inform compliance monitoring, Mountain Valley shall file with the Secretary, the results of the pre-construction bald eagle nest and colonial rookery surveys **prior to construction.**

19. Mountain Valley shall **not begin** construction activities **until**:

    a. Mountain Valley files with the Secretary the results of all outstanding biological surveys;

    b. the staff completes Endangered Species Act consultation with the FWS; and

    c. Mountain Valley has received written notification from the Director of OEP, or the Director's designee, that construction or use of mitigation may begin.

20. Mountain Valley shall **not begin** construction of facilities and/or use of all staging, storage, or temporary work areas and new or to-be-improved access roads **until**:

    a. Mountain Valley files with the Secretary:

        i. remaining cultural resources survey reports;

        ii. site evaluation reports and avoidance or treatment plans, as required; and

        iii. comments on the cultural resources reports and plans from the Virginia and North Carolina State Historic Preservation Officers and interested Indian tribes.

    b. Mountain Valley implements the stipulations of the May 17, 2020 executed programmatic agreement for the Southgate Project; and

c. The Commission staff reviews and the Director of OEP, or the Director's designee, approves the cultural resources reports and plans, and notifies Mountain Valley in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "**CUI//PRIV-DO NOT RELEASE**."

21. **Prior to construction**, Mountain Valley shall file its *Nighttime Construction Noise Management Plan* with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, that demonstrates noise levels will be reduced below 48.6 decibels on the A-weighted scale (dBA) at night and 55 dBA day-night sound level (L_{dn}) overall at the nearest noise sensitive area (NSA), or not exceed 10 dBA over the ambient at the nearest NSA where ambient noise levels are already above 55 dBA. This plan shall indicate site-specific mitigation measures and indicate resulting noise impacts on NSAs.

22. **No later than 60 days after placing the Lambert Compressor Station (including the Interconnect) into service**, Mountain Valley shall file a noise survey with the Secretary. If a full load condition noise survey is not possible, Mountain Valley shall provide an interim survey at the maximum possible load **within 60 days** of placing the station into service and provide the full load survey **within 6 months**. If the noise attributable to the operation of the equipment at the station under interim or full load conditions exceeds an L_{dn} of 55 dBA at the nearest NSA, Mountain Valley shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. Mountain Valley shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Mountain Valley Pipeline, LLC Docket No. CP19-14-000

(Issued June 18, 2020)

GLICK, Commissioner, *dissenting in part*:

1. I dissent in part from today's order because I believe that the Commission's action violates both the Natural Gas Act[1] (NGA) and the National Environmental Policy Act[2] (NEPA). The Commission once again refuses to consider the consequences its actions have for climate change. Although neither the NGA nor NEPA permit the Commission to assume away the climate change implications of constructing and operating this project, that is exactly what the Commission is doing here.

2. In today's order authorizing Mountain Valley Pipeline, LLC's (Mountain Valley) proposed Southgate Project (Project),[3] the Commission continues to treat greenhouse gas (GHG) emissions and climate change differently than all other environmental impacts. The Commission again refuses to consider whether the Project's contribution to climate change from GHG emissions would be significant,[4] even though it quantifies the direct GHG emissions from the Project's construction and operation.[5] That failure forms an integral part of the Commission's decisionmaking: The refusal to assess the significance of the Project's contribution to the harm caused by climate change is what allows the Commission to determine that the environmental impacts associated with the Project are "acceptable"[6] and, as a result, conclude that the Project is required by the public

[1] 15 U.S.C. § 717f (2018).

[2] National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 *et seq.*

[3] *Mountain Valley Pipeline, L.L.C.*, 171 FERC ¶ 61,232 (2020) (Certificate Order).

[4] *Id.* PP 97–99.

[5] Southgate Project Final Environmental Impact Statement at 4-184–4-185 & Tables 4.11-4, 4.11-5 (EIS).

[6] Certificate Order, 171 FERC ¶ 61,232 at P 144; EIS at 5-1 ("If the Project is constructed and operated in accordance with the mitigating measures discussed in this EIS, and our recommendations, adverse environmental impacts would be reduced to less than significant levels").

convenience and necessity.[7] Claiming that a project has no significant environmental impacts while at the same time refusing to assess the significance of the project's impact on the most important environmental issue of our time is not reasoned decisionmaking.[8]

3. Making matters worse, the Commission again refuses to make a serious effort to assess the indirect effects of the Project—despite the fact that the record plainly provides that the Project will be used to transport natural gas to residential and commercial end-users in North Carolina and Virginia.[9] The United States Court of Appeals for the District of Columbia Circuit (D.C. Circuit) has repeatedly criticized the Commission for its stubborn refusal to identify and consider the reasonably foreseeable GHG emissions caused by the downstream combustion of natural gas transported through an interstate pipeline. But even so, today's order doubles down on approaches that the D.C. Circuit has already rejected. So long as the Commission refuses to heed the court's unambiguous directives, I have no choice but to dissent.

4. Finally, I disagree with the Commission's decision to grant Mountain Valley a 14 percent return on equity (ROE) for the Project's initial rates.[10] The majority's decision not only represents an unwarranted departure from recent precedent,[11] but it also does

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[7] Certificate Order, 171 FERC ¶ 61,232 at P 145.

[8] Commissioner McNamee argues that the Commission can consider a project's direct GHG emissions under NEPA and in its public convenience and necessity determination without actually assessing whether the GHG emissions are significant. Certificate Order, 171 FERC ¶ 61,232 (McNamee, Comm'r, concurring at P 2). No matter how many times he says so, this does not constitute consideration of the impact of the Project's GHG emissions. If you refuse to consider how the project's GHG emissions will impact the environment you aren't actually examining those emissions for purposes of NEPA and the NGA.

[9] Certificate Order, 171 FERC ¶ 61,232 at n.60 ("Mountain Valley states that the natural gas transported by the Southgate Project will be used to make bundled gas sales primarily to residential and small- and medium-sized commercial customers for heating, cooking, and other end-uses typical of natural gas local distribution company customers.") (citing Mountain Valley's March 15, 2019 Data Request Response at 3); *see id.* P 43 ("The project shipper is a local distribution company, which will locally distribute gas to residential, commercial, and industrial end-use customers."); *id.* P 99 ("[A]s discussed in the final EIS, most of the gas will serve North Carolina end-users, primarily by residential and small and medium-sized commercial customers.").

[10] *Id.* P 57.

[11] In developing incremental rates for pipeline expansion projects, the Commission's general policy is to use the rate of return components approved in the

nothing but lend credence to the North Carolina Commission's concern that we offer "no assurances that the consuming public will be protected from excessive rates."[12]

I. The Commission's Public Interest Determination Is Not the Product of Reasoned Decisionmaking

5. We know with certainty what causes climate change: It is the result of GHG emissions, including carbon dioxide and methane, released in large quantities through the production, transportation, and consumption of fossil fuels, including natural gas. The Commission recognizes this relationship, finding, as it must, that "anthropogenic sources of GHGs are the primary cause of warming of the global climate system"[13] and that GHG emissions from the Project's construction and operation "would increase the atmospheric concentration of GHGs, in combination with past, current, and future emissions from all other sources globally and contribute incrementally to future climate change impacts."[14] In light of this undisputed relationship between anthropogenic GHG emissions and climate change, the Commission must carefully consider the Project's contribution to climate change, both in order to fulfill NEPA's requirements and to determine whether the Project is in the public interest.[15]

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pipeline's last NGA section 4 rate proceeding, or in the absence of a litigated ROE on file, the most recent ROE approved in a litigated NGA section 4 rate case. *Gulfstream Natural Gas Sys., L.L.C.*, 170 FERC ¶ 61,199, at PP 18-19 (2020); *Cheyenne Connector, LLC,* 168 FERC ¶ 61,180, at PP 51-52 (2019); *Cheniere Corpus Christi Pipeline, LP,* 169 FERC ¶ 61,135, at PP 34-35.

[12] *See* Certificate Order, 171 FERC ¶ 61,232 at 62; North Carolina Commission Protest at 16.

[13] EIS at 4-176.

[14] *Id.* at 4-262.

[15] Section 7 of the NGA requires that, before issuing a certificate for new pipeline construction, the Commission must find both a need for the pipeline and that, on balance, the pipeline's benefits outweigh its harms. 15 U.S.C. § 717f. Furthermore, NEPA requires the Commission to take a "hard look" at the environmental impacts of its decisions. *See* 42 U.S.C. § 4332(2)(C)(iii); *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983). This means that the Commission must consider and discuss the significance of the harm from a pipeline's contribution to climate change by actually evaluating the magnitude of the pipeline's environmental impact. Doing so enables the Commission to compare the environment before and after the proposed federal action and factor the changes into its decisionmaking process. *See Sierra Club v. FERC*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (*Sabal Trail*) ("The [FEIS] needed to

6. Today's order on rehearing falls short of that standard. As part of its public interest determination, the Commission must examine the Project's impact on the environment and public safety, which includes the facility's impact on climate change.[16] That is now clearly established D.C. Circuit precedent.[17] The Commission, however, insists that it need not consider whether the Project's contribution to climate change is significant because—for want of a better explanation—it "cannot."[18] However, the most troubling part of the Commission's rationale is what comes next. Based on this alleged inability to assess the significance of the Project's impact on climate change, the Commission still summarily concludes that all of the Project's environmental impacts would be "acceptable."[19] Think about that. The Commission is simultaneously stating that it cannot assess the significance of the Project's impact on climate change[20] while concluding that all environmental impacts are acceptable to the public interest.[21] That is

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include a discussion of the 'significance' of this indirect effect."); 40 C.F.R. § 1502.16 (a)–(b) (An agency's environmental review must "include the environmental impacts of the alternatives including the proposed action," as well as a discussion of direct and indirect effects *and their significance*. (emphasis added)).

[16] *See Sabal Trail*, 867 F.3d at 1373 (explaining that the Commission must consider a pipeline's direct and indirect GHG emissions because the Commission may "deny a pipeline certificate on the ground that the pipeline would be too harmful to the environment"); *see also Atl. Ref. Co. v. Pub. Serv. Comm'n of N.Y.*, 360 U.S. 378, 391 (1959) (holding that the NGA requires the Commission to consider "all factors bearing on the public interest").

[17] *See Allegheny Def. Project v. FERC*, 932 F.3d 940, 945-46 (D.C. Cir. 2019), *reh'g en banc granted, judgment vacated*, 2019 WL 6605464 (D.C. Cir. Dec. 5, 2019); *Birckhead v. FERC*, 925 F.3d 510, 518-19 (D.C. Cir. 2019); *Sabal Trail*, 867 F.3d at 1371-72. The history of these cases is discussed further below. *See infra* P 9.

[18] *See* Certificate Order, 171 FERC ¶ 61,232 at P 102 ("[T]he Commission cannot determine whether an individual project's contribution to climate change would be significant."); EIS at 4-263 ("Currently, there is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Southgate Project's incremental contribution to GHGs.").

[19] Certificate Order, 171 FERC ¶ 61,232 at P 144; EIS at 5-1.

[20] Certificate Order, 171 FERC ¶ 61,232 at P 102; EIS at 4-263–4-264 ("[W]e are unable to determine the significance of the Southgate Project's contribution to climate change.").

[21] Certificate Order, 171 FERC ¶ 61,232 at P 144.

unreasoned and an abdication of our responsibility to give climate change the "hard look" that the law demands.[22]

7. It also means that the volume of emissions caused by the Project does not play a meaningful role in the Commission's public interest determination, no matter how many times the Commission assures us otherwise. Using the approach in today's order, the Commission will always be able to conclude that a project will not have any significant environmental impact irrespective of the project's actual GHG emissions or those emissions' impact on climate change. So long as that is the case, a project's impact on climate change cannot, as a logical matter, play a meaningful role in the Commission's public interest determination. A public interest determination that systematically excludes the most important environmental consideration of our time is contrary to law, arbitrary and capricious, and not the product of reasoned decisionmaking.

8. Commissioner McNamee notes that he believes the D.C. Circuit cases cited above[23] were wrongly decided.[24] Although that is his prerogative, it is irrelevant to the task before us. As he has explained, we are called on to apply the law and the facts, not our personal policy preferences. But surely, implicit in that statement, is a recognition that we must apply the law as it is, not as we wish it were. The D.C. Circuit has unambiguously interpreted the "public convenience and necessity" standard in section 7 of the NGA to encompass the authority to consider and, if appropriate, act upon "the direct and indirect environmental effects" of a proposed pipeline.[25] As Commissioners,

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[22] *See, e.g.*, *Myersville Citizens for a Rural Cmty., Inc. v. FERC*, 783 F.3d 1301, 1322 (D.C. Cir. 2015) (explaining that agencies cannot overlook a single environmental consequence if it is even "arguably significant"); *see also Michigan v. EPA*, 135 S. Ct. 2699, 2706 (2015) ("Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational." (internal quotation marks omitted)); *Motor Vehicle Mfrs. Ass'n, Inc. v. State Farm Mut. Auto. Ins. Co*., 463 U.S. 29, 43 (1983) (explaining that agency action is "arbitrary and capricious if the agency has . . . entirely failed to consider an important aspect of the problem, [or] offered an explanation for its decision that runs counter to the evidence before the agency").

[23] *Supra* notes 16-17.

[24] *See* Certificate Order, 171 FERC ¶ 61,232 (McNamee, Comm'r, concurring at PP 12-13).

[25] *E.g., Sabal Trail*, 867 F.3d at 1373.

our job is to apply that law, not to attack binding judicial precedent in favor of an interpretation that was, in fact, expressly rejected by the court.[26]

II. The Commission's NEPA Analysis of the Project's Contribution to Climate Change Is Deficient

9. The Commission's NEPA analysis is similarly flawed. In order to evaluate the environmental consequences of the Project under NEPA, the Commission must consider the harm caused by its GHG emissions[27] and "evaluate the 'incremental impact' that [those emissions] will have on climate change or the environment more generally."[28] The D.C. Circuit has repeatedly instructed the Commission that the GHG emissions caused by the reasonably foreseeable combustion of natural gas transported through a pipeline are an indirect effect and must, therefore, be included within the Commission's NEPA analysis.[29] While the Commission quantifies the Project's direct GHG emissions from construction and operation,[30] it refuses to even disclose the Project's indirect GHG emissions from downstream combustion. Once again the Commission takes the position that if it does not know the exact volume and end-use of the natural gas, any associated GHG emissions are categorically not reasonably foreseeable.[31] What's more, the

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[26] *Id.*; *see Birckhead*, 925 F.3d at 519 (explaining that in "the pipeline certification context the Commission does have statutory authority to act" on the reasonably foreseeable GHG emissions caused by the pipeline (citing *Sabal Trail*, 867 F.3d at 1373)).

[27] When conducting a NEPA review, an agency must consider both the direct and the indirect effects of the project under consideration. 40 C.F.R. §§ 1502.16(b), 1508.8(b); *Sabal Trail*, 867 F.3d at 1371.

[28] *See Ctr. for Biological Diversity,* 538 F.3d at 1216 ("While the [environmental document] quantifies the expected amount of CO2 emitted . . . , it does not evaluate the 'incremental impact' that these emissions will have on climate change or on the environment more generally . . . ."); *Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 995 (9th Cir. 2004) ("A calculation of the total number of acres to be harvested in the watershed is a necessary component . . . , but it is not a sufficient description of the actual environmental effects that can be expected from logging those acres.").

[29] *See Allegheny Def. Project*, 932 F.3d at 945-46; *Birckhead*, 925 F.3d at 518-19; *Sabal Trail*, 867 F.3d at 1371-72.

[30] EIS at 4-184–4-185 & Tables 4.11-4, 4.11-5.

[31] Certificate Order, 171 FERC ¶ 61,232 at P 99 (stating that "because the end-use of the contracted for volumes is unknown, any potential GHG emissions associated with

Commission even goes so far as to suggest that, because constructing any new pipeline *may* not increase the interstate transportation system's overall capacity, estimating the pipeline's downstream GHG emissions is not just needless, but "misleading."[32] This is nothing more than another version of the Commission's argument that *Sabal Trail* "is narrowly limited to the facts of that case"—an argument that the D.C. Circuit rejected emphatically in *Birckhead*.[33] Indeed, *Birckhead* rejected as a "total non-sequitur" the argument that the potential for increased natural gas transportation capacity to reduce GHG emissions by displacing existing natural gas supplies or more GHG-intensive forms of electricity generation somehow renders the downstream GHG indirect emissions from a natural gas pipeline not reasonably foreseeable.[34] Even in the face of some uncertainty, the courts have required the Commission to use its "best efforts" to identify and consider the full scope of a project's environmental impact, an exercise which may require using educated assumptions.[35]

10. Instead, the Commission's overly narrow and circular definition of indirect effects[36] disregards the Project's central purpose—to facilitate additional natural gas

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the ultimate combustion of the transported gas are not reasonably foreseeable, and therefore, not an indirect impact of the Southgate Project").

[32] *Id.* P 100.

[33] *Birckhead*, 925 F.3d at 518-19.

[34] *Id.*

[35] *Sabal Trail*, 867 F.3d at 1374 ("We understand that emission estimates would be largely influenced by assumptions rather than direct parameters about the project, but some educated assumptions are inevitable in the NEPA process. And the effects of assumptions on estimates can be checked by disclosing those assumptions so that readers can take the resulting estimates with the appropriate amount of salt." (internal citations and quotation marks omitted)).

[36] *See San Juan Citizens All. et al. v. U.S. Bureau of Land Mgmt.*, No. 16-CV-376-MCA-JHR, 2018 WL 2994406, at *10 (D.N.M. June 14, 2018) (holding that it was arbitrary for the Bureau of Land Management to conclude "that consumption is not 'an indirect effect of oil and gas production because production is not a proximate cause of GHG emissions resulting from consumption'" as "this statement is circular and worded as though it is a legal conclusion"). The Commission must use its "best efforts" to identify and quantify the full scope of the environmental impacts and, as the U.S. Court of Appeals for the District of Columbia found in *Sierra Club v. FERC*, educated assumptions are inevitable in the process of emission quantification. *See* 867 F.3d 1357, 1374 (D.C. Cir. 2017) (*Sabal Trail*).

consumption.[37] The Commission cannot ignore the fact that adding firm transportation capacity is likely to "spur demand" for natural gas[38]—a fact that Mountain Valley certainly recognizes[39]—and, for that reason, the Commission must at least examine the effects that an expansion of pipeline capacity might have on consumption and production.[40] Indeed, if a proposed pipeline neither increases the supply of natural gas available to consumers nor decreases the price that those consumers would pay, it is hard to imagine why that pipeline would be "needed" in the first place.

11. Recognizing this fact, Mountain Valley instead claims that it would be "double counting" to consider the Project's downstream GHG emissions here, because the Commission "previously quantified" these emissions when it authorized the Mountain Valley mainline system.[41] But, as I argued in that proceeding, while the Commission may have quantified the GHG emissions, at no point did the Commission consider them

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[37] *See supra* note 9; *see also* Certificate Order, 171 FERC ¶ 61,232 at P 38 (Mountain Valley argues that the Project "will . . . provide North Carolina and southern Virginia access to new natural gas supplies" and "provide the opportunity to serve commercial and industrial load in Virginia and North Carolina not currently served by natural gas.").

[38] *Barnes v. U.S. Dep't of Transp.*, 655 F.3d 1124, 1138 (9th Cir. 2011) (holding that it "is completely inadequate" for an agency to ignore a project's "growth inducing effects" where the project has a unique potential to spur demand); *id.* at 1139 (distinguishing *City of Carmel-by-the-Sea v. U.S. Dep't of Transp.*, 123 F.3d 1142 (9th Cir. 1997), which the majority relies on in today's order) ("[O]ur cases have consistently noted that a new runway has a unique potential to spur demand, which sets it apart from other airport improvements, like changing flight patterns, improving a terminal, or adding a taxiway, which increase demand only marginally, if at all."); *id.* at 1139 ("[E]ven if the stated purpose of [a new airport runway project] is to increase safety and efficiency, the agencies must analyze the impacts of the increased demand attributable to the additional runway as growth-inducing effects.").

[39] *See* Certificate Order, 171 FERC ¶ 61,232 at P 38.

[40] As the United States Court of Appeals for the Eighth Circuit explained in *Mid States Coal. for Progress v. Surface Transp. Bd.*—a case that also involved the downstream emissions from new infrastructure for transporting fossil fuels—when the "nature of the effect" (end-use emissions) is reasonably foreseeable, but "its extent is not" (specific consumption activity producing emissions), an agency may not simply ignore the effect. 345 F.3d 520, 549 (8th Cir. 2003).

[41] Certificate Order, 171 FERC ¶ 61,232 at P 100.

in making its public interest determination.[42] Simply asserting that a project is in the public interest without any discussion why is not reasoned decisionmaking. The Commission's utter failure to actually consider these emissions as part of its public interest determination renders Mountain Valley's argument empty and unconvincing.

12. I remain baffled by the Commission's continued refusal to take any step towards considering indirect downstream emissions and their impact on climate change unless specifically and expressly directed to do so by the courts (and even that does not always seem to be the case[43]). Here there are plenty of steps that the Commission could take to consider the GHGs associated with the Project's incremental capacity if the Commission were actually inclined to take a 'hard look' at climate change. At a minimum, we know that the vast majority, 97 percent, of all natural gas consumed in the United States is combusted[44]—a fact that, on its own might be sufficient to make downstream emissions reasonably foreseeable, at least absent contrary evidence. After all, the D.C. Circuit has recognized that NEPA does not require absolute certainty and that "some educated assumptions are inevitable in the NEPA process."[45] Moreover, the record here makes this a relatively easy case: Mountain Valley states that the natural gas transported by the Project will be sold "primarily to residential and small- and medium-sized commercial customers for heating, cooking, and other end-uses typical of natural gas local distribution company customers."[46] That would seem to be more-than-sufficient to confirm that the gas is highly likely to be combusted, making the resulting GHG emissions reasonably foreseeable.

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[42] *See Mountain Valley Pipeline, LLC*, 163 FERC ¶ 61,197 (2018) (Glick, Comm'r, dissenting).

[43] *El Paso Natural Gas Co., L.L.C.*, 169 FERC ¶ 61,133 (2019) (Glick, Comm'r, dissenting in part at PP 10-11) (criticizing the Commission for failing to follow the D.C.'s guidance in *Birckhead* and consider GHG emissions associated with natural gas transportation capacity that it was told would be used to serve electricity generation).

[44] U.S. Energy Info. Admin., *September 2019 Monthly Energy Review* 22, 97 (2019) (reporting that, in 2018, 778 Bcf of natural gas had a non-combustion use compared to 29,956 Bcf of total consumption), *https://www.eia.gov/totalenergy/data/monthly/archive/00351908.pdf*.

[45] *Sabal Trail*, 867 F.3d at 1374; *see id.* (stating that "the effects of assumptions on estimates can be checked by disclosing those assumptions so that readers can take the resulting estimates with the appropriate amount of salt").

[46] Certificate Order, 171 FERC ¶ 61,232 at n.60; Mountain Valley March 15, 2019 Data Request Response at 3.

13. In any case, even where the Commission quantifies the Project's construction and operational GHG emissions, it still fails to "evaluate the 'incremental impact' that [those emissions] will have on climate change or the environment more generally."[47] In *Sabal Trail*, the court explained that the Commission was required "to include a discussion of the 'significance' of" the indirect effects of the project, including its GHG emissions.[48] That makes sense. Identifying and evaluating the consequences that a project's GHG emissions may have for climate change is essential if NEPA is to play the disclosure and good government roles for which it was designed.[49] But neither the Commission's orders in this proceeding nor the accompanying EIS provide that discussion or even attempt to assess the significance of the Project's GHG emissions.

14. Instead, the Commission insists that it need not assess the significance of the Project's GHG emissions because it lacks a "universally accepted methodology" for evaluating the project's impact on climate change.[50] But that does not excuse the Commission's failure to evaluate these emissions let alone to determine the significance of the Project's environmental impact from these emissions. As an initial matter, the lack of a single methodology does not prevent the Commission from adopting *a* methodology, even if that methodology is not universally accepted. One possible methodology endorsed by the courts is comparing a project's GHG emissions against a known benchmark, such as a state emission reduction requirement, an approach the Commission

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[47] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1216 (9th Cir. 2008); *see also WildEarth Guardians v. Zinke*, No. CV 16-1724 (RC), 2019 WL 1273181, at *1 (D.D.C. Mar. 19, 2019) (explaining that the agency was required to "provide the information necessary for the public and agency decisionmakers to understand the degree to which [its] decisions at issue would contribute" to the "impacts of climate change in the state, the region, and across the country").

[48] *Sabal Trail*, 867 F.3d at 1374.

[49] *See, e.g.*, *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989) (explaining that one of NEPA's purposes is to ensure that "relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision"); *Lemon v. Geren*, 514 F.3d 1312, 1315 (D.C. Cir. 2008) ("The idea behind NEPA is that if the agency's eyes are open to the environmental consequences of its actions and if it considers options that entail less environmental damage, it may be persuaded to alter what it proposed.").

[50] Certificate Order, 171 FERC ¶ 61,232 at P 102; EIS at 4-263 ("[T]here is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Southgate Project's incremental contribution to GHGs.").

has relied on in the past[51] but inexplicably fails to undertake here, even though the Commission recognizes that both North Carolina and Virginia have GHG emissions reduction targets.[52] Armed with a known target, the Commission has all the information necessary to "compare the emissions from this project to emissions from other projects, to total emissions from the state" and make a determination about significance.[53] As the D.C. Circuit stated in *Sabal Trail*, "[w]ithout such comparisons, it is difficult to see how [the Commission] could engage in 'informed decision making' with respect to the greenhouse-gas effects of this project, or how 'informed public comment' could be possible."[54] Instead of doing so here, the Commission disregards its prior position and asserts that "[w]ithout the ability to determine discrete resource impacts, we are unable to determine the significance of the Southgate Project's contribution to climate change."[55] This defies logic. The Commission cannot simultaneously argue an established benchmark is necessary to determine significance and, then, when a benchmark is provided, argue the relevant comparison is not useful. Moreover, the Commission often relies on percentage comparisons when it comes to other environmental impacts as the basis for determining significance.[56] Refusing to apply the same consideration when it comes to GHG emissions and climate change is arbitrary and capricious.

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[51] *Fl. Se. Connection, LLC*, 164 FERC ¶ 61,099, at PP 19-21 (2018) (Glick, Comm'r, dissenting) (arguing that the Commission's refusal to assess the significance of a project's GHG emissions, despite having compared project emissions to state and national emission inventories, is not reasoned decisionmaking); *PennEast Pipeline Co.*, 164 FERC ¶ 61,098, at PP 118-121 (2018) (Glick, Comm'r, dissenting) (same); *Venture Global Calcasieu Pass, LLC*, 166 FERC ¶ 61,144 (2019) (Glick, Comm'r, dissenting) (same). In each of the orders cited above, the Commission offered reasoning, similar to that advanced in today's order, in an attempt to justify the Commission's refusal to determine the significance of the projects' respective contributions to climate change. And, yet, in each of these cases the Commission compared the project emissions to national, and in some cases state, emission inventories. The Commission offers nothing in today's order to explain its refusal to similarly disclose and compare project emissions in this case.

[52] EIS at 4-263.

[53] *Sabal Trail*, 867 F.3d at 1374.

[54] *Id.*

[55] EIS at 4-263–4-264.

[56] See, for example, the Commission's environmental analysis of Columbia Gas Transmission's Buckeye XPress Project, where the Commission finds that impacts amounting to one percent of the overall prime farmland affected would be "permanent,

15. Independent of whether there are established GHG reduction targets, the Commission has several tools to assess the harm from the Project's contribution to climate change, including, for example, the Social Cost of Carbon. By measuring the long-term damage done by a ton of carbon dioxide, the Social Cost of Carbon links GHG emissions to actual environmental effects from climate change, thereby facilitating the necessary "hard look" at the Project's environmental impacts that NEPA requires.

16. Especially when it comes to a global problem like climate change, a measure for translating a single project's climate change impacts into concrete and comprehensible terms plays a useful role in the NEPA process by putting the harms from climate change in terms that are readily accessible for both agency decisionmakers and the public at large. The Commission, however, continues to ignore the tools at its disposal, relying on deeply flawed reasoning that I have previously critiqued at length.[57]

17. Regardless of the tools, methodologies, or targets available, the Commission can use its expertise to consider all factors and determine, quantitatively or qualitatively, whether the Project's GHG emissions have a significant impact on climate change. That is precisely what the Commission does in other aspects of its environmental review. Consider, for example, the Commission's findings that the Project will not have a significant effect on issues as diverse as "wildlife,"[58] and "forests,"[59] and "property values,"[60] without relying on a specific federal or state benchmark. Notwithstanding the lack of any "universally accepted methods" to assess these impacts, the Commission managed to use its judgment to conduct a qualitative review and assess the significance

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but not significant." Buckeye Xpress Project Environmental Assessment, Docket No. CP18-137-000, at B-33; *see also Columbia Gas Transmission, LLC*, 170 FERC ¶ 61,045, at P 138 (2020). Notwithstanding the fact that there are no universally accepted or objective standards or targets to compare this impact to, the Commission was able to determine that the project's environmental impact was not significant based on this proportionate effect. It is clear that it is only when it comes to climate change that the Commission suddenly gets cold feet about using percentages to determine significance.

[57] *See, e.g.*, *Transcontinental Gas Pipe Line Co., LLC*, 167 FERC ¶ 61,110 (2019) (Glick, Comm'r, dissenting in part at P 6 & n.11) (noting that the Social Cost of Carbon "gives both the Commission and the public a means to translate a discrete project's climate impacts into concrete and comprehensible terms"); *Fla. Se. Connection, LLC*, 164 FERC ¶ 61,099 (2018) (Glick, Comm'r, dissenting).

[58] EIS at 4-95.

[59] *Id.* at 4-62–4-71.

[60] *Id.* at 4-137–4-138. 4-153.

of the Project's effect on those considerations.[61] The Commission's refusal to, at the very least, exercise similar qualitative judgment to assess the significance of GHG emissions here is arbitrary and capricious.[62]

18. That refusal is even more mystifying because NEPA "does not dictate particular decisional outcomes."[63] NEPA "'merely prohibits uninformed—rather than unwise—agency action.'"[64] In other words, taking the matter seriously—and rigorously examining a project's impacts on climate change—does not necessarily prevent any Commissioner from ultimately concluding that a project meets the public interest standard.

19. Even if the Commission were to determine that a project's GHG emissions are significant, that would not be the end of the inquiry nor would it mean that the project is not in the public interest or required by the public convenience and necessity. Instead, the Commission could require mitigation—as the Commission often does with regard to other environmental impacts. The Supreme Court has held that, when a project may cause potentially significant environmental impacts, the relevant environmental impact statement must "contain a detailed discussion of possible mitigation measures" to address adverse environmental impacts.[65] The Court explained that, "[w]ithout such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects" of a project, making an examination of possible mitigation measures necessary to ensure that the agency has taken a "hard look" at the environmental consequences of the action at issue.[66] The Commission not only has the obligation to discuss mitigation of adverse environmental impacts under NEPA, but also

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[61] *See also supra* note 56 and accompanying discussion describing the Commission's use of just such a technique regarding impacts to farmland.

[62] After all, the standard the Commission typically uses for evaluating significance is whether the adverse impact would result in a substantial adverse change in the physical environment. Surely that standard is open to some subjective interpretation by each Commissioner. What today's order does not explain is why it is appropriate to exercise subjective interpretation and judgment when it comes to potential impacts such as those to property values and forests, but not climate change.

[63] *Sierra Club v. U.S. Army Corps of Engineers*, 803 F.3d 31, 37 (D.C. Cir. 2015).

[64] *Id.* (quoting *Robertson*, 490 U.S. at 351).

[65] *Robertson*, 490 U.S. at 351.

[66] *Id.* at 352; *see also* 40 C.F.R. §§ 1508.20 (defining mitigation), 1508.25 (including in the scope of an environmental impact statement mitigation measures).

the authority to condition certificates under section 7 of the NGA,[67] which could encompass measures to mitigate a project's GHG emissions.[68]

20. My colleague, Commissioner McNamee, seems to relish in constantly reminding us that Congress has failed to enact more than 70 bills proposed to reduce GHG emissions. Somehow that must suggest that climate change is not worthy of consideration and mitigation under the Natural Gas Act's public interest standard. But as science tells us and, in fact the Commission's orders admit, increased GHG emissions cause climate change.[69] And, as is the case with regard to numerous other environmental impacts for which Congress has not established regulatory regimes,[70] this Commission has the duty to ensure that impacts attributable to the Project's direct and indirect GHG emissions are sufficiently mitigated or, if they cannot be mitigated, that the Project's benefits outweigh those impacts. Commissioner McNamee argues that the Commission

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[67] 15 U.S.C. § 717f(e); Certificate Order, 171 FERC ¶ 61,232 at P 146 ("[T]he Commission has the authority to take whatever steps are necessary to ensure the protection of environmental resources . . . , including authority to impose any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the order, as well as the avoidance or mitigation of unforeseen adverse environmental impacts resulting from project construction and operation.").

[68] Commissioner McNamee implies that, as part of a mitigation mechanism, I want the Commission to consider imposing a carbon tax or a cap-and-trade like system. Certificate Order, 171 FERC ¶ 61,232 (McNamee, Comm'r, concurring at P 52). That is a red herring. To my knowledge, no one has suggested that the Commission can impose a carbon tax or something similar under NGA section 7. My point is that the Commission could consider discrete measures that offset the adverse effects of the Project itself, just like it does for a host of other adverse environmental impacts. For example, the project developer could purchase renewable energy credits or plant trees sufficient to sequester the Project's GHG emissions. Tailored programs that offset the actual emissions from the Project are a far cry from a comprehensive emissions-trading scheme and have much in common with other forms of mitigation routinely required by the Commission, including the mitigation contained in this order.

[69] *See supra* notes 13 and 14 and accompanying text.

[70] Take, for example, the Commission's analysis of the Project's impacts on "forests," for which there is no congressionally-established regulatory regime. Notwithstanding this fact, the Commission concludes that, "in the context" of the total number of acres of forestland in Virginia and North Carolina, impacts on forests, including the clearing of 597.5 acres of forested uplands and the permanent conversion of 18.5 acres of interior forest, would be long-term but mitigated to less than significant levels. *See* EIS at 4-62–4-71.

cannot require mitigation for the Project's GHG emissions without a congressionally endorsed mitigation program with established limits.[71] But the absence of such a regime has not stopped the Commission—with Commissioner McNamee's support—from requiring the mitigation it determined to be necessary in the past.[72] After all, section 7 of the NGA gives the Commission the express "power to attach to the issuance of the certificate and to the exercise of the rights granted thereunder such reasonable terms and conditions as the public convenience and necessity may require."[73] That climate impacts continue to be treated differently serves only to highlight this Commission's stubborn refusal to identify any potential climate mitigation measures or discuss how such measures might affect the magnitude of the Project's impact on climate change.

21. Furthermore, a rigorous examination and determination of significance regarding climate change impacts would bolster any finding of public interest by providing the Commission a more complete set of information necessary to weigh benefits against adverse effects. By refusing to assess significance, however, the Commission short circuits any discussion of mitigation measures for the Project's GHG emissions, eliminating a potential pathway for us to achieve consensus on whether the Project is consistent with the public interest.

III. The Commission's Initial Rate Determination Is an Unwarranted Departure from Commission Precedent

22. I disagree with the Commission's decision to authorize Mountain Valley's proposed 14 percent ROE, because I believe it is unwarranted and gratuitous and will ultimately come at the expense of end-users, such as the residential, commercial, and industrial customers this project is meant to serve. In approving 14 percent ROEs for greenfield pipeline projects, the Commission has held that it is an appropriate rate of return because it reflects the fact that new entrants developing greenfield projects experience greater risk than existing pipeline companies.[74] In contrast, the Commission's general policy in developing rates for incremental expansion projects is to require a pipeline to use the ROE approved in its last NGA section 4 rate proceeding, or, if the

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[71] *See* Certificate Order, 171 FERC ¶ 61,232 (McNamee, Comm'r, concurring at PP 53, 57).

[72] *See Jordan Cove Energy Project L.P.*, 170 FERC ¶ 61,202, at PP 139, 279 & envtl. condition 28 (2020) (requiring certificate applicant to mitigate adverse impacts on short-term housing by hiring a professional housing coordinator to address the Commission's housing concerns).

[73] 15 U.S.C. § 717f(e).

[74] *Cheniere Corpus Christi Pipeline, LP,* 169 FERC ¶ 61,135 at P 34.

pipeline has not filed a rate case, the ROE from the last litigated NGA section 4 rate case.[75] The Commission departs from its general policy in today's order, by allowing Mountain Valley to use a 14 percent ROE in setting rates for the Project—an incremental expansion of Mountain Valley's mainline system—when Mountain Valley already received the right to charge this higher rate for service on its mainline system.[76] What is more, the company has since executed binding service contracts with shippers for the mainline system's full design capacity, providing a level of revenue certainty that applicants for greenfield projects do not typically have.

23. Mountain Valley has more in common with an existing pipeline company proposing an expansion project than a new market entrant proposing to construct a greenfield pipeline. For this reason, I would have applied the Commission's current policy and required Mountain Valley to use the 10.55 percent ROE approved in *El Paso Natural Gas Co.*[77]—the most recent NGA section 4 rate case litigated before the Commission—to design the initial rates for the Project.[78] Mountain Valley has not provided any evidence justifying a departure from the Commission's current policy, which it has recently applied to multiple similar incremental pipeline expansion

[75] *See Cheyenne Connector, LLC*, 168 FERC ¶ 61,180 at PP 51-52 (rejecting Rockies Express's proposal to use a 13 percent ROE approved as part of its greenfield certificate authorization to an incremental pipeline expansion project, and instead requiring Rockies Express to revise its incremental recourse rates to reflect a 10.55 percent ROE from the last litigated rate case); *see also Gulfstream Natural Gas Sys., L.L.C.*, 170 FERC ¶ 61,199 at P 19 (rejecting Gulfstream Natural's proposal to use a 14 percent ROE, found to be appropriate for its greenfield project, to an incremental pipeline expansion project, and instead requiring use of use the most recent ROE approved by the Commission in a litigated NGA section 4 rate case, 10.55 percent); *Cheniere Corpus Christi Pipeline, LP,* 169 FERC ¶ 61,135 at PP 34-35 ("It is not appropriate to use the 14 percent ROE approved in Cheniere Pipeline's initial certificate authorizations in determining the cost of service for [an incremental expansion project] because it would not adequately reflect the lower risks associated with expanding an existing pipeline system.").

[76] Certificate Order, 171 FERC ¶ 61,232 at P 57.

[77] 145 FERC ¶ 61,040, at P 642 (2013), *reh'g denied,* 154 FERC ¶ 61,120 (2016).

[78] *Gulfstream Natural Gas Sys., L.L.C.*, 170 FERC ¶ 61,199 at PP 18-19; *Cheyenne Connector,* 168 FERC ¶ 61,180 at PP 51-52; *Corpus Christi,* 169 FERC ¶ 61,135 at PP 34-35*; Alliance Pipeline L.P.,* 140 FERC ¶ 61,212, at PP 18-20 (2012).

projects.[79] The Commission's decision today serves only to further erode confidence in its promise to "'hold the line' while awaiting the adjudication of just and reasonable rates."[80]

For these reasons, I respectfully dissent in part.

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Richard Glick
Commissioner

[79] *See e.g., Gulfstream Natural Gas Sys., L.L.C.*, 170 FERC ¶ 61,199 at P 19, decided less than a month ago.

[80] *See* Certificate Order, 171 FERC ¶ 61,232 at P 62.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Mountain Valley Pipeline, LLC Docket No. CP19-14-000

(Issued June 18, 2020)

McNAMEE, Commissioner, *concurring*:

1. Today's order issues Mountain Valley Pipeline, LLC (Mountain Valley) a certificate to construct and operate its proposed Southgate Project.[1] The Southgate Project is designed to provide up to 375,000 dekatherms (Dth) per day of firm transportation service.[2] Additionally, this order directs the Office of Energy Projects (OEP) to not issue any notice to proceed with construction of the Southgate Project until Mountain Valley receives necessary federal permits for the Mainline System[3], and the Director of OEP, or the Director's designee, lifts the stop-work order and authorizes Mountain Valley to continue constructing the Mainline System.[4] I agree that the order complies with the Commission's statutory responsibilities under the Natural Gas Act (NGA) and the National Environmental Policy Act (NEPA). The order determines that the Project is in the public convenience and necessity, finding that the project will not adversely affect Mountain Valley's existing customers or competitor pipelines and their captive customers, and the project's benefits will outweigh any adverse economic effects on landowners and surrounding communities.[5] The order also finds that the environmental impacts associated with the project, if constructed and operated as described in the Environmental Impact Statement (EIS), are acceptable considering the public benefits that the project will provide.[6] Consistent with the holding in *Sierra Club v. FERC* (*Sabal Trail*),[7] the Commission quantified and considered the greenhouse gas

[1] *Mountain Valley Pipeline, LLC*, 171 FERC ¶ 61,232 (2020) (Certificate Order).

[2] *Id.* P 11.

[3] *Id.* P 3. (The Mainline System consists of a 303.5-mile-long, 42-inch-diameter interstate pipeline system to provide up to 2,000,000 Dth per day of firm natural gas transportation service from Wetzel County, West Virginia, to an interconnection with Transcontinental Gas Pipe Line, LLC's Compressor Station 165 in Pittsylvania County, Virginia.)

[4] *Id.* P 9.

[5] *Id.* P 52.

[6] *Id.* P 144.

[7] 867 F.3d 1357 (D.C. Cir. 2017). This case is commonly referred to as "Sabal

(GHG) emissions associated with the construction and operation of the Project and found that because the end-use of the contracted volumes is unknown, any potential GHG emissions are not reasonably foreseeable.[8] The Commission also found that the Social Cost of Carbon is not a suitable methodology to determine whether the Project would have a significant impact on climate change.[9]

2. Although I fully support this order, I write separately to address what I perceive to be a misinterpretation of the Commission's authority under the NGA and NEPA. There have been contentions that the NGA authorizes the Commission to deny a certificate application based on the environmental effects that result from the upstream production and downstream use of natural gas, that the NGA authorizes the Commission to establish measures to mitigate GHG emissions, and that the Commission violates the NGA and NEPA by not determining whether GHG emissions significantly affect the environment. I disagree.

3. A close examination of the statutory text and foundation of the NGA demonstrates that the Commission does not have the authority under the NGA or NEPA to deny a pipeline certificate application based on the environmental effects of the upstream production or downstream use of natural gas nor does the Commission have the authority to unilaterally establish measures to mitigate GHG emissions. Further, the Commission has no objective basis to determine whether GHG emissions will have a significant effect on climate change nor the authority to establish its own basis for making such a determination.

4. It is my intention that my discussion of the statutory text and foundation will assist the Commission, the courts, and other parties in their arguments regarding the meaning of the "public convenience and necessity" and the Commission's consideration of a project's effect on climate change. Further, my review of appellate briefs filed with the court and the Commission's orders suggests that the court may not have been presented with the arguments I make here. Before I offer my arguments, it is important that I further expound on the current debate.

I. Current debate

5. When acting on a certificate application, the Commission has two primary statutory obligations: (1) to determine whether the project is required by the "public

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Trail" because the Sabal Trail Pipeline is one of the three pipelines making up the Southeast Market Pipelines Project.

[8] Certificate Order, 171 FERC ¶ 61,232 at P 99; Final Environmental Impact Statement at 4-263.

[9] *Id.* P 102.

convenience and necessity" as required by the NGA;[10] and (2) to take a "hard look" at the direct,[11] indirect,[12] and cumulative effects[13] of the proposed action as required by NEPA and the Council on Environmental Quality's (CEQ) implementing regulations. Recently, there has been much debate concerning what factors the Commission can consider in determining whether a proposed project is in the "public convenience and necessity," and whether the effects of upstream production and downstream use of natural gas are indirect effects of a certificate application as defined by NEPA.

6. Equating NGA section 7's "public convenience and necessity" standard with a "public interest" standard, my colleague has argued that NGA section 7 requires the Commission to weigh GHGs emitted from project facilities and related to the upstream production or downstream use of natural gas.[14] In support of his contention, my colleague has cited the holding in *Sabal Trail* and dicta in *Atlantic Refining Co. v. Public Service Commission of State of New York* (*CATCO*).[15] My colleague has argued that the NGA requires the Commission to determine whether GHG emissions have a significant impact on climate change in order for climate change to "play a meaningful role in the Commission's public interest determination."[16] And he argues that by not determining the significance of those emissions, the "public interest determination [] systematically

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[10] 15 U.S.C. § 717f(e) (2018).

[11] Direct effects are those "which are caused by the action and occur at the same time and place." 40 C.F.R. § 1508.8(a) (2019).

[12] Indirect effects are those "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b) (2019). The U.S. Supreme Court held that NEPA requires an indirect effect to have "a reasonably close causal relationship" with the alleged cause; "a 'but for' causal relationship is insufficient to make an agency responsible for a particular effect under NEPA and the relevant regulations." *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 767 (2004).

[13] Cumulative effects are those "which result[] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7 (2019).

[14] *See, e.g.*, *Adelphia Gateway, LLC*, 169 FERC ¶ 61,220 (2019) (Glick, Comm'r, dissenting at P 3) (Adelphia Dissent); *Cheyenne Connector, LLC*, 168 FERC ¶ 61,180 (2019) (Glick, Comm'r, dissenting at P 4) (Cheyenne Connector Dissent).

[15] Adelphia Dissent P 4 n.7 (citing *CATCO*, 360 U.S. 378, 391 (1959)). The case *Atlantic Refining Co. v. Public Service Commission of State of New York* is commonly known as "*CATCO*" because the petitioners were sometimes identified by that name.

[16] Adelphia Dissent P 5.

excludes the most important environmental consideration of our time" and "is contrary to law, arbitrary and capricious" and is not "the product of reasoned decision making."[17]

7. My colleague has also argued that the emissions from all downstream use of natural gas are indirect effects of a project and must be considered in the Commission's NEPA environmental documents.[18] In other proceedings, he has argued that the Commission must also consider as indirect effects GHG emissions from upstream natural gas production.[19] He has asserted that NEPA requires the Commission to determine whether GHG emissions will have a significant effect on climate change and that the Commission could make that determination using the Social Cost of Carbon or its own expertise.[20] Further, he has contended that the Commission could mitigate any GHG emissions in the event that it made a finding that the GHG emissions had a significant impact on climate change.[21]

8. Several recent cases before the United States Court of Appeals for the D.C. Circuit have also considered the Commission's obligations under NGA section 7 and NEPA as they apply to what environmental effects the Commission is required to consider under NEPA.[22] In *Sabal Trail*, the D.C. Circuit vacated and remanded the Commission's order issuing a certificate for the Southeast Market Pipelines Project, finding that the Commission inadequately assessed GHGs emitted from downstream power plants in its EIS for the project. [23] The court held that the downstream GHG emissions resulting from burning the natural gas at the power plants were a reasonably foreseeable indirect effect

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[17] *Id.*

[18] *Id.* P 6.

[19] Cheyenne Connector Dissent P 10.

[20] Adelphia Dissent PP 8-10.

[21] *Id.* P 12.

[22] The courts have not explicitly opined on whether the Commission is required to determine whether GHG emissions will have a significant impact on climate change or whether the Commission must mitigate GHG emissions. The D.C. Circuit, however, has suggested that the Commission is not required to determine whether GHG emissions are significant. *Appalachian Voices v. FERC*, 2019 WL 847199, *2 (D.C. Cir. Feb. 19, 2019) (unpublished) ("FERC provided an estimate of the upper bound of emissions resulting from end-use combustion, and it gave several reasons why it believed petitioner's preferred metric, the Social Cost of Carbon, is not an appropriate measure of project-level climate change impacts and their significance under NEPA or the Natural Gas Act. That is all that is required for NEPA purposes.").

[23] *Sabal Trail*, 867 F.3d 1357.

of authorizing the project and, at a minimum, the Commission should have estimated those emissions.

9. Further, the *Sabal Trail* court found the Commission's authorization of the project was the legally relevant cause of the GHGs emitted from the downstream power plants "because FERC could deny a pipeline certificate on the ground that the pipeline would be too harmful to the environment."[24] The court stated the Commission could do so because, when considering whether pipeline applications are in the public convenience and necessity, "FERC will balance 'the public benefits against the adverse effects of the project,' *see Minisink Residents for Envtl. Pres. & Safety v. FERC*, 762 F.3d 97, 101-02 (D.C. Cir. 2014) (internal quotation marks omitted), including adverse environmental effects, *see Myersville Citizens for a Rural Cmty. v. FERC*, 783 F.3d 1301, 1309 (D.C. Cir. 2015)."[25] Relying on its finding that the Commission could deny a pipeline on environmental grounds, the court distinguished *Sabal Trail* from the Supreme Court's holding in *Public Citizen,* where the Court held "when the agency has no *legal* power to prevent a certain environmental effect, there is no decision to inform, and the agency need not analyze the effect in its NEPA review"[26] and the D.C. Circuit's decision in *Sierra Club v. FERC* (*Freeport*), where it held "that FERC had *no legal authority to prevent* the adverse environmental effects of natural gas exports."[27]

10. Based on these findings, the court concluded that "greenhouse-gas emissions are an indirect effect of authorizing this project, which FERC could reasonably foresee, and which the agency has legal authority to mitigate."[28] The court also held "the EIS for the Southeast Market Pipelines Project should have either given a quantitative estimate of the downstream greenhouse emissions . . . or explained more specifically why it could not have done so."[29] The court impressed that "[it did] not hold that quantification of greenhouse-gas emissions is required *every* time those emissions are an indirect effect of an agency action" and recognized that "in some cases quantification may not be feasible."[30]

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[24] *Id.* at 1373.

[25] *Id.*

[26] *Id.* at 1372 (citing *Pub. Citizen*, 541 U.S. at 770) (emphasis in original).

[27] *Id.* at 1373 (citing *Freeport*, 827 F.3d 36, 47 (D.C. Cir. 2016)) (emphasis in original).

[28] *Id.* at 1374 (citing 15 U.S.C. § 717f(e)).

[29] *Id.*

[30] *Id.* (emphasis in original).

11. More recently, in *Birckhead v. FERC*,[31] the D.C. Circuit commented in dicta on the Commission's authority to consider downstream emissions. The court stated that because the Commission could "'deny a pipeline certificate on the ground that the pipeline would be too harmful to the environment, the agency is the legally relevant cause of the direct and indirect environmental effects of pipelines it approves'—even where it lacks jurisdiction over the producer or distributor of the gas transported by the pipeline."[32] The court also examined whether the Commission was required to consider environmental effects related to upstream gas production, stating it was "left with no basis for concluding that the Commission acted arbitrarily or capriciously or otherwise violated NEPA in declining to consider the environmental impacts of upstream gas production."[33]

12. I respect the holding of the court in *Sabal Trail* and the discussion in *Birckhead*, and I recognize that the *Sabal Trail* holding is binding on the Commission. However, I respectfully disagree with the court's finding that the Commission can, pursuant to the NGA, deny a pipeline based on environmental effects stemming from the upstream production or downstream use of natural gas, and that the Commission is therefore required to consider such environmental effects under the NGA and NEPA.[34]

13. The U.S. Supreme Court has observed that NEPA requires an indirect effect to have "a reasonably close causal relationship" with the alleged cause.[35] Whether there is a reasonably close causal relationship depends on "the underlying policies or legislative intent" of the agency's organic statute "to draw a manageable line between those causal changes that may make an actor responsible for an effect and those that do not."[36] Below, I review the text of the NGA and subsequent acts by Congress to demonstrate that the "public convenience and necessity" standard in the NGA is not so broad as to include

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[31] 925 F.3d 510 (D.C. Cir. 2019).

[32] *Id.* at 519 (citing *Sabal Trail*, 867 F.3d at 1373) (internal quotations omitted).

[33] *Id.* at 518.

[34] Though the D.C. Circuit's holding in *Sabal Trail* is binding on the Commission, it is not appropriate to expand that holding through the dicta in *Birckhead* so as to establish new authorities under the NGA and NEPA. The Commission is still bound by the NGA and NEPA as enacted by Congress, and interpreted by the U.S. Supreme Court and the D.C. Circuit. Our obligation is to read the statutes and case law in harmony. This concurrence articulates the legal reasoning by which to do so.

[35] *Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983).

[36] *Id.* at 774 n.7.

environmental effects of the upstream production or downstream use of natural gas, and that the Commission cannot be responsible for those effects.

14. As for GHGs emitted from pipeline facilities themselves, I believe that the Commission can consider such emissions in its public convenience and necessity determination and is required to consider them in its NEPA analysis. As I set forth below, however, the Commission cannot unilaterally establish measures to mitigate GHG emissions, and there currently is no suitable method for the Commission to determine whether GHG emissions are significant.

II. The NGA does not permit the Commission to deny a certificate application based on environmental effects related to the upstream production or downstream use of natural gas

15. To interpret the meaning of "public convenience and necessity," we must begin with the text of the NGA.[37] I recognize that the Commission[38] and the courts have equated the "public convenience and necessity" standard with "all factors bearing on the public interest."[39] However, the phrase "all factors bearing on the public interest" does not mean that the Commission has "broad license to promote the general public welfare"[40] or address greater societal concerns. Rather, the courts have stated that the words must "take meaning from the purposes of regulatory legislation."[41] The Court has

[37] 15 U.S.C. § 717f(e) (2018). *See infra* PP 42-48. It is noteworthy that the phrase "public interest" is not included in NGA section 7(c)(1)(A) (requiring pipelines to have a certificate) or NGA section 7(e) (requiring the Commission to issue certificates). Rather, these provisions use the phrase "public convenience and necessity." NGA section 7(c)(1)(B) does refer to public interest when discussing how the Commission can issue a temporary certificate in cases of emergency. *Id.* § 717f(c)(1)(B). Congress is "presumed to have used no superfluous words." *Platt v. Union Pac. R.R. Co.*, 99 U.S. 48, 58 (1878); *see also U.S. ex rel. Totten v. Bombardier Corp.*, 380 F.3d 488, 499 (D.C. Cir. 2004) ("It is, of course, a 'cardinal principle of statutory construction that a statute ought, upon the whole, to be so construed that, if it can be prevented, no clause, sentence, or word shall be superfluous, void, or insignificant.'" (citing *Alaska Dep't of Envtl. Conservation v. EPA*, 540 U.S. 461, n.13 (2004))).

[38] *See, e.g.*, *North Carolina Gas Corp.*, 10 FPC 469, 475 (1950).

[39] *CATCO*, 360 U.S. at 391 ("This is not to say that rates are the only factor bearing on the public convenience and necessity, for § 7(e) requires the Commission to evaluate all factors bearing on the public interest."). The Court never expounded further on that statement.

[40] *NAACP v. FPC*, 425 U.S. 662, 669 (1976).

[41] *Id.*; *see also Office of Consumers' Counsel v. FERC*, 655 F.2d 1132, 1147 (D.C.

made clear that statutory language "cannot be construed in a vacuum. It is a fundamental canon of statutory construction that the words of a statute must be read in their context and with a view to their place in the overall statutory scheme."[42] The Court has further instructed that one must "construe statutes, not isolated provisions."[43]

16. Indeed, that is how the Court in *CATCO* – the first U.S. Supreme Court case including the "all factors bearing on the public interest" language – interpreted the phrase "public convenience and necessity." In that case, the Court held that the public convenience and necessity requires the Commission to closely scrutinize initial rates *based on the framework and text* of the NGA.[44]

17. Following this precedent, the phrase "public convenience and necessity" must therefore be read within the overall statutory scheme of the NGA. As set forth below, construing the NGA *as a statute* demonstrates that Congress determined the public

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Cir. 1980) ("Any such authority to consider all factors bearing on the 'public interest' must take into account what the 'public interest' means in the context of the Natural Gas Act. FERC's authority to consider all factors bearing on the public interest when issuing certificates means authority to look into those factors which reasonably relate to the purposes for which FERC was given certification authority. It does not imply authority to issue orders regarding any circumstance in which FERC's regulatory tools might be useful.").

[42] *Davis v. Mich. Dep't of Treasury*, 489 U.S. 803, 809 (1989).

[43] *Graham Cty. Soil & Water Conservation Dist. v. U.S. ex rel. Wilson*, 559 U.S. 280, 290 (2010) (quoting *Gustafson v. Alloyd Co.*, 513 U.S. 561, 568 (1995)).

[44] *CATCO*, 360 U.S. 378, 388-91. The Court stated "[t]he Act was so framed as to afford consumers a complete, permanent and effective bond of protection from excessive rates and charges." *Id.* at 388. The Court found that the text of NGA sections 4 and 5 supported the premise that Congress designed the Act to provide complete protection from excessive rates and charges. *Id.* ("The heart of the Act is found in those provisions requiring . . . that all rates and charges 'made, demanded, or received' shall be 'just and reasonable.'"); *id.* at 389 ("The overriding intent of the Congress to give full protective coverage to the consumer as to price is further emphasized in § 5 of the Act . . . ."). The Court recognized that the Commission's role in setting initial rates was a critical component of providing consumers complete protection because "the delay incident to determination in § 5 proceedings through which initial certificated rates are reviewable appears nigh interminable" and "would provide a windfall for the natural gas company with a consequent squall for the consumers," which "Congress did not intend." *Id.* at 389-90.

interest required (i) the public to have access to natural gas and (ii) economic regulation of the transportation and sale of natural gas to protect such public access.

A. The text of the NGA does not support denying a certificate application based on the environmental effects of the upstream production or downstream use of natural gas

1. NGA section 1(a)—limited meaning of "public interest"

18. Section 1 of the NGA sets out the reason for its enactment. NGA section 1(a) states, "[a]s disclosed in reports of the Federal Trade Commission [(FTC)] made pursuant to S. Res. 83 (Seventieth Congress, first session) and other reports made pursuant to the authority of Congress, it is declared that the business of transporting and selling natural gas for ultimate distribution to the public *is affected with a public interest,* and that Federal regulation in matters relating to the transportation of natural gas and the sale thereof in interstate and foreign commerce is necessary in the *public interest*."[45]

19. A review of the FTC Report referred to in NGA section 1 demonstrates that the NGA was enacted to counter activities that would limit the public's access to natural gas and subject the public to abusive pricing. Specifically, the FTC Report states "[a]ll communities and industries within the capacity and reasonable distance of existing or future transmission facilities should be assured a natural-gas supply and receive it at fair, nondiscriminatory prices."[46]

20. The FTC Report further states "[a]ny proposed Federal legislation should be premised, in part at least, on the fact that natural gas is a valuable, but limited, natural resource in Nation-wide demand, which is produced only in certain States and limited areas, and the conservation, production, transportation, and distribution of which, therefore, under proper control and regulation, are matters charged with high national public interest."[47]

21. The text of NGA section 1(a) and its reference to the FTC Report make clear that "public interest" is directly linked to ensuring the public's access to natural gas through

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[45] 15 U.S.C. § 717(a) (2018) (emphasis added).

[46] FEDERAL TRADE COMMISSION, UTILITY CORPORATIONS FINAL REPORT OF THE FEDERAL TRADE COMMISSION TO THE SENATE OF THE UNITED STATES PURSUANT TO SENATE RESOLUTION NO. 83, 70TH CONGRESS, 1ST SESSION ON ECONOMIC, CORPORATE, OPERATING, AND FINANCIAL PHASES OF THE NATURAL-GAS-PRODUCING, PIPE-LINE, AND UTILITY INDUSTRIES WITH CONCLUSIONS AND RECOMMENDATIONS NO. 84-A at 609 (1936) (FTC Report), https://babel.hathitrust.org/cgi/pt?id=ien.35556021351598&view=1up&seq=718.

[47] *Id.* at 611.

regulating its transport and sale. Moreover, the NGA is designed to promote the "public interest" primarily through economic regulation. This is apparent in the text of the NGA and by its reference to the FTC Report that identifies the concern with monopolistic activity that would limit access to natural gas.[48]

22. Therefore, there is no textual support in NGA section 1 for the claim that the Commission may deny a pipeline application due to potential upstream and downstream effects of GHG emissions on climate change. But, this is not the end of the analysis. We must also examine the Commission's specific authority under NGA section 7.

2. NGA section 7—Congress grants the Commission and pipelines authority to ensure the public's access to natural gas

23. Like NGA section 1, the text of NGA section 7 makes clear that its purpose is to ensure that the public has access to natural gas. A review of the various provisions of NGA section 7 make this point evident:

- Section 7(a) authorizes the Commission to "direct a natural-gas company to extend or improve its transportation facilities, to establish physical connection of its transportation facilities with the facilities of, and sell natural gas . . . to the public . . . ."[49] The Commission has stated that "[s]ection 7(a) clearly established the means whereby the Commission

[48] 15 U.S.C. § 717(a) (2018) ("Federal regulation in matters relating to the transportation of natural gas and the sale thereof in interstate and foreign commerce is necessary in the public interest"). The limited, economic regulation meaning of "public interest" was clear at the time the NGA was adopted. The NGA's use of the phrase "affected with the public interest" is consistent with the States' use of this phrase when enacting laws regulating public utilities. Historically, state legislatures used the phrase "affected with the public interest" as the basis of their authority to regulate rates charged for the sale of commodities, rendered services, or use of private property. *Munn v. Illinois*, 94 U.S. 113, 125-26 (1876). The Court found that businesses affected with a public interest or "said to be clothed with a public interest justifying some public regulation" include "[b]usinesses, which, though not public at their inception, may be fairly said to have risen to be such and have become subject in consequence to some government regulation." *Charles Wolff Packing Co. v. Court of Indus. Relations*, 262 U.S. 522, 535 (1923). In essence, these businesses became quasi-public enterprises and were determined to have an "indispensable nature." *Id.* at 538. Such a conclusion also meant that if these businesses were not restrained by the government, the public could be subject to "the exorbitant charges and arbitrary control to which the public might be subjected without regulation." *Id.*

[49] 15 U.S.C. § 717f(a) (2018).

could secure *the benefits* of gas service for certain communities, markets and territories adjacent to those originally established by the gas industry, where in the public interest."[50]

- Section 7(b) requires Commission approval for a natural gas pipeline company to "abandon all or any portion of its facilities subject to the jurisdiction of the Commission, or any service rendered by means of such facilities."[51] That is, Congress considered access to natural gas to be so important that it even prohibited natural gas pipeline companies from abandoning service without Commission approval.

- Section 7(c)(1)(B) authorizes the Commission to "issue a temporary certificate in cases of emergency, to assure maintenance of adequate service or to serve particular customers, without notice or hearing, pending the determination of an application for a certificate."[52] The underlying presumption of this section is that the need for natural gas can be so important that the Commission can issue a certificate without notice and hearing.

- Section 7(e) states "a certificate *shall* be issued" when a project is in the public convenience and necessity,[53] leaving the Commission no discretion after determining a project meets the public convenience and necessity standard.

- Section 7(h) grants the pipeline certificate holder the powers of the sovereign to "exercise of the right of eminent domain in the district court of the United States."[54] By granting the power of eminent domain, Congress made clear the importance of ensuring that natural gas could be delivered from its source to the public by not allowing traditional property rights to stand in the way of pipeline construction. Furthermore, the sovereign's

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[50] *Arcadian Corp. v. Southern Nat. Gas Co.*, 61 FERC ¶ 61,183, at 61,676 (1992) (emphasis added). The Commission's analysis in this regard was unaffected by the opinion in *Atlanta Gas Light Co. v. FERC*, 140 F.3d 1392 (11th Cir. 1998) (vacating the Commission's 1991 and 1992 orders on other grounds).

[51] 15 U.S.C. § 717f(b) (2018).

[52] *Id.* § 717f(c)(1)(B).

[53] *Id.* § 717f(e) (emphasis added).

[54] *Id.* § 717f(h).

power of eminent domain must be for a public use[55] and Congress considered natural gas pipelines a public use.

24. Each of these textual provisions illuminate the ultimate purpose of the NGA: to ensure that the public has access to natural gas because Congress considered such access to be in the public interest.[56] To now interpret "public convenience and necessity" to mean that the Commission has the authority to deny a certificate for a pipeline due to upstream or downstream emissions because the pipeline may result in access to, and the use of, natural gas would radically rewrite the NGA and undermine its stated purpose.

3. NGA section 1(b) and section 201 of the Federal Power Act (FPA)—authority over environmental effects related to the upstream production and downstream use of transported natural gas reserved to States

25. Statutory text also confirms that control over the physical environmental effects related to the upstream production and downstream use of natural gas are squarely reserved for the States. NGA section 1(b) provides that "[t]he provisions of this chapter . . . shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities for such distribution or to the production or gathering of natural gas."[57] The Ninth Circuit and the D.C. Circuit have interpreted the reference to distribution as meaning that States have exclusive authority over the gas

[55] *Miss. & Rum River Boom Co. v. Patterson*, 98 U.S. 403, 406 (1878) ("The right of eminent domain, that is, the right to take private property for public uses, appertains to every independent government.").

[56] This interpretation is also supported by the Commission's 1999 Certificate Policy Statement. *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227, 61,743 (1999), *clarified*, 90 FERC ¶ 61,128, *further clarified*, 92 FERC ¶ 61,094 (2000) (Certificate Policy Statement) ("[I]t should be designed to foster competitive markets, protect captive customers, and avoid unnecessary environmental and community impacts *while serving increasing demands for natural gas*.") (emphasis added); *id.* at 61,751 ("[T]he Commission is urged to authorize new pipeline capacity to meet an anticipated increase in demand for natural gas . . . .").

[57] 15 U.S.C. § 717(b) (2018); *see Pennzoil v. FERC*, 645 F.2d 360, 380-82 (5th Cir. 1981) (holding that FERC lacks the power to even interpret gas purchase agreements between producers and pipelines for the sale of gas that has been removed from NGA jurisdiction).

once the gas moves beyond high-pressure mainlines.[58] Likewise, FPA section 201 specifically reserves the authority to make generation decisions to the States.[59]

26. U.S. Supreme Court precedent and legislative history confirm that the regulation of the physical upstream production and downstream use of gas is reserved for the States.[60] The Court has observed that Congress enacted the NGA to address "specific evils" related to non-transparent rates for the interstate transportation and sale of natural gas and the monopoly power of holding companies that owned natural gas pipeline company stock.[61] The Court has also found that Congress enacted the NGA to

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[58] *See S. Coast Air Quality Mgmt. Dist. v. FERC*, 621 F.3d 1085, 1092 (9th Cir. 2010) ("In sum, the history and judicial construction of the Natural Gas Act suggest that all aspects related to the direct consumption of gas . . . remain within the exclusive purview of the states."); *Pub. Utils. Comm'n of Cal. v. FERC*, 900 F.2d 269, 277 (D.C. Cir. 1990) ("[T]he state . . . has authority over the gas once it moves beyond the high-pressure mains into the hands of an end user."). I note that the court in *Sabal Trail* did not discuss or distinguish *Public Utilities Commission of State of Cal v. FERC*.

[59] 16 U.S.C. § 824(b)(1) (2018) ("The Commission . . . shall not have jurisdiction, except as specifically provided in this subchapter and subchapter III of this chapter, over facilities used for the generation of electric energy . . . ."). Despite Congress explicitly denying the Commission jurisdiction over generation decisions in the FPA, some argue that the Commission has the authority to prevent natural gas generation through general language in the NGA regarding public convenience and necessity. Such an approach violates the principle that explicit language trumps general provisions. *See, e.g.*, *Passamaquoddy Tribe v. State of Me.*, 897 F. Supp. 632, 635 ("In this case, the unequivocal language in the Maine Settlement Act clearly trumps the Gaming Act's general provisions that are silent as to Maine.").

[60] Some will argue that the Court's dicta in *FPC v. Hope Natural Gas Co.* (*Hope*)—"[t]he Commission is required to take account of the ultimate use of the gas," 320 U.S. 591, 639 (1944)—means that the Commission can consider environmental effects related to the downstream use of natural gas. However, such argument takes the Court's statement out of context. In fact, that Court makes that statement in support of its argument that while the 1942 amendments to the NGA eliminated the language, "the intention of Congress that natural gas shall be sold in interstate commerce for resale for ultimate public consumption for domestic, commercial, industrial, or any other use at the lowest possible reasonable rate consistent with the maintenance of adequate service in the public interest," "there is nothing to indicate that it was not and is still not an accurate statement of purpose of the Act." *Id.* at 638. Such argument further supports that Congress enacted the NGA to provide access to natural gas and to protect consumers from monopoly power.

[61] *Id.* at 610 ("state commissions found it difficult or impossible to discover what

> fill the regulatory void created by the Court's earlier decisions prohibiting States from regulating interstate transportation and sales for resale of natural gas, while at the same time leaving undisturbed the recognized power of the States to regulate all in-state gas sales directly to consumers. Thus, the NGA "was drawn with meticulous regard for the continued exercise of state power, not to handicap it any way."[62]

27. In *Transco*,[63] the Court also recognized that "Congress did not desire that an important aspect of this field be left unregulated."[64] Thus, the Court held that where

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it cost interstate pipe-line companies to deliver gas within the consuming states"); *id.* ("[T]he investigations of the Federal Trade Commission had disclosed the majority of the pipe-line mileage in the country used to transport natural gas, together with an increasing percentage of the natural gas supply for pipe-line transportation, had been acquired by a handful of holding companies."). Senate Resolution 83, which directed the FTC to develop the report that the NGA is founded on, also demonstrates that Congress was only concerned with consumer protection and monopoly power. The resolution directed the FTC to investigate capital assets and liabilities of natural gas companies, issuance of securities by the natural gas companies, the relationship between company stockholders and holding companies, other services provided by the holding companies, adverse impacts of holding companies controlling natural gas companies, and potential legislation to correct any abuses by holding companies. FTC Report at 1.

[62] *Gen. Motors Corp. v. Tracy*, 519 U.S. 278, 292 (1997) (internal citations omitted) (quoting *Panhandle E. Pipeline Co. v. Pub. Serv. Comm'n of Ind.*, 332 U.S. 507, 516-22 (1947) (*Panhandle*)); *see also Nw. Cent. Pipeline v. State Corp. Comm'n*, 489 U.S. 493, 512 (1989) ("The NGA 'was designed to supplement state power and to produce a harmonious and comprehensive regulation of the industry. Neither state nor federal regulatory body was to encroach upon the jurisdiction of the other.'" (quoting *Panhandle*, 332 U.S. at 513)); *Panhandle*, 332 U.S. at 520 (In recognizing that the NGA articulated a legislative program recognizing the respective responsibilities of federal and state regulatory agencies, the Court noted that the NGA does not "contemplate ineffective regulation at either level as Congress meant to create a comprehensive and effective regulatory scheme, complementary in its operation to those of the states and in no manner usurping their authority."). Congress continued to draw the NGA with meticulous regard to State power when it amended the NGA in 1954 to add the Hinshaw pipeline exemption so as "to preserve state control over local distributors who purchase gas from interstate pipelines." *Louisiana Power & Light Co. v. Fed. Power Comm'n*, 483 F.2d 623, 633 (5th Cir. 1973).

[63] *Transco*, 365 U.S. 1 (1961).

[64] *Id.* at 19.

congressional authority is not explicit and States cannot practicably regulate a given area, the Commission can consider the issue in its public convenience and necessity determination.[65]

28. Based on this rule, and legislative history,[66] the *Transco* Court found that in its public convenience and necessity determination, the Commission appropriately considered whether the end-use of the gas in a non-producing state was economically wasteful as there was a regulatory gap and no State could be expected to control how gas is used in another State.[67] The Court also impressed that

> The Commission ha[d] not attempted to exert its influence over such "*physically*" wasteful practices as improper well spacing and the flaring of unused gas which result in the entire loss of gas and are properly of concern to the producing State; nor has the Commission attempted to regulate the "economic" aspects of gas used within the producing State.[68]

29. In contrast, there is no legislative history to support the Commission considering environmental effects related to the upstream production or downstream use of gas. Furthermore, the field of environmental regulation of such activities is not one that has been left unregulated.[69] Unlike in *Transco*, States can reasonably be expected to regulate

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[65] *Id*. at 19-20.

[66] *Id.* at 10-19.

[67] *Id.* at 20-21.

[68] *Id.* at 20 (emphasis added).

[69] I note that the Federal Power Commission, the Commission's predecessor, at times previously considered environmental impacts in its need analysis when weighing the beneficial use of natural gas between competing uses. The Federal Power Commission did not consider negative environmental impacts of downstream end use as a reason to deny the use of natural gas. *See, e.g.*, *El Paso Natural Gas Co.*, 50 FPC 1264 (1973) (denying a certificate because the proposed project would impact existing customers dependent on natural gas and use of gas was not needed to keep sulfur emissions within the national ambient air quality standards); *Transwestern Pipeline Co.*, 36 FPC 176 (1966) (discussing use of gas instead of oil or coal and noting potential air pollution benefits); *El Paso Nat. Gas Co.*, 22 FPC 900, 950 (1959) ("[T]he use of natural gas as boiler fuel in the Los Angeles area should be considered as being in a different category than gas being used for such a purpose in some other community where the smog problem does not exist and that the use of gas for boiler fuel in this area should not be considered an inferior use."); *see also* FPC ANNUAL REP. at 2 (1966) ("Any showing that additional gas for boiler fuel use would substantially reduce air

air emissions from the upstream production or downstream use of natural gas: "air pollution control at its source is the primary responsibility of States and local governments."[70] The Clean Air Act vests States with authority to issue permits to regulate stationary sources related to upstream and downstream activities.[71] In addition, pursuant to their police powers, States have the ability to regulate environmental effects related to the upstream production and downstream use of natural gas within their jurisdictions.[72] The FTC Report referenced in NGA section 1(a) recognizes States' ability to regulate the use of natural gas.[73] And, various States have exercised this ability. For example, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont participate in the Regional Greenhouse Gas

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pollution merits serious consideration. Important as this factor may be, however, it cannot be considered in isolation."). Often these orders discussed sulfur and smog air pollution that occurred in the area where the natural gas would be transported when determining need as compared to the need or use of natural gas somewhere else. All of this was premised on the Commission's NGA authority to use its public convenience and necessity authority to provide access to natural gas and to conserve gas by preventing economic waste. The Commission appears to have stopped this analysis in the late-1970s. It is noteworthy that the U.S. Environmental Protection Agency (EPA) was established in 1970, Congress established more comprehensive air emissions regulation by amending the Clean Air Act in 1970 and 1977 (Pub. L. 91-604, 84 Stat. 1676 (1970); Pub. L. 95-95, 91 Stat. 685 (1977)), and Congress enacted the Department of Energy Organization Act, which replaced the Federal Power Commission with the Federal Energy Regulatory Commission, 42 U.S.C. §§ 7101 *et seq*.

[70] 42 U.S.C. § 7401 (2018).

[71] *Id.* § 7661e ("Nothing in this subchapter shall prevent a State, or interstate permitting authority, from establishing additional permitting requirements not inconsistent with this chapter."). The Act defines "permitting authority" as "the Administrator or the air pollution control agency authorized by the Administrator to carry out a permit program under this subchapter." *Id.* § 7661.

[72] *Huron Portland Cement Co. v. Detroit*, 362 U.S. 440, 442 (1960) ("Legislation designed to free from pollution the very air that people breathe clearly falls within the exercise of even the more traditional concept of what is compendiously known as the police power.").

[73] FTC Report at 716 (describing Louisiana) ("The department of conservation be, and it is hereby, given supervision over the production and use of natural gas in connection with the manufacture of carbon black in other manufacturing enterprises and for domestic consumption.").

Initiative (RGGI), which requires power plants with a capacity over 25 megawatts to hold allowances equal to their CO_2 emissions over a three-year control period.[74]

30. Some may make the argument that "considering" the environmental effects related to upstream production and downstream use is hardly "regulating" such activities. I disagree. For the Commission to consider such effects would be an attempt to exert influence over States' regulation of physical upstream production or downstream use of natural gas, which the Court in *Transco* suggested would be encroaching upon forbidden ground. If, for example, the Commission considered and denied a certificate based on the GHG emissions released from production activities, the Commission would be making a judgment that such production is too harmful for the environment and preempting a State's authority to decide whether and how to regulate upstream production of natural gas. Furthermore, for the Commission to consider and deny a project based on emissions from end users, the Commission would be making a judgment that natural gas should not be used for certain activities.[75] Such exertion of influence is impermissible: "when the Congress explicitly reserves jurisdiction over a matter to the states, as here, the Commission has no business considering how to 'induc[e] a change [of state] policy' with respect to that matter."[76]

31. Hence, there is no jurisdictional gap in regulating GHG emissions for the Commission to fill. The NGA reserves authority over the upstream production and downstream use of natural gas to the States, and States can practicably regulate GHGs emitted by those activities. And, even if there were a gap that federal regulation could fill, as discussed below, it is nonsensical for the Commission to attempt to fill a gap that

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[74] REGIONAL GREENHOUSE GAS INITIATIVE, https://www.rggi.org/program-overview-and-design/elements (LAST ACCESSED NOV. 18, 2019).

[75] *See also Myersville Citizens for a Rural Cmty., Inc. v. FERC*, 783 F.3d 1301, 1320 (D.C. Cir. 2015) ("The Commission's power to preempt state and local regulation by approving the construction of natural gas facilities is limited by the Natural Gas Act's savings clause, which provides that the Natural Gas Act's terms must not be construed to 'affect[] the rights of States' under the Clean Air Act. 15 U.S.C. § 717b(d)(2)."); *Dominion Transmission, Inc. v. Summers*, 723 F.3d 238, 243 (D.C. Cir. 2013) ("But Congress expressly saved states' [Clean Air Act] powers from preemption.").

[76] *Altamont Gas Transmission Co. v. FERC*, 92 F.3d 1239, 1248 (D.C. Cir. 1996); *see ANR Pipeline Co. v. FERC*, 876 F.2d 124, 132 (D.C. Cir. 1989) ("We think it would be a considerable stretch from there to say that, in certifying transportation that is necessary to carry out a sale, the Commission is required to reconsider the very aspects of the sale that have been assessed by an agency specifically vested by Congress with authority over the subject.").

Congress has clearly meant for the EPA to occupy.[77] Therefore, because GHG emissions from the upstream production and downstream use of natural gas are not properly of concern to the Commission, the Commission cannot deny a certificate application based on such effects.

B. Denying a pipeline based on upstream or downstream environmental effects would undermine other acts of Congress

32. Since enactment of the NGA and NEPA, Congress has enacted additional legislation promoting the production and use of natural gas and limiting the Commission's authority over the natural gas commodity. Each of these legislation enactments indicates that the Commission's authority over upstream production and downstream use of natural gas has been further limited by Congress. Arguments that the Commission can rely on the NGA's public convenience and necessity standard and NEPA to deny a pipeline application so as to prevent the upstream production or downstream use of natural gas would undermine these acts of Congress.

1. Natural Gas Policy Act of 1978

33. Determining that federal regulation of natural gas limited interstate access to the commodity, resulting in shortages and high prices, Congress passed the Natural Gas Policy Act of 1978 (NGPA). The NGPA significantly deregulated the natural gas industry.[78] Importantly, NGPA section 601(c)(1) states, "[t]he Commission may not deny, or condition the grant of, any certificate under section 7 of the Natural Gas Act based upon the amount paid in any sale of natural gas, if such amount is deemed to be just and reasonable under subsection (b) of this section."[79]

34. Besides using price deregulation to promote access to natural gas, Congress gave explicit powers to the President to ensure that natural gas reached consumers. NGPA section 302(c) explicitly provides, "[t]he President may, by order, require any pipeline to transport natural gas, and to construct and operate such facilities for the transportation of

[77] *See infra* PP 53-58.

[78] Generally, the NGPA limited the Commission's authority over gas that is not transported in interstate commerce, new sales of gas, sales of gas and transportation by Hinshaw pipelines, and certain sales, transportation and allocation of gas during certain gas supply emergencies. *See, e.g.*, NGPA sections 601(a)(1)(A)-(D), 15 U.S.C. § 3431(a)(1)(A)-(D) (2018).

[79] *Id.* § 3431(c)(1) (2018). In addition, section 121(a) provides, "the provisions of subtitle A respecting the maximum lawful price for the first sale of each of the following categories of natural gas shall, except as provided in subsections (d) and (e), cease to apply effective January 1, 1985." 15 U.S.C. § 3331(a), *repealed by* the Wellhead Decontrol Act of 1989, Pub. L. 101-60 § 2(b), 103 Stat. 157 (1989).

natural gas, as he determines necessary to carry out any contract authorized under subsection (a)."[80] Similarly, the NGPA gave authority to the Secretary of Energy to promote access to natural gas.[81]

35. There can be no doubt about the plain language of the NGPA: the Court observed that Congress passed the NGPA to "promote gas transportation by interstate and intrastate pipelines."[82] Furthermore, the NGPA was "intended to provide investors with adequate incentive to develop new sources of supply."[83]

2. Powerplant and Industrial Fuel Use Act of 1978

36. With respect to natural gas as a fuel source for electric generation, in 1987 Congress repealed sections of the Powerplant and Industrial Fuel Use Act of 1978 (Fuel Use Act),[84] which had restricted the use of natural gas in electric generation so as to conserve it for other uses. With the repeal of the Fuel Use Act, Congress made clear that natural gas could be used for electric generation and that the regulation of the use of natural gas by power plants unnecessary.[85]

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[80] *Id.* § 3362.

[81] *See id.* § 3391(a) ("[T]he Secretary of Energy shall prescribe and make effective a rule . . . which provides . . . no curtailment plan of an interstate pipeline may provide for curtailment of deliveries for any essential agricultural use . . . ."); *id.* § 3392(a) ("The Secretary of Energy shall prescribe and make effective a rule which provides that notwithstanding any other provisions of law (other than subsection (b)) and to the maximum extent practicable, no interstate pipeline may curtail deliveries of natural gas for any essential industrial process or feedstock use . . . ."); *id.* § 3392(a) ("The Secretary of Energy shall determine and certify to the Commission the natural gas requirements (expressed either as volumes or percentages of use) of persons (or classes thereof) for essential industrial process and feedstock uses (other than those referred to in section 3391(f)(1)(B))."); *id.* § 3393(a) ("The Secretary of Energy shall prescribe the rules under sections 3391 and 3392 of this title pursuant to his authority under the Department of Energy Organization Act to establish and review priorities for curtailments under the Natural Gas Act.").

[82] *Gen. Motors Corp. v. Tracy*, 519 U.S. at 283 (quoting 57 Fed. Reg. 13271 (Apr. 16, 1992)).

[83] *Pub. Serv. Comm'n of State of N.Y. v. Mid-Louisiana Gas Co.*, 463 U.S. 319, 334 (1983).

[84] 42 U.S.C. § 8342, *repealed by* Pub. L. 100-42, § 1(a), 101 Stat. 310 (1987).

[85] The Commission need not look any further than the text of the statutes to determine its authority. In the case of the repeal of the Fuel Use Act, the legislative

3. Natural Gas Wellhead Decontrol Act of 1989

37. If there were any remaining doubt that the Commission has no authority to consider the upstream production of natural gas and its environmental effects, such doubt was put to rest when Congress enacted the Wellhead Decontrol Act.[86] In this legislation, Congress specifically removed the Commission's authority over the upstream production of natural gas.[87]

38. But the Wellhead Decontrol Act was not merely about deregulating upstream natural gas production. Congress explained that the reason for deregulating natural gas at the wellhead was important to ensuring that end users had access to the commodity. The Senate Committee Report for the Wellhead Decontrol Act states "the purpose (of the legislation) is to promote competition for natural gas at the wellhead *to ensure consumers an adequate and reliable supply of natural gas at the lowest reasonable price*."[88] Similarly, the House Committee Report to the Wellhead Decontrol Act notes, "[a]ll sellers must be able to reasonably reach the highest-bidding buyer in an increasingly

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history is informative as to Congress's reasoning. *See* H.R. Rep. 100-78 *2 ("By amending [Fuel Use Act], H.R. 1941 will remove artificial government restrictions on the use of oil and gas; allow energy consumers to make their own fuel choices in an increasingly deregulated energy marketplace; encourage multifuel competition among oil, gas, coal, and other fuels based on their price, availability, and environmental merits; preserve the 'coal option' for new baseload electric powerplants which are long-lived and use so much fuel; and provide potential new markets for financially distressed oil and gas producers."); *id.* *6 ("Indeed, a major purpose of this bill is to allow individual choices and competition and fuels and technologies . . . ."); *see also* President Ronald Reagan's Remarks on Signing H.R. 1941 Into Law, 23 WEEKLY COMP. PRES. DOC. 568, (May 21, 1987) ("This legislation eliminates unnecessary restrictions on the use of natural gas. It promotes efficient production and development of our energy resources by returning fuel choices to the marketplace. I've long believed that our country's natural gas resources should be free from regulatory burdens that are costly and counterproductive.").

[86] Pub. L. 101-60, 103 Stat. 157 (1989).

[87] The Wellhead Decontrol Act amended NGPA section 601(a)(1)(A) to read, "[f]or purposes of section 1(b) of the Natural Gas Act, the provisions of the Natural Gas Act and the jurisdiction of the Commission under such Act shall not apply to any natural gas solely by reason of any first sale of such natural gas." 15 U.S.C. § 3431(a)(1)(A), *amended by*, Pub. L. 101-60 § 3(a)(7)(A), 103 Stat. 157 (1989). *United Distrib. Cos. v. FERC*, 88 F.3d 1105, 1166 (D.C. Cir. 1996) ("That enactment contemplates a considerably changed natural gas world in which regulation plays a much reduced role and the free market operates at the wellhead.").

[88] S. Rep. No. 101-39 at 1 (emphasis added).

national market. All buyers must be free to reach the lowest-selling producer, and obtain shipment of its gas to them on even terms with other suppliers."[89] The House Committee Report also states the Commission's "current competitive 'open access' pipeline system [should be] maintained."[90] With this statement, the House Committee Report references Order No. 436 in which the Commission stated that open access transportation "is designed to remove any unnecessary regulatory obstacles and to facilitate transportation of gas to any end user that requests transportation service."[91]

4. Energy Policy Act of 1992

39. In the Energy Policy Act of 1992 (EPAct 1992), Congress also expressed a preference for providing the public access to natural gas. EPAct section 202 states, "[i]t is the sense of the Congress that natural gas consumers and producers, and the national economy, are best served by a competitive natural gas wellhead market."[92]

40. The NGA, NGPA, the repeal of the Fuel Use Act, the Wellhead Decontrol Act, and EPAct 1992 each reflect Congressional mandates to promote the production, transportation, and use of natural gas. None of these acts, and no other law, including NEPA, modifies the presumption in the NGA to facilitate access to natural gas. And, it is not for the Commission to substitute its judgment for that of Congress in determining energy policy.

C. "Public convenience and necessity" does not support consideration of environmental effects related to upstream production or downstream use of natural gas

41. In addition to considering the text of the NGA as a whole and subsequent-related acts, we must interpret the phrase "public convenience and necessity" as used when enacted. As discussed below, "public convenience and necessity" has always been understood to mean "need" for the service. To the extent the environment is considered, such consideration is limited to the effects stemming from the construction and operation of the proposed facilities and is not as broad as some would believe.[93]

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[89] H.R. Rep. No. 101-29 at 6.

[90] *Id.* at 7.

[91] *Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol*, Order No. 436, 50 Fed. Reg. 42,408, 42,478 (Oct. 18, 1985) (Order No. 436).

[92] Pub. L. No. 102-486, 106 Stat. 2776 (1992).

[93] Some will cite the reference to environment in footnote 6 in *NAACP v. FPC* to argue that the Commission can consider the environmental effects of upstream production and downstream use of natural gas. *NAACP v. FPC*, 425 U.S. 662, 670 n.6.

42. When Congress enacted the NGA, the phrase "public convenience and necessity" was a term of art used in state and federal public utility regulation.[94] In 1939, one year after the NGA's enactment, the Commission's predecessor agency, the Federal Power Commission, defined public convenience and necessity as "a public need or benefit without which the public is inconvenienced to the extent of being handicapped in the pursuit of business or comfort or both, without which the public generally in the area involved is denied to its detriment that which is enjoyed by the public of other areas similarly situated."[95] To make such showing, the Commission required certificate applicants to demonstrate that the public needed its proposed project, the applicant could perform the proposed service, and the service would be provided at reasonable rates.[96]

43. To the extent that public convenience and necessity included factors other than need, they were limited and directly related to the proposed facilities, not upstream or downstream effects related to the natural gas commodity. Such considerations included the effects on pipeline competition, duplication of facilities, and social costs, such as misuse of eminent domain and environmental impacts resulting from the creation of the

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The Court's statement does not support that argument. The Court states that the environment could be a subsidiary purpose of the NGA and FPA by referencing FPA section 10, which states the Commission shall consider whether a hydroelectric project is best adapted to a comprehensive waterway by considering, among other things, the proposed *hydroelectric project's effect* on the adequate protection, mitigation, and enhancement of fish and wildlife. Nothing in the Court's statement or the citation would support the consideration of upstream and downstream impacts. *See supra* note 67 (explaining that the Federal Power Commission previously considered environmental impacts of downstream end use when weighing the beneficial use of natural gas between competing uses).

[94] William K. Jones, *Origins of the Certificate of Public Convenience and Necessity: Developments in the States, 1870-1920*, 79 COLUM. L. REV. 426, 427-28 (1979) (Jones).

[95] *Kan. Pipe Line & Gas Co.*, 2 FPC 29, 56 (1939).

[96] *See* Order No. 436, at 42,474 (listing the requirements outlined in *Kan. Pipe Line & Gas Co.*: "(1) they possess a supply of natural gas adequate to meet those demands which it is reasonable to assume will be made upon them; (2) there exist in the territory proposed to be served customers who can reasonably be expected to use such natural-gas service; (3) the facilities for which they seek a certificate are adequate; (4) the costs of construction of the facilities which they propose are both adequate and reasonable; (5) the anticipated fixed charges or the amount of such fixed charges are reasonable; and (6) the rates proposed to be charged are reasonable.").

right-of-way or service.[97] For example, the Commonwealth of Massachusetts considered environmental impacts resulting from the creation of the right-of-way and service in denying an application to build a railroad along a beach. The Commonwealth found that "the demand for train service was held to be outweighed by the fact the beach traversed 'will cease to be attractive when it is defaced and made dangerous by a steam railroad.'"[98]

44. The Commission's current guidance for determining whether a proposed project is in the public convenience and necessity is consistent with the historic use of the term. As outlined in its 1999 Certificate Policy Statement, the Commission implements an economic balancing test that is focused on whether there is a need for the facilities and adverse economic effects stemming from the construction and operation of the proposed facilities themselves. The Commission designed its balancing test "to foster competitive markets, protect captive customers, and avoid unnecessary environmental and community impacts while serving increasing demands for natural gas."[99] The Commission also stated that its balancing test "provide[s] appropriate incentives for the optimal level of construction and efficient customer choices."[100] To accomplish these objectives, the Commission determines whether a project is in the public convenience and necessity by balancing the public benefits of the project against the adverse economic impacts on the applicant's existing shippers, competitor pipelines and their captive customers, and landowners.[101]

45. Although the Certificate Policy Statement also recognizes the need to consider certain environmental issues related to a project, it makes clear that the environmental impacts to be considered are related to the construction and operation of the pipeline itself and the creation of the right-of-way.[102] As noted above, it is the Commission's objective to avoid *unnecessary* environmental impacts, meaning to route the pipeline to avoid environmental effects where possible and feasible, not to prevent or mitigate environmental effects from the upstream production or downstream use of natural gas. This is confirmed when one considers that, if the project had unnecessary adverse

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[97] Jones at 428.

[98] *Id.* at 436.

[99] Certificate Policy Statement, 88 FERC ¶ at 61,743.

[100] *Id.*

[101] *Id.*

[102] *See also Ctr. for Biological Diversity v. U.S. Army Corps of Eng'rs*, 941 F.3d 1288, 1299 (11th Cir. 2019) ("Regulations cannot contradict their animating statutes or manufacture additional agency power.") (citing *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 125-26 (2000)).

environmental effects, the Commission would require the applicant to reroute the pipeline: "If the environmental analysis following a preliminary determination indicates a preferred route other than the one proposed by the applicant, the earlier balancing of the public benefits of the project against its adverse effects would be reopened to take into account the adverse effects on landowners who would be affected by the changed route."[103]

46. Further, the Certificate Policy Statement provides, "[i]deally, an applicant will structure its proposed project to avoid adverse economic, competitive, environmental, or other effects on the relevant interests from the construction of the new project."[104] And that is what occurred in this case. Mountain Valley modified its pipeline route to reduce impacts on various landowners[105] and eliminated a compressor station that had originally been proposed in pre-filing to be located near milepost 26 in North Carolina.[106] Additionally, Mountain Valley co-located 49 percent of the proposed pipeline route with existing utility corridors and rights-of-way. [107] Further, during the pre-filing period, Mountain Valley assessed numerous route alternatives. Mountain Valley adopted 101 route alternative segments and/or minor route variations into its proposed Project design for various reasons, including landowner requests, avoidance of sensitive environmental resources (such as archaeological sites or wetlands), avoidance of areas of steep terrain or side slopes, and engineering considerations.[108]

47. In sum, the meaning of "public convenience and necessity" does not support weighing the public need for the project against effects related to the upstream production or downstream use of natural gas.

D. NEPA does not authorize the Commission to deny a certificate application based on emissions from the upstream production or downstream use of transported natural gas

48. The text of the NGA, and the related subsequent acts by Congress, cannot be revised by NEPA or CEQ regulations to authorize the Commission to deny a certificate

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[103] Certificate Policy Statement, 88 FERC ¶ at 61,749.

[104] *Id.* at 61,747.

[105] Final EIS at 3-26 to 3-28.

[106] Certificate Order, 171 FERC ¶ 61,232 at P 27.

[107] *Id*. P 27

[108] Final EIS at 3.

application based on effects from the upstream production and downstream use of natural gas.

49. The courts have made clear that NEPA does not expand a federal agency's substantive or jurisdictional powers.[109] Nor does NEPA repeal by implication any other statute.[110] Rather, NEPA is a merely procedural statute that requires federal agencies to take a "hard look" at the environmental effects of a proposed action before acting on it.[111] NEPA also does not require a particular result. In fact, the Supreme Court has stated, even if a NEPA analysis identifies an environmental harm, the agency can still approve the project.[112]

50. Further, CEQ's regulations on indirect effects cannot make the GHG emissions from upstream production or downstream use part of the Commission's public convenience and necessity determination under the NGA. As stated above, an agency's obligation under NEPA to consider indirect environmental effects is not limitless. Indirect effects must have "a reasonably close causal relationship" with the alleged cause, and that relationship is dependent on the "underlying policies or legislative intent."[113] NEPA requires such reasonably close causal relationship because "inherent in NEPA and

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[109] *Nat. Res. Def. Council, Inc. v. EPA*, 822 F.2d 104, 129 (D.C. Cir. 1987) ("NEPA, as a procedural device, does not work a broadening of the agency's substantive powers. Whatever action the agency chooses to take must, of course, be within its province in the first instance.") (citations omitted); *Cape May Greene, Inc. v. Warren*, 698 F.2d 179, 188 (3d Cir. 1986) ("The National Environmental Policy Act does not expand the jurisdiction of an agency beyond that set forth in its organic statute."); *Gage v. U.S. Atomic Energy Comm'n*, 479 F.2d 1214, 1220 n.19 (D.C. Cir. 1973) ("NEPA does not mandate action which goes beyond the agency's organic jurisdiction."); *see also Flint Ridge Dev. Co. v. Scenic Rivers Ass'n of Okla.*, 426 U.S. 776, 788 (1976) ("where a clear and unavoidable conflict in statutory authority exists, NEPA must give way").

[110] *U.S. v. Students Challenging Regulatory Agency Procedures*, 412 U.S. 669, 694 (1973).

[111] *Vt. Yankee Nuclear Power Corp. v. Nat. Res. Def. Council, Inc.*, 435 U.S. 519, 558 (1978) ("NEPA does set forth significant substantive goals for the Nation, but its mandate to the agencies is essentially procedural.").

[112] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) ("Although these procedures are almost certain to affect the agency's substantive decision, it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process.").

[113] *Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 n.7 (1983).

its implementing regulations is a 'rule of reason,'"[114] which "recognizes that it is pointless to require agencies to consider information they have no power to act on, or effects they have no power to prevent."[115] Thus, "where an agency has no ability to prevent a certain effect due to its limited statutory authority over the relevant actions, the agency cannot be considered a legally relevant 'cause' of the effect."[116]

51. The Commission has no power to deny a certificate for effects related to the upstream production or downstream use of natural gas. As explained above, the Commission's consideration of adverse environmental effects is limited to those effects stemming from the construction and operation of the pipeline facility and the related right-of-way. For the Commission to deny a pipeline based on GHGs emitted from the upstream production or downstream use of natural gas would be contrary to the text of the NGA and subsequent acts by Congress. The NGA reserves such considerations for the States, and the Commission must respect the jurisdictional boundaries set by Congress. Suggesting that the Commission can consider such effects not only risks duplicative regulation but in fact defies Congress.

III. The NGA does not contemplate the Commission establishing mitigation for GHG emissions from pipeline facilities

52. My colleague has also suggested that the Commission should require the mitigation of GHG emissions from the certificated pipeline facilities and the upstream production and downstream use of natural gas transported on those facilities.[117] I understand his suggestions as proposing a carbon emissions fee, offsets or tax (similar to the Corps' compensatory wetland mitigation program), technology requirements (such as

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[114] *Pub. Citizen*, 541 U.S. at 767.

[115] *Ctr. for Biological Diversity*, 941 F.3d at 1297; *see also Town of Barnstable v. FAA*, 740 F.3d 681, 691 (D.C. Cir. 2014) ("NEPA's 'rule of reason' does not require the FAA to prepare an EIS when it would 'serve no purpose.'").

[116] *Pub. Citizen,* 541 U.S. at 770; *see also Town of Barnstable*, 740 F.3d at 691 ("Because the FAA 'simply lacks the power to act on whatever information might be contained in the [environmental impact statement ('EIS')],' NEPA does not apply to its no hazard determinations.") (internal citation omitted); *Ohio Valley Envtl. Coal. v. Aracoma Coal Co.*, 556 F.3d 177, 196-97 (4th Cir. 2009) (finding that the U.S. Army Corps of Engineers (Corps) was not required to consider the valley fill projects because "[West Virginia Department of Environmental Protection], and not the Corps, [had] 'control and responsibility' over all aspects of the valley fill projects beyond the filling of jurisdictional waters.").

[117] *Transcontinental Gas Pipe Line Company, LLC, (Transco)* 171 FERC ¶ 61,031 (2020) (Comm'r, Glick, dissenting at P 17).

scrubbers or electric-powered compressor units),[118] or emission caps. Some argue that the Commission can require such mitigation under NGA section 7(e), which provides "[t]he Commission shall have the power to attach to the issuance of the certificate . . . such reasonable terms and conditions as the public convenience and necessity may require."[119]

53. I disagree. The Commission cannot interpret NGA section 7(e) to allow the Commission to unilaterally establish measures to mitigate GHG emissions because Congress, through the Clean Air Act, assigned the EPA and the States exclusive authority to establish such measures. Congress designated the EPA as the expert agency "best suited to serve as primary regulator of greenhouse gas emissions," [120] not the Commission.

54. The Clean Air Act establishes an all-encompassing regulatory program, supervised by the EPA to deal comprehensively with interstate air pollution.[121] Congress entrusted the Administrator of the EPA with significant discretion to determine appropriate emissions measures. Congress delegated the Administrator the authority to determine whether pipelines and other stationary sources endanger public health and welfare; section 111 of the Clean Air Act directs the Administrator of the EPA "to publish (and from time to time thereafter shall revise) a list of categories of stationary sources. He shall include a category of sources in such list if in *his judgment* it causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare"[122] and to establish standards of performance for the identified stationary sources.[123] The Clean Air Act requires the Administrator to conduct complex balancing when determining a standard of performance, taking into consideration what is technologically achievable and the cost to achieve that standard.[124]

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[118] It is also important to consider the impact on reliability that would result from requiring electric-compressor units on a gas pipeline. In the event of a power outage, a pipeline with electric-compressor units may be unable to compress and transport gas to end-users, including power plants and residences for heating and cooking.

[119] *Id.* § 717f(e) (2018).

[120] *American Elec. Power Co., Inc. v. Conn.*, 564 U.S. 410, 428 (2011).

[121] *See id.* at 419.

[122] 42 U.S.C. § 7411(b)(1)(A) (2018).

[123] *Id.* § 7411(b)(1)(B).

[124] *Id.* § 7411(a)(1).

55. In addition, the Clean Air Act allows the Administrator to "distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing such standards."[125] The Act also permits the Administrator, with the consent of the Governor of the State in which the source is to be located, to waive its requirements "to encourage the use of an innovative technological system or systems of continuous emission reduction."[126]

56. Congress also intended that States would have a role in establishing measures to mitigate emissions from stationary sources. Section 111(f) notes that "[b]efore promulgating any regulations . . . or listing any category of major stationary sources . . . the Administrator shall consult with appropriate representatives of the Governors and of State air pollution control agencies."[127]

57. Thus, the text of the Clean Air Act demonstrates it is improbable that NGA section 7(e) allows the Commission to establish GHG emission standards or mitigation measures out of whole cloth. To argue otherwise would defeat the significant discretion and complex balancing that the Clean Air Act entrusts in the EPA Administrator, and would eliminate the role of the States.

58. Furthermore, to argue that the Commission may use its NGA conditioning authority to establish GHG emission mitigation—a field in which the Commission has no expertise—and address climate change—an issue that has been subject to profound debate across our nation for decades—is an extraordinary leap. The Supreme Court's "major rules" canon advises that agency rules on issues that have vast economic and political significance must be treated "with a measure of skepticism" and require Congress to provide clear authorization.[128] The Court has articulated this canon because Congress does not "hide elephants in mouseholes"[129] and "Congress is more likely to have focused upon, and answered, major questions, while leaving interstitial matters to answer themselves in the course of the statute's daily administration."[130]

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[125] *Id.* § 7411(a)(2).

[126] *Id.* § 7411(j)(1)(A).

[127] *Id.* § 7411(f)(3).

[128] *Util. Air Regulatory Grp. v. EPA*, 573 U.S. 302, 324 (2014); *Brown & Williamson,* 529 U.S. at 160 ("Congress could not have intended to delegate a decision of such economic and political significance to an agency in so cryptic a fashion."); *see also Gonzales v. Oregon*, 546 U.S. 243, 267-68 (2006) (finding regulation regarding issue of profound debate suspect).

[129] *Whitman v. American Trucking Ass.,* 531 U.S. 457, 468 (2001).

[130] *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 12, 159 (quoting Justice

59. Courts would undoubtedly treat with skepticism any attempt by the Commission to establish GHG emission mitigation measures. Congress has introduced climate change bills since at least 1977,[131] over four decades ago. Over the last 15 years, Congress has introduced and failed to pass 70 legislative bills to reduce GHG emissions—29 of those were carbon emission fees or taxes.[132] For the Commission to suddenly declare such climate mitigation power resides in the long-extant NGA and that Congress's efforts were superfluous strains credibility. Establishing a carbon emissions fee or tax, or GHG mitigation out of whole cloth would be a major rule, and Congress has made no indication that the Commission has such authority.

60. Some may make the argument that the Commission can develop mitigation measures without establishing a standard. I disagree. Establishing mitigation measures requires determining how much mitigation is required – i.e., setting a limit, or establishing a standard, that quantifies the amount of GHG emissions that will adversely affect the human environment. Some may also argue that the Commission has unilaterally established mitigation in other contexts, including wetlands, soil conservation, and noise. These examples, however, are distinguishable. Congress did not exclusively assign the authority to establish avoidance or restoration measures for mitigating effects on wetlands or soil to a specific agency. The Corps and the EPA developed a wetlands mitigation bank program pursuant to section 404 of the Clean Water Act.[133] Congress endorsed such mitigation.[134] As for noise, the Clean Air Act

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Breyer, *Judicial Review of Questions of Law and Policy*, 38 ADMIN. L. REV. 363, 370 (1986)); *see also* Abbe R. Gluck & Lisa Schultz Bressman, *Statutory Interpretation from the Inside—An Empirical Study of Congressional Drafting, Delegation, and the Canons: PART I*, 65 STAN. L. REV. 901, 1004 (2013) ("Major policy questions, major economic questions, major political questions, preemption questions are all the same. Drafters don't intend to leave them unresolved.").

[131] National Climate Program Act, S. 1980, 95th Cong. (1977).

[132] CONGRESSIONAL RESEARCH SERVICE, MARKET-BASED GREENHOUSE GAS EMISSION REDUCTION LEGISLATION: 108TH THROUGH 116TH CONGRESSES at 3 (Oct. 23, 2019), https://fas.org/sgp/crs/misc/R45472.pdf. Likewise, the CEQ issued guidance on the consideration of GHG emissions in 2010, 2014, 2016, and 2019. None of those documents require, let alone recommend, that an agency establish a carbon emissions fee or tax.

[133] 33 U.S.C. § 1344 (2018).

[134] *See* Water Resources Development Act, Pub. L. 110-114, § 2036(c), 121 Stat. 1041, 1094 (2007); National Defense Authorization Act, Pub. L. 108-136, § 314, 117 Stat. 1392, 1430 (2004); Transportation Equity Act for the 21st Century, Pub. L. 105-178, § 103 (b)(6)(M), 112 Stat. 107, 133 (1998); Water Resources Development Act of

assigns the EPA Administrator authority over determining the level of noise that amounts to a public nuisance and requires federal agencies to consult with the EPA when its actions exceed the public nuisance standard.[135] The Commission complies with the Clean Air Act by requiring project noise levels in certain areas to not exceed 55 dBA Ldn, as required by EPA's guidelines.[136]

61. Accordingly, there is no support that the Commission can use its NGA section 7(e) authority to establish measures to mitigate GHG emissions from proposed pipeline facilities or from the upstream production or downstream use of natural gas.[137]

IV. The Commission has no standard for determining whether GHG emissions significantly affect the environment

62. My colleague has argued that the Commission violates the NGA and NEPA by not determining the significance of GHG emissions that are effects of a project.[138] He has challenged the Commission's explanation that it cannot determine significance because there is no standard for determining the significance of GHG emissions.[139] He has argued that the Commission can adopt the Social Cost of Carbon[140] to determine whether GHG emissions are significant or rely on its own expertise as it does for other

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1990, Pub. L. 101-640, § (a)(18)(C), 104 Stat. 4604, 4609 (1990).

[135] 42 U.S.C. § 7641(c) ("In any case where any Federal department or agency is carrying out or sponsoring any activity resulting in noise which the Administrator determines amounts to a public nuisance or is otherwise objectionable, such department or agency shall consult with the Administrator to determine possible means of abating such noise.").

[136] *See Williams Gas Pipelines Cent., Inc.*, 93 FERC ¶ 61,159, at 61,531-52 (2000).

[137] In addition, requiring a pipeline to mitigate emissions from the upstream production or downstream use of natural gas would not be "a reasonable term or condition as the public convenience and necessity may require." 15 U.S.C. § 717f(e) (2018). It would be unreasonable to require a pipeline to mitigate an effect it has no control over. Further, as discussed above, emissions from the upstream production and downstream use of natural gas are not relevant to the NGA's public convenience and necessity determination.

[138] Cheyenne Connector PP 2, 7.

[139] *Id.* PP 12-13.

[140] *Id.* P 13.

environmental resources, such as soils, groundwater, and wetland resources.[141] He has suggested that the Commission does not make a finding of significance in order to deceptively find that a project is in the public convenience and necessity.[142]

63. I disagree. The Social Cost of Carbon is not a suitable method for determining whether GHG emissions that are caused by a proposed project will have a significant effect on climate change, and the Commission has no authority or reasoned basis using its own expertise to make such determination.

A. Social Cost of Carbon is not a suitable method to determine significance

64. The Commission has found, and I agree, that the Social Cost of Carbon is not a suitable method for the Commission to determine significance of GHG emissions.[143] Because the courts have repeatedly upheld the Commission's reasoning,[144] I will not restate the Commission's reasoning here.

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[141] *Dominion Energy Transmission, Inc.*, 169 FERC ¶ 61,229 (2019) (Comm'r, Glick, dissenting at P 10).

[142] *Id.* P 2. The dissent uses the phrase "public interest"; however, as noted earlier, the Commission issues certificates when required by the public convenience and necessity. NGA section 7(e) does not include the phrase "public interest." To the extent that the courts and the Commission have equated the "public convenience and necessity" with "public interest," the "public convenience and necessity" is not as broad as some would argue. *See supra* P 16.

[143] *Fla. Se. Connection, LLC*, 162 FERC ¶ 61,233, at P 48 (2018); *see also PennEast Pipeline Co., LLC*, 164 FERC ¶ 61,098, at P 123 ("Moreover, EPA recently confirmed to the Commission that the tool, which 'no longer represents government policy,' was developed to assist in rulemakings and 'was not designed for, and may not be appropriate for, analysis of project-level decision-making.'") (citing EPA's July 26, 2018 Comments in PL18-1-000).

[144] *Appalachian Voices*, 2019 WL 847199, *2; *EarthReports, Inc. v. FERC*, 828 F.3d 949, 956 (D.C. Cir. 2016); *Sierra Club v. FERC*, 672 F. App'x 38, (D.C. Cir. 2016); *see also 350 Montana v. Bernhardt*, No. CV 19-12-M-DWM, 2020 WL 1139674, *6 (D. Mont. March 9, 2020) (upholding the agency's decision to not use the Social Cost of Carbon because it is too uncertain and indeterminate to be useful); *Citizens for a Healthy Cmty. v. U.S. Bureau of Land Mgmt.*, 377 F. Supp. 3d 1223, 1239-41 (D. Colo. 2019) (upholding the agency's decision to not use the Social Cost of Carbon); *WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 77-79 (D.D.C. 2019) (upholding the agency's decision to not use the Social Cost of Carbon); *High Country Conservation Advocates v. U.S. Forest Serv.*, 333 F. Supp. 3d 1107, 1132 (D. Colo. 2018) vacated and remanded on

65. However, I will address the suggestion that the Social Cost of Carbon can translate a project's impact on climate change into "concrete and comprehensible terms" that will help inform agency decision-makers and the public at large.[145] The Social Cost of Carbon, described as an estimate of "the monetized damages associated with an incremental increase in carbon emissions in a given year,"[146] may appear straightforward. On closer inspection, however, the Social Cost of Carbon and its calculated outputs are not so simple to interpret or evaluate.[147] When the Social Cost of Carbon estimates that one metric ton of CO_2 costs $12 (the 2020 cost using a discount rate of 5 percent),[148] agency decision-makers and the public have no reasoned basis or benchmark to determine whether that cost is significant. Bare numbers standing alone simply *cannot* ascribe significance.

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other grounds 2020 WL 994988 (10th Cir. March 2, 2020) ("[T]he *High Country* decision did not mandate that the Agencies apply the social cost of carbon protocol in their decisions; the court merely found arbitrary the Agencies' failure to do so without explanation.").

[145] Cheyenne Connector Dissent P 13 n.27.

[146] Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Support Document – Technical Update of the Social Cost of Carbon for Regulatory impact Analysis – Under Executive Order 12866* at 1 (Aug. 2016), https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf (2016 Technical Support Document).

[147] In fact, the website for the Climate Framework for Uncertainty Negotiation and Distribution (FUND) – one of the three integrated assessment models that the Social Cost of Carbon uses – states "[m]odels are often quite useless in unexperienced hands, and sometimes misleading. No one is smart enough to master in a short period what took someone else years to develop. Not-understood models are irrelevant, half-understood models are treacherous, and mis-understood models dangerous." FUND-Climate Framework for Uncertainty, Negotiation and Distribution, http://www.fund-model.org/ (LAST VISITED NOV. 18, 2019).

[148] *See* 2016 Technical Support Document at 4. The Social Cost of Carbon produces wide-ranging dollar values based upon a chosen discount rate, and the assumptions made. The Interagency Working Group on Social Cost of Greenhouse Gases estimated in 2016 that the Social Cost of one ton of carbon dioxide for the year 2020 ranged from $12 to $123. *Id.*

B. The Commission has no authority or reasoned basis to establish its own framework

66. Some argue that the lack of externally established targets does not relieve the Commission from establishing a framework or targets on its own. Some have suggested that the Commission can make up its own framework, citing the Commission's framework for determining return on equity (ROE) as an example. However, they overlook the fact that Congress designated the EPA, not the Commission, with exclusive authority to determine the amount of emissions that are harmful to the environment. In addition, there are no available resources or agency expertise upon which the Commission could reasonably base a framework or target.

67. As I explain above, Congress enacted the Clean Air Act to establish an all-encompassing regulatory program, supervised by the EPA to deal comprehensively with interstate air pollution. Section 111 of the Clean Air Act directs the Administrator of the EPA to identify stationary sources that "in his judgment cause[], or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare"[149] and to establish standards of performance for the identified stationary sources.[150] Thus, the EPA has exclusive authority for determining whether emissions from pipeline facilities will have a significant effect on the environment.

68. Further, the Commission is not positioned to unilaterally establish a standard for determining whether GHG emissions will significantly affect the environment when there is neither federal guidance nor an accepted scientific consensus on these matters.[151] This inability to find an acceptable methodology is not for a lack of trying. The Commission

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[149] 42 U.S.C. § 7411(b)(1)(A) (2018).

[150] *Id.* § 7411(b)(1)(B).

[151] The Council on Environmental Quality's 2019 Draft Greenhouse Gas Guidance states, "[a]gencies need not undertake new research or analysis of potential climate effects and may rely on available information and relevant scientific literature." CEQ, *Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions*, 84 Fed. Reg. 30,097, 30,098 (June 26, 2019); *see also* CEQ FINAL GUIDANCE FOR FEDERAL DEPARTMENTS AND AGENCIES ON CONSIDERATION OF GREENHOUSE GAS EMISSIONS AND THE EFFECTS OF CLIMATE CHANGE IN NATIONAL ENVIRONMENTAL POLICY ACT REVIEWS at 22 (Aug. 1, 2016) ("agencies need not undertake new research or analysis of potential climate change impacts in the proposed action area, but may instead summarize and incorporate by reference the relevant scientific literature"), https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf.

reviews the climate science, state and national targets, and climate models that could inform its decision-making.[152]

69. Moreover, assessing the significance of project effects on climate change is unlike the Commission's determination of ROE. Establishing ROE has been one of the core functions of the Commission since its inception under the FPA as the Federal Power Commission.[153] And, setting ROE has been an activity of state public utility commissions, even before the creation of the Federal Power Commission.[154] The Commission's methodology is also founded in established economic theory.[155] In contrast, assessing the significance of GHG emissions is not one of the Commission's core missions and there is no suitable methodology for making such determination.

70. It has been argued that the Commission can establish its own methodology for determining significance, pointing out that the Commission has determined the significance of effects on soils, groundwater, and wetland resources, using its own expertise and without generally accepted significance criteria or a standard methodology.

71. I disagree. As an initial matter, it is important to note that when the Commission states it has no suitable methodology for determining the significance of GHG emissions, the Commission means that it has no reasoned basis for making such finding. The Commission's findings regarding significance for soils, groundwater, and wetland resources have a reasoned basis. For example, for groundwater resources, using information provided by the U.S. Geological Service, the Commission identified major groundwater aquifers, water supply wells, and springs crossed by the project.[156] The Commission also used information published by the EPA to identify contaminated

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[152] *Fla. Se. Connection, LLC*, 162 FERC ¶ 61,233, at P 36; *see also WildEarth Guardians*, 738 F.3d 298, 309 (D.C. Cir. 2013) ("Because current science does not allow for the specificity demanded by the Appellants, the BLM was not required to identify specific effects on the climate in order to prepare an adequate EIS.").

[153] *Hope*, 320 U.S. 591 (1944); *FPC v. Nat. Gas Pipeline Co. of America*, 315 U.S. 575 (1942).

[154] *See, e.g., Willcox v. Consol. Gas Co.*, 212 U.S. 19, 41 (1909) (finding New York State must provide "a fair return upon the reasonable value of the property at the time it is being used for the public.").

[155] *Inquiry Regarding the Commission's Policy for Determining Return on Equity*, 166 FERC ¶ 61,207 (2019) (describing the Commission's use of the Discounted Cash Flow model that was originally developed in the 1950s as a method for investors to estimate the value of securities).

[156] Final EIS at 4-27 to 4-33.

groundwater resources within .25 miles of the Project.[157] Based on this information, the Commission identified a location nearby the Project with an active or unresolved contamination concern.[158] The Commission found that use of proper spill, containment, and handling procedures in Mountain Valley's Spill, Prevention, Control, and Countermeasures Plan would minimize the chance of spills and leaks.[159] Additionally, the Commission found that temporary and minor impacts could result during trenching activities in areas with shallow groundwater but Mountain Valley would implement best management practices to protect groundwater resources and would adhere to applicable federal, state, and local requirements to protect groundwater resources.[160] Based on this information, the Commission had a reasoned basis to find that the Project would not result in significant impacts on groundwater resources.[161]

72. In contrast, the Commission has no reasoned basis to determine whether a project has a significant effect on climate change. To assess a project's effect on climate change, the Commission can only quantify the amount of project emissions and compare that number to national emissions to calculate a percentage of national emissions. That calculated number cannot inform the Commission on climate change effects caused by the project, e.g., increase of sea level rise, effect on weather patterns, or effect on ocean acidification. Nor are there acceptable scientific models that the Commission may use to attribute every ton of GHG emissions to a physical climate change effect.

73. Without adequate support or a reasoned target, the Commission cannot ascribe significance to particular amounts of GHG emissions. To do so would not only exceed our agency's authority, but would risk reversal upon judicial review. Courts require agencies to "consider[] the relevant factors and articulate[] a rational connection between the facts found and the choice made."[162] Simply put, stating that an amount of GHG

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[157] *Id*. at 4-31.

[158] *Id.*

[159] *Id.*

[160] *Id.* at 4-33.

[161] *Id.*

[162] *City of Tacoma v. FERC*, 460 F.3d 53, 76 (D.C Cir. 2006) (quoting *Ariz. Cattle Growers' Ass'n v. FWS*, 273 F.3d 1229, 1235-36 (9th Cir. 2001)); *see also American Rivers v. FERC*, 895 F.3d 32, 51 (D.C. Cir. 2018) (". . . the Commission's NEPA analysis was woefully light on reliable data and reasoned analysis and heavy on unsubstantiated inferences and *non sequiturs*") (italics in original); *Found. for N. Am. Wild Sheep v. U.S. Dep't of Agr.*, 681 F.2d 1172, 1179 (9th Cir. 1982) ("The EA provides no foundation for the inference that a valid comparison may be drawn between the sheep's reaction to hikers and their reaction to large, noisy ten-wheel ore trucks.").

emissions appears significant without any support fails to meet the agency's obligations under the Administrative Procedure Act (APA).

V. Conclusion

74. This concurrence is intended to assist the Commission, courts, and other parties in their consideration of the Commission's obligations under the NGA and NEPA. The Commission cannot act *ultra vires* and claim more authority than the NGA provides it, regardless of the importance of the issue sought to be addressed.[163] The NGA provides the Commission no authority to deny a certificate application based on the environmental effects from the upstream production or downstream use of natural gas. Congress enacted the NGA, and subsequent legislation, to ensure the Commission provided public access to natural gas. Further, Congress designed the NGA to preserve States' authority to regulate the physical effects from the upstream production and downstream use of natural gas, and did not leave that field unregulated. Congress simply did not authorize the Commission to judge whether the upstream production or downstream use of gas will be too environmentally harmful.

75. Nor does the Commission have the ability to establish measures to mitigate GHG emissions. Pursuant to the Clean Air Act, Congress exclusively assigned that authority to the EPA and the States. Finally, the Commission has no reasoned basis for determining whether GHG emissions are significant that would satisfy the Commission's APA obligations and survive judicial review.

76. I recognize that some believe the Commission should do more to address climate change. The Commission, an energy agency with a limited statutory authority, is not the appropriate authority to establish a new regulatory regime.

For these reasons, I respectfully concur.

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Bernard L. McNamee
Commissioner

[163] *Office of Consumers' Counsel*, 655 F.2d at 1152 ("[A]ppropriate respect for legislative authority requires regulatory agencies to refrain from the temptation to stretch their jurisdiction to decide questions of competing public priorities whose resolution properly lies with Congress.").

Appendix F

EJSCREEN Materials

1. EJSCREEN 1-mile Study Area
2. EJSCREEN Census Block Group 511430105001 (labeled A)
3. EJSCREEN Census Block Group 511430107001 (labeled B)

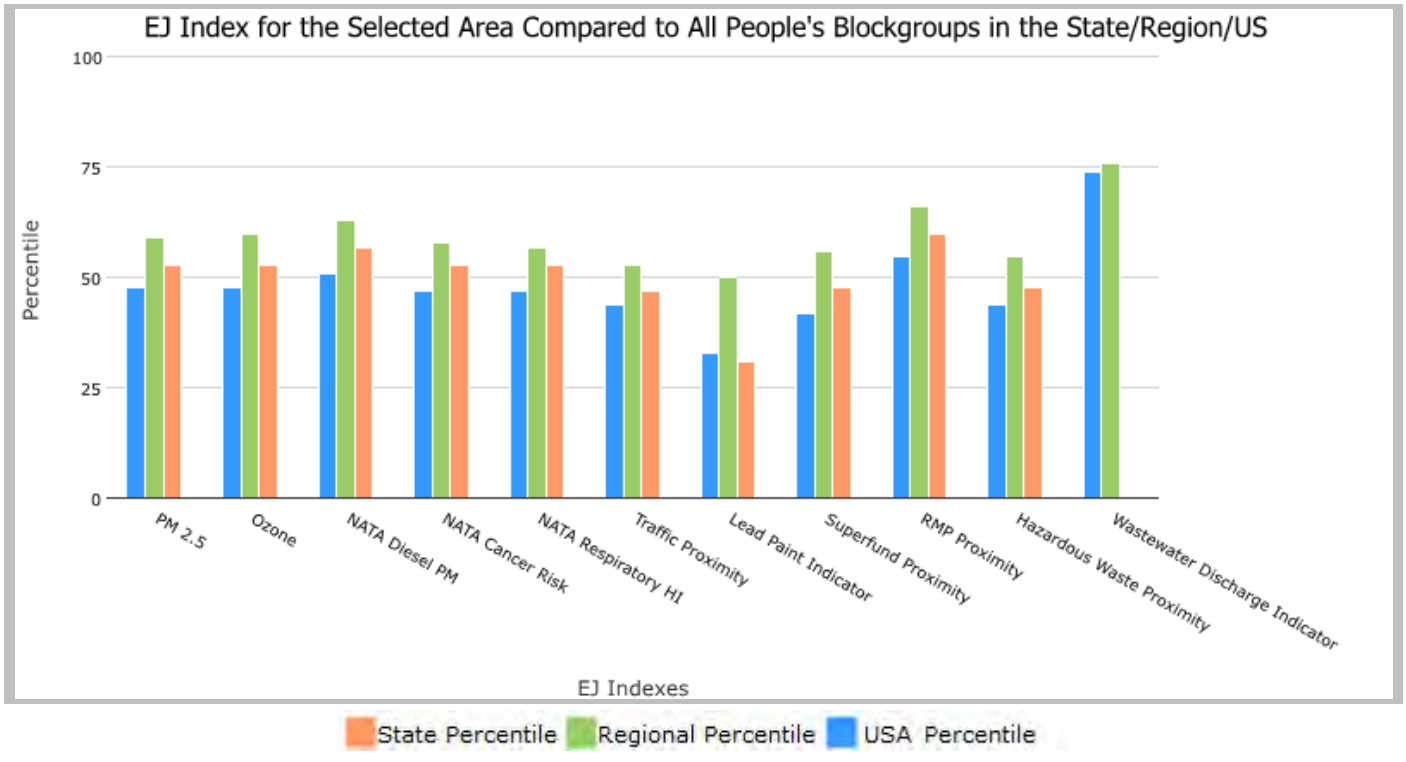
EJSCREEN Report (Version 2019)

1 miles Ring around the Area, VIRGINIA, EPA Region 3

Approximate Population: 182

Input Area (sq. miles): 3.74

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	53	59	48
EJ Index for Ozone	53	60	48
EJ Index for NATA* Diesel PM	57	63	51
EJ Index for NATA* Air Toxics Cancer Risk	53	58	47
EJ Index for NATA* Respiratory Hazard Index	53	57	47
EJ Index for Traffic Proximity and Volume	47	53	44
EJ Index for Lead Paint Indicator	31	50	33
EJ Index for Superfund Proximity	48	56	42
EJ Index for RMP Proximity	60	66	55
EJ Index for Hazardous Waste Proximity	48	55	44
EJ Index for Wastewater Discharge Indicator	N/A	76	74



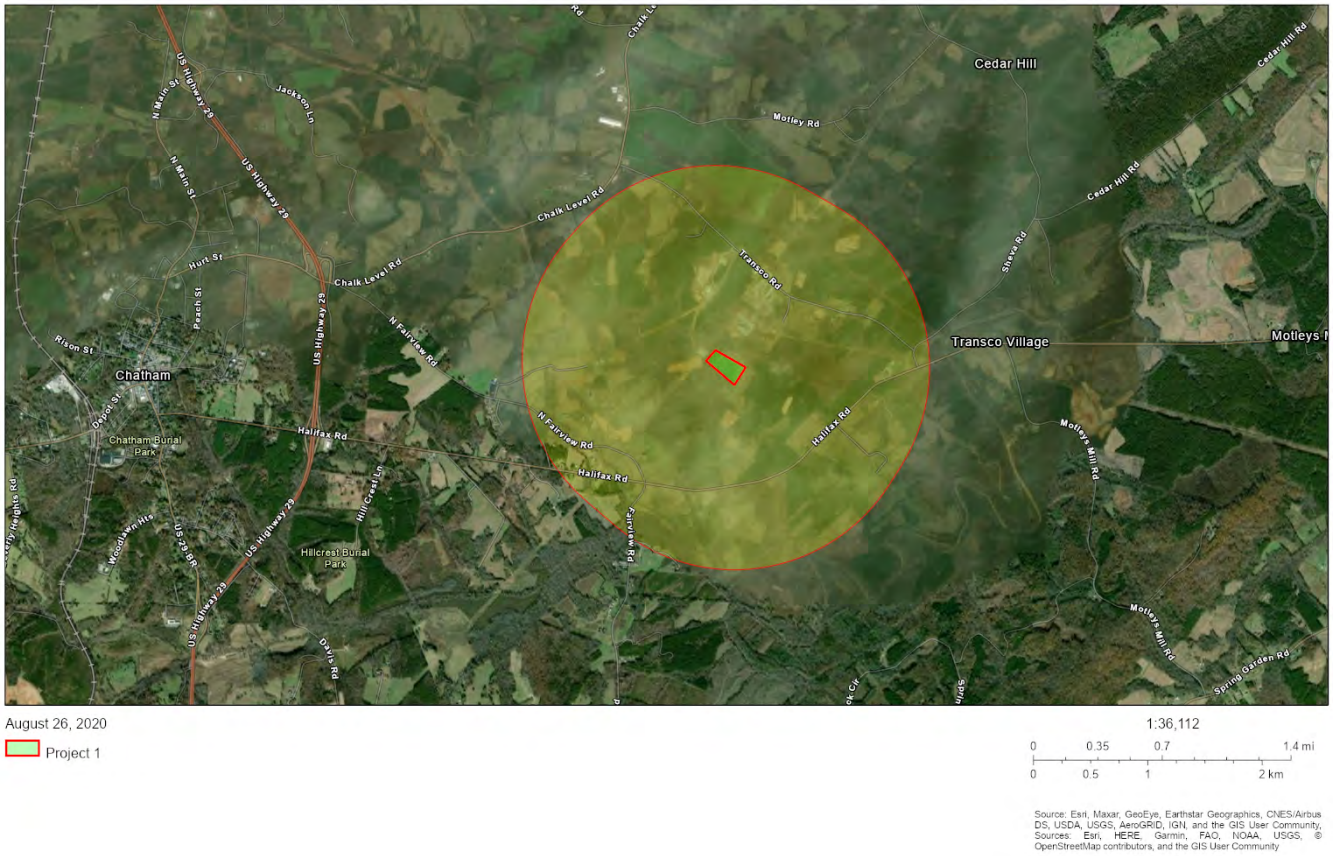
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2019)

1 miles Ring around the Area, VIRGINIA, EPA Region 3

Approximate Population: 182

Input Area (sq. miles): 3.74



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2019)

1 miles Ring around the Area, VIRGINIA, EPA Region 3

Approximate Population: 182

Input Area (sq. miles): 3.74

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	8.05	7.79	64	8.64	29	8.3	40
Ozone (ppb)	41.2	42.5	33	44.9	11	43	35
NATA* Diesel PM (µg/m^3)	0.174	0.425	11	0.477	<50th	0.479	<50th
NATA* Cancer Risk (lifetime risk per million)	30	31	43	31	<50th	32	<50th
NATA* Respiratory Hazard Index	0.39	0.41	41	0.4	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	53	570	30	640	25	750	25
Lead Paint Indicator (% Pre-1960 Housing)	0.24	0.21	68	0.36	46	0.28	56
Superfund Proximity (site count/km distance)	0.055	0.11	44	0.15	34	0.13	45
RMP Proximity (facility count/km distance)	0.041	0.38	2	0.62	2	0.74	3
Hazardous Waste Proximity (facility count/km distance)	0.23	0.66	47	1.3	34	4	38
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.8	N/A	30	22	14	37
Demographic Indicators							
Demographic Index	28%	32%	49	30%	57	36%	46
Minority Population	22%	37%	34	32%	50	39%	41
Low Income Population	33%	26%	67	28%	66	33%	56
Linguistically Isolated Population	4%	3%	76	3%	78	4%	66
Population With Less Than High School Education	3%	11%	22	11%	20	13%	19
Population Under 5 years of age	3%	6%	25	6%	26	6%	24
Population over 64 years of age	25%	14%	88	16%	87	15%	88

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 1-miles radius
Description:

Summary of ACS Estimates	2013 - 2017
Population	181
Population Density (per sq. mile)	51
Minority Population	40
% Minority	22%
Households	79
Housing Units	108
Housing Units Built Before 1950	12
Per Capita Income	24,614
Land Area (sq. miles) (Source: SF1)	3.52
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.03
% Water Area	1%

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	181	100%	339
Population Reporting One Race	181	100%	614
White	141	78%	314
Black	33	18%	183
American Indian	0	0%	12
Asian	2	1%	15
Pacific Islander	0	0%	12
Some Other Race	6	3%	78
Population Reporting Two or More Races	0	0%	12
Total Hispanic Population	6	3%	78
Total Non-Hispanic Population	175		
White Alone	141	78%	314
Black Alone	33	18%	183
American Indian Alone	0	0%	12
Non-Hispanic Asian Alone	2	1%	15
Pacific Islander Alone	0	0%	12
Other Race Alone	0	0%	12
Two or More Races Alone	0	0%	12
Population by Sex			
Male	90	49%	229
Female	91	51%	172
Population by Age			
Age 0-4	6	3%	64
Age 0-17	21	12%	85
Age 18+	160	88%	240
Age 65+	44	25%	106

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017 .

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 1-miles radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	133	100%	237
Less than 9th Grade	2	2%	31
9th - 12th Grade, No Diploma	2	2%	33
High School Graduate	60	45%	155
Some College, No Degree	46	34%	125
Associate Degree	17	13%	78
Bachelor's Degree or more	23	17%	73
Population Age 5+ Years by Ability to Speak English			
Total	175	100%	306
Speak only English	164	94%	305
Non-English at Home[1+2+3+4]	11	6%	79
[1]Speak English "very well"	4	2%	38
[2]Speak English "well"	7	4%	50
[3]Speak English "not well"	0	0%	12
[4]Speak English "not at all"	0	0%	52
[3+4]Speak English "less than well"	0	0%	52
[2+3+4]Speak English "less than very well"	7	4%	52
Linguistically Isolated Households*			
Total	3	100%	26
Speak Spanish	3	100%	23
Speak Other Indo-European Languages	0	0%	12
Speak Asian-Pacific Island Languages	0	0%	12
Speak Other Languages	0	0%	12
Households by Household Income			
Household Income Base	79	100%	118
< $15,000	15	19%	72
$15,000 - $25,000	12	15%	62
$25,000 - $50,000	16	20%	63
$50,000 - $75,000	18	22%	65
$75,000 +	19	24%	90
Occupied Housing Units by Tenure			
Total	79	100%	118
Owner Occupied	71	91%	116
Renter Occupied	7	9%	43
Employed Population Age 16+ Years			
Total	163	100%	293
In Labor Force	81	50%	254
Civilian Unemployed in Labor Force	0	0%	30
Not In Labor Force	82	50%	167

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 1-miles radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	N/A	N/A	N/A
English	N/A	N/A	N/A
Spanish	N/A	N/A	N/A
French	N/A	N/A	N/A
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	N/A	N/A	N/A
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	N/A	N/A	N/A
Chinese	N/A	N/A	N/A
Japanese	N/A	N/A	N/A
Korean	N/A	N/A	N/A
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	N/A	N/A	N/A
Other Asian	N/A	N/A	N/A
Tagalog	N/A	N/A	N/A
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	N/A	N/A	N/A
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	N/A	N/A	N/A
Total Non-English	N/A	N/A	N/A

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017.
*Population by Language Spoken at Home is available at the census tract summary level and up.

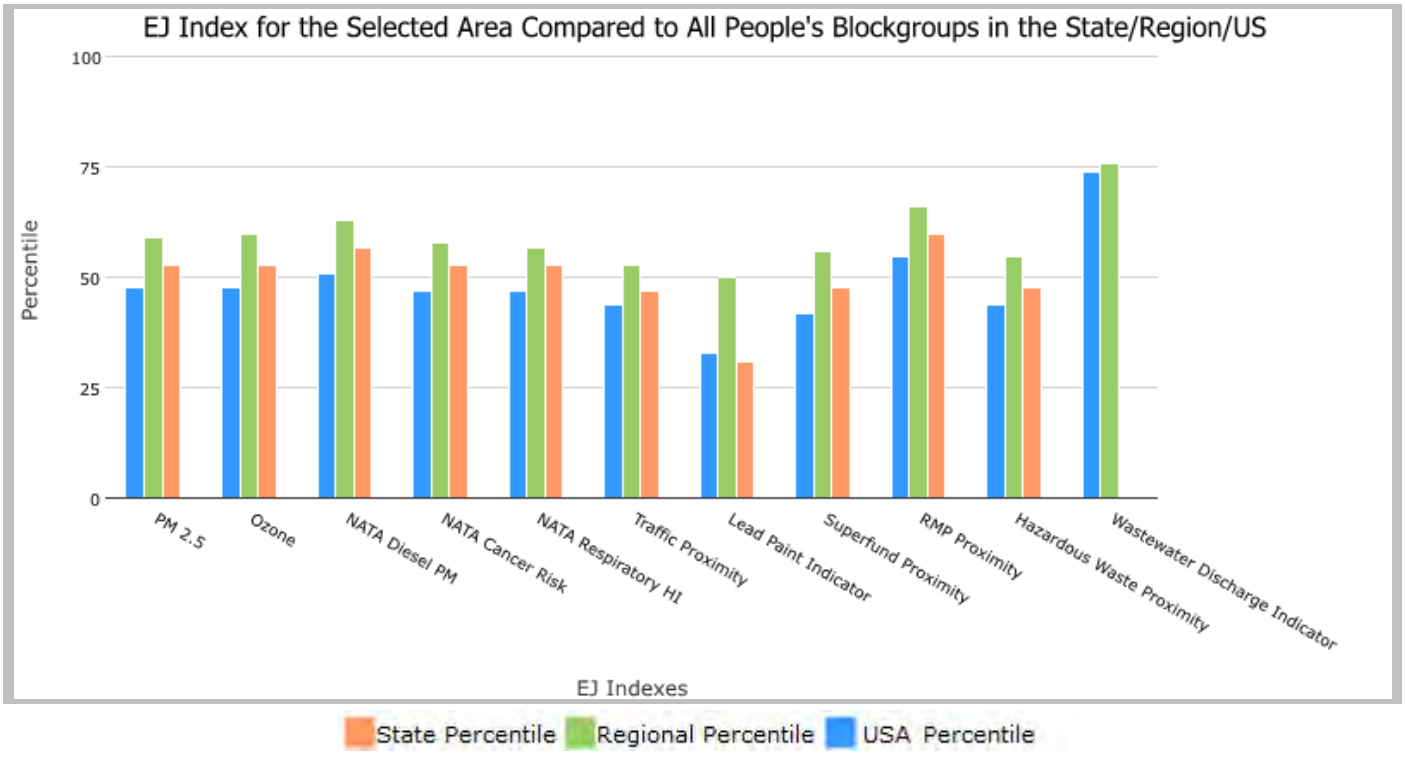
EJSCREEN Report (Version 2019)

Blockgroup: 511430105001, VIRGINIA, EPA Region 3

Approximate Population: 1,176

Input Area (sq. miles): 24.40

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	53	59	48
EJ Index for Ozone	53	60	48
EJ Index for NATA* Diesel PM	57	63	51
EJ Index for NATA* Air Toxics Cancer Risk	53	58	47
EJ Index for NATA* Respiratory Hazard Index	53	57	47
EJ Index for Traffic Proximity and Volume	47	53	44
EJ Index for Lead Paint Indicator	31	50	33
EJ Index for Superfund Proximity	48	56	42
EJ Index for RMP Proximity	60	66	55
EJ Index for Hazardous Waste Proximity	48	55	44
EJ Index for Wastewater Discharge Indicator	N/A	76	74



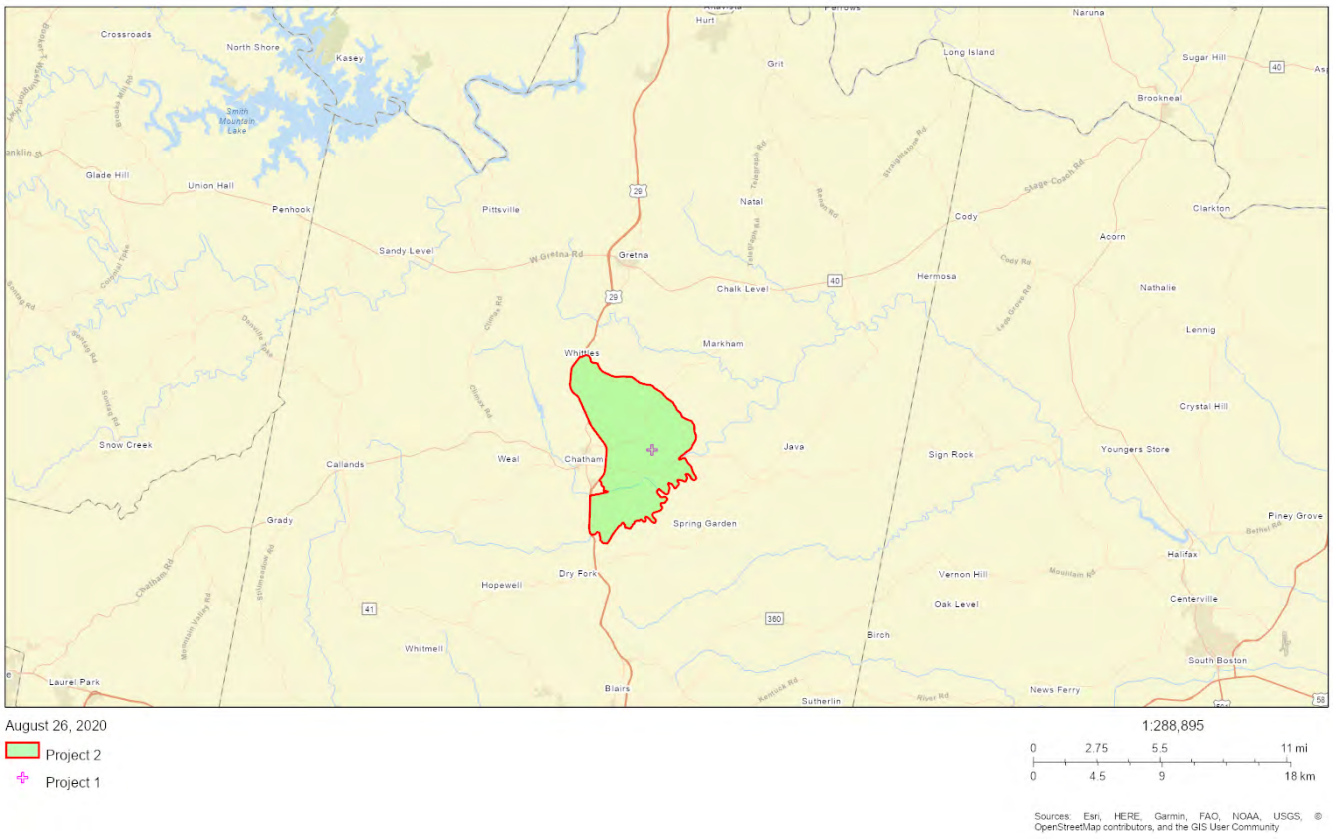
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2019)

Blockgroup: 511430105001, VIRGINIA, EPA Region 3

Approximate Population: 1,176

Input Area (sq. miles): 24.40



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2019)

Blockgroup: 511430105001, VIRGINIA, EPA Region 3

Approximate Population: 1,176

Input Area (sq. miles): 24.40

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	8.05	7.79	64	8.64	29	8.3	40
Ozone (ppb)	41.2	42.5	33	44.9	11	43	35
NATA* Diesel PM (µg/m^3)	0.174	0.425	11	0.477	<50th	0.479	<50th
NATA* Cancer Risk (lifetime risk per million)	30	31	43	31	<50th	32	<50th
NATA* Respiratory Hazard Index	0.39	0.41	41	0.4	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	53	570	30	640	25	750	25
Lead Paint Indicator (% Pre-1960 Housing)	0.24	0.21	68	0.36	46	0.28	56
Superfund Proximity (site count/km distance)	0.055	0.11	44	0.15	34	0.13	45
RMP Proximity (facility count/km distance)	0.041	0.38	2	0.62	2	0.74	3
Hazardous Waste Proximity (facility count/km distance)	0.23	0.66	47	1.3	34	4	38
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.8	N/A	30	22	14	37
Demographic Indicators							
Demographic Index	28%	32%	49	30%	57	36%	46
Minority Population	22%	37%	34	32%	50	39%	41
Low Income Population	33%	26%	67	28%	66	33%	56
Linguistically Isolated Population	4%	3%	76	3%	78	4%	66
Population With Less Than High School Education	3%	11%	22	11%	20	13%	19
Population Under 5 years of age	3%	6%	25	6%	26	6%	24
Population over 64 years of age	25%	14%	88	16%	87	15%	88

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description:

Summary of ACS Estimates	2013 - 2017
Population	1,176
Population Density (per sq. mile)	49
Minority Population	261
% Minority	22%
Households	525
Housing Units	718
Housing Units Built Before 1950	82
Per Capita Income	24,518
Land Area (sq. miles) (Source: SF1)	24.19
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.21
% Water Area	1%

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	1,176	100%	339
Population Reporting One Race	1,176	100%	582
White	915	78%	314
Black	213	18%	183
American Indian	0	0%	12
Asian	11	1%	15
Pacific Islander	0	0%	12
Some Other Race	37	3%	46
Population Reporting Two or More Races	0	0%	12
Total Hispanic Population	37	3%	46
Total Non-Hispanic Population	1,139		
White Alone	915	78%	314
Black Alone	213	18%	183
American Indian Alone	0	0%	12
Non-Hispanic Asian Alone	11	1%	15
Pacific Islander Alone	0	0%	12
Other Race Alone	0	0%	12
Two or More Races Alone	0	0%	12
Population by Sex			
Male	582	49%	229
Female	594	51%	172
Population by Age			
Age 0-4	41	3%	64
Age 0-17	138	12%	85
Age 18+	1,038	88%	240
Age 65+	289	25%	106

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017 .

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	861	100%	237
Less than 9th Grade	13	2%	22
9th - 12th Grade, No Diploma	16	2%	28
High School Graduate	387	45%	155
Some College, No Degree	297	34%	125
Associate Degree	113	13%	78
Bachelor's Degree or more	148	17%	73
Population Age 5+ Years by Ability to Speak English			
Total	1,135	100%	306
Speak only English	1,063	94%	305
Non-English at Home[1+2+3+4]	72	6%	61
[1]Speak English "very well"	24	2%	38
[2]Speak English "well"	48	4%	50
[3]Speak English "not well"	0	0%	12
[4]Speak English "not at all"	0	0%	12
[3+4]Speak English "less than well"	0	0%	12
[2+3+4]Speak English "less than very well"	48	4%	50
Linguistically Isolated Households*			
Total	19	100%	26
Speak Spanish	19	100%	23
Speak Other Indo-European Languages	0	0%	12
Speak Asian-Pacific Island Languages	0	0%	12
Speak Other Languages	0	0%	12
Households by Household Income			
Household Income Base	525	100%	118
< $15,000	99	19%	72
$15,000 - $25,000	78	15%	62
$25,000 - $50,000	105	20%	63
$50,000 - $75,000	118	22%	65
$75,000 +	125	24%	90
Occupied Housing Units by Tenure			
Total	525	100%	118
Owner Occupied	476	91%	116
Renter Occupied	49	9%	43
Employed Population Age 16+ Years			
Total	1,058	100%	293
In Labor Force	527	50%	254
Civilian Unemployed in Labor Force	0	0%	12
Not In Labor Force	531	50%	167

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	1,093	100%	467
English	1,031	94%	479
Spanish	24	2%	78
French	3	0%	12
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	13	1%	46
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	0	0%	12
Chinese	0	0%	12
Japanese	N/A	N/A	N/A
Korean	4	0%	22
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	0	0%	12
Other Asian	3	0%	15
Tagalog	0	0%	12
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	0	0%	12
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	12
Total Non-English	62	6%	669

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017.
*Population by Language Spoken at Home is available at the census tract summary level and up.

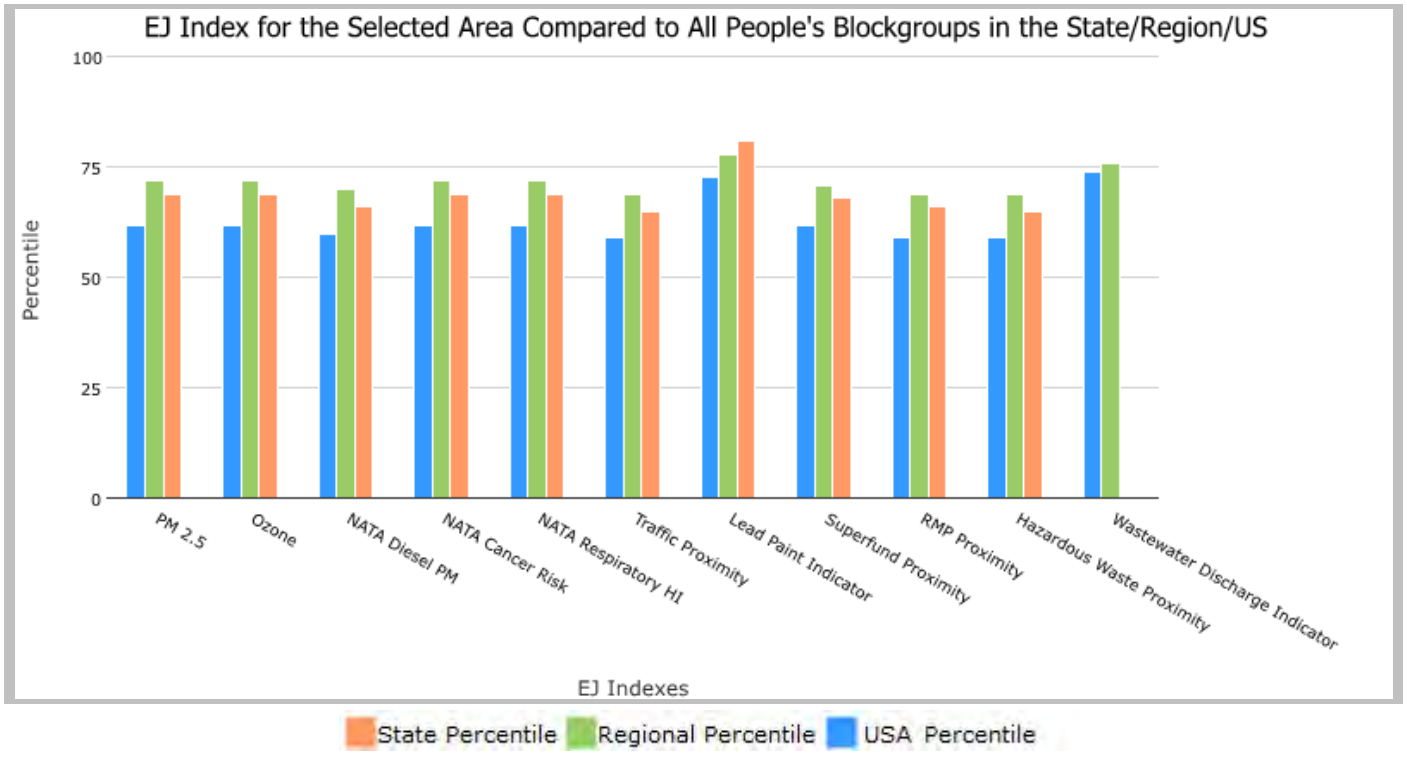
EJSCREEN Report (Version 2019)

Blockgroup: 511430107001, VIRGINIA, EPA Region 3

Approximate Population: 631

Input Area (sq. miles): 58.41

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	69	72	62
EJ Index for Ozone	69	72	62
EJ Index for NATA* Diesel PM	66	70	60
EJ Index for NATA* Air Toxics Cancer Risk	69	72	62
EJ Index for NATA* Respiratory Hazard Index	69	72	62
EJ Index for Traffic Proximity and Volume	65	69	59
EJ Index for Lead Paint Indicator	81	78	73
EJ Index for Superfund Proximity	68	71	62
EJ Index for RMP Proximity	66	69	59
EJ Index for Hazardous Waste Proximity	65	69	59
EJ Index for Wastewater Discharge Indicator	N/A	76	74



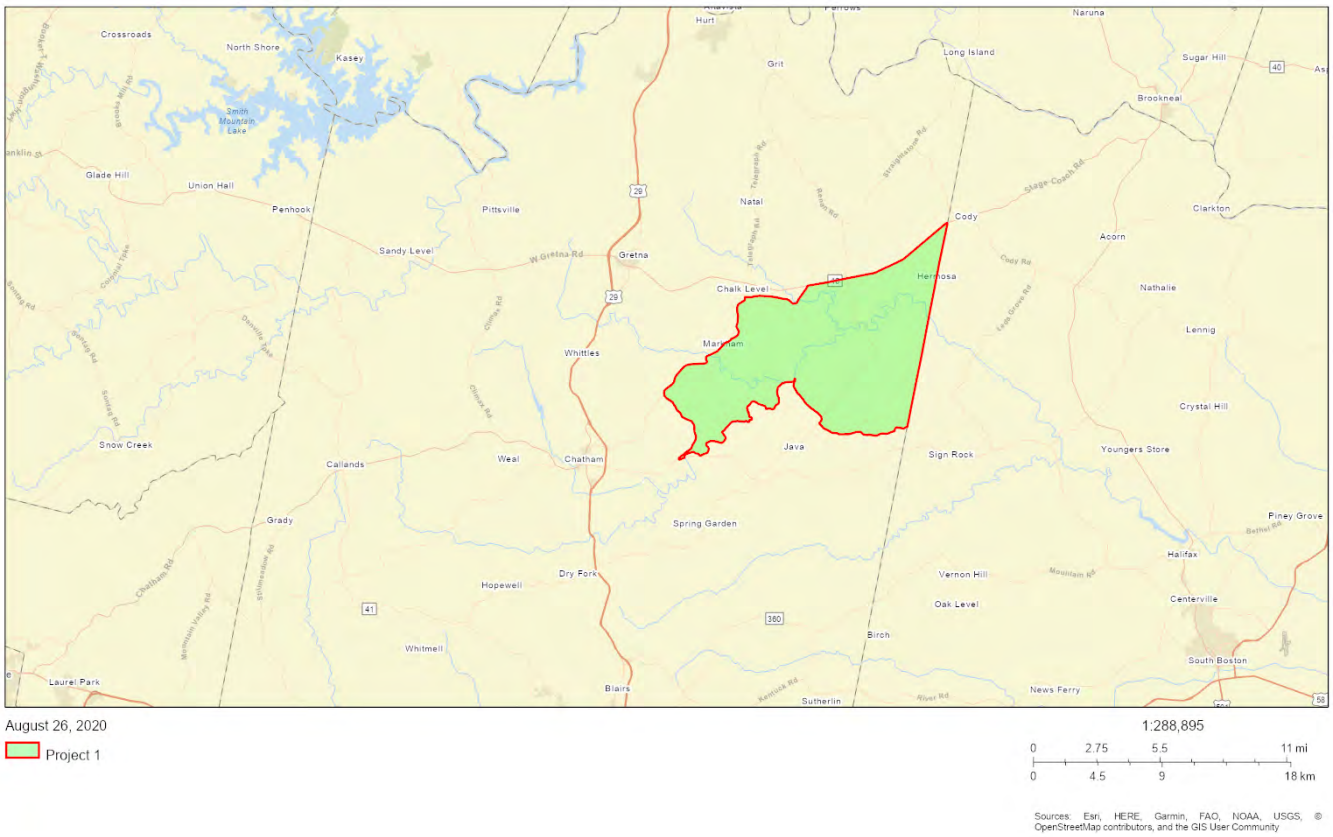
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2019)

Blockgroup: 511430107001, VIRGINIA, EPA Region 3

Approximate Population: 631

Input Area (sq. miles): 58.41



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2019)

Blockgroup: 511430107001, VIRGINIA, EPA Region 3

Approximate Population: 631

Input Area (sq. miles): 58.41

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	8.06	7.79	64	8.64	29	8.3	40
Ozone (ppb)	40.8	42.5	24	44.9	7	43	32
NATA* Diesel PM (µg/m^3)	0.144	0.425	6	0.477	<50th	0.479	<50th
NATA* Cancer Risk (lifetime risk per million)	30	31	48	31	<50th	32	<50th
NATA* Respiratory Hazard Index	0.4	0.41	43	0.4	50-60th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	0	570	6	640	5	750	4
Lead Paint Indicator (% Pre-1960 Housing)	0.42	0.21	84	0.36	64	0.28	71
Superfund Proximity (site count/km distance)	0.035	0.11	26	0.15	17	0.13	31
RMP Proximity (facility count/km distance)	0.04	0.38	2	0.62	1	0.74	2
Hazardous Waste Proximity (facility count/km distance)	0.048	0.66	5	1.3	3	4	7
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.8	N/A	30	22	14	37
Demographic Indicators							
Demographic Index	44%	32%	77	30%	77	36%	67
Minority Population	46%	37%	65	32%	71	39%	64
Low Income Population	41%	26%	78	28%	77	33%	68
Linguistically Isolated Population	0%	3%	52	3%	55	4%	45
Population With Less Than High School Education	22%	11%	87	11%	88	13%	81
Population Under 5 years of age	2%	6%	12	6%	13	6%	12
Population over 64 years of age	26%	14%	91	16%	89	15%	90

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description:

Summary of ACS Estimates	2013 - 2017
Population	631
Population Density (per sq. mile)	11
Minority Population	293
% Minority	46%
Households	293
Housing Units	499
Housing Units Built Before 1950	179
Per Capita Income	24,709
Land Area (sq. miles) (Source: SF1)	57.92
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.46
% Water Area	1%

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	631	100%	129
Population Reporting One Race	626	99%	298
White	338	54%	89
Black	239	38%	95
American Indian	0	0%	12
Asian	0	0%	12
Pacific Islander	0	0%	12
Some Other Race	49	8%	78
Population Reporting Two or More Races	5	1%	8
Total Hispanic Population	49	8%	78
Total Non-Hispanic Population	582		
White Alone	338	54%	89
Black Alone	239	38%	95
American Indian Alone	0	0%	12
Non-Hispanic Asian Alone	0	0%	12
Pacific Islander Alone	0	0%	12
Other Race Alone	0	0%	12
Two or More Races Alone	5	1%	8
Population by Sex			
Male	328	52%	78
Female	303	48%	66
Population by Age			
Age 0-4	13	2%	19
Age 0-17	59	9%	32
Age 18+	572	91%	111
Age 65+	165	26%	48

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017 .

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	507	100%	106
Less than 9th Grade	46	9%	31
9th - 12th Grade, No Diploma	65	13%	33
High School Graduate	226	45%	77
Some College, No Degree	97	19%	41
Associate Degree	33	7%	26
Bachelor's Degree or more	73	14%	37
Population Age 5+ Years by Ability to Speak English			
Total	618	100%	132
Speak only English	569	92%	106
Non-English at Home[1+2+3+4]	49	8%	79
[1]Speak English "very well"	18	3%	31
[2]Speak English "well"	0	0%	12
[3]Speak English "not well"	0	0%	12
[4]Speak English "not at all"	31	5%	52
[3+4]Speak English "less than well"	31	5%	52
[2+3+4]Speak English "less than very well"	31	5%	52
Linguistically Isolated Households*			
Total	0	0%	12
Speak Spanish	0	0%	12
Speak Other Indo-European Languages	0	0%	12
Speak Asian-Pacific Island Languages	0	0%	12
Speak Other Languages	0	0%	12
Households by Household Income			
Household Income Base	293	100%	53
< $15,000	57	19%	38
$15,000 - $25,000	51	17%	26
$25,000 - $50,000	46	16%	27
$50,000 - $75,000	67	23%	33
$75,000 +	72	25%	34
Occupied Housing Units by Tenure			
Total	293	100%	53
Owner Occupied	246	84%	50
Renter Occupied	47	16%	36
Employed Population Age 16+ Years			
Total	590	100%	123
In Labor Force	314	53%	105
Civilian Unemployed in Labor Force	23	4%	30
Not In Labor Force	276	47%	66

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	652	100%	177
English	589	90%	155
Spanish	54	8%	115
French	7	1%	12
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	0	0%	12
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	0	0%	12
Chinese	0	0%	12
Japanese	N/A	N/A	N/A
Korean	0	0%	12
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	2	0%	8
Other Asian	0	0%	12
Tagalog	0	0%	12
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	0	0%	12
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	12
Total Non-English	63	10%	235

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017.
*Population by Language Spoken at Home is available at the census tract summary level and up.

Appendix G

MVP Southgate Project

Public, Stakeholder, and Agency Participation Plan

(November 2018)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 1

Appendix 1-L

Public, Stakeholder, and Agency Participation Plan

MVP Southgate Project

Public, Stakeholder, and Agency Participation Plan

November 2018

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1.0 PLAN PURPOSE

The purpose of this Public, Stakeholder and Agency Participation Plan is to identify stakeholders and potential issues related to the proposed MVP Southgate Project ("Project" or "Southgate Project"), determine appropriate and effective methods of communication with stakeholders, identify responsible parties, document the public consultation process, and adhere to communication protocols. The Southgate Project team is dedicated to seeking out greater involvement from the various affected groups early in the planning so that those who are interested may participate in the decision-making process. The Project's goal is to work with stakeholders to achieve consensus and settlements on mutually acceptable Project designs. The Southgate Project team believes an early and more collaborative approach will lead to Project designs that minimize impacts to landowners, communities, and the environment, while enabling us to develop more comprehensive applications for submittal to the Federal Energy Regulatory Commission ("FERC") and other agencies.

2.0 PROJECT SCOPE

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the FERC" or "Commission pursuant to Section 7(c) of the Natural Gas Act to construct and operate the Southgate Project. The Project will provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States, including for the Project's anchor shipper, PSNC Energy, a wholly-owned subsidiary of SCANA Corporation, a local distribution company serving customers in North Carolina. The Southgate Project is expected be in service by late 2020. The Project is a separate project from the 303-mile Mountain Valley Pipeline that is currently under construction. The Southgate Project will be developed, constructed, and owned by Mountain Valley and will be operated by EQM Midstream Partners, LP.

The Southgate Project includes an approximate 0.4-mile-long 24-inch-diameter pipeline (H-605), 73 miles of 24- and 16-inch-diameter natural gas pipeline (H-650), a new 28,915 nominal horsepower compressor station (Lambert Compressor Station), meter stations and other ancillary facilities (e.g. contractor yards and access roads) required for the safe and reliable operation of the pipeline. The Southgate Project facilities will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, in North Carolina.

3.0 OUTREACH PLAN GOAL

Mountain Valley and the Southgate Project team know that stakeholder outreach and public consultation are essential elements of the permitting process and will play an important role in the overall successful development of the Project.

The Southgate Project team has developed a comprehensive stakeholder list and public participation plan. The plan is built around the fundamental principle that open, honest and proactive communication is simply the right thing to do and necessary for the sound development of the Project. The Project strives to be a good neighbor and a good corporate citizen, and believes that every person, organization, and institution that might be affected by the Project has the right to be informed and should have an opportunity to participate in the decisions that might affect them.

The Southgate Project team, including land agents and survey crews, will participate in Public Consultation Training. This training includes appropriate communication, participation and documentation practices with stakeholders.

The Southgate Project team will also be trained in appropriate research methods about determining property ownership and legal descriptions. They will receive training on landowner negotiations, including effective listening skills. These skills are a fundamental part of the communication process between stakeholder and agent.

4.0 OUTREACH AND PUBLIC PARTICIPATION PLAN

It is the Southgate Project's objective to ensure that all potential federal, state and community stakeholders are informed of our intentions relative to the proposed Project in a timely manner. The Public, Stakeholder, and Agency Participation Plan, herein outlined, has the following objectives:

- *Identify all key stakeholders along the proposed pipeline route*. While landowners are the most obvious and directly affected stakeholders, many additional individuals and organizations along the proposed route may have a stake in the Southgate Project. Identifying and engaging them is important to the success of the Project.
- *Establish channels for two-way communication throughout the life of the Project*. Mountain Valley realizes that effective communication must be two-way. In addition to sharing information, the Project's outreach effort is designed to create a continuing dialogue with stakeholders, from the start of the pre-filing process through construction, restoration, and operation. It is also designed to provide stakeholders with a central point of contact to maintain ease of communication and ensure consistency of messaging.

Examples of FERC Key Stages and other information to be communicated:

- Pre-filing Request
- Open Houses
- Draft Resource Reports and Alternatives
- Monthly Status Reports
- FERC issues Notice of Intent
- Draft Resource Reports
- FERC Scoping Meetings
- Responses to Scoping Comments
- File Application
- Data Requests & Responses
- Supplemental information
- Commission Order
- Construction
- In-service

- *Ask for public input at critical stages of planning*. Mountain Valley believes that the Southgate Project is a partnership not only with the commercial partners, but with all stakeholders. With that idea in mind, the Southgate Project team has sought input and ideas from stakeholders during the planning and pre-filing process. This has helped to identify and address areas of concern. The Project held three open houses at locations convenient to affected stakeholders along the proposed Southgate Project route. These open house events initiated the open-dialogue process with our community members. The Southgate Project open houses and other activities outlined herein, have been designed to serve as opportunities for the public to learn about the Project and for the Southgate Project team to listen to concerns of affected stakeholders.
- *Keep stakeholders informed throughout the process*. Early and timely communication with all stakeholders is essential to the Southgate Project's success. The Project is committed to proactively communicating, through the use of website updates and other methods, during all phases of the

Project. Many outreach plans are designed to communicate effectively during early stages of implementation – especially during the approval stage – but then reduce communication during construction. While communication about the Southgate Project will certainly be heaviest early in the process, the Project team plans to proactively communicate, via website updates and other methods, during all phases of the Project, even after all approvals have been received.

- *Engage local resources*. To gain insight into public perceptions along the route and to improve the credibility of the Project, the Southgate Project team has retained community involvement specialists, who are very familiar with and knowledgeable about the local area, to supplement the efforts of the Project team. These specialists will arrange community meetings and other necessary meetings between the Project and stakeholders. Additionally, they will serve as the "eyes and ears" of the Project, helping to identify growing areas of concern, potential issues, and misinformation.

5.0 STAKEHOLDER IDENTIFICATION

Mountain Valley will focus its efforts on reaching the following audiences:

- Landowners
- Local elected officials
  - Mayors, city councils, boards of supervisors
  - County commissioners
  - County and municipal planning organizations
  - Zoning boards, etc.
- State elected officials
  - State senators (local area staff)
  - State congressmen (local area staff)
- Federal elected officials
  - U.S. Senators (local area staff)
  - U.S. Congressmen (local area staff)
- Federal, state, and local regulatory agencies
- Native American Tribes
- Economic development agencies/chambers of commerce
- Owners of mineral rights, such as coal companies
- Local law enforcement agencies
- Local emergency services (fire departments, ambulatory)
- Local media outlets

- Environmental non-governmental organizations
- Community at large

The status of contacts made to-date with federal and state agencies, local elected officials and municipal planning agencies can be found in the Southgate Project's pre-filing monthly reports to the FERC.

5.1 AGENCIES

In April 2018, the Project team made phone calls to all permitting agencies that require consultation of the projects plan to use the FERC pre-filing process and invited them to participate in the pre-filing process. Additionally, the Southgate Project team sent written correspondence to many of the aforementioned agencies requiring consultation that included a formalized invitation to participate in the FERC pre-filing process, a basic project overview, and a point of contact for the project.

The Southgate Project team remains committed to working with federal and state agencies. In the spirit of two-way engagement, the Project team is responding, and will continue to respond, to requests for information from these agencies in a timely manner. During the initial contacts, a specific line of communication was established between the agency personnel and Project staff. This line of communication will be utilized as confirmation to better understand agency requests and reaffirm agency receipts of requested information.

5.2 OTHER STAKEHOLDERS

The Southgate Project contacted stakeholders, including any affected landowners (as that term is defined by 18 CFR Section 157.6(d) (2)). In areas where notifying a larger group may be necessary, the Project will expand the mailing list to include landowners that may fall outside the requirements stated in 18 CFR Section 157.6(d)(2). Many of these stakeholders will have already been contacted, but it is the Project's goal to provide all stakeholders – including those with whom we have been in contact – the same information at the same time. The letter will describe the Project and provide updated information and inform stakeholders of the pre- filing process timeline and invite them to open houses.

5.3 STAKEHOLDER OUTREACH ACTIVITIES

Mountain Valley will employ the following methods to ensure successful communication and outreach, including:

Stakeholder Identification and Issues Management & Database Tracking System: After identifying stakeholders, the Southgate Project has developed and maintained an issues management system to track contact with these stakeholders in a manner that helps identify address and resolve emerging issues and concerns.

Information Materials: The Southgate Project has developed messages and materials to inform stakeholders about the Project and to address potential questions and areas of concern. These materials include, for example:

- A project overview fact sheet
- Frequently Asked Questions (FAQ)
- "Standard presentation" information posters, etc. for use at open houses and other meetings

- Internal project guidance concerning key messages about the Southgate Project to ensure consistency in communication
- Media advisories to announce public meetings and other Project updates
- Project newsletter to be physically mailed directly to affected landowners and other stakeholders 3-4 times per year and made available online via the Project website
- Project website that will include all the above, as well as maps of the proposed pipeline route

Media Relations: Keeping the media appropriately informed helps minimize the potential for misunderstanding and allows the Project to inform all stakeholders while reducing inaccurate information. Messages and materials about the Southgate Project will continue to be refined throughout the development effort to contain updated information and to address stakeholder concerns that may arise. In addition, materials contain the following information:

- Purpose and Need of the Project
- Information on Mountain Valley
- Information on environmental and other benefits of natural gas
- Discussion of today's energy market and the need for expanded natural gas infrastructure
    - FERC background information – The role of the FERC and other regulatory agencies in the process, and an overview of the pre-filing and filing processes
    - Information on construction, including the types and sizes of equipment used
    - Information on environmental activities conducted throughout the project, including pre-construction environmental surveys, measures during construction to minimize impact on environmental resources including agricultural resources, restoration, and post-construction monitoring
    - Safety information – A discussion of pre- and post-construction safety, and an overview of the safety record of the interstate natural gas pipeline industry and of the Project's affiliates
    - A Project time line – An intended time frame for completing key phases of the Southgate Project.

Training: A significant component of the outreach and communication team's effort is focused on training the Project team. The goal of the training effort is to familiarize all personnel who participate in the Project – both home office and field staff, including sub-contractors – of the Southgate Project outreach and public participation plan and to provide specific modules of training – including those developed by INGAA/IRWA for those personnel and contractors who interface with the public. Southgate Project staff receiving training includes all Project personnel and all contractors involved in field engineering, siting and survey, permitting and environmental impact mitigation, land acquisition, operations, property-owner relations, and government affairs. The Southgate Project's guiding principle is to train each individual shortly after retention for the Project or before the individual engages in his or her designated role.

Website: Because of its accessibility and the ability to be constantly updated, online communications will play a vital role in stakeholder dialogue. In addition to serving as a repository for up-to- date materials and information, the MVP Southgate Project website will feature mechanisms for stakeholders to ask questions and provide input about the Project.

Direct Contact Outreach: Mountain Valley will utilize direct contact, either in-person, by phone, or correspondence (e-mail and letter) with stakeholders throughout the Project, as appropriate. The Southgate Project will notify landowners affected by the Project as required by FERC's regulations. For example, direct contact by Project right-of-way representatives is a necessity in communicating with affected landowners. Direct contact with agencies has already been initiated by Project environmental staff and will continue.

Open Houses: In June 2018, Mountain Valley conducted three community open houses at locations in the project area. The Southgate Project's community open houses were in addition to the FERC scoping meetings. A formal presentation was not given during these open houses. However, attendees had direct, one-on-one access to members of the Project team who listened to stakeholder ideas and concerns and answered questions about the Project. The Project used an "information station" open house format with topic-specific stations covering possible concerns and potential solutions. The stations included rights-of-way, environmental, construction, engineering, etc., as well as a station dedicated specifically for FERC personnel. Each station contained information pertinent to that area of project responsibility, presented both in larger visual aids and/or in handout form and manned by Project team members knowledgeable of the subject presented. This allowed attendees arriving at different times to circulate among the stations and gather information in a more personal and relaxed fashion. Land agents were present at the open houses to review the proposed route and to answer any specific landowner concerns.

The Southgate Project utilized GIS software as a means of highlighting the proximity of the Southgate Project route to individual landowners' properties, businesses, farms, neighbors, etc. Stakeholders were notified and invited directly via invitations sent by U.S. mail and indirectly through news media reports, advertising and the MVP Southgate Project website about the open house schedule.

Locations of the open houses were determined and selected based on their proximity to the Southgate Project route and meeting room capacity, with intent to be as convenient as possible to the majority of landowners along the route. A list of dates and locations are provided in the table below:

Project Open House Meetings – MVP Southgate Project	
Date	**Location**
June 28, 2018	Olde Dominion Agriculture Complex Chatham, VA
June 26, 2018	Reidsville Event Center Reidsville, NC
June 25, 2018	The Palladium Event Center Burlington, NC

Scoping Meetings: The FERC conducted scoping meetings in the Southgate Project area. The Project participated in those scoping meetings, as well as in meetings with Federal, State, and local resource agencies.

FERC Scoping Meetings – MVP Southgate Project	
Date	**Location**
August 23, 2018	Vailtree Event and Conference Center Haw River, NC
August 21, 2018	Olde Dominion Agriculture Complex Chatham, VA
August 20, 2018	Reidsville Event Center Reidsville, NC

Project Contact Information: The Southgate Project maintains and monitors a toll-free phone number, e-mail address, and postal mailing address that enable stakeholders to obtain additional Project information and provide input. This information is included on printed materials and the Project website.

In summary, the Southgate Project understands that Stakeholder Outreach does not stop at submittal of the application or possible receipt of a certificate of Public Convenience and Necessity but is an ongoing commitment to keeping the public at-large, affected landowners, the market, and other interested parties informed of the Project status. The Project will seek to continue the relationships and dialogue built during these crucial early stages of public interaction.

5.4 COMMUNICATIONS MILESTONES

- April 2018 to present – Initial communications with agencies and stakeholders
- April 2018 – MVP Southgate Project website live and online
- April 2018 – Landowner welcome packet to introduce the Southgate Project
- May 15, 2018 – FERC accepts the Southgate Project into Pre-filing Process
- May – June 2018 – Additional informational letter to stakeholders; open house invitations; print media outreach
- June 2018 – Community open houses
- August 2018 – MVP Southgate Project first newsletter
- August 2018 – Public scoping meetings hosted by FERC
- November 2018 – File Certificate Application

5.5 COMMUNICATION VEHICLES

- Briefing materials for elected officials
- Website: www.mvpsouthgate.com
- Toll-free hotline: 833-MV-SOUTH
- Email: mail@mvpsouthgate.com

- Community open houses
- Site visits
- Maps for stakeholders to view (hard copy and electronic versions)
- High-level maps for general distribution
- Regular mailings to engage stakeholders without internet access and locations set up to review voluminous Project info
- Newspaper advertorials as needed
- Media interviews, including TV, radio, newspapers, to produce ongoing public stories and articles regarding updates on the MVP Southgate Project

5.6 FERC LANDOWNER ASSISTANCE

The FERC landowner helpline via telephone is toll-free at 1-877-337-2237 and via email address is LandownerHelp@FERC.gov

5.7 MVP SOUTHGATE PROJECT LANDOWNER RESOLUTION PROCESS

In the early stages of the Project's planning and development, the Southgate Project established a protocol to address landowner concerns and answer questions. The protocol utilizes Southgate Project's toll-free phone line (833-MV-SOUTH) and/or email submission to mail@mvpsouthgate.com and this same protocol will be utilized during the construction phase as well. These communication portals were created as a means for landowners, as well as community members, to contact Project representatives with questions, concerns, and issues. The Southgate Project also keeps a formal record of all calls and emails received in order to effectively track inquiries and resolutions. The three-step process is as follows:

Step 1: Gather Information

- Southgate Project representative will request all necessary information to complete the information section of the Inquiry/Issues Tracking Log, including the individual's name, address, parcel number, phone number, and Project reference. Additionally, any details offered regarding the purpose of the call will be entered on the Tracking Log.

Step 2: Define the Inquiry/Issue

- Southgate Project representative will work with the individual to help understand and address their concerns. If the representative can resolve the issue, they will record this on the Tracking Log. Otherwise, the individual will be advised that their concerns have been documented and that they can generally expect a return call within three business days from an MVP Southgate Project representative. The questions/concerns/issues as documented on the Tracking Log will then be directed to the appropriate right-of-way agent.

Step 3: Resolution

- If the issues are resolved during Step 2, the Southgate Project representative will complete the process by documenting how a resolution was reached for the Tracking Log. If a resolution is not

reached during Step 2, the Tracking Log is forwarded to the appropriate right-of-way agent who will return the call and also update the Tracking Log with the resolution. The delegation of the issue should generally follow this progression until resolution is reached. If a right-of-way agent receives a direct phone call relating to environmental, construction, or non- right-of-way issues from a landowner during pre-construction, construction, or post-construction activities, the agent will request all necessary information (as outlined in Step 1) and will initiate submission of the information on the Inquiry/Issues Tracking Log. The agent will then proceed to Steps 2 and 3 until a resolution is reached. After working with the Southgate Project representative and appropriate right-of-way agent, if the landowner is still not completely satisfied with the resolution, the individual should contact the Commission's Landowner Helpline at (877) 337-2237, or by email, LandownerHelp@FERC.gov.

5.8 MVP SOUTHGATE PROJECT FORMAL APPLICATION – PUBLIC LOCATIONS FOR VIEWING

When the formal application from Southgate Project is filed with the FERC, it will be sent to a public location in each county in Virginia and North Carolina. The list below identifies the locations in each county where the public can review a hard copy and/or a digital copy (depending on the preference of the library or county building).

County	Name	Address
Pittsylvania	Pittsylvania County Public Library	24 Military Drive, Chatham, VA 24531
Rockingham	Reidsville Public Library	204 W Morehead Street, Reidsville, NC 27320
Rockingham	Eden Public Library	598 S. Pierce Street, Eden, NC 27188
Alamance	May Memorial Library	342 S. Spring Street, Burlington, NC 27215

Appendix H

Examples of Information on MVP Southgate Project Website

NEWS & INFO

June 18, 2020

The Federal Energy Regulatory Commission has approved a Certificate of Public Convenience and Necessity for the MVP Southgate project. To read the full order granting the certificate, click here.

Press Release

Project Announcement News Release

Project Application to FERC News Release

Project Update

Project Status Update – Oct. 15, 2018

Project Fact Sheets

MVP Southgate Project Overview

Natural Gas Pipeline Safety

Compressor Station Fact Sheet

Construction Fact Sheet

FERC Filings

Certificate Application Volume 1

Resource Report 1 – General Project Description

RR01-001-Appendix 1A

RR01-002-Appendix 1A

RR01-003 Appendix 1A

RR01-004 Appendix 1A

RR01-005 Appendix 1A

Resource Report 2 – Water Use and Quality

RR02-Appendix 2-Ia-VA

RR02-Appendix 2-Ib-VA

RR02-Appendix 2-Ic-VA

RR02-Appendix 2-Id-VA

RR02-Appendix 2-Ie-VA

RR02-Appendix 2-Ij-NC

RR02-Appendix 2-Ik-NC

RR02-Appendix 2-Im-NC

RR02-Appendix 2-Il-NC

RR02-Appendix 2-In-NC

RR02-Appendix 2-Ig-NC

RR02-Appendix 2-If-NC

RR02-Appendix 2-Ii-NC

Survey Fact Sheet

MVP Southgate Myth v. Fact (page 1)

MVP Southgate Myth v. Fact (page 2)

Environmental Impact Statement (EIS) Pre-Filing Environmental Review Process

Project Newsletter

Volume 1 – MVP Southgate Newsletter

Volume 2 – MVP Southgate Newsletter

Volume 3 – MVP Southgate Newsletter

Volume 4 – MVP Southgate Newsletter

Volume 5 – MVP Southgate Newsletter

Volume 6 – MVP Southgate Newsletter

Volume 7 – MVP Southgate Newsletter

RR02-Appendix 2-lh-NC

Resource Report 3 – Fish, Wildlife and Vegetation

RR03-Appendix 3-A

Resource Report 4 – Cultural Resources

Resource Report 5 – Socioeconomics

Resource Report 6 – Geologic Resources

Resource Report 7 – Soils

Resource Report 8 – Land Use, Recreation and Aesthetics

Resource Report 9 – Air and Noise Quality

Resource Report 10 – Alternatives

Resource Report 11 – Reliability and Safety

Resource Report 12 – PCB Contamination

Transmittal letter describing data response (12/3/18)

Response to data request (12/3/18)

Transmittal letter describing supplemental filing (01/24/19)

Supplemental filing (01/24/19)

Transmittal letter describing data responses (2/28/19)

Response to OEMR data request (2/28/19)

Spreadsheet – Response to OEMR data request (2/18/19)

MVP Southgate Environmental Info Request (3/5/19)

MVP Southgate Data Responses (3/5/19)

Data Response – 1 of 6 (3/5/19)

Data Response – 2 of 6 (3/5/19)

Data Response – 3 of 6 (3/5/19)

Data Response – 4 of 6 (3/5/19)

Data Response – 5 of 6 (3/5/19)

Data Response – 6 of 6 (3/5/19)

Aligment sheet revision comments – (3/29/19)

Supplemental filing – Response matrix – (3/29/19)

Supplemental filing – Table of contents – (3/29/19)

Supplemental filing – Transmittal letter – (3/29/19)

Supplemental RR 1-11 Attachments – (3/29/19)

Supplemental RR 2 – 1 – (3/29/19)

Supplemental RR 2 – 2 – (3/29/19)

Supplemental RR 2 – 3 – (3/29/19)

Supplemental RR 2 – 4 – (3/29/19)

Supplemental RR Responses – (3/29/19)

Supplemental RR01 – 01 – H605 – (3/29/19)

Supplemental RR01 – 02 – H650 1-14 – (3/29/19)

Supplemental RR01 – 03 – H650 15-28 – (3/29/19)

Supplemental RR01 – 04 – H650 1-17 –

(3/29/19)

Supplemental RR01 – 05 – H650 17A-28 – (3/29/19)

Supplemental RR01 – 06 – H650 1-12A – (3/29/19)

Supplemental RR01 – 07 – H650 13-21 – (3/29/19)

Supplemental RR01 – 08 – Quads Maps – (3/29/19)

Supplemental RR01 – 09 – Permit HDD – (3/29/19)

Supplemental RR01 – 10 – Cont Yard – (3/29/19)

Supplemental Wetland Waterbody Delineation – (3/29/19)

MVP Southgate Environmental Info Request 2 Transmittal (5/13/19)

Data Responses (5/13/19)

Environmental Info Request – Response Attachments (5/13/19)

Supplemental materials – transmittal letter (5/22/19)

Supplemental materials – variations (5/22/19)

Supplemental materials – access roads, structures (5/22/19)

Supplemental materials – attachments, appendices (5/22/19)

MVP Southgate Environmental Info Request

3 Transmittal (6/21/19)

Environmental Info Response (6/21/19)

Environmental Info Response – Attachments (6/21/19)

Draft Environmental Impact Statement (7/26/19)

DEIS Attachments (7/26/19)

MVP Southgate supplemental transmittal letter (8/9/19)

MVP Southgate supplemental filing (8/9/19)

MVP Southgate Environmental Info Request 4 Transmittal (10/18/19)

Environmental Info Response (10/18/19)

Environmental Info Response – Attachments (10/18/19)

Response to comments on DEIS (10/21/19)

Supplemental filing – transmittal letter (10/22/19)

Supplemental filing – Part 1

Supplemental filing – Part 2

Supplemental filing – Part 3

Supplemental filing – Part 4

Alignment sheet 1

Alignment sheet 2

Alignment sheet 3

Alignment sheet 4

Quad Sheet 1

Quad Sheet 2

Quad Sheet 3

MVP Southgate Environmental Info Request 5 Transmittal (11/13/19)

Environmental Info Response 1 (11/7/19)

Environmental Info Response (11/13/19)

Environmental Info Response – Attachments (11/13/19)

Environmental Info Response – Attachments, supplemental info (11/13/19)

Variance – Response

NCDWR JPA Response

Survey Progress – Cultural Resources Attachment – Tables

CS – Lambert – Attachment

Revised Alignment Sheets Letter (12/20/19)

MVP Southgate Final Environmental Impact Statement (2/14/20)

MVP Southgate FEIS Appendix A

MVP Southgate FEIS Appendix 1.1

MVP Southgate Answer to Requests for Rehearing (8/10/20)

View The Archive

Appendix I

Samples of Direct Mailings and Newsletters

1. MVP Southgate Letter to Stakeholder with Landowner Welcome Packet (April 11, 2018)
2. MVP Southgate Letter to Landowner (May 24, 2018)
3. MVP Southgate Newsletter, Vol. 1 (August 2018)
4. MVP Southgate Newsletter, Vol. 2 (December 2018)
5. MVP Southgate Newsletter, Vol. 3 (April 2019)
6. MVP Southgate Newsletter, Vol. 4 (August 2019)
7. MVP Southgate Newsletter, Vol. 5 (December 2019)
8. MVP Southgate Newsletter, Vol. 6 (March 2020)
9. MVP Southgate Newsletter, Vol. 7 (July 2020)
10. MVP Southgate Informational Letter (September 2020)

625 L berty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

April 11, 2018

Dear Stakeholder,

As a valued stakeholder and community member, we would like to introduce the MVP Southgate project, a proposed natural gas pipeline designed to transport clean-burning, affordable natural gas from the Marcellus and Utica shale gas regions to growing demand markets in central North Carolina. MVP Southgate will be developed, constructed, and owned by Mountain Valley Pipeline, LLC (Mountain Valley) and regulated by the Federal Energy Regulatory Commission (FERC). PSNC Energy, a local distribution company, will utilize MVP Southgate as a diversified and reliable source of natural gas to serve its customers. Pending regulatory approvals, an in-service date is targeted for the fourth quarter of 2020.

As proposed, MVP Southgate will receive gas from the end of the Mountain Valley Pipeline mainline in Pittsylvania County, Virginia and extend approximately 70 miles south to new delivery points in Rockingham and Alamance Counties, North Carolina. The MVP Southgate route is being designed to avoid sensitive or protected areas; limit surface disturbance; minimize the overall environmental footprint; and utilize as many existing gas and electric transmission corridors as possible. The MVP Southgate project team will work diligently with stakeholders, including landowners, community members, local officials, as well as state and federal agencies to identify the best possible route for the proposed pipeline.

Civil, cultural, and environmental surveys will play a vital role in the route planning process as they help the project team to better understand the unique features of the region. During the coming days and weeks, land agents will be requesting survey permission from property owners for several routing options within what is known as a “study corridor.” Having an extended area for analysis and evaluation will allow the MVP Southgate project team to thoroughly evaluate options and determine an optimum route.

Your property has been identified as part of the study corridor and a land agent representing MVP Southgate will contact you to discuss permission for accessing your property in order to conduct these important surveys. Property owners often have critical pieces of historical or environmental information that can help our experts to identify a deliberate and thoughtful route; therefore, we want to thank you for your assistance during these early stages of planning and development.

Mountain Valley is dedicated to the safe, responsible, and environmentally conscious construction of the proposed MVP Southgate pipeline – and we want our community members to understand the natural gas transportation process and know that we are committed to the safety of our communities. Please contact us with questions or comments via email at mail@mvpsouthgate.com; or by phone at **833-MV-SOUTH**; and visit our website at www.mvpsouthgate.com.

Sincerely,

Josie Schultz
External Communications Manager
on behalf of Mountain Valley Pipeline, LLC

Attachments:
MVP Southgate Project Overview
Proposed MVP Southgate Map
Natural Gas Pipeline Safety

Project Overview

As proposed, the MVP Southgate project is a natural gas pipeline system that spans approximately 70 miles from southern Virginia into central North Carolina – and as an interstate pipeline will be regulated by the Federal Energy Regulatory Commission (FERC). MVP Southgate will be developed, constructed, and owned by Mountain Valley Pipeline, LLC (Mountain Valley).

With a vast supply of natural gas from Marcellus and Utica shale production, the Mountain Valley Pipeline mainline will transport natural gas to markets in the Mid- and South-Atlantic regions of the United States. The MVP Southgate project, as proposed, will receive gas from the Mountain Valley Pipeline mainline in Pittsylvania County, Virginia and extend approximately 70 miles south to new delivery points in Rockingham and Alamance Counties, North Carolina. MVP Southgate would provide low-cost supply access to natural gas produced in the Marcellus and Utica shale regions – for service delivery to PSNC Energy customers, as well as existing and new end-user markets in southern Virginia and central North Carolina.

The pipeline will be regulated under the federal Natural Gas Act, which requires a Certificate of Public Convenience and Necessity from the FERC before construction can commence. As currently proposed, the pipeline will be 16 to 20 inches in diameter and will require approximately 50 feet of permanent easement, with up to 100 feet of temporary easement during construction. In addition, as currently designed, the project would require one compressor station that is anticipated to be located at the beginning of the project in Pittsylvania County, Virginia, on land owned by Mountain Valley.

The Planning and Development Process

Several commercial and engineering aspects must be completed before construction can begin on MVP Southgate. Commercial aspects include securing and confirming capacity commitments, and while the project has a capacity commitment from PSNC Energy, a wholly owned subsidiary of SCANA Corporation, as an anchor shipper, an Open Season is being held to understand additional market interest. The Open Season will provide all market participants, including natural gas producers, marketers, industrial users, and local distribution companies, an opportunity to access capacity on the pipeline. Additional market interest received during the Open Season may change the current project scope

The engineering and environmental considerations include surveying and evaluating preliminary routing to help determine a final route with the least overall impact to landowners, historic and cultural resources, and the environment. An important step in the process is obtaining permission to access landowner property to conduct engineering and environmental surveys. At this stage, we are only seeking permission to access property – and the actual act of surveying will not begin until we receive permission. We may obtain landowner permissions for parcels that are not in the final route; however, a comprehensive evaluation is necessary to determine the route.

To-date, we are seeking landowner permissions in the following counties:

- **Virginia**: Pittsylvania
- **North Carolina**: Alamance and Rockingham

Once a preliminary route is determined, the environmental review process with the FERC will begin. This is referred to as the Pre-Filing Review, which provides for early identification and resolution of environmental issues and allows for direct interaction between FERC staff, community members, and other stakeholders. Once the Pre-Filing Review begins, a series of community open houses will be held along the proposed route corridor.

After the Pre-Filing Review is complete, Mountain Valley will file an application with the FERC for a Certificate of Public Convenience and Necessity. Construction cannot commence until the FERC issues this certificate, which will include the FERC's environmental analysis of the project.

Designing the Route

The proposed MVP Southgate route is being designed to avoid sensitive or protected areas when feasible; limit surface disturbance; and minimize the overall environmental footprint, as well as utilize as many existing gas and electric transmission corridors as possible. The MVP Southgate project team will work diligently with stakeholders, including landowners, community members, local officials, and state and federal agencies to identify the best possible route for the proposed pipeline. The currently proposed route avoids all federal and state parks and wildlife preserves.

Health, Safety, and Environment:

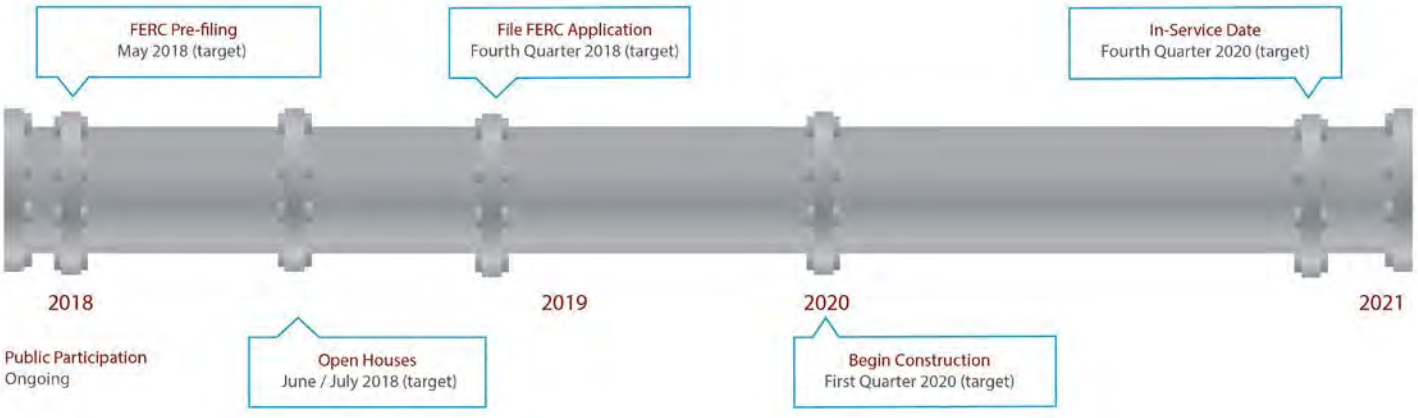
As the lead federal agency, the FERC will oversee the federal permitting process for MVP Southgate and will also coordinate with other federal, state, and local agencies during the environmental review process to identify and address potential environmental concerns.

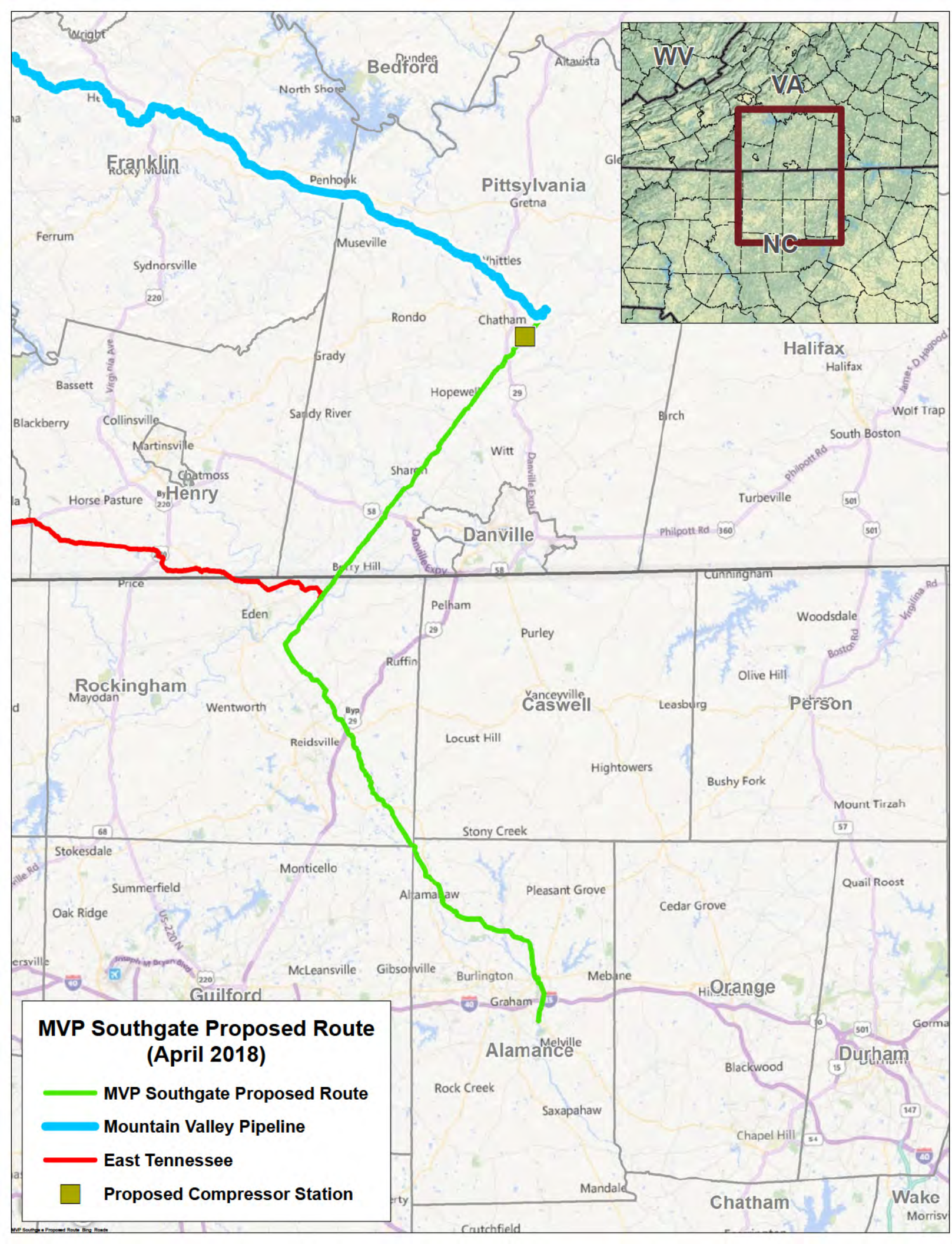
- U.S. Department of Transportation statistics confirm that natural gas transmission pipelines are the safest form of energy transportation
- Construction and operation of natural gas transmission lines follow strict federal and state guidelines that minimize environmental disturbance
- Safety is a core value and number one priority for Mountain Valley
- Mountain Valley has a steadfast commitment to environmental protection and will conduct its business operation in a sustainable and environmentally responsible manner at all times

Community Benefits:

- Local communities can receive revenue from taxes paid on the pipeline and compressor station
- States can receive revenue from sales and use taxes paid during the construction of the project
- Potential employment opportunities for local residents during the construction phase of the project
- Increased activity and revenue for restaurants, hotels/motels, and retailers
- Natural gas supply diversity for PSNC Energy customers and other consumers in the region

Proposed Project Schedule




WV
VA
NC
MVP Southgate Proposed Route
(April 2018)
MVP Southgate Proposed Route
Mountain Valley Pipeline
East Tennessee
Proposed Compressor Station
Bedford
Franklin
Pittsylvania
Halifax
Henry
Danville
Rockingham
Caswell
Person
Orange
Alamance
Durham
Guilford
Chatham
Wake
Wright
Dundee
Altavista
North Shore
Penhook
Gretna
Ferrum
Museville
Sydnorsville
Whittles
Rondo
Chatham
Grady
Bassett
Hopewell
Sandy River
Blackberry
Collinsville
Martinsville
Birch
Wolf Trap
South Boston
Witt
Chatmoss
Horse Pasture
Turbeville
Philpott Rd
Price
Eden
Pelham
Purley
Woodsdale
Cunningham
Ruffin
Olive Hill
Wentworth
Vanceyville
Leasburg
Reidsville
Locust Hill
Hightowers
Bushy Fork
Mount Tirzah
Stony Creek
Stokesdale
Monticello
Summerfield
Oak Ridge
Pleasant Grove
Cedar Grove
Quail Roost
McLeansville
Gibsonville
Burlington
Mebane
Graham
Melville
Blackwood
Rock Creek
Saxapahaw
Chapel Hill
Mandale
Cutchfield

Natural Gas Pipeline Safety

The safety of our communities, our employees, our contractors, and our pipeline will always remain a top priority. We will strive to ensure that the construction and operation of our natural gas infrastructure systems meet or exceed all federal and state safety regulations.

Fast Facts:

- The natural gas pipeline network has the best safety record of any energy delivery system according to the National Transportation Safety Board and the U.S. Department of Transportation (U.S. DOT).
- Federal and state regulations govern the design, construction, operations, and maintenance of natural gas pipelines.

Are natural gas pipelines safe?

Pipelines are the safest way to transport natural gas over long distances. Natural gas pipelines are built according to rigorous safety standards and have an outstanding safety record. According to the U.S. Energy Information Administration, the U.S. natural gas pipeline network consists of more than 300,000 miles of interstate and intrastate transmission pipelines.

What measures will Mountain Valley Pipeline, LLC take in constructing the proposed pipeline?

Mountain Valley Pipeline, LLC (Mountain Valley) will meet or exceed all U.S. DOT safety requirements during construction. Safety will be engineered into all facets of pipeline design, construction, and operation. The project will utilize trained and experienced inspectors who will carefully monitor pipeline construction to ensure compliance with safety standards and construction specifications. High-quality steel pipe will be used in the construction of Mountain Valley Pipeline, including adding protective coatings to the pipe during manufacturing. All pipe will be carefully inspected before it is installed to ensure it meets quality standards. After installation all pipeline field welds will be tested and inspected.

Before being placed into operation, the line would be pressure tested to certify integrity. Once in service, the pipeline would be patrolled, monitored, inspected, and maintained by the pipeline operator.

Considerations to ensure pipeline safety:

- No construction of buildings or other structures would be permitted on the permanent right-of-way.
- No planting of trees or other deep-rooting plants that may obstruct the permanent right-of-way would be permitted.
- No excavation or impounding water within the permanent right-of-way would be permitted without permission from the company.

How would Mountain Valley protect the pipeline and maintain its safe operation?

Safety is our priority in everything we do. Mountain Valley would ensure safe operation by maintaining the right-of-way to provide ready access and operate the pipeline in accordance with U.S. DOT and Federal Energy Regulatory Commission regulations. Regular inspections will occur to ensure pipeline integrity. The pipeline will be monitored 24-hours-a-day, 365-days-a-year using sophisticated computerized systems and around-the-clock personnel.

Additional Safety Information

- Interstate Natural Gas Association of American **www.ingaa.org**
- 811 Call Before You Dig **www.call811.com**

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

May 24, 2018

[redacted]
Chatham, VA 24531-5459

Parcel #: 2436-20-1215,2435-29-6519
Tract #: VA-PI-002.003.CS1,VA-PI-002.002.CS1

Dear [redacted],

The MVP Southgate project is a proposed natural gas infrastructure system designed to transport clean-burning, affordable natural gas from the Marcellus and Utica regions to growing demand markets in central North Carolina. MVP Southgate will be developed, constructed, and owned by Mountain Valley Pipeline, LLC (Mountain Valley) – and as an interstate pipeline will regulated by the Federal Energy Regulatory Commission (FERC). PSNC Energy, a local distribution company, will utilize MVP Southgate as a diversified and reliable source of natural gas to serve its customers.

As proposed, MVP Southgate will receive gas from the end of the Mountain Valley Pipeline mainline in Pittsylvania County, Virginia and extend approximately 72 miles south to new delivery points in Rockingham and Alamance Counties, North Carolina. Other facilities associated with the project will include two compressor stations that will be located along the pipeline route, as well as measurement, regulation, and other ancillary facilities required for safe operation of the pipeline. During the past several weeks, we have been contacting landowners along the proposed route and requesting property access to conduct survey work.

As an important stakeholder and community member, we want to keep you informed of the proposed schedule, as well as provide ways for you to stay engaged throughout the various stages of the MVP Southgate project. On May 15, 2018, the FERC approved our use of the pre-filing process and assigned the following Docket Number: **PF18-4**. We have enclosed a FERC brochure titled, *An Interstate Natural Gas Facility on My Land? What Do I Need to Know?* This brochure will help guide landowners through the FERC process and explain how they can become involved in the project.

As part of our outreach efforts, we will host community open houses to introduce and discuss the proposed MVP Southgate project. While there will not be a formal speech or presentation during these open houses, you will have direct, one-on-one access to people who will listen to your ideas and answer your questions about the project. This is your opportunity to meet with members of the MVP Southgate project team, as well as talk with FERC representatives. You are invited and welcome to attend any of the following community open houses:

Monday, June 25, 2018
5:30 – 7:30 PM
The Palladium
1272 Plaza Drive
Burlington, NC 27215

Tuesday June 26, 2018
5:30 – 7:30 PM
The Reidsville Event Center
223 S. Scales Street
Reidsville, NC 27230

Thursday, June 28, 2018
5:30 – 7:30 PM
Olde Dominion Agricultural Complex
19783 U.S. Hwy 29 South
Chatham, VA 24531

In the fourth quarter of 2018, Mountain Valley plans to file the application for the Certificate of Public Convenience and Necessity with the FERC and other federal and state agencies. This aspect of the FERC process can take up to 12 months or longer and construction cannot begin until the FERC issues the certificate, which will include a comprehensive environmental analysis of the project. Based on this timeline, and upon receipt of the required regulatory approvals, which includes approvals by relevant federal and state agencies, we anticipate the MVP Southgate project to be in-service during the fourth quarter of 2020.

We are excited about this project and we encourage community members and stakeholders to attend the open houses to learn more about the benefits of bringing a reliable supply of natural gas to the region. Mountain Valley is dedicated to the safe, responsible, and environmentally conscious construction of the proposed MVP Southgate pipeline – and we want our community members to understand the natural gas transportation process and know that we are committed to the safety of our communities. Please contact us with questions or comments via email at mail@mvpsouthgate.com; or by phone at 833-MV-SOUTH; and visit our website at www.mvpsouthgate.com.

Sincerely,

Josie Schultz
External Communications Manager
on behalf of Mountain Valley Pipeline, LLC

Attachments:
MVP Southgate Project Overview
FERC Brochure :: An Interstate Natural Gas Facility on My Land? What Do I Need to Know?

MVP SOUTHGATE

IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 1 :: August 2018

MVP SOUTHGATE

Our project newsletter to stakeholders

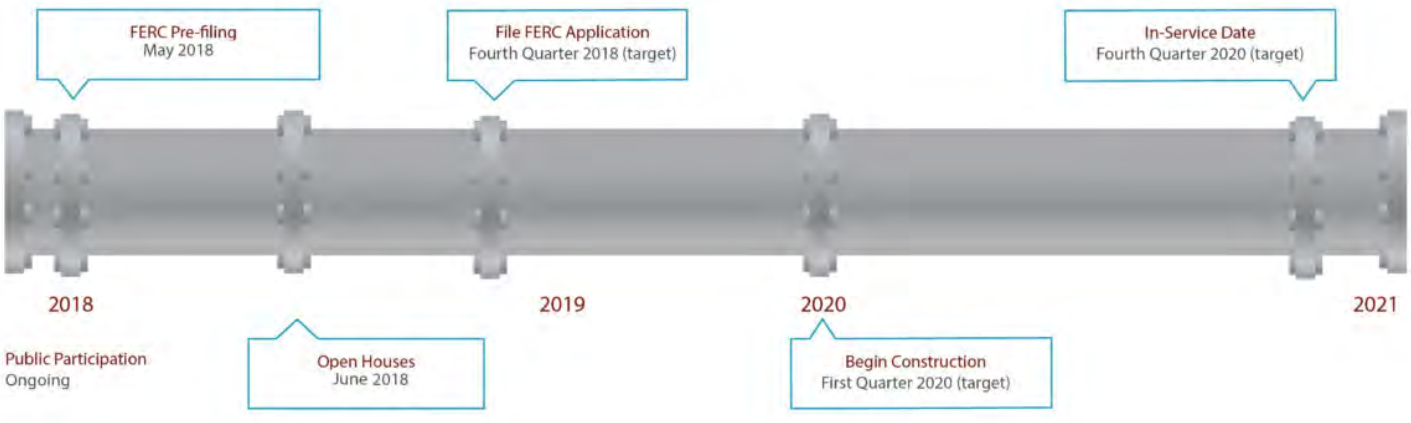
We are pleased to introduce the inaugural newsletter for the MVP Southgate. In an effort to maintain communication with stakeholders throughout the process/ project, we plan to issue this newsletter approximately 3-4 times per year. The newsletter will provide an update on where we are in the regulatory process, what stakeholders should expect in terms of next steps, and other relevant information on our project and the natural gas industry.

Tell me about the FERC pre-filing . . .

On May 3, 2018, Mountain Valley Pipeline, LLC (Mountain Valley) submitted its pre-filing request to the Federal Energy Regulatory Commission (FERC) to construct, own, and operate new interstate natural gas pipeline facilities and transport natural gas in interstate commerce. FERC issued docket number PF18-4-000 for the MVP Southgate project.

The pre-filing request letter provided a description of the proposed MVP Southgate project, including maps of the proposed pipeline route, lists of permitting agencies, an overview of the public participation plan, and a proposed schedule of major project milestones. The FERC formally accepted the MVP Southgate project into its pre-filing process on May 15, 2018.

The intent of the pre-filing process is to conduct significant outreach to seek stakeholder input; conduct field surveys to identify cultural resources, wetlands, and endangered species; to address potential constructability issues; and to begin the permit application submission process with other relevant regulatory agencies. All of this work is aimed at resolving issues and submitting a more complete formal application with the FERC, which we intend to do by the end of the year.



Keeping an open dialogue with our landowners and communities

Prior to being accepted by the FERC into the pre-filing process, we have been hard at work talking with local officials, community members, and landowners throughout the three counties in which the proposed route and alternative routes traverse. Our outreach team has been conducting public presentations and meeting with elected officials, tribes, non-governmental groups and other stakeholders since shortly after the project was announced in April. In addition, we appreciate the communities joining us at one or more of our three open houses that we held in June. Our team members welcomed the opportunity to engage with you and to listen to the issues and concerns you have related to the project.

We are currently working to address those issues in our formal filings with the FERC. One of our most recent documents to the FERC included several "alternative" routes that we were able to identify, in part, thanks to the feedback we received during our community open houses. While these alternative routes do not formally change the currently proposed route, they do provide options for further evaluation as we continue to design a route that is environmentally responsible, avoids sensitive areas, protects cultural resources, and minimizes the overall project footprint. These alternative route maps can be found on the MVP Southgate website.

Our team of land agents continues to work with landowners along the proposed route, as well as the alternative routes, to obtain permission for survey access on their properties. To date, we have received permission from 78 percent of landowners. In June, we began surveying properties along the study corridor. Surveying activity continues on parcels within the corridor. These surveys are vital to providing details necessary to finalize a proposed route that results in the least impacts possible to landowners and the environment.

Tell me about 'scoping meetings'

The next step in the regulatory process is for the FERC to hold an official scoping period and associated meetings. Scoping meetings are hosted by the FERC and are designed to help their staff identify relevant issues for major projects. These meetings also offer another opportunity for landowners and the public to provide detailed comments regarding the project. Scoping is the process of defining and refining the 'scope' of an environmental impact statement (EIS) and any alternatives needing investigation.

The FERC scoping meetings are open to the general public and are structured for people to make statements to the FERC staff about the project. In addition, the FERC staff describes the environmental review process, provides relevant information, and answers procedural questions.

The information gathered at scoping meetings helps us prepare environmental mitigation measures for the environmental resource reports required in the Certificate Application. In return, this information provides the FERC staff with the necessary resources to publish a more complete environmental document for public review.

For more information on our project

Access recent project filings on the FERC website at
https://elibrary.ferc.gov/idmws/docket_search.asp and use the docket number PF18-4

Contact the MVP Southgate project team

» www.mvpsouthgate.com
» Call us toll-free: 833-MV-SOUTH
» Send us an email: mail@mvpsouthgate.com

Schedule of upcoming scoping meetings hosted by the FERC

Monday, August 20, 2018
5 – 8 PM
Reidsville Event Center
223 S. Scales Street
Reidsville, NC 27320

Tuesday, August 21, 2018
5 – 8 PM
Olde Dominion Agricultural Complex
19783 U.S. Hwy 29 South
Chatham, VA 24531

Thursday, August 23, 2018
5 – 8 PM
Vailtree Event and Conference Center
1567 Bakatsias Lane
Haw River, NC 27258

A NOTE FROM THE MVP SOUTHGATE PROJECT TEAM

We want to thank the hundreds of people who attended our open houses this summer to learn more about the MVP Southgate proposal, for asking good questions and for providing us with valuable feedback. We also want to invite you to the upcoming scoping meetings, where staff members from the Federal Energy Regulatory Commission will discuss the regulatory process and answer your questions.

These meetings are part of an extensive process designed to keep the public informed about the need and purpose of the proposed MVP Southgate project, and the rigorous review by state and federal agencies that must take place before the project can be approved for construction.

The MVP Southgate is currently proposed as a 24-inch diameter, 72-mile long interstate natural gas transmission pipeline, and it would be owned by Mountain Valley Pipeline, LLC. Mountain Valley is a joint venture of partner companies that have extensive experience in building and maintaining underground pipeline systems.

As proposed, MVP Southgate would start in Pittsylvania County, Virginia, near the endpoint of the Mountain Valley Pipeline, the 42-inch pipeline originating in northern West Virginia and scheduled for completion in early 2019. MVP Southgate would continue south through Pittsylvania County, crossing the state line and connecting with the existing East Tennessee Natural Gas transmission pipeline and PSNC Energy's system in Rockingham County, before ultimately connecting with PSNC Energy's system at an existing facility southeast of Graham in Alamance County.

We are eager to build this project in order to meet the region's growing demand for natural gas. In fact, we wouldn't be proposing this major infrastructure project if it wasn't needed. Highly-respected energy research organizations and the federal government, among other agencies, organizations and businesses, have recognized demand for natural gas will continue to grow, particularly in this region.

PSNC Energy has signed a long-term agreement for capacity on the MVP Southgate project to meet demand in the Triangle area. For PSNC and its customers, MVP Southgate offers the best-cost option for meeting demand for natural gas and enhancing the reliability of the region's existing natural gas infrastructure systems. Pipelines also are recognized as by far the safest means for transporting fuel, and MVP Southgate would incorporate sophisticated technologies, including remote-monitoring 24 hours per day, to ensure the safe operation of the line.

We have worked diligently to design a route that minimizes impact on landowners and natural resources. As a result, about half of the currently proposed route is co-located along existing pipeline and powerline rights-of-way.

For those areas where we have not been able to co-locate along existing rights-of-way, we continue to conduct research to develop the best route possible. We appreciate the many landowners who've expressed interest in working with us to identify such a route; in fact, as of early August, 78 percent of landowners along the proposed path of the pipeline had granted permission for us to conduct important survey work that helps us to inform route development and adjustments.

We continue to plan for a formal application to the FERC later this year, and we hope to receive a Certificate of Public Convenience and Necessity in time for construction to begin in early 2020. This would allow for the project to be completed and begin serving customers during winter in late 2020.

On a long-term basis, MVP Southgate will offer significant economic benefits associated with the increased access to natural gas, the preferred fuel source for manufacturers and other commercial and industrial businesses. It also offers potential savings to residential customers; heating a home with natural gas is about half the cost of using propane.

In the near-term, construction of the project also would offer a boost to local and state economies. FTI Consulting, a highly-regarded economic consulting firm, has estimated construction would generate an estimated 670 jobs in Virginia and 1,260 in North Carolina in 2020. The operation of the pipe would also generate significant new property tax revenue to counties along the route, which could be used to fund public services such as education and public safety.

We look forward to seeing you at the upcoming scoping meetings, continuing conversations about the project, and addressing any concerns you may have.

Mountain Valley is committed to contributing to the success of communities along the proposed MVP Southgate project's route, and we are excited about the potential benefits that this new infrastructure line will bring.

MVP SOUTHGATE

The MVP Southgate project is a natural gas pipeline that spans approximately 72 miles from southern Virginia to central North Carolina – and as an interstate pipeline will be regulated by the Federal Energy Regulatory Commission (FERC). MVP Southgate will be developed, constructed, and owned by Mountain Valley Pipeline, LLC (Mountain Valley).

Mountain Valley is a joint venture of EQT Midstream Partners, LP; NextEra US Gas Assets, LLC; Con Edison Transmission, Inc.; WGL Midstream; and RGC Midstream, LLC. From planning and development, to construction and in-service operation – Mountain Valley is dedicated to the safety of its communities, employees, and contractors, and to the preservation and protection of the environment.

www.mvpsouthgate.com

IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 2 :: December 2018

MVP SOUTHGATE

Our project newsletter to stakeholders

We are pleased to provide you with the second newsletter for the MVP Southgate project. As part of our effort to maintain communication with stakeholders, we plan to issue this newsletter approximately 3-4 times per year. The newsletter will provide an update on where we are in the regulatory process, what stakeholders should expect in terms of next steps, and other relevant information on our project and the natural gas industry.

MVP Southgate's formal filing with the FERC

On November 6, 2018, the MVP Southgate project team filed an official application with the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity. Through the certificate application filing, the FERC is being asked to certify the public convenience and necessity of the MVP Southgate project. The commission, together with cooperating agencies, will conduct a detailed review and evaluation of a broad number of subjects, including public safety; water resources; air quality; wildlife, soils, and vegetation; protected species; cultural and historic resources; sound levels; alternatives; and economic benefits.

The certificate application is a collection of information gathered before and during the FERC pre-filing process. This comprehensive set of documentation includes extensive research from environmental, geological, and economic studies conducted by the MVP Southgate project team and outside experts, as well as intelligence gathered during discussions with landowners along the route, local elected officials and others.

As part of the application, the MVP Southgate project team filed updated Resource Reports and a proposed route map that incorporated input from agencies, landowners and other stakeholders, as well as information from surveys and engineering analysis, gathered during the pre-filing process. These documents are available at mvpsouthgate.com.

With the application filed, what's next?

Now that the MVP Southgate team has filed its formal application, the project must undergo a lengthy and extensive regulatory review process before construction can begin. Meanwhile, TRC Engineers Inc. will continue to perform survey activities in order to inform the project's design and permitting. The FERC will review the project's submitted application and will prepare a Draft Environmental Impact Statement (DEIS), which we anticipate being issued in the spring of 2019. After the DEIS is issued, the FERC will hold public comment meetings on the statement, after which they will assess the comments and begin drafting a Final Environmental Impact Statement (FEIS). The current project schedule is targeting fall of 2019 for issuance of the FEIS. After additional review of the FEIS, the FERC makes a decision whether the MVP Southgate project can proceed with construction by issuing an order and granting certification. The project is targeted for construction to begin in the first quarter of 2020, with a completion date targeted for the fourth quarter of 2020.

Tell me more about recent changes to the project...

The MVP Southgate project's formal application removed one compressor station that had previously been planned for Rockingham County, North Carolina, and modified the diameter of the pipe. As currently proposed, the pipeline will require one compressor station on land owned by Mountain Valley Pipeline, LLC, near the project's starting point in Pittsylvania County, Virginia. The project will include 24-inch diameter steel pipe for approximately the first 31 miles into Rockingham County, and 16-inch diameter steel pipe for approximately the remaining 42 miles to the project's termination point in Alamance County.

The MVP Southgate project team considered a wide range of alternatives and variations to the proposed route, and made 191 route adjustments in response to feedback collected during the pre-filing process. The proposed route identified in the application encompasses these various revisions, which include the protection of streams, wetlands, and cultural resources, as well as the avoidance of, or minimization of impacts to, several sensitive areas. This includes the reduction in the temporary right-of-way width from 100 feet to 75 feet at wetland and waterbody crossings, and a proposal to cross Cascade Creek, Wolf Island Creek, and Deep Creek via conventional bore based on recommendations from the U.S. Fish and Wildlife Service.

Our commitment to safe, responsible construction and operation

Pipelines are recognized by the U.S. Department of Transportation as the safest means to move natural gas. In fact, few may realize that more than 20,000 miles of natural gas pipeline currently operate in Virginia, and more than 30,000 miles of natural gas pipeline currently operate in North Carolina. These pipelines pass through rural, suburban and urban areas in these states.

The MVP Southgate project will connect with existing pipeline systems in Rockingham and Alamance counties in North Carolina. The project team takes its environmental and public safety responsibilities very seriously and is dedicated to meeting or exceeding state and federal requirements. During construction at many smaller waterbodies along the route, we anticipate using the same type of crossing method commonly used in construction of sewer and drinking water lines.

At other, larger waterbodies, including the Dan River, we anticipate using horizontal directional drilling, a labor- and time-intensive process that involves drilling beneath the riverbed, thereby avoiding any direct impact to the waterbody. This involves the use of lubricating mud and additives that meet the same standards and specifications of additives used to drill drinking water wells.

Safety tips for winter travel

Safety is a top priority for the MVP Southgate team, and as winter sets in, we want to help keep our communities safe as they prepare for seasonal travel. Road trips during the holidays and routine daily commutes can become hazardous when the temperatures turn colder and the snow begins to fly. Checking the forecast before heading out on the road can be vital to ensuring safe travels; make sure to observe current conditions and anticipate quick changes in the weather.

Safety check your car before leaving

Always perform a quick safety check on your car before leaving your driveway.

- Examine tire pressure, test the brakes, and make sure the heater is working properly.
- If snow has fallen, make sure to brush the snow off your car and defrost your windows before driving to ensure maximum visibility.

A project designed to meet public need for clean, affordable natural gas

The MVP Southgate project's primary objective is to serve customers of PSNC Energy, a local distribution company in North Carolina. The company, which recently opted not to have an affiliate ownership stake in the project, is the anchor shipper on the proposed pipeline. The project is designed to strengthen the reliability of natural gas service in central North Carolina. Additionally, other markets along the project area will have the ability to access the MVP Southgate project, which in turn could attract manufacturing opportunities to the area. Having a safe, reliable source of natural gas is important to secure industry growth and stimulate job creation and spending throughout the region.

"Over the past decade, PSNC Energy has added more than 100,000 new natural gas customers," said Rusty Harris, president and chief operating officer of PSNC Energy. "We are committed to ensuring the highest levels of service to the homes and businesses that rely on natural gas for heating, cooking and other uses, and the MVP Southgate project offers the most efficient and cost-effective way to enhance reliability and provide the diversity of supply needed to meet our customers' needs."

WHAT OTHERS ARE SAYING...

During the past six months, there has been a lot of talk about the MVP Southgate project in Virginia and North Carolina. Many landowners, community members, and elected officials have expressed both concerns and support for the pipeline through personal meetings, phone calls, emails, and letters to the editor in various publications. In the natural gas industry, the negative stories are often the ones we hear the most, while the positive stories fall by the wayside.

The proposed pipeline will bring economic benefits to Virginia and North Carolina, and to communities located along the route. Here are some comments from supporters of the project that you may not have heard:

"The NC Chamber supports the MVP Southgate project because it will improve access to affordable natural gas and help strengthen North Carolina's reputation as a leading place in the world to do business. Many employers rely on natural gas to fuel their operations and the construction of the MVP Southgate project will bolster efforts to attract and retain businesses in North Carolina." **– Gary Salamido,** *chief operating officer and acting president of the NC Chamber*

"The proposed MVP Southgate pipeline would increase the region's supply of affordable, reliable and domestic natural gas and provide the fuel needed to meet North Carolinians' current and future energy demands." **– Mark Pope,** *president of the North Carolina Economic Development Association*

"Time and again we hear from manufacturers and other large companies that the availability of natural gas is a critical component in the site selection process. The Southern Virginia Mega Site at Berry Hill is the commonwealth's biggest business park, and the MVP Southgate project's proximity to that site offers tremendous long-term economic development opportunities. The Virginia Chamber fully supports the project and the potential benefits its construction and operation could bring." **– Barry DuVal,** *president of the Virginia Chamber of Commerce*

"The MVP Southgate project is important to the region and to the commonwealth. The efforts undertaken by the project team reflect a commitment to build the proposed pipeline in a safe and respectful manner, and Virginia FREE supports it." **– Chris Saxman,** *executive director of Virginia FREE*

MVP SOUTHGATE

Happy Holidays

Your feedback is important to us

In order to access project filings and provide comments, please visit the FERC website at:

https://elibrary.ferc.gov/idmws/docket_search.asp
Reference the docket number: CP19-14

Contact the MVP Southgate project team

» www.mvpsouthgate.com
» Call us toll-free: 833-MV-SOUTH
» Send us an email: mail@mvpsouthgate.com

IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 3 :: April 2019

MVP SOUTHGATE

Our project newsletter to stakeholders

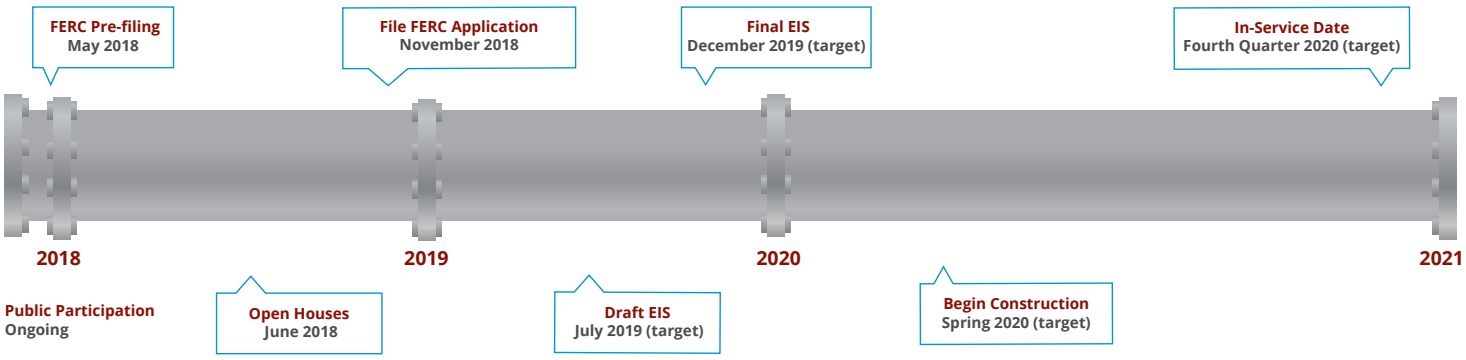
We are pleased to provide you with the third newsletter for the MVP Southgate project. As part of our effort to maintain communication with stakeholders, we plan to issue this newsletter approximately 3-4 times per year. The newsletter will provide an update on where we are in the regulatory process, what stakeholders should expect in terms of next steps, and other relevant information on our project and the natural gas industry.

MVP Southgate receives Notice of Schedule

On March 15, 2019, the Federal Energy Regulatory Commission (FERC) issued a Notice of Schedule (NOS) for the MVP Southgate project. This announcement represents a key milestone in the formal application process, as the NOS lays out the FERC's environmental review process for the remainder of the project. The dates identified in the NOS follow a targeted timeline, and as with any large-scale project, these dates are subject to change. In the event dates are modified, all pertinent agencies and stakeholders will receive project development updates.

What's next?

The FERC and the cooperating agencies are in the process of reviewing MVP Southgate's November 2018 certificate application and supplemental materials subsequently submitted. After the review is complete, the FERC will issue a Draft Environmental Impact Statement (DEIS), which is scheduled for issuance in July 2019. A public comment period will then open, and a series of public meetings will be held in communities along the proposed route. The FERC will designate the specific number of meetings, as well as the dates and locations. Once the meetings are completed and the comments are addressed, the FERC is scheduled to issue a Final Environmental Impact Statement (FEIS) in December 2019. After the FEIS is issued, the FERC will issue a decision on whether to authorize the MVP Southgate project. If the FERC approves the project, the MVP Southgate project team anticipates starting construction in the spring of 2020 and continues to target a fourth quarter 2020 in-service date.



Survey activity along the proposed route

The MVP Southgate team has conducted a multitude of surveys during the past year and appreciates the many landowners who have worked collaboratively with team members. This important work has been completed on approximately 90 percent of the proposed 73-mile route and is continuing in select areas in order to determine a route with the least overall impact to landowners, cultural and historic resources, and the environment. Civil, cultural, and environmental surveys have played a vital role in the planning process, as they help the team learn more about the region and its unique features in an effort to safely and responsibly develop the route. Results from these surveys have provided numerous route variations that have been, or may be, considered during the regulatory process.

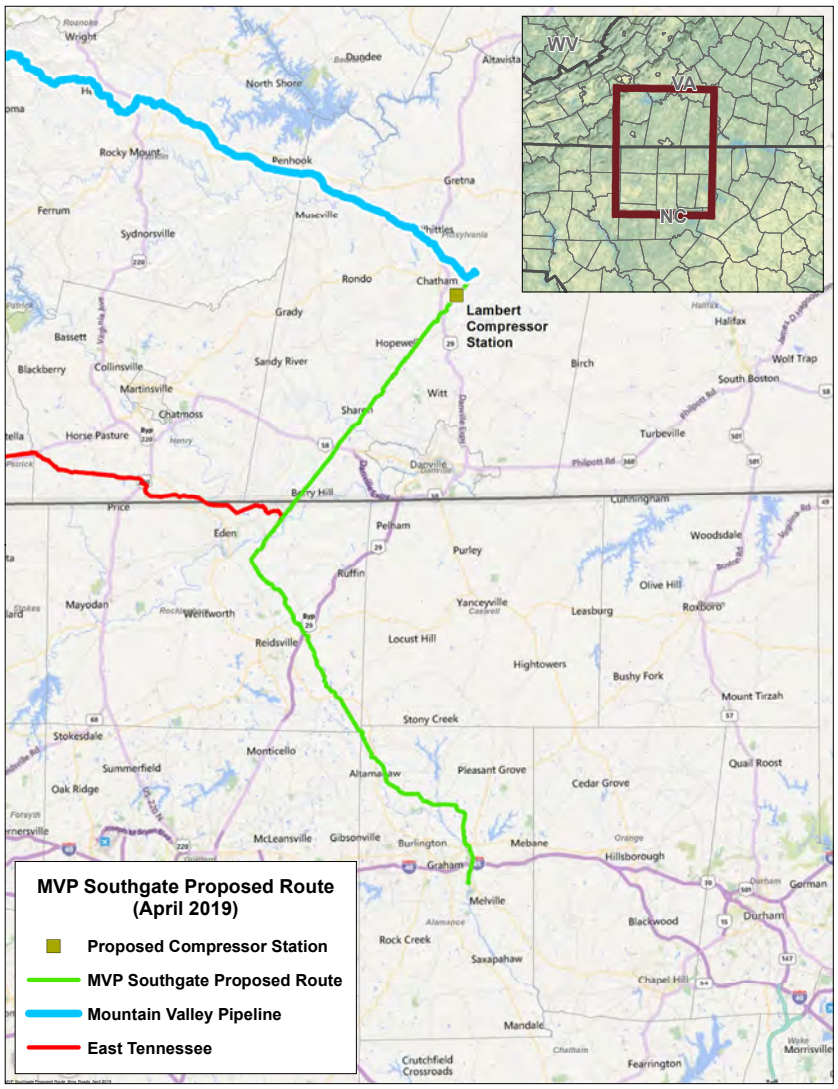
Civil surveys provide valuable information on the terrain of the proposed pipeline, allowing the team to determine where to avoid residential areas, decrease the amount of steep sidehill construction, and how to best traverse roads and railroad crossings. During civil surveys, field crews walk the proposed route, and place visible markers along the centerline of the route that help guide other survey crews to effectively conduct their work.

Cultural surveys are conducted to help identify and protect cultural and historic features along the proposed pipeline route. In order to conduct these surveys, trained experts travel the route and document historic buildings and search for signs of potential archeological resources. If indicators are present, archeologists perform a small discovery excavation to determine the validity of the resources. If and when resources are verified, extensive documentation of items is performed and possible route alternatives are considered to avoid areas of cultural significance.

Environmental surveys are also an integral element of the routing process and include many levels of study that provide invaluable information on the region – and most specifically along the proposed route. Waterbody and wetland surveys are being conducted to determine areas where the pipeline should take special precautions to preserve water resources. If and when resources are located, extensive documentation is performed and route alternatives are considered to avoid waterbody and wetland areas when feasible.

Compressor station for MVP Southgate

A compressor station is a natural gas facility located along a pipeline route that compresses gas in the pipeline to increase pressure, allowing it to flow through the line toward its intended destination. Friction and elevation changes induce pressure drop on natural gas traveling in a pipeline; therefore, a compressor station is typically placed every 40 to 100 miles along a pipeline route.



Based on the current capacity of 375 million cubic feet per day, the MVP Southgate project team has identified the need for one compressor station near the start of the proposed route to transport natural gas to its delivery points in Rockingham and Alamance counties in North Carolina.

The natural gas compressor will be driven by turbine engines that will be powered by natural gas. They will utilize a fraction of the gas coming through the station from the pipeline as fuel and will compress the remainder for transport and delivery.

The Lambert Compressor Station will be sited in Pittsylvania County, Virginia, at milepost (MP) 0.0 on land owned by Mountain Valley. It will pull gas from the connection with the Mountain Valley Pipeline for delivery to the North Carolina delivery points. This station will contain two gas-driven turbines, which combined will provide 28,915 nominal horsepower. The station is expected to include a compressor building, electrical control building, office, and air compressor building. A chain linked security fence will surround the perimeter of the station site upon completion of construction.

The MVP Southgate compressor station will be monitored 24/7 by an offsite system and will have remote devices with the ability to observe, control, and shut down operations in the event of an emergency. Emissions from the construction and operation of each compressor station will comply with all applicable air quality regulations as permitted by regulatory authorities. Equipment, controls, and safe operating practices will be utilized to minimize emissions.

MVP SOUTHGATE

Your feedback is important

Please visit the MVP Southgate website for news stories, project updates, and to access the FERC filings:

mvpsouthgate.com

Contact MVP Southgate

» www.mvpsouthgate.com
» Call us toll-free: 833-MV-SOUTH
» Send us an email: mail@mvpsouthgate.com

IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 4 :: August 2019

MVP SOUTHGATE

Our project newsletter to stakeholders

We are pleased to provide you with the fourth newsletter for the MVP Southgate project as part of our effort to maintain communication with stakeholders throughout the regulatory process.

MVP Southgate receives Draft Environmental Impact Statement

On Friday, July 26, 2019, the Federal Energy Regulatory Commission (FERC) issued the Draft Environmental Impact Statement (DEIS) for the MVP Southgate project. This DEIS was issued after more than 15 months of project planning and development. It reflects the evaluation of data from civil, environmental and cultural surveys conducted along 90 percent of the proposed route, as well as feedback from landowners, state and federal agencies, local officials, tribes and non-governmental organizations.

Through the DEIS, the FERC evaluates the potential environmental impacts associated with construction and operation of the proposed pipeline. While some environmental impacts are anticipated, the FERC concluded that those impacts would be limited and that, through implementation of the MVP Southgate team's proposed plans and additional conditions offered by the FERC, these impacts could be reduced to less than significant levels.

In order to meet growing public demand, MVP Southgate was designed to provide the region with an additional supply of natural gas, and the team has worked closely with its many stakeholders to develop a route that minimizes potential impacts. Since the project was announced in April 2018, the MVP Southgate team has made more than 1,000 adjustments to its route. The majority of these changes have been based on landowner requests, engineering considerations or an effort to avoid sensitive resources.

The MVP Southgate team will continue to work with landowners and other stakeholders to refine the proposed route as necessary and will respond to the FERC with the information requested in the DEIS. The MVP Southgate team also will evaluate and respond to public comments on the DEIS. Comments can be submitted to the FERC through September 16, 2019.

Key takeaways from FERC's Draft Environmental Impact Statement:

- "Based on our findings we conclude that the proposed Project is the preferred alternative that can meet the Project's stated purpose." (Page 3-48)
- "Based on our review of the potential impacts and mitigation measures, including our recommendations, we conclude that constructing and operating the Project would not significantly impact wildlife, terrestrial habitats, migratory birds, or fisheries and aquatic resources." (Page ES-6)
- "We conclude that Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety." (Page ES-8)

Read the full DEIS at www.mvpsouthgate.com/news-info/

The next steps

FERC staff will host public meetings to collect comments on the DEIS. Individual verbal comments will be taken on a one-on-one basis with a court reporter. While there will not be a formal presentation during these meetings, the public will have direct access to Commission staff to answer questions about the DEIS and the environmental review process. MVP Southgate representatives will also be present at each meeting to answer questions about the project.

Numbers will be provided to attendees in the order of their arrival, and distribution of the numbers will be discontinued at 7 p.m. in order to ensure all comments are received by the session closing time. Comments provided to the court reporter will be recorded, transcribed and submitted under the project's FERC Docket No. CP19-14, and will be considered by FERC in preparation of the Final Environmental Impact Statement (FEIS). The FERC has scheduled the FEIS for release in December 2019.

Schedule of upcoming DEIS public comment meetings

Rockingham County, NC
August 19, 2019
5 PM to 8 PM

Rockingham Community College
215 Wrenn Memorial Road
Wentworth, NC 27375

Pittsylvania County, VA
August 20, 2019
5 PM to 8 PM

Olde Dominion
Agricultural Complex
19783 U.S. Hwy 29 South
Chatham, VA 24531

Alamance County, NC
August 22, 2019
5 PM to 8 PM

Vailtree Event &
Conference Center
1567 Bakatsias Lane
Haw River, NC 27258

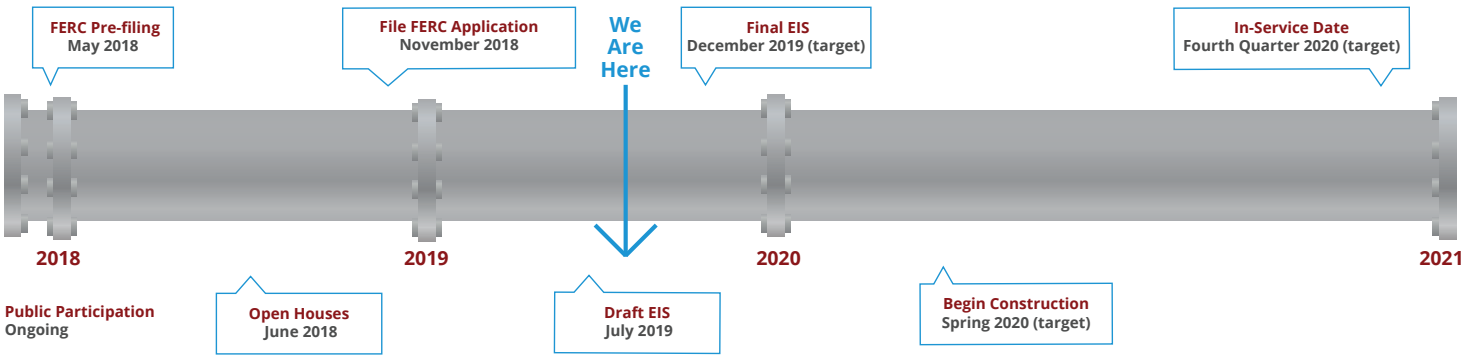
Additional efforts noted in the DEIS

- More than 50 percent of the proposed MVP Southgate project route is co-located along existing rights of way.
- The temporary easement needed for construction of the project would be reduced in wetland areas to 75 feet.
- Upon completion of construction, the MVP Southgate team will re-establish vegetation on the right of way and restore the ground surface to original contours as closely as practicable.

Other ways to comment

Comments citing the project docket number, CP19-14, may also be submitted until September 16, 2019, through:

- U.S. Mail: Secretary, Federal Energy Regulatory Commission, 888 First Street NE, Room 1A, Washington, D.C. 20426
- eFiling: www.ferc.gov



Our focus: Safety and preserving culture, environment

Safety is the No. 1 priority for the MVP Southgate project team. That's why we've committed to meeting or exceeding industry standards and best practices for construction and operation of this proposed interstate natural gas transmission line.

This project includes 24/7 remote monitoring and steel pipe at least .375-inch thick and buried under a marked right-of-way at least three feet below ground level. Cathodic protection beds and a fusion-bonded epoxy, like the one used to protect the interior of public drinking water pipes, will be used to protect this steel pipe against corrosion. Federal, state and project inspectors will be assigned throughout the right-of-way to monitor activity and compliance during construction.

For more than a year, our team has been working with experts in the field to identify environmentally and culturally sensitive areas along the project's proposed 74 mile route. We are dedicated to building this project in the most responsible manner, and teams of archaeologists, biologists and engineers have worked diligently to avoid those sensitive areas, mitigate any impacts and develop the best possible route in order to provide the additional supply of natural gas that North Carolinians need.

An archaeological technician sifts through excavated soil at a cultural survey and archaeological testing site along the proposed MVP Southgate project. Members of the North Carolina Office of State Archaeology, the North Carolina Commission of Indian Affairs and the U.S. Army Corps of Engineers visited the site to witness the surveying activities.

Engaging with the community

The MVP Southgate project team believes in making positive contributions to the community and being a good corporate citizen. We are proud to be members of the Danville-Pittsylvania Chamber of Commerce in Virginia, and the Reidsville, Eden and Alamance County chambers of commerce in North Carolina. The project team also proudly supports other education- and business-oriented activities and organizations, including the 2019 NC Envirothon and the Rockingham County Education Foundation.

Team members are focused on engaging with business leaders, residents, government officials, non-governmental groups and other stakeholders to increase economic opportunity and maintain the region's high quality of life.

We intend to continue working with local and state public safety agencies and emergency responders to discuss the safe and responsible construction and operation of the proposed pipeline.

Rockingham County Education Foundation's 10th annual fundraiser benefit was supported through ticket sales, donations and sponsorships, with proceeds directly supporting programs to increase educational opportunities for county residents.

MVP SOUTHGATE

Your feedback is important

For more information on our project

Access recent project filings on the FERC website at
https://elibrary.ferc.gov/idmws/docket_search.asp
and use the docket number **CP19-14**

Contact the MVP Southgate project team
www.mvpsouthgate.com
Call us toll-free: **833-MV-SOUTH**
Send us an email: **mail@mvpsouthgate.com**

IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 5 :: December 2019

MVP SOUTHGATE

Our project newsletter to stakeholders

We are pleased to provide you with the fifth newsletter for the MVP Southgate project as part of our effort to maintain communication with stakeholders throughout the regulatory process.

Latest Regulatory News

In October and November 2019, the MVP Southgate team provided the Federal Energy Regulatory Commission (FERC) with multiple filings, including supplemental materials and additional data requested by the commission's Office of Energy Projects. These requests and filings are part of the normal regulatory process for a project of this nature. The office's requests were issued to clarify data and gather additional information on plans and procedures identified in the project's certificate application filed in November 2018. The requests also focused on information addressing topics such as pipeline construction, routing, cultural resources, environmental procedures, technical analyses, and other issues raised by various state and federal agencies regarding the project.

The MVP Southgate team also filed responses to public comments submitted during the FERC's comment period on the Draft Environmental Impact Statement for the proposed project. The Draft Environmental Impact Statement concluded that the MVP Southgate project could be built and operated safely and with limited adverse environmental impacts. The MVP Southgate project team's filings are available on the FERC website, ferc.gov, under Docket No. CP19-14, and at mvpsouthgate.com/news-info.

About MVP Southgate

Mountain Valley Pipeline, LLC, announced this proposed 74-mile interstate natural gas transmission pipeline in 2018. It is designed to meet customer demand for low-cost natural gas supply access in southern Virginia and central North Carolina. Dominion Energy North Carolina (DENC), formerly PSNC Energy, is a local natural gas distribution company that signed a long-term agreement to purchase natural gas from MVP Southgate. The North Carolina Utilities Commission has recognized MVP Southgate as the best option for meeting DENC customers' growing demand for natural gas.

Fast facts

- A majority of the route is collocated along existing natural gas and electric transmission line corridors
- Survey work has been completed on 95 percent of the route
- A majority of the project right-of-way has been acquired
- Construction is targeted to start in 2020

In North Carolina

The North Carolina Department of Environmental Quality (NC DEQ) is reviewing our application for a Water Quality Certification for proposed crossings of waterbodies along the project route in North Carolina. This authority is delegated to the state under the federal Clean Water Act. The MVP Southgate team has worked collaboratively with state regulators and is pleased to report that the proposed project would result in:

- No permanent impact to streams in North Carolina
- No permanent loss of wetlands in North Carolina
- No crossing of the Haw River

Unlike roads or other typical development projects, the MVP Southgate project won't result in large swaths of impervious land or an altered grade. The project's permanent footprint is a 50-foot wide green-field right-of-way. The pipeline will be buried at least three feet underground, with the surface re-graded to pre-construction conditions and revegetated with native plant species.

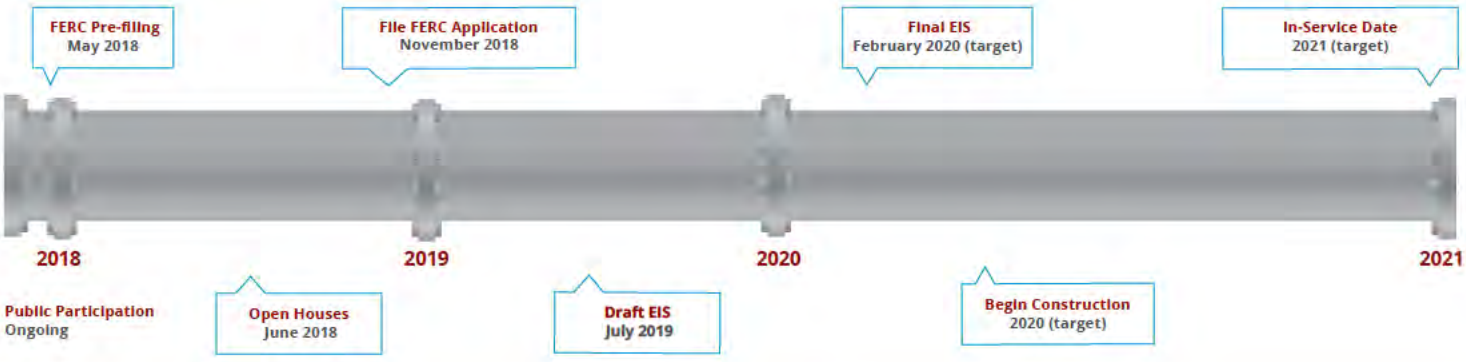
No herbicides will be used within 100 feet of wetlands or waterbodies unless permitted to do so by an appropriate public agency; elsewhere, locally certified personnel would apply a biodegradable herbicide to help maintain the right-of-way. At Stoney Creek and the Dan River, we have proposed to use horizontal directional drilling (HDD) to ensure protection of those waterbodies and avoid any direct impacts. Any additives used to facilitate these HDD crossings and other borings would meet the same standards as those that are applied for wells to provide drinking water.

In Virginia

The MVP Southgate team has applied with the Virginia Department of Environmental Quality for an air quality permit for its proposed Lambert Compressor Station.

This two-turbine compressor station would be built on land owned by Mountain Valley Pipeline, LLC, and adjacent to an older existing compressor station serving Transco. Emission-controls incorporated into the design of MVP Southgate's proposed compressor station ensure this facility's safe and efficient operation, and its status as a very minor source of emissions. The project team continues to discuss the proposed station and provide additional data as requested so that the agency is able to complete a thorough review of the application in 2020.

Project Schedule



Natural gas pipelines: More common than you think

With 2.5 million miles of natural gas pipelines operating in the U.S., it's easy to forget how prevalent, safe and important pipelines are in our communities.

In North Carolina, there are more than 35,000 miles of natural gas pipelines, including underground pipes that cross the Haw River, the Dan River and other streams, rivers and lakes. Natural gas and hazardous liquids pipelines have safely crossed under the Jordan Lake, which provides drinking water to residents in Wake County and other localities; through the city of Greensboro; and through Durham and Wake counties. The town of Haw River's Red Slide Park is on top of a natural gas transmission pipeline.

In Virginia, there are more than 22,000 miles of natural gas pipelines. They operate in densely populated areas such as the city of Norfolk and in Fairfax County, in northern Virginia, and in suburban and rural areas across the commonwealth. The Spring Hollow Reservoir, a drinking water source for the Roanoke area, was built on top of a natural gas transmission pipeline decades ago. Camp Roanoke, a popular recreational area for paddling and canoeing, coexists with that same natural gas pipeline, which provides a reliable supply of fuel for home heating, cooking and commercial operations in Southwest Virginia.

A disc golf course at Red Slide Park in the town of Haw River, North Carolina, is on top of an existing natural gas transmission pipeline right of way.

Elsewhere across the country, the same scenario exists. A natural gas transmission pipeline runs along the property of Atlanta's SunTrust Park, home of the Braves, and near the Battery Atlanta, a vibrant commercial and residential area. New York's Central Park has a natural gas transmission line running through it. The Chicago suburbs boast natural gas transmission pipelines crisscrossing residential and commercial districts, meeting demand for an affordable, clean-burning fuel that is critical to helping families and businesses get through winter and go about their daily lives.

An existing natural gas transmission pipeline right-of-way passes by the Graham Paddle Access at the Haw River along Highway 54 in Alamance County, North Carolina.

These systems are recognized as the safest and most efficient means for providing consumers with natural gas. They also eliminate the need for transport by road or rail, amplifying the clean-air benefits that this fuel source provides.

"Natural gas provides for nearly 25% of our country's total energy consumption, and petroleum provides for nearly 40%," according to the U.S. Pipeline & Hazardous Materials Safety Administration. "This requires the transportation of huge volumes of hazardous liquids and gas, and the most feasible, most reliable and safest way to do so is through pipelines."

The MVP Southgate project is designed to provide Dominion Energy North Carolina, a local natural gas distribution company, with the supply of affordable, domestic natural gas needed to meet existing and future customer demand.

MVP SOUTHGATE

Happy Holidays

Your feedback is important to us

For more information on our project

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IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 6 :: March 2020

MVP SOUTHGATE

Our project newsletter to stakeholders

We are pleased to provide you with the sixth newsletter for the MVP Southgate project as part of our effort to maintain communication with stakeholders throughout the regulatory process.

About MVP Southgate

Mountain Valley announced this proposed 75-mile interstate natural gas transmission pipeline in 2018. It is designed to meet customer demand for low-cost natural gas supply access in southern Virginia and central North Carolina. Dominion Energy North Carolina (DENC), formerly PSNC Energy, is a local natural gas distribution company that signed a long-term agreement to purchase natural gas from MVP Southgate. The North Carolina Utilities Commission has recognized MVP Southgate as the best option for meeting DENC customers' demand for natural gas.

MVP Southgate receives Final Environmental Impact Statement

On Friday, Feb. 14, 2020, the Federal Energy Regulatory Commission (FERC) issued the Final Environmental Impact Statement (FEIS) for the MVP Southgate project.

The FEIS concludes that the MVP Southgate project can be built and operated safely and successfully. While construction and operation of the MVP Southgate would result in some adverse environmental impacts, the majority of these impacts would be temporary and reduced to less-than-significant levels. As part of the FERC review, specific mitigation measures were developed in order to appropriately and reasonably reduce the environmental impacts resulting from construction and operation of the pipeline. These mitigation measures are being recommended as conditions to any authorization issued by the Commission.

The MVP Southgate team appreciates the strong support that this important infrastructure project has received in North Carolina and Virginia. We remain committed to continuing to work collaboratively and cooperatively with landowners, federal and state agencies, local governments, tribes, community groups and other non-governmental organizations in the coming months, and we look forward to receiving all necessary permits and authorizations in order to build and operate this important infrastructure line.

Key takeaways from FERC's Final Environmental Impact Statement

"We conclude that Mountain Valley's compliance with applicable design, construction and maintenance standards, and DOT safety regulations would be protective of public safety."
(Page ES-9)

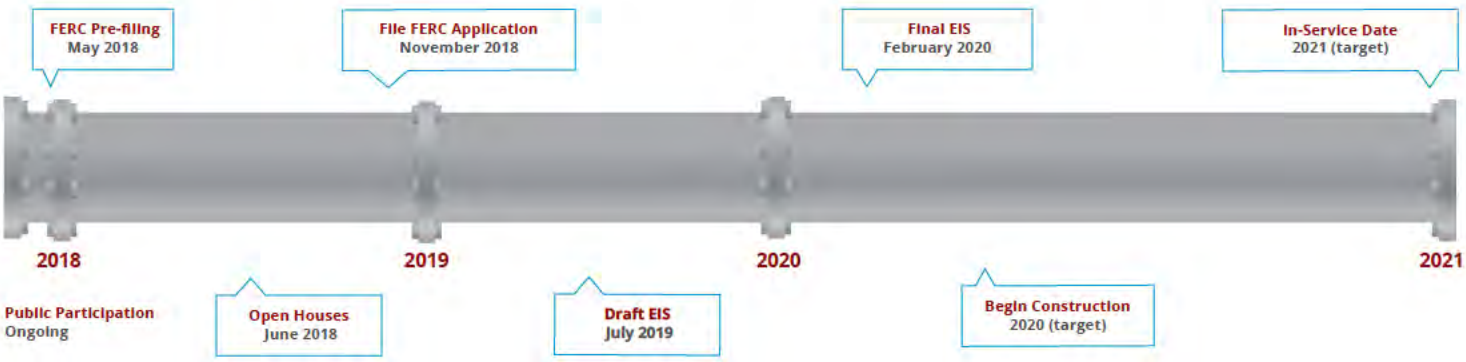
"[N]o other alternative would meet the purpose of the Project, be technically and economically feasible, and provide a significant environmental advantage."
(Page ES-10)

"Though temporary impacts would result from the Project, with implementation of BMPs and mitigation proposed by Mountain Valley, as well as our recommendations, we conclude the Project would not significantly affect water resources."
(Page 4-51)

Read the full FEIS at www.mvpsouthgate.com/news-info/

What's next

The MVP Southgate team anticipates receiving all necessary permits and authorizations in order to begin construction this year. The MVP Southgate project is targeted to enter service in 2021, providing the additional supply of natural gas needed to meet public demand and generating additional annual tax revenue to localities along the proposed route.



More key points from the FEIS

"Our review of available studies indicates that the Project is not likely to have a significant adverse impact on property values." (Page ES-7)

[W]e conclude that the Project would not result in high and adverse impacts on vulnerable populations and would not have a disproportionately high and adverse impact on the remaining environmental justice populations within the study area.
(Page 4-153)

Due to the distance between the Project and the Jordan Lake impoundment and the proposed surface water protection measures, no impacts would be expected to Jordan Lake's water quality or function.
(Page 4-43)

The proposed MVP Southgate project will use a horizontal directional drill to cross below the bed of the Dan River in order to avoid potential impacts on the waterbody.

"Mountain Valley proposes to cross the Dan River via HDD and no in-stream disturbance is anticipated." (Page 4-39)

"For the Southgate Project, Mountain Valley proposes to use Virginia and North Carolina standards for erosion and sediment control, which mandate that control measures be designed to handle storm events that are reasonably expected to occur during the period of construction. Mountain Valley has also agreed to implement supplemental control measures, which exceed the minimum standards required by these states." (Page 1-12)

Frequently Asked Questions about the MVP Southgate

Underground pipeline systems are the safest and most efficient way to move natural gas. Many people may not realize that more than 30,000 miles of natural gas pipeline currently operate in North Carolina, or that more than 20,000 miles of natural gas pipeline operate in Virginia today. That makes it easy for misinformation to spread. Here are some of the most common

questions circulating about this proposed project, along with the facts.

Question: Is the MVP Southgate project being built to export gas overseas?
Fact: The MVP Southgate project is far from the coast and even farther from the nearest LNG export facility. Furthermore, MVP Southgate has not filed for the federal Section 3 authorization needed to be able to export natural gas. The MVP Southgate project team has no plans to file for this authorization.

Question: Is there a local need for this project?
Fact: Yes. The MVP Southgate project is being built to provide low-cost supply access to natural gas produced in the Marcellus and Utica shale regions for service delivery to Dominion Energy North Carolina (formerly PSNC Energy) customers, as well as existing and new end-user markets in southern Virginia and central North Carolina. DENC is a local distribution company and is the anchor shipper on the MVP Southgate project. It has demonstrated to the North Carolina Utilities Commission that the MVP Southgate project offers the best-cost option for providing natural gas to its customers.

Question: Why are some people saying that studies show this project isn't needed?
Fact: Opposition-funded studies have provided flawed conclusions based on incomplete data. The North Carolina Utilities Commission regulates public utilities in North Carolina, including local gas distribution companies. In 2018, Dominion Energy North Carolina (formerly known as PSNC Energy) demonstrated to the NCUC that MVP Southgate offers the best-cost option for providing the natural gas that its customers demand. The company's application included public and nonpublic, confidential data, which allowed for a full and thorough analysis. The NCUC approved the application.

Question: Will drilling under the Dan River and other waterbodies include the use of toxic drilling mud?
Fact: The project team will use water-based drilling mud, typically consisting of inert clay like bentonite and water. Contractors will be limited to use of additives that are NSF/ANSI Standard 60 compliant. This is the same accreditation used to certify additives for drilling water wells. This attests that any additives meet the high standards intrinsic to water well fluids and ensures no harm to local drinking water supplies.

Question: Is the epoxy coating used on the pipeline toxic?
Fact: Fusion-bonded epoxy coatings have been used in various applications since the 1960s. This includes being used to line the interior of pipes in public drinking water systems as a measure to inhibit corrosion of the steel pipes. Fusion-bonded epoxy coatings have been studied extensively, and we are unaware of any evidence supporting claims of risk to human health or the environment.

Question: Is construction of a natural gas pipeline uniquely dangerous?
Fact: The construction sequence for a natural gas pipeline closely follows the sequence for any other type of pipeline, whether it is designed to carry wastewater, drinking water or hazardous materials. The sequence involves tree-felling, clearing, grading, trenching, stringing and welding pipe, lowering pipe into the trench, backfilling and restoration.
In areas where blasting is required, crews use small, controlled charges that are applied after a rigorous and scientific analysis. This is a highly technical process performed by experienced professionals in order to avoid impacts to groundwater. At waterbody crossings, any dams used to facilitate construction are released in a very slow, deliberative and controlled fashion to minimize turbidity. These are common practices used routinely in construction of various types of pipelines.

The MVP Southgate team is committed to safely and responsibly building and operating this important project. The proposed route and more details about the project can be found at www.mvpsouthgate.com.

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Your feedback is important to us

For more information on our project

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and use the docket number **CP19-14**

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IN THE PIPELINE

MVP SOUTHGATE NEWSLETTER
Volume 7 :: July 2020

MVP SOUTHGATE

Our project newsletter to stakeholders

We are pleased to provide you with the seventh newsletter for the MVP Southgate project as part of our effort to maintain communication with stakeholders throughout the regulatory process.

MVP Southgate receives FERC certificate

The Federal Energy Regulatory Commission (FERC) approved a Certificate of Public Convenience and Necessity for the MVP Southgate project on Thursday, June 18, 2020, marking a key milestone in the project's regulatory review.

The certificate, which recognizes the clear public need for the proposed project, follows more than two years of planning, development, and review. The proposed 75-mile underground pipeline will tie into the Mountain Valley Pipeline near Chatham, Virginia, and transport natural gas to delivery points in Rockingham and Alamance counties in North Carolina. Dominion Energy North Carolina (DENC), formerly PSNC Energy, is the local distribution company serving much of central North Carolina and is the anchor shipper on the MVP Southgate project.

The MVP Southgate team has worked diligently with landowners, community members, local officials, and state and federal agencies to identify the best possible route for the proposed pipeline. Approximately half of the route is collocated along existing utility corridors.

A Final Environmental Impact Statement (FEIS), issued in February 2020, concluded the project would result in limited adverse impacts and acknowledged the hundreds of route adjustments made to accommodate landowner requests, engineering considerations and avoid sensitive resources. The FEIS also noted the project is the preferred option for meeting the intended purpose of providing new natural gas supply access to central North Carolina and southern Virginia.

Construction of this important infrastructure project is expected to create approximately 1,700 jobs and generate more than $10 million in state and local tax revenues in North Carolina and Virginia.

After entering service, the MVP Southgate project is expected to generate more than $4.5 million in new annual ad valorem tax revenues to local communities along its route and provide the region with the additional supply needed to meet residential and business demand for affordable, clean-burning natural gas.

FERC's Order

To read the FERC's full order granting a Certificate of Public Convenience and Necessity for MVP Southgate, visit www.mvpsouthgate.com/news-info

Excerpts from the FERC's Order

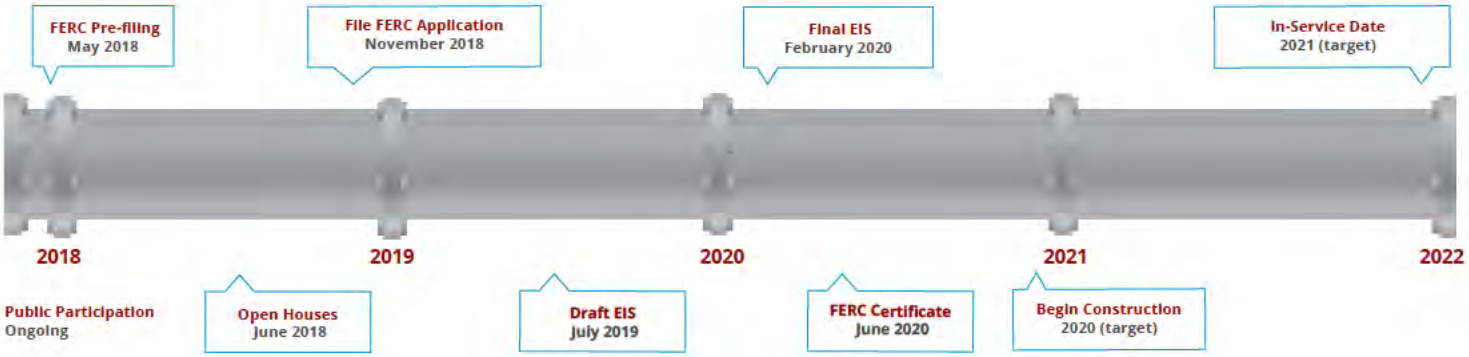
In the 130-page order, the FERC detailed the rationale for concluding that construction and operation of the MVP Southgate project is needed to meet public demand for natural gas. Here are some key excerpts:

"We find that Mountain Valley has sufficiently demonstrated that there is market demand for its project." (Page 19)

"Commission staff identified numerous reasonable alternatives to the project, which were evaluated in the EIS. Staff concluded that none of the alternatives analyzed would meet the project's purpose and need, be technically feasible, and offer a significant environmental advantage." (Page 38)

"The Commission encourages cooperation between interstate pipelines and local authorities. However, this does not mean that state and local agencies, through application of state or local laws, may prohibit or unreasonably delay the construction or operation of facilities approved by this Commission." (Page 67)

Project Schedule



Next steps

The MVP Southgate project team continues to work with state and federal agencies to satisfy permitting requirements necessary for construction to begin. The project team also continues to acquire right-of-way for the pipeline. To date, Mountain Valley has purchased easements across the majority of the proposed route.

In North Carolina, the project team has worked collaboratively with the state Department of Environmental Quality for more than a year as part of the application process for a state water-quality certification permit, and continues to work toward satisfying the requirements for this permit. The project team has committed to a series of best-management practices that raise the bar for linear infrastructure construction in North Carolina and protect waterbodies, riparian buffers and wetlands along the route.

In Virginia, the project team is working with the state Department of Environmental Quality to satisfy air permit requirements related to the project's proposed compressor station in Pittsylvania County. The station would incorporate state-of-the-art technology to ensure it is a minor source of emissions, and is proposed to be built on land already owned by Mountain Valley.

Response to COVID-19

Community groups, companies and charitable organizations are working together to provide relief to families and small businesses struggling to get by because of the COVID-19 pandemic. Mountain Valley and the companies leading the Southgate joint venture are committed to being good partners and supporting these community efforts.

In Pittsylvania County, Virginia, the Rotary Club of Chatham and the Boys & Girls Clubs of the Danville Area are spearheading relief services. The Rotary Club teamed with Pittsylvania County Public Schools to fund meal deliveries to families of students in need, while the Boys & Girls Clubs staffed and maintained food supplies at drive-through pick-up areas.

In North Carolina, the Reidsville Chamber of Commerce and Reidsville Downtown Corporation launched a "Buy One, Give One Community Relief Program." The Chamber sold gift cards to local businesses and raised $15,000 in matching funds – provided by the Reidsville Area Foundation and MVP Southgate – to support local charitable organizations, including the Salvation Army of Rockingham County.

The Salvation Army of Rockingham County operates food pantries in Reidsville and Eden, and provides clothing, rent/utility relief and food to those in need.

In Alamance County, officials designated the United Way of Alamance County as the Emergency Operations Center Feeding Coordinator. The organization coordinated and distributed more than $150,000 in donated funds to Alamance County nonprofits, churches and other charitable organizations for relief services that helped more than 10,000 people per month. They also just completed a Spirit of Alamance Food Drive that raised over 3,200 shelf-stable items for local food pantries.

Protect Yourself And Others

The COVID-19 pandemic is affecting all facets of life, and it is important for everyone to take steps to limit the risk of infection. More details about these general safety recommendations from the U.S. Centers for Disease Control and Prevention can be found at https://www.cdc.gov/coronavirus/2019-nCoV/index.html

Wash your hands often

- Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing.
- If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol.
- Avoid touching your eyes, nose, and mouth with unwashed hands.

Avoid close contact

- Avoid close contact with people who are sick, even inside your home.
- Maintain at least 6 feet from other people.

Cover your mouth and nose with a cloth face cover when around others

- Everyone should wear a cloth face cover when they have to go out in public.
- Cloth face coverings should not be placed on young children under age 2, anyone who has trouble breathing, or is unconscious, incapacitated or otherwise unable to remove the mask without assistance.

Cover coughs and sneezes

- Always cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow and do not spit.
- Throw used tissues in the trash.
- Immediately wash your hands.

Clean and disinfect

- Clean AND disinfect frequently touched surfaces daily.

Monitor your health

- Be alert for symptoms. Watch for fever, cough, shortness of breath, or other symptoms of COVID-19.

MVP SOUTHGATE

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625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

September xxx, 2020

Dear resident:

MVP Southgate is contacting you to let you know about a project proposed in your community. The MVP Southgate Project is a 75-mile natural gas pipeline running from Chatham, Virginia to Alamance County, North Carolina. Part of the project includes the construction of the Lambert Compressor Station, which is a new compressor station to be located within approximately 1.5 miles of your home, near the intersection of Transco Road and Halifax Road (see attached map).

Compressor stations are needed to push the natural gas from one location to another. A similar but much larger compressor station, Transco Station 165, has been located in your immediate area for several decades, so you may have some familiarity with this type of facility. The purpose of this letter is to reach out to people living within this area to let you know some facts about the proposed project and see if you have any questions at this time.

The attached fact sheet will give you additional information regarding the compressor station proposal. MVP Southgate is required to get an air permit from the Virginia Department of Environmental Quality (VDEQ) and approval for the compressor station from the Virginia Air Pollution Control Board. The Air Board and staff from VDEQ will conduct a public meeting, provide notices of meetings and hearings and opportunities for public comment, and will provide more information related to this project in the coming months.

Another part of the approval process is evaluating whether *environmental justice* issues are present near the site. Environmental justice means the fair treatment and meaningful involvement of all people in proximity to a proposed project. Our project team invited an independent consultant, Professor Alexa Sutton Lawrence, who is a Community Relations Advisor at Land & Heritage Consulting to assist with the environmental justice analysis. Dr. Lawrence is an environmental justice advocate with experience in this area and will help the MVP Southgate Project and community members assess potential environmental justice issues in the surrounding communities. Her goal is to conduct a Community Impact Assessment with the intent of identifying any potential opportunities, concerns, or benefits to communities located near the proposed project.

Any information provided by community members to Dr. Lawrence for the Community Impact Assessment will remain strictly confidential at an individual level; however, the accumulated findings of this assessment will be made publicly available to MVP Southgate, the permitting agencies and the community overall.

If you would like to share your thoughts about the project for this Community Impact Assessment, please reach out directly to Dr. Lawrence to schedule a 30-minute interview before September 30, 2020. She can be reached at **336-933-1946** or by email at alexa@landandheritageconsulting.com.

You can also request additional information about the project or provide comments by calling us at 833-687-6884 (833-MV-SOUTH), by email at mail@mvpsouthgate.com, or by mail using the self-stamped envelope enclosed with this letter.

We have provided options in the enclosed comments form to help you and our team engage in communications related to this project. Please use the enclosed form and select the option that best applies to your interest and return it in the enclosed self-stamped envelope.

Please note that an independent consultant will be handling the responses, so if you select Option 2, your information will be only provided to Dr. Lawrence. If you select options 1 or 3, your information and comments will be provided to the MVP Southgate team.

We look forward to your questions and comments.

Sincerely,

MVP Southgate Team

Comments Form

Please select the option below that best applies to your interest and return this form in the enclosed self-stamped envelope.

My name is _____ and I can be reached at _____.

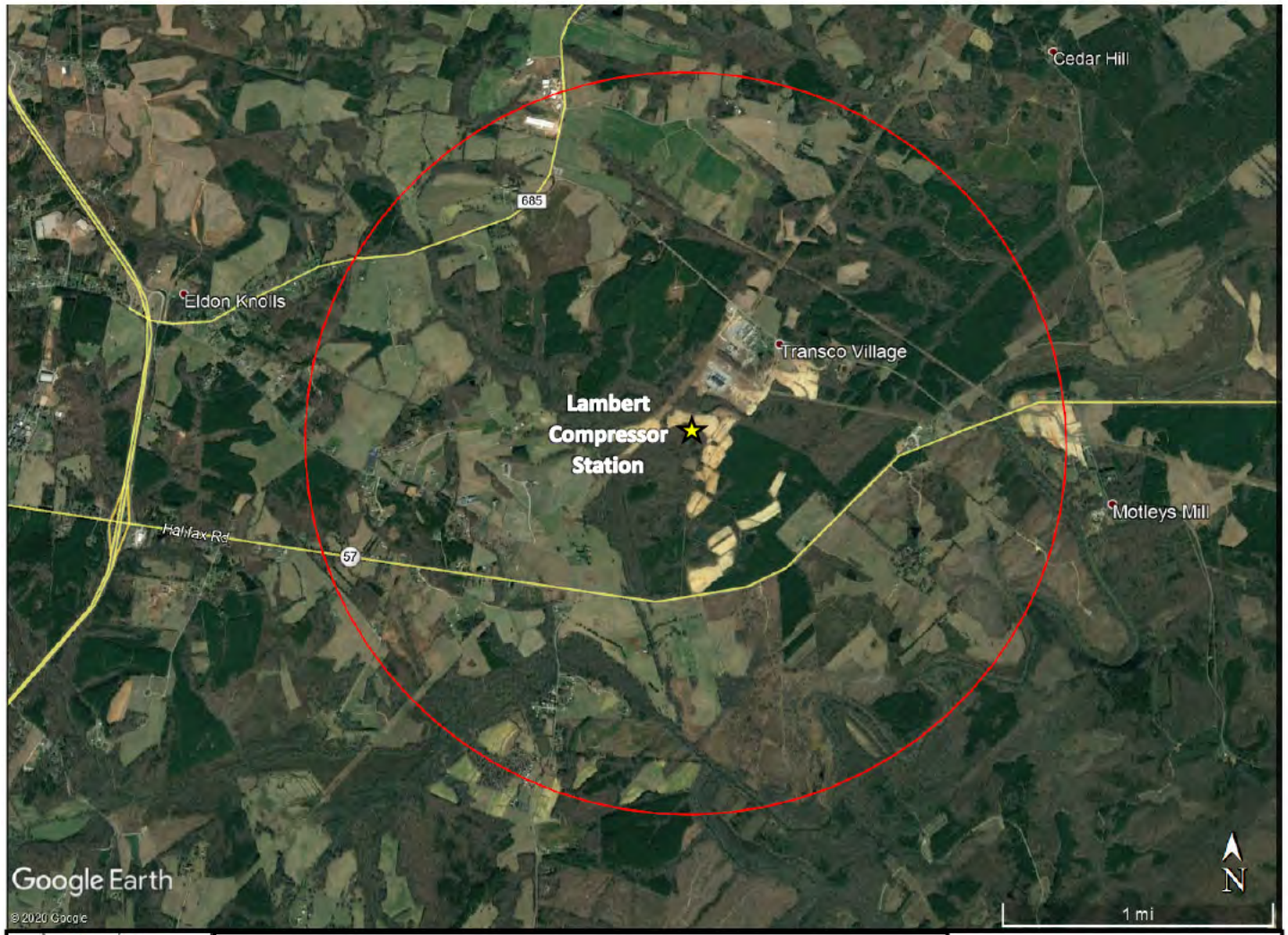
☐ 1. I would like to be contacted by MVP Southgate team to discuss general questions related to the MVP compressor station project.

☐ 2. I would like to be contacted by Professor Lawrence's team to participate in the Community Impact Assessment.
Please send this response back before September 30, 2020 for this option

☐ 3. I am including written comments about the project.

Please note that an independent consultant will be handling the responses, so if you select Option 2, your information will be only provided to Dr. Lawrence. If you select options 1 or 3, your information and comments will be provided to the MVP Southgate team.

Please Provide Any Additional Comments about the Lambert Compressor Station Project:



Location Map
Proposed Lambert Compressor Station

★ Lambert Compressor Station

— 1.5-mile Radius from Facility

MVP SOUTHGATE

Project Overview

The MVP Southgate project is a proposed interstate natural gas pipeline system that will tie into the Mountain Valley Pipeline near Chatham, Virginia, and transport supplies of Marcellus and Utica natural gas to delivery points in Rockingham and Alamance counties in North Carolina for distribution to residential and commercial customers.

The project requires one compressor station, with a proposed location near its start, and on land owned by the project near Chatham, Virginia. The MVP Southgate compressor station will be monitored 24/7 by an offsite system and will have remote devices with the ability to observe, control, and shut down operations in the event of an emergency. Emissions from the construction and operation of the compressor station will comply with all applicable air quality regulations as permitted by regulatory authorities. Equipment, controls, and safe operating practices will be utilized to minimize emissions.

The pipeline will be 24 inches in diameter through Pittsylvania County, Virginia, for the first 31 miles, and 16 inches in diameter for the remaining 44 miles. The pipeline project will require approximately 50 feet of permanent easement, with up to an additional 50 feet of temporary easement during construction (for a total of up to 100 feet during construction).

As an interstate pipeline project, MVP Southgate is governed by the federal Natural Gas Act and regulated by the Federal Energy Regulatory Commission (FERC). Mountain Valley Pipeline, LLC, will construct and own the proposed MVP Southgate project. EQM Midstream Partners will operate the pipeline and own the largest interest in the project.

Project Schedule

MVP Southgate filed a revised air permit application with the Virginia Department of Environmental Quality in July 2020 for the Lambert Compressor Station. The agency will hold a public hearing on the application that will be noticed in advance, and is anticipated to issue a decision whether to grant the permit in the first quarter of 2021.

Compressor Stations

What is a compressor station?

A compressor station is a natural gas facility located along a pipeline route that compresses gas in the line to increase pressure, allowing it to flow through the line toward its intended destination. Friction and elevation changes induce pressure drop on the natural gas traveling in a pipeline and must be periodically compressed to ensure consistent pressure and efficient delivery.

Where will MVP Southgate's compressor station be located?

MVP Southgate's Lambert Compressor Station will be built on land owned by the project and near an existing compressor station at Transco Village, more than two miles east of the Chatham town limit.

How much land will be affected?

Construction of the compressor station will affect 18.6 acres of land owned by Mountain Valley. The facility will require 3.8 acres for operations, and it is expected to include a compressor building, electrical control building, office, and air compressor building. A chain linked security fence will surround the perimeter of the station site upon completion of construction.

How big will this facility be?

The compressor station is considerably smaller than the existing Transco compressor station in the area, about a third of the capacity and less than 10% of total ton per year emissions of all air regulated pollutants. As proposed, it will include two gas-driven turbines, providing approximately 27,756 nominal hp of compression. This level of power is equivalent to about a quarter of one jet engine. The station also will incorporate equipment, controls and other features, including catalytic converter technology, to reduce air emissions to levels classified by federal and state regulators as minor.

Will this facility be busy or noisy?

This facility will be monitored remotely 24 hours a day, 7 days per week, and one or two employees will likely report to the site daily. A small number of workers may periodically visit the facility to perform maintenance. At the nearest noise-sensitive area, which is slightly more than a half mile away, the sound of the facility's operation will be minor and comparable to the sound of a refrigerator humming.

Appendix J

Tribal Contact Information

Organization	Name	Title	Date	Type	Comments
Absentee-Shawnee Tribe of Oklahom	Edwina Butler-Wolfe	Governor	5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Absentee-Shawnee Tribe	Devon Frazier	Tribal Historic Preservation Officer	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Catawba Indian Nation	Wenonah G. Haire	Tribal Historic Preservation Officer	5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			6/28/2018	Meeting	MVP Southgate Introductory Meeting with invitation to coordinate
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			9/5/18	Letter	Hard and digital copies of the prefiling draft of MVP Southgate Project Resource Report 4.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			12/21/18	Phone Call	Contacted Alex Miller to request project address.
			2/6/19	Email	MVP invitation to attend a site visit location along the MVP Southgate pipeline route on March 14, 2019.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			9/5/19	Letter	The Catawba Indian Nation disclosed a letter to MVP Southgate stating they have no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites. However, they would like to be notified if Native American artifacts or remains are found during ground disturbance.
			11/5/2019	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Catawba Indian Nation	Caitlin (Haire) Rogers	Tribal Historic Preservation Office	5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).
Catawba Indian Nation	Darin Steen	Environmental Services Director	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Catawba Indian Nation	Evie Stewart	Tribal Administrator	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Catawba Indian Nation	William Harris	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Cayuga Nation	Clint Halftown	Nation Representative	11/2/22018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Cherokee Nation of Oklahoma	Elizabeth Toombs	Tribal Historic Preservation Office	5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			11/30/18	Email	Email discussion regarding MVP Southgate's FERC filing.
			12/5/18	Email	Email discussion between MVP Southgate and Ms. Toombs regarding the FERC filing docket number.
Cherokee Nation of Oklahoma	Bill John Baker	Principle Chief	5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			11/6/2018	Email	Email discussion regarding MVP Southgate's FERC filing.
			5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			8/3/18	Email	Additional information is provided

Cheroenhaka (Nottoway) Tribe	Walt Brown	Chief	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Cheyenne River Sioux Tribe	Steve Vance	Tribal Historic Preservation Officer	5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/18	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Chickahominy Tribe	Ruth Hennamen		5/31/2018	Phone Call	Phone call to schedule project introduction meeting
			6/1/2018	Email	Follow up email regarding introduction
			8/15/18	Phone Call	Schedule joint tribal meeting in Richmond
			9/6/18	Meeting	Joint tribal meeting
			11/2/18	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			5/1/19	Meeting	Discoveries Plan (UDP). No comments from the tribe were mentioned, however there will be continued coordination between
Chickahominy Tribe	Stephen Adkins	Chief	5/31/2018	Phone Call	Phone introduction and to schedule meeting
			6/1/2018	Email	Follow up email regarding introduction
			6/25/18	Meeting	MVP Southgate Introductory Meeting with invitation to coordinate
			8/15/18	Phone Call	Schedule joint tribal meeting in Richmond
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			9/6/18	Meeting	Joint tribal meeting
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/6/19	Email	MVP invitation to attend a site visit at a location along the MVP Southgate pipeline route on March 14th, 2019.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/16/19	Email	MVP communication about the Southgate Tribal/Archaeological site visit.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
			5/1/19	Meeting	MVP met with Chief Adkins and Ms. Hennamen to discuss Cultural Resource Investigations and the Unanticipated Discoveries Plan (UDP). No comments from the tribe were mentioned, however there will be continued coordination between MVP and the tribe.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Chickahominy Tribe Eastern Division	Gene Pathfollower Adkins	Chief	5/31/2018	Phone Call	Phone introduction and to schedule meeting
			6/1/2018	Email	Follow up email regarding introduction
			8/15/18	Phone Call	Schedule joint tribal meeting in Richmond
			9/6/18	Meeting	Joint tribal meeting
			11/2/18	Email	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Chickahominy Tribe Eastern Division	Gerald Stewart	Chief	5/31/2018	Phone Call	Phone introduction and to schedule meeting
			11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Chickasaw Nation	Bill Anoatubby	Governor	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Choctaw Nation of Oklahoma	Gary Batton	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.

Choctaw Nation of Oklahoma	Ian Thompson	Tribal Historic Preservation Officer	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Coharie Tribe	Gene Jacobs	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Coharie Tribe	Freddie Carter	Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Coharie Tribe	Greg Jacobs	Executive Director	5/31/2018	Phone Call	Phone introduction and to schedule meeting
			8/3/18	Email	Additional information provided
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Cultural Heritage Partners (CHP)	Marion Werkheiser	Representative	10/9/2018	Meeting	MVP Southgate Met With CHP (Marion Werkheiser And Ellen Chapman) In Richmond, VA To Discuss MVP Southgate.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			3/29/2019	Email	MVP Southgate Informed CHP That The Site Visit Has Been Postponed To April 25th, 2019.
			4/10/2019	Email	MVP Soutgate Sent Email With The Final Logistics For The Site Visit On April 25, 2019.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			1/24/2020	Email	Email regarding unanticipated discoveries plan
			2/6/2020	Email	Discussion On Deep Testing And Future Meeting Arrangements.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/18/2020	Meeting	Meeting With CHP Partners (Marion Wekheiser, Greg Werkheiser, Will Cook), Monacan Indian Nation (Rufus Elliott), Sappony Tribe (Dante Desiderio) And MVP Southgate (Alex Miller, William Lavarco, Rich Estabrook, Carolyn Stewart, Agnes Ramsey).
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
			7/16/2020	Email	MVP Southgate sent an email with the latest cultural reports.
Cultural Heritage Partners (CHP)	Ellen Chapman	Representative	10/9/2018	Meeting	MVP Southgate Met With CHP (Marion Werkheiser And Ellen Chapman) In Richmond, VA To Discuss MVP Southgate.
			2/13/19	Email	Discussion between MVP and Ms. Chapman about the MVP Southgate Cultural Resource Reports.
			2/21/19	Email	Email from Ms. Chapman to MVP discussing the Southgate FTP website.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			3/25/19	Email	Ms. Chapman emailed MVP Southgate in regards to the Southgate Resource Report 4.
			4/18/19	Phone Call	Phone Call with Ellen Chapman of Cultural Heritage Partners who represent the Monacan Nation (VA federally recognized tribe).Requested site number for the archaeological tribal site visit. Does not know at this time if CHP will attend the site visit. Monacan Nation may be sending their own representative, Vicky Ferguson. Identified site of interest for CHP and the Monacan – 31RK235
Cultural Heritage Partners (CHP)	Kelli Peterson	Attorney at Law	2/6/19	Email	MVP invitation to attend a site visit at a location along hte MVP Southgate pipeline route on March 14th, 2019.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
Delaware Nation	Darren Hill	Director of Cultural Preservation Program	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Delaware Nation	Deborah Dotson	President	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Delaware Nation	Kim Penrod	Director of Cultural Resources	5/31/2018	Phone Call	Phone introduction and to schedule meeting
			6/1/2018	Email	Follow up email regarding introduction
			7/11/2018	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Delaware Tribe of Indians	Chester Brooks	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Delaware Tribe	Susan Bachor	Tribal Historic Preservation Officer	11/2/2018	Email	occur on November 6, 2018.
Eastern Band of Cherokee Indians	Russell Townsend	Tribal Historic Preservation Officer	5/31/18	Phone Call	Phone call to schedule project introduction meeting
			6/1/18	Email	Follow up email regarding introduction
			6/29/18	Meeting	MVP Southgate Introductory Meeting with invitation to coordinate
			10/15/18	Email	Cherokee tribe confirmed that the Southgate project is outside of their designated terroritory.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/6/19	Email	MVP invitation to attend a site visit at a location along the MVP Southgate pipeline route on March 14th, 2019.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).

			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
Eastern Band of Cherokee Indians	Richard Sneed	Principal Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Eastern Shawnee Tribe of Oklahoma	Glenna Wallace	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Eastern Shawnee Tribe of Oklahoma	Brett Barnes	Tribal Historic Preservation Officer	5/31/2018	Phone Call	Phone introduction and to schedule meeting
			7/11/2018	Email	Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Haliwa-Saponi Tribe	Archie Lynch	Tribal Administrator	5/31/18	Phone Call	Phone call to schedule project introduction meeting
			8/3/18	Email	Additional information is provided
			11/2/18	Email	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)
			11/6/2018	Letter	MVP Southgate Natural Gas Pipeline in Pittsylvania County, VA and Alamance County, NC
Haliwa-Saponi Indian Tribe	Ogletree Richardson	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Haliwa-Saponi Indian Tribe	Michael Richardson	Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Jena Band of Choctaw Indians	Cheryl Smith	Principal Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Jena Band of Choctaw Indians	Alina Shively	Tribal Historic Preservation Officer	11/2/18	Email	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)
Lumbee Tribe of North Carolina	Harvey Godwin	Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
The Lumbee Tribe	Freda Porter	Administrator	5/31/18	Phone Call	Phone call to schedule project introduction meeting
			8/3/18	Email	Additional information is provided
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Mattaponi Tribe	Mark Custalow	Chief	5/31/18	Phone Call	Phone call to schedule project introduction meeting
			8/3/18	Email	Additional information is provided
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Meherrin Indian Tribe	Jonathan Caudill	Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Meherrin Indian Tribe	Wayne Brown	Chief/Tribal Administrator	5/31/18	Phone Call	Phone call to schedule project introduction meeting
			8/3/2018	Email	Additional information is provided
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Mississippi Band of Choctaw Indians	Phyliss Anderson	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Monacan Indian Nation	Dean Branham	Chief	5/31/18	Phone Call	Phone introduction and to schedule meeting
			6/1/18	Email	Follow up email regarding introduction
			6/27/18	Phone Call	Pre-Scheduled meeting for project introduction, arrived in Lynchburg to meet, Chief Branham asked to delay and then postponed.
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			8/15/18	Phone Call	Schedule joint tribal meeting in Richmond (Left Message)
			9/6/18	Meeting	Joint tribal meeting (Chief Branham invited, did not attend)
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/6/19	Email	MVP invited the stakeholder to attend a Tribal Site visit.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.

			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
			7/16/2020	Email	MVP Southgate sent an email with the latest cultural reports.
Monacan Indian Nation	Kenneth Branham	Museum Guide (Chief as of July, 2019)	4/26/2019	Visit	Monacan Museum visit, tour guided by Kenneth Branham. Two hours spent touring museum and learning about Monacan history and current interests. Obtained 2 copies of *The Monacan Indians: Our Story* , by Diane Shields and Karenne Wood
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Muscogee Creek Nation	Corain Lowe-Zepeda	Tribal Historic Preservation Officer	5/31/18	Phone Call	Phone introduction and to schedule meeting
			7/11/2018	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Muscogee Creek Nation	James Floyd	Principal Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Muscogee Creek Nation	Raelynn Butler	Manager, Historic and Cultural Preservations	5/31/18	Phone Call	Phone introduction and to schedule meeting
			7/11/2018	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
Nansemond Tribe	Sam Bass	Chief	5/31/18	Phone Call	Phone introduction and to schedule meeting
			7/11/2018	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/6/19	Email	MVP Southgate sent the stakeholder an invitation to a Tribal site visit.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
			4/29/19	Meeting	Meeting with Sam Bass with MVP Southgate.
			5/1/19	Meeting	Mr. Bass Received A CD With The Latest Reports For Review From MVP And Stated There Are No Concerns At This Point. He Appreciates The Continued Coordination From MVP Moving Forward.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			11/5/2019	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
			7/16/2020	Email	MVP Southgate sent an email with the latest cultural reports.
Nansemond Tribe	Lee Lockamy	Chief	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			7/11/2018	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
North Carolina Comission of Indian A	Gregory Richardson	Executive Director	2/28/2019	Email	MVP Notified The Stakeholder That An Upcoming Site Visit Will Be Rescheduled In April Due To Inclement Weather.
			4/15/2019	Email	MVP Southgate Emailed MR. Richardson To Provide Details For A Tribal Site Visit.
			4/23/2019	Email	Mr. Richardson Confirmed He Will Attend The Tribal Site Visit On 4/25/2019.
			4/25/2019	Meeting	Meeting – Archaeological Site Visit: Jean Gibby, US Army Corps Of Engineers; John Mintz, NC State Archaeologist; Rosie Blewitt-Golsch, Assistant State Archaeologist; Greg Richardson, Executive Director Of NC Commission Of Indian Affairs
			4/26/2019	Email	Follow Up Email Regarding The Southgate Tribal Visit On 4/25/2019.
			8/7/2019	Letter	flash drive.
			8/23/2019	Phone Call	Phone Call Discussion In Regards To Attending The NC Commission Of Indian Affairs Annual Meeting.
			9/4/2019	Phone Call	Phone Call Discussion In Regards To Attending The NC Commission Of Indian Affairs Annual Meeting (Confirm Date, Time, Etc.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			11/5/2019	Mail	MVP Southgate Sent A Flash Drive With The Latest Cultural Reports.
			3/30/2020	Mail	MVP Southgate Sent A Flash Drive With The Latest Cultural Reports.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
Nottoway Indian Tribe of VA	Leroy Hardy	Councilperson	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			11/6/2018	Letter	MVP Southgate Natural Gas Pipeline in Pittsylvania County, VA and Alamance County, NC

			4/23/19	Email	Email communication between MVP and Nottoway Tribe for an attempt to initiate coordination regarding the project.
Nottoway Tribe	Lynette Allston	Chief	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			8/3/18	Email	Additional project information provided.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Nottoway Indian Tribe of VA	Beth Roach	Councilperson	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			5/7/19	Phone Call	Ms. Roach, a Tribal Council Member, returned a call to MVP Southgate to inform that the Tribe would be signing the Confidentiality Agreement, thus allowing MVP to supply archaeological reports for their review,
			5/10/19	Phone Call	Follow up conversation on taking next steps after the NDA is signed. MVP expects to begin coordinating with her by meeting face to face soon to share project progress, cultural information and schedule going forward.
Occaneechi Band of the Saponi Natio	W.A. (Tony) Hayes	Tribal Chair	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			8/3/18	Email	Additional project information provided.
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/6/19	Email	MVP invitation to attend a site visit at a location along the MVP Southgate pipeline route on March 14th, 2019.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/15/19	Email	MVP Southgate reached out to the Occaneechi Band of Saponi to invite them on a tribal site visit.
			4/15/19	Email	The Occaneechi Band of Saponi responded "Yes" to MVP Southgate's tribal site visit invitation.2019.
			5/15/19	Phone Call	MVP Southgate coordinating with Mr. Hayes for the delivery of Southgate reports.
			5/17/19	Email	Mr. Hayes, Please find enclosed 3 CDs containing all of the Cultural Resource Reports available to date for MVP Southgate. Please do not hesitate to contact me if you have any questions, comments, or issues. Thank you, Agnes S. Ramsey Project Manager - Tribal Relations Phone (561) 691-2820 Cell (561) 385-9018
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			10/4/19	Email	PRIV- Discussion regarding Southgate DEIS comment.
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
			7/16/2020	Email	MVP Southgate sent an email with the latest cultural reports.
			7/31/20	Email	Discussion regarding the MVP Southgate Post Data Recovery Outreach Plan. Mr. Hayes concurred with the current scope.
Occaneechi Band of Saponi Indians	Vickie Jeffries	Tribal Administrator	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			2/25/19	Email	MVP invited the stakeholder to a Tribal Site Visit.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			3/6/2020	Mail	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
Oneida Nation of Wisconsin	Corina Williams	Tribal Historic Preservation Officer	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Oneida Nation of Wisconsin	Tehassi Hill	Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Oneida Indian Nation	Raymond Halbritter	Nation Representative	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Oneida Indian Nation	Jesse Bergevin	Historian	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Onondaga Nation	Sidney Hill	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Onondaga Nation	Tony Gonyea	Faithkeeper of the Onondaga Nation	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Ottawa Tribe of Oklahoma	Ethel Cook	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Ottawa Tribe of Oklahoma	Rhonda Hayworth	Tribal Historic Preservation Officer	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation

Pamunkey Tribe	Robert Gray	Representative	6/1/2018	Email	Follow up email regarding introduction
			11/2/2018	Email	occur on November 6, 2018.
			2/6/19	Email	MVP invitation to attend a site visit at a location along the MVP Southgate pipeline route on March 14th, 2019.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
Patawomeck Tribe	John R. Lightner	Chief	5/31/2018	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			8/3/18	Email	Additional information provided
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Poarch Band of Creeks	Stephanie Bryan	Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Poarch Band of Creek Indians	Carolyn White	Tribal Historic Preservation Officer	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Rappahannock Tribe	Anne Richardson	Chief	5/31/18	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			8/15/18	Phone Call	Schedule joint tribal meeting in Richmond
			9/6/18	Meeting	Joint tribal meeting
			11/2/18	Email	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)
			2/6/19	Email	MVP invitation to attend a site visit at a location along the MVP Southgate pipeline route on March 14th, 2019.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
			5/10/19	Phone Call	MVP spoke with Anne Richards, Chief of the Rappahannock. She stated MVP Southgate is outside of their Area of Interest. However, if Human Remains are identified to let them know.
Sappony	Otis Martin	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Sappony	Dorothy Crowe	Tribal Chair	5/31/18	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			11/2/2018	Letter	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)
			2/6/19	Email	MVP invited the stakeholder to a Tribal Site Visit.
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			7/7/20	Email	MVP Southgate Provided An Invitation For Additional Surveys Site Visit.
Sappony	Dante Desiderio	Executive Director	5/31/18	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			8/3/18	Email	Additional information provided
			6/1/2018	Email	Follow up email regarding introduction
			11/2/18	Email	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)
			1/25/19	Meeting	MVP Southgate Discussion @ Sappony Tribal Center
			8/7/2019	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance.
			3/6/2020	Letter	MVP Southgate sent a flash drive with the latest cultural reports.
			3/18/2020	Meeting	Meeting With CHP Partners (Marion Wekheiser, Greg Werkheiser, Will Cook), Monacan Indian Nation (Rufus Elliott), Sappony Tribe (Dante Desiderio) And MVP Southgate (Alex Miller, William Lavarco, Rich Estabrook, Carolyn Stewart, Agnes Ramsey).
			3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
			7/16/2020	Email	MVP Southgate sent an email with the latest cultural reports.
			8/10/20	Meeting	Sappony members attended a cultural site visit with the project team.
Sappony	Charlene Martin	Tribal Treasurer	8/6/2020	Meeting	Charlene, Logan and Brooklyn visited the August 6, 2020 MVP Southgate cultural site investigation.
			8/10/2020	Email	Follow up email regarding the August 6, 2020 MVP Southgate cultural site investigation.
Seneca Nation	Jay Toth	Tribal Historic Preservation Officer	11/2/18	Email	Formal introduction to MVP Southgate, notice of application with FERC, and invitation for coordination (NC State Recognized Tribe)

Seneca Nation of Indians	Todd Gates	President	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Seneca-Cayuga Nation	William Fisher	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Seneca-Cayuga Tribe	William Tarrant	Tribal Historic Preservation Officer	11/2/18	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Shawnee Tribe (Pipelines)	Tonya Tipton	Preservation Office	11/6/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Shawnee Tribe of Oklahoma	Ron Sparkman	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Stockbridge-Munsee Mohican Comm	Bonney Hartley	Tribal Historic Preservation Officer	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Stockbridge-Munsee Community of W	Shannon Holsey	President	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
St. Regis Mohawk Tribe	Beverly Cook	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
St. Regis Mohawk Tribe	Arnold Printup	Tribal Historic Preservation Officer	11/2/18	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Tonawanda Band of Seneca	Roger Hill	Chief /NAGPRA Contact	11/2/18	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Tonawanda Band of Seneca Indians of New York	Roger Hill	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Tuscarora Nation	Neil Patterson	Director of the Chiefs Council Tuscarora Environmental Program	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Tuscarora Nation	Leo Henry	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Tuscarora Nation	Bryan Printup	Representative	5/31/18	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			7/11/2018	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/6/2018	Letter	MVP Southgate Natural Gas Pipeline in Pittsylvania County, VA and Alamance County, NC
Upper Mattaponi Tribe	Frank Adams	Chief	5/31/18	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/24/18	Meeting	MVP Southgate Introductory Meeting with invitation to coordinate
			7/11/18	Email	Follow up email to the introductory information that was sent in June. Attached are the detailed work plans for Project Archaeological Survey, testing, and deep testing investigations for your review and comment.
			11/2/18	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
			11/6/2018	Letter	MVP Southgate Natural Gas Pipeline in Pittsylvania County, VA and Alamance County, NC
			2/6/19	Email	MVP invitation to attend a site visit at a location along the MVP Southgate pipeline route on March 14th, 2019.
			2/27/19	Email	MVP emailed the tribes with the 2nd transmittal of Southgate Cultural Resource Report(s).
			2/28/19	Email	MVP notified the stakeholder that an upcoming site visit will be rescheduled in April due to inclement weather.
			4/16/19	Email	MVP Southgate reached out to provide a photo/video session as an alternative to the tribal site visit occurring on 4/25/2019.
			5/1/19	Phone Call	Chief Adams of the Upper Mattaponi Tribe received a CD with the latest reports for review from MVP and stated they have no concerns at this point. He appreciates the continued coordination from MVP moving forward.
			8/7/19	Letter	MVP Southgate sent a project update about the FERC Draft Environmental Impact Statement issuance and cultural report flash drive.
			11/5/19	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			3/6/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
			7/6/2020	Email	MVP Southgate sent an invitation for an archaeological site visit invitation occuring on August 6, 2020.
			7/16/2020	Email	MVP Southgate sent an email with the latest cultural reports.
			8/3/2020	Phone Call	Discussion about the Southgate PA Outreach Plan.
United Keetoowah Band of Cherokee	Karen Prichett	Tribal Historic Preservation Office	11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
United Keetoowah Band of Cherokee Indians in Oklahoma	Joe Bunch	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Upper Mattaponi Tribe	Kenneth Adams	Chief	3/30/2020	Mail	MVP Southgate sent a flash drive with the latest cultural reports.
Waccamaw Sioux Tribe	Brenda Moore	Housing Coordinator	5/31/18	Phone Call	Introduction and Coordination Call to introduce MVP Southgate project and invite participation
			6/1/2018	Email	Follow up email regarding introduction
			8/3/18	Email	Additional information provided
			11/2/2018	Email	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.

Waccamaw Tribe	Lacy Freeman	Chief	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.
Waccamaw Tribe	Matthew Blanks	Council Chair	11/2/2018	Letter	Notification that MVP Southgate's filing with FERC of an application for an approximately 73-mile natural gas pipeline would occur on November 6, 2018.

Appendix K

MVP Southgate Project

Resource Report 4 – Cultural Resources

(November 2018)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4 – Cultural Resources

November 2018

MVP Southgate Project
Resource Report 4 – Cultural Resources

Resource Report 4 - Filing Requirements	
Information	**Location in Resource Report**
Minimum Filing Requirements	
1. Initial cultural resources consultation and documentation, and documentation of consultation with Native Americans. (§ 380.12(f)(1)(I) & (2)) See § 380.14 for specific procedures.	Section 4.3.3, Appendix 4-A
2. Overview/Survey Report(s). (§ 380.12(f)(1)(ii) & (2) • See § 380.14 for specific procedures. • For the offshore area this will usually require completion of geophysical and other underwater surveys before filing.	Appendices 4-D, 4-E, 4-F, and 4-G
Additional Information Often Missing and Resulting in Data Requests	
3. Identify the project APE in terms of direct or indirect effects to known cultural resources.	Section 4.4
4. Provide a project map with mileposts clearly showing boundaries of all survey areas (right-of-way, extra work areas, access roads, etc.). Ensure that you mark mileposts, clearly specify survey corridor widths, and clearly indicate where you have not completed surveys.	Appendix 4-B
5. Provide documentation of consultation with applicable State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO), and land-managing agencies regarding the need for and required extent of cultural resource surveys.	Section 4.3, Appendix 4-A
6. Provide a narrative summary of overview results, cultural resource surveys completed, identified cultural resources and any cultural resource issues.	Section 4.5
7. Provide a project specific Ethnographic Analysis (can be part of Overview/Survey Report).	Part of Overview/Survey Reports (Appendices 4-D and 4-E)
8. Identify by mileposts any areas requiring survey for which the landowner denied access.	Section 4.5, Appendix 4-B
9. Provide written comments on the Overview and Survey Reports from the applicable SHPOs, THPOs, and land-managing agencies, if available.	Not Available
10. Provide a Summary Table of completion status of cultural resource surveys, and applicable SHPO or THPO and land-managing agency comments on the reports.	Section 4.5
11. Provide a Summary Table of identified cultural resources, and applicable SHPO or THPO and land-managing agency comments on the eligibility recommendations for those resources.	Section 4.5
12. Provide a brief summary of the status of contact with federally recognized Indian tribes, including copies of all related correspondence and records of verbal communications.	Section 4.3.3, Appendix 4-A
13. Provide a brief summary of comments received from stakeholders regarding cultural resources.	Section 4.3.4
14. Provide a schedule for completing any outstanding cultural resource studies.	Section 4.5.3
15. Provide an Unanticipated Discoveries Plan for the project area, referencing appropriate state statues.	Section 4.6, Appendix 4-C

RESOURCE REPORT 4
CULTURAL RESOURCES

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RESOURCE REPORT 4
CULTURAL RESOURCES

LIST OF ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AL	Alamance County (in access road designations)
APE	Area of Potential Effects
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CL	Centerline
CLG	Certified Local Government
FERC or Commission	Federal Energy Regulatory Commission
GIS	Geographic Information System
GPS	Global Positioning System
Mountain Valley	Mountain Valley Pipeline, LLC
MP	milepost
NRHP	National Register of Historic Places
NC HPO	North Carolina Historic Preservation Office
NEPA	National Environmental Policy Act
NGO	Non-governmental organization
NHPA	National Historic Preservation Act
OSA	North Carolina Office of State Archaeology
PA	Permanent Access Road
PI	Pittsylvania County (in access road designations)
Project or Southgate Project	MVP Southgate Project
RO	Rockingham County (in access road designations)
SHPO	State Historic Preservation Officer
TA	Temporary Access Road
THPO	Tribal Historic Preservation Officer
TRC	TRC Environmental Corporation
U.S.	United States
V-CRIS	Virginia Cultural Resources Information System
VDHR	Virginia Department of Historic Resources

RESOURCE REPORT 4
CULTURAL RESOURCES

4.1 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Southgate Project" or "Project"). The Southgate Project facilities will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina. See Resource Report 1 (General Project Description) for additional Project information.

4.1.1 Environmental Resource Report Organization

Resource Report 4 is prepared and organized according to the FERC *Guidance Manual for Environmental Report Preparation* (February 2017). This report comprises six major sections and a separate section containing references. Following this introduction (Section 4.1), Section 4.2 discusses the scope and authority of the review process, while Section 4.3 discusses coordination with State and Federal agencies, Native American groups, and other interested parties. The direct and indirect area of potential effects ("APE") for the Project are defined in Section 4.4, and Section 4.5 presents the methods and results of the cultural resources investigations to date. Section 4.6 discusses the Project's Unanticipated Discoveries Plan, and Section 4.7 contains the References.

4.2 SCOPE AND AUTHORITY

The Southgate Project is being reviewed under Section 106 of the National Historic Preservation Act ("NHPA") of 1966, as amended and under the National Environmental Policy Act of 1969 ("NEPA"). Prior to authorizing an undertaking (e.g., the issuance of a FERC Certificate), Section 106 requires federal agencies, including the FERC, to take into account the effect of that undertaking on cultural resources listed or eligible for listing in the National Register of Historic Places ("NRHP") and afford the Advisory Council on Historic Preservation ("ACHP") an opportunity to comment on the undertaking. The Section 106 compliance process is coordinated at the state level by the State Historic Preservation Officer ("SHPO"), represented in Virginia by the Virginia Department of Historic Resources ("VDHR") and in North Carolina by the North Carolina Historic Preservation Office ("NC HPO"). The FERC, as the lead federal agency, must consult with the VDHR, NC HPO, and federally-recognized Native American groups regarding the potential effects of the Project on historic properties. The Project, as a non-federal party, is assisting the FERC to fulfill its obligations under Section 106 and the ACHP's implementing regulations at 36 Code of Federal Regulations ("CFR") 800.

The primary goals of cultural resources investigations conducted as part of the Section 106 review are to:

- Locate, document, and evaluate buildings, structures, objects, landscapes, and archaeological sites that are listed, or eligible for listing, in the NRHP;
- Assess potential effects of the Project on those resources; and
- Provide recommendations for subsequent treatment, if necessary, to assist with compliance with Section 106.

In addition to complying with Section 106 and its implementing regulations (36 CFR Part 800, *Protection of Historic Properties*), the cultural resources investigations are being conducted for the Project in accordance with 18 CFR Part 380, the FERC's *Regulations Implementing the National Environmental Policy Act* (including Sections 380.3 – Environmental Information to be Supplied by an Applicant and 380.14 – Compliance with the National Historic Preservation Act); the FERC's Office of Energy Projects' *Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects* (FERC, 2017a) and *Guidance Manual for Environmental Report Preparation* (FERC, 2017b); and the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (48 Federal Register 44716-42, Sept. 29, 1983). The work also conforms to the relevant SHPO guidelines, including the VDHR's *Guidelines for Conducting Historic Resources Survey in Virginia* (VDHR, 2017) and the NC HPO's *Archaeological Investigation Standards and Guidelines* (NC HPO, 2017) and *Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106-110 Compliance Reports in North Carolina* (NC HPO, 2016).

4.3 AGENCY AND NATIVE AMERICAN COORDINATION

The Southgate Project is assisting the FERC in meeting its Section 106 obligations by conducting Section 106 coordination with various state and local agencies and Native American groups located in or having interests regarding cultural resources in Virginia and North Carolina. Section 4.3 details the correspondence the Project has conducted to date with each of these entities. Correspondence related to the cultural resources surveys for the Project referenced below is included in Appendix 4-A, and additional correspondence will be forwarded to the Commission upon receipt.

4.3.1 Virginia Department of Historic Resources

The Southgate Project submitted a Project information package to the VDHR for review and comment on April 27, 2018. On May 17, 2018, Project staff met with VDHR staff to discuss the Project. Topics covered the Project facilities and routing, the nature of the direct and indirect area of potential effects ("APEs"), the types of cultural resources expected to be encountered (potentially including archaeological sites, aboveground resources, historic districts, and cultural landscapes), proposed methods for identification and evaluation of resources, and proposed coordination with Native American groups.

On June 4, 2018, the Southgate Project provided the VDHR with a Geographic Information System ("GIS") shapefile of the Project facilities as well as detailed protocols for the identification and assessment of historic architectural resources, including the nature of the Project indirect effects APE. On July 2, 2018, the Project provided the VDHR with detailed protocols for the identification and assessment of archaeological resources and for archaeological deep testing (should it prove necessary), including the nature of the Project direct effects APE. On August 3, 2018, the Project contacted the VDHR to invite VDHR staff for site visits and to inform the VDHR that Draft Resource Report 4 and the Project-specific Unanticipated Discoveries Plan would be filed with FERC and submitted to the VDHR for comment later in August. Draft Resource Report 4 and the Plan for Unanticipated Discoveries of Historic Properties and Human Remains were submitted to the VDHR for comment on August 13, 2018 (digitally) and on August 16, 2018 (hard copy). On September 14, 2018, the VDHR responded via letter that Draft Resource Report 4 satisfactorily describes the work to date and that the Plan for Unanticipated Discoveries of Historic Properties and Human Remains was satisfactory.

4.3.2 North Carolina Historic Preservation Office

The Southgate Project submitted a Project information package to the NC HPO for review and comment on April 27, 2018. On May 10, 2018, the Project staff met with NC HPO staff to discuss the Project. Topics covered the Project facilities and routing, the nature of the direct and indirect effects APEs, the types of cultural resources expected to be encountered (potentially including archaeological sites, aboveground resources, historic districts, and cultural landscapes), proposed methods for identification and evaluation of resources, and proposed coordination with Native American groups. On May 21, 2018, the NC HPO responded to the information provided and provided additional guidance regarding Project review procedures. In addition, on May 17 and May 22, 2018, the NC HPO provided information on historical associations and other potentially interested groups within the Project area.

On June 4, 2018, the Southgate Project provided the NC HPO with a GIS shapefile of the Project as well as detailed protocols for the identification and assessment of archaeological and historic architectural resources. On July 6, 2018, the NC HPO approved the protocols and requested additional information concerning the protection of potential graves that might be encountered during Project investigations. The revised protocols were provided on August 13, 2018. On July 24 and 27, 2018, the Project and the NC HPO exchanged emails concerning planning for upcoming NC HPO staff visits to the Project. On August 3, 2018, the Project contacted the NC HPO to alert the NC HPO that Resource Report 4 and the Project Unanticipated Discoveries Plan would be filed with FERC and submitted to the NC HPO for comment later in August, and to continue planning the site visits. On August 21, 2018, four members of the NC HPO staff visited the Southgate Project. Draft Resource Report 4 and the Plan for Unanticipated Discoveries of Historic Properties and Human Remains were submitted to the NC HPO for comment on August 13, 2018, along with the revised protocols for the identification of archaeological resources. On September 6, 2018, the NC HPO responded via letter approving the revised protocols and the Plan for Unanticipated Discoveries of Historic Properties and Human Remains.

4.3.3 Native American Coordination

The Southgate Project, on behalf of the FERC, contacted (via email, phone calls, and meetings) federally-recognized Native American groups to provide them the opportunity to identify concerns related to the Project. Information on those tribes and contacts, and responses received to date, is provided in Table 4.3-1 (see Tables Section) and in Appendix 4-A. As of October 15, 2018, three tribes, the Catawba Indian Nation, the Chickahominy Tribe, and the Upper Mattaponi Tribe have requested further coordination on the Project under the Section 106 review process. In addition, on August 3, 2018, the Monacan Indian Nation contacted the FERC and requested consulting party status on the Project, and on September 10, 2018, the Cheyenne River Sioux and Rosebud Sioux tribes contacted the FERC and requested consulting party status on the Project. Three tribes, the Delaware Tribe of Indians, the Eastern Band of Cherokee Indians, and the Muscogee (Creek) Nation have responded that the Project is outside their areas of interest.

Notice that Draft Resource Report 4 and the Plan for Unanticipated Discoveries of Historic Properties and Human Remains were available for review was provided to the federally recognized tribes on August 31, 2018. On September 28, 2018, the Catawba Indian Nation responded via letter that it has no immediate concerns regarding the Project but wish to be notified if Native American artifacts and/or human remains are located during the ground disturbance phase of the Project.

In addition to contacting the federally-recognized Native American groups, the Southgate Project is contacting the North Carolina Commission on Indian Affairs, which represents both federally and non-federally recognized Native American tribes residing in North Carolina, to provide it an opportunity to identify concerns related to the Project. The Project also is contacting the individual non-federally recognized tribes in North Carolina and Virginia to provide those groups the opportunity to identify concerns related to the Project. Information on those contacts, and responses received to date, are provided in Table 4.3-2 (see Tables Section). In addition, on August 2, 2018, the Sappony Tribe (a non-federally recognized tribe in North Carolina) contacted the FERC and requested consulting party status on the Project, and on October 15, 2018, the Occaneechi Band of the Saponi Nation (a non-federally recognized tribe in North Carolina) contacted the FERC and requested consulting party status on the Project.

4.3.4 Coordination with Other State and Local Agencies and with Individuals

As of October 15, 2018, the Southgate Project has provided information on the Project to one Certified Local Government ("CLG") and one historical association in Virginia (Table 4.3-3, see Tables Section). The Pittsylvania Historical Society has responded expressing an interest in the Project, and coordination with that group is ongoing.

The Southgate Project has provided information on the Project to two CLGs and eight historical or genealogical associations or museums in North Carolina, one of which also has interests in Virginia (Table 4.3-4, see Tables Section). As of October 15, 2018, the Alamance County Historical Properties Commission, the Graham Historical Museum, and the Rockingham County Historical Society have responded expressing an interest in the Project, and coordination with those groups is ongoing.

The FERC is using the NEPA scoping and public comment process as its public participation process under Section 106, and several individuals and one organization (Preservation Virginia) have provided comments relating to cultural resources. Information relating to potential cultural resources identified by those parties is provided in Table 4.3-5 (see Tables Section).

4.4 AREA OF POTENTIAL EFFECTS

The APE is the "geographic area or areas within which an undertaking may directly or indirectly cause changes in the character of or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). The APE is defined based on the *potential* for effect, which may differ for aboveground cultural resources (historic structures and landscapes) and subsurface resources (archaeological sites).

4.4.1 Direct Effects APE

The Project APE for direct effects was determined to include all areas where ground-disturbing activities may take place. The APE for direct effects includes a 300- or 400-foot-wide study corridor that subsumes areas of ground disturbance for the pipeline trench, as well as associated temporary workspaces (temporary construction right-of-way and additional temporary workspace). The APE for direct effects is 300 feet wide where the corridor is not collocated with other utility corridors, and 400 feet wide where it is collocated. Within this corridor, a 100-foot-wide right-of-way would include construction areas and additional temporary workspaces. The 100-foot right-of-way will consist of 50 feet of permanent easement centered over the pipeline and 50 feet of temporary workspace. The direct effects APE also includes Project-related facilities outside of the corridor, such as access roads, cathodic protection ground beds,

compressor and meter stations, and contractor yards. The direct effects APE also includes areas of the pipeline that will be installed using the horizontal directional drill method.

4.4.2 Indirect Effects APE

The indirect effects APE is the area within which any resources (including individual resources, potential historic districts, or cultural landscapes) might be within view of proposed vegetation clearing or aboveground construction, or otherwise potentially affected by Project activities. The indirect effects APE will minimally consist of a 450-foot-wide corridor centered on the pipeline centerline, 250-foot-wide corridors centered on access road centerlines, and an area extending 0.5-mile from the compressor station and meter station sites. The indirect effects APE generally will be terminated 0.5 mile from the pipeline corridor or other Project activity, or where vegetation and/or topography obstructs lines of sight. Figure 4.5-1 (Appendix 4-B) depicts a 0.5-mile radius from all identified Project activities, which generally constitutes the maximum extent of the indirect effects APE.

4.5 CULTURAL RESOURCES INVESTIGATIONS

Cultural resources include archaeological sites, historic standing structures, objects, districts, traditional cultural properties, and other properties that illuminate important aspects of prehistory or history or have important and long-standing cultural associations with established communities or social groups. Significant archaeological and architectural properties are generally identified using the eligibility criteria for listing in the NRHP, in consultation with the SHPOs of the respective states through which a project traverses, and/or Tribal Historic Preservation Officers ("THPOs") of Native American groups residing in or with historical ties to the area.

The cultural resources investigations for the Southgate Project are being conducted in accordance with FERC and SHPO guidelines. The individuals responsible for conducting the surveys meet or exceed all requirements set forth by the Secretary of Interior at 36 CFR Part 61.

4.5.1 Overview Results

The initial phase of the investigation involved background research to gather information about previous cultural resources investigations and known archaeological sites and aboveground resources within one-mile of the Project direct effects APE and to determine which Native American groups and other organizations might have interest in the Project. The following methodology was used to complete the overview:

- Identification of any known archaeological sites and previously recorded aboveground cultural resources through background research and state site file searches. Data pertaining to the known resources, including their locational, functional, and temporal characteristics, were reviewed where applicable;
- Review of recent cultural resources studies performed in the counties where the Project is located;
- Review of primary and secondary historic information (such as maps or county histories) to identify areas where previous structures and landscapes were potentially located;
- Research concerning the Native American groups formerly and presently residing in the Project area;

- Conversations with VDHR and NC HPO staff concerning Native American groups with interests in the Project area; and
- Contacts with Native American groups and others to request information regarding the area.

As part of this work, the Project conducted research at the VDHR and NC HPO offices and in various other repositories.

Archaeological Sites

The VDHR archaeological site files are part of the state database system known as the Virginia Cultural Resources Information System ("V-CRIS"). The Southgate Project conducted a site file search of the VDHR files in April 2018 and updated that search on September 26, 2018. V-CRIS contains records for 79 archaeological sites that have been previously recorded within 0.5-mile of the Project including 24 precontact sites, 19 precontact and postcontact sites, and 36 postcontact sites. Information on those resources is provided in Table 4.5-1 (see Tables Section). Of those 79 sites, two have been determined eligible for the NRHP by the VDHR, three are considered potentially eligible for the NRHP, 42 have not been evaluated for NRHP eligibility, and 32 have been determined not eligible for the NRHP by the VDHR.

The NC HPO archaeological site files are maintained by the North Carolina Office of State Archaeology ("OSA"). The Southgate Project conducted a site file search of the OSA files in April 2018 and updated that search on September 26, 2018. The OSA files contain records for 63 archaeological sites that have been previously recorded within 0.5-mile of the Project, including 46 precontact sites, 12 precontact and postcontact sites, and five postcontact sites. Information on those sites is provided in Table 4.5-2 (see Tables Section). Of those 63 sites, two are listed in the NRHP, 33 are unassessed for NRHP eligibility, and 28 have been determined not eligible for the NRHP by NC HPO.

Aboveground Cultural Resources

A search of V-CRIS revealed 79 postcontact aboveground cultural resources recorded within 0.5-mile of the Project in Virginia. Information on those resources is provided in Table 4.5-3 (see Tables Section). Those 79 resources include four that are listed in the NRHP, five that have been determined eligible for the NRHP by the VDHR (including three that have been determined eligible for Environmental Review purposes only), 21 that have been determined not eligible for the NRHP by the VDHR, and 48 that the VDHR has not evaluated for NRHP eligibility. An additional resource bears the notation "Primary resource is no longer extant" but has apparently not been evaluated for NRHP eligibility by the VDHR.

A search of NC HPO records revealed 94 postcontact aboveground cultural resources recorded within 0.5-mile of the Project in North Carolina. Information on those resources is provided in Table 4.5-4 (see Tables Section). Of those 94 resources, at least 21 have been demolished since being recorded (including one that had been listed on the NRHP). The 73 remaining previously recorded aboveground resources in North Carolina include five resources listed on the NRHP, five resources that have been placed on the NC HPO study list (indicating that they may be NRHP eligible but require additional evaluation), and 63 that have been surveyed only and have not been assessed for NRHP eligibility.

4.5.2 Archaeological Field Survey

The Southgate Project is conducting systematic Phase I archaeological field surveys of the Project corridor and other facilities, following the state guidelines and protocols developed for the Project. The survey

procedures include a pedestrian walkover of all portions of the APE, systematic surface examination of all suitable areas, and systematic subsurface testing of areas lacking sufficient surface visibility or that have potential for subsurface resources. The archaeological surveys began on May 10, 2018 and are ongoing. This Resource Report 4 contains information on all survey activities conducted through September 20, 2018, and the results of those surveys are provided in Appendices 4-D and 4-E. Additional reports will be filed as access is obtained and surveys and site evaluations are completed.

In Virginia, crews excavate 40-centimeter-diameter shovel tests at maximum intervals of 15 meters within the survey areas; additional close-interval shovel tests are excavated to delineate potential archaeological sites and finds. Shovel tests are excavated in arbitrary 10-centimeter levels to sterile subsoils (with the exception of disturbed plow zone soils, which are excavated as a single level), unless natural obstructions (e.g., rocks, bedrock, or roots) prevent further excavation. Excavated soil is hand screened through 0.25-inch wire mesh hardware cloth. Cultural materials remaining in the mesh are bagged and tagged by level within each shovel test pit, and the counts and types of recovered cultural material are noted on field forms. Soil profiles are recorded for each shovel test on standardized forms. All shovel tests are filled following excavation to restore the ground surface to its original contour. Digital photographs are taken of the general Project area and recorded on standardized logs. Sub-meter Global Positioning System ("GPS") data are collected from each shovel test excavated within the study area. Visible surface features (e.g., foundations) encountered during the survey are recorded through description and photographs, and locational data are collected with the GPS and drawn on Project maps.

In North Carolina, crews excavate 30- to 40-centimeter-diameter shovel tests at intervals of 30 meters within the survey areas; additional close-interval shovel tests are excavated to delineate potential archaeological sites and finds. Tests are excavated in arbitrary 10-centimeter levels to sterile subsoils (with the exception of disturbed plow zone soils, which are excavated as a single level), unless natural obstructions (e.g., rocks, bedrock, or roots) prevent further excavation. Excavated soil is hand screened through 0.25-inch wire mesh hardware cloth. Cultural materials remaining in the mesh are bagged and tagged by level within each shovel test, and the counts and types of recovered cultural material are noted on field forms. Soil profiles are recorded for each shovel test on standardized forms. All shovel tests are filled following excavation to restore the ground surface to its original contour. Digital photographs are taken of the general Project area and recorded on standardized logs. Sub-meter GPS data are collected from each shovel test excavated within the study area. Visible surface features (e.g., foundations) encountered during the survey are recorded through description and photographs, and locational data are collected with the GPS and drawn on Project maps.

Tables 4.5-5 and 4.5-6 (see Tables Section) describe the completion status for the cultural resources surveys along the pipeline route and of aboveground facility sites as of September 20, 2018. This information is also provided graphically in Figure 4.5-1 (Appendix 4-B), which depicts both the direct effects APE and the maximum potential extent of the indirect effects APE. As of September 20, 2018, archaeological surveys have been completed for approximately 61.89 miles (84.7 percent) of the pipeline route, including 25.5 miles (97.7 percent) of the route in Virginia and 36.39 miles (77.4 percent) of the route in North Carolina. In addition, surveys have been completed for 18.1 miles (81.6 percent) of access roads in Virginia and 21.2 miles (78.8 percent) of access roads in North Carolina.

Virginia Archaeological Survey Results

The archaeological surveys in Virginia conducted to date have resulted in the identification of 42 archaeological resources: 31 precontact archaeological sites or isolated finds, six postcontact archaeological sites or isolated finds, and five precontact and postcontact archaeological sites or isolated finds (Table 4.5-7, see Tables Section). These include 23 precontact archaeological sites or isolated finds, five postcontact archaeological sites or isolated finds, and four precontact and postcontact archaeological sites or isolated finds located along the pipeline route; one precontact site located along the pipeline; two precontact sites and one precontact and postcontact site located within the Lambert Compressor Station; one postcontact site situated at a Contractor Yard, and five precontact sites or isolated finds located along access roads. (Cemeteries are considered aboveground resources in Virginia and are not included in these totals.)

Based on the survey data, 31 of the 42 archaeological sites or finds in Virginia appear to have limited research potential within the direct effects APE or otherwise fail to meet the NRHP criteria. Per VDHR guidelines, those sites will be recommended as not eligible for listing in the NRHP under Criteria A–D (if their boundaries have been totally defined within the direct effects APE) or recommended NRHP unassessed (if their boundaries have not been defined), and no further archaeological evaluation will be recommended for the Project (see Table 4.5-7, Tables Section).

The Southgate Project recommends 11 sites in Virginia as NRHP unassessed and requiring additional survey (one site) or avoidance or additional evaluation (10 sites) based on their characteristics within the direct effects APE (Appendix 4-D). Of those 11 sites, three will be avoided, and additional survey or evaluation will be conducted for the remaining eight sites (Table 4.5-7). Results of the additional survey or evaluation will be submitted to the VDHR and tribes, and any necessary avoidance plans will be submitted to the FERC, the VDHR and the tribes for review and approval.

North Carolina Archaeological Survey Results

The archaeological surveys in North Carolina conducted to date have resulted in the identification of 61 archaeological resources: 40 precontact archaeological sites or isolated finds, seven precontact and postcontact sites or isolated finds, and 14 postcontact sites or isolated finds (including cemeteries; which are considered archaeological sites in North Carolina) (Table 4.5-8, see Tables Section). These include 37 precontact archaeological sites or isolated finds, seven precontact and postcontact sites or isolated finds, and 13 postcontact archaeological sites or isolated finds along the pipeline route; and three precontact sites or isolated finds and one postcontact site along access roads.

Based on the survey data, 49 of the 61 archaeological sites or finds in North Carolina appear to have limited research potential and otherwise fail to meet the NRHP criteria based on the deposits present within the direct effects APE. Per NC HPO guidelines, those sites will be recommended as not eligible for listing in the NRHP under Criteria A–D, and no further archaeological evaluation will be recommended for the Project. These 49 sites include five postcontact cemeteries that will be recommended as not eligible for the NRHP, but that will be avoided by the Project. (One of those, 31RK234, is considered potentially eligible for the NRHP as architectural resource RK1531).

The Southgate Project recommends 12 sites in North Carolina as NRHP unassessed. Of these sites, four will be avoided, and evaluation will be conducted for the remaining eight sites (Table 4.5-8). Results of

the will be submitted to the NC HPO and tribes, and any necessary avoidance plans will be submitted to the FERC, the NC HPO and the tribes for review and approval.

4.5.3 Aboveground Cultural Resources Survey

Following completion of background research, the Southgate Project is conducting systematic surveys of historic architectural properties and other aboveground resources within the Project direct and indirect effects APEs. The fieldwork involves the identification of all aboveground properties within the APE that appear to be at least 50 years old or are included in previous inventories, including potential cultural landscapes and historic districts. Prior to fieldwork, the architectural historians use aerial photographs, topographic maps, and other sources to identify, map, and compile a database of potential aboveground resources within the APEs. Aerial base maps and property parcel maps are then used during the fieldwork to identify the study corridor. The architectural historians visit accessible parcels from public rights-of-way, associated properties, and known or potential historic districts for which any portion of the property intersects with the study corridor. Each property included in the survey is assigned a survey number and plotted on a base map. Data regarding the current condition and significant characteristics of identified properties are recorded, and the information on the inventory forms for previously surveyed properties is verified. Photographs of each surveyed property and its views toward the Project are taken with a high-resolution digital camera. If any potential historic districts are identified, the surveyors will record information about the area's character; photograph streetscapes, views, and individual properties; and identify the boundaries of the potential district.

Based on the condition, integrity, materials, approximate age, design, and setting of the identified resources, a preliminary assessment is formed regarding the potential NRHP eligibility of each property. An assessment of the potential effects of the Project then is conducted for properties that are listed or evaluated as potentially eligible for listing in the NRHP. The assessment takes into account the location of the property in relation to the pipeline, the nature of the potential effects, and the characteristics of the property's significance.

Virginia Aboveground Cultural Resources Survey Results

In Virginia, intensive aboveground survey fieldwork by Southgate Project architectural historians is ongoing. As of September 20, 2018, the Project has identified 74 aboveground resources within the Project study areas in Virginia; an additional 23 previously identified aboveground resources remain to be revisited or redocumented by the Project (Appendix 4-F). Table 4.5-9 (see Tables Section) lists the aboveground resources identified in Virginia for the Project to date. No historic districts or historic cultural landscapes have been identified to date in Virginia. Per VDHR guidelines, historic cemeteries lacking associated archaeological components are classified as aboveground resources in Virginia.

Two of the 74 aboveground resources identified in Virginia are currently listed on or will be recommended eligible for the NRHP, and four of the resources are considered potentially eligible for the NRHP. The NRHP eligibility of one resource is considered undetermined, and the Project recommends the remaining 67 above ground resources in Virginia as not eligible for the NRHP. The Project will complete the survey and assessment of NRHP eligibility of the remaining aboveground resources within the APE and will assess potential Project effects on any resources that are NRHP listed or are determined NRHP eligible. If any of

those resources are to be affected by the Project, the Project then will evaluate measures to avoid, minimize, and/or mitigate those effects.

North Carolina Aboveground Cultural Resources Survey Results

In North Carolina, intensive aboveground survey fieldwork by Southgate Project architectural historians is ongoing. As of September 20, 2018, the Project has identified 267 aboveground resources within the Project study areas in North Carolina (Appendix 4-G). Table 4.5-10 (see Tables Section) lists the aboveground resources identified in North Carolina for the Project to date. No historic districts or historic cultural landscapes have been identified to date in North Carolina. Per NC HPO guidelines, historic cemeteries are generally classified as archaeological sites in North Carolina (although one cemetery that was previously recorded as an aboveground resource is listed here).

Two of the 267 aboveground resources identified in North Carolina are currently listed on the NRHP, while the eligibility status of an additional 16 aboveground resources is presently considered undetermined. The Project will complete the assessment of NRHP eligibility for those resources and will assess potential Project effects to any resources that are NRHP listed or are determined NRHP eligible. If any of those resources are to be affected by the Project, the Project then will evaluate measures to avoid, minimize, and/or mitigate those effects. The Project recommends the remaining 249 aboveground resources in North Carolina as not eligible for the NRHP.

4.5.4 Aboveground Cultural Resource Impacts and Avoidance Measures

To the greatest extent practicable, the Project will not result in direct effects to NRHP-eligible or -listed aboveground resources as a result of Project construction and operation. The only areas where Project-related impacts may occur is in areas with shallow depth to bedrock where blasting may be required. Where consolidated rock is encountered during construction, the Project's preferred procedure will be to fracture and excavate the bedrock using standard construction equipment. The Project's blasting technique would typically involve small charges strong enough to crack rock in the pipeline centerline. As currently planned, the impact of such blasting is expected to be limited to within 50 feet of the right-of-way. The Project's contractor will prepare a detailed Blasting Plan for each distinct blasting area, which will comply with all permit requirements. Structures within 150 feet, historic or not, will be evaluated for pre- and post-blasting condition. Further details regarding the Project's Blasting Plan and mitigation efforts are included in Resource Report 6.

4.5.5 Summary

As of September 20, 2018, archaeological survey has been completed for approximately 61.89 miles (84.7 percent) of the Southgate Project pipeline route including 25.5 miles (97.7 percent) of the route in Virginia and 36.39 miles (77.4 percent) of the route in North Carolina. In addition, surveys have been completed for 18.1 miles (81.6 percent) of access roads in Virginia and 21.2 miles (78.8 percent) of access roads in North Carolina.

The archaeological surveys completed to date have resulted in the identification of 103 archaeological resources: 42 in Virginia and 61 in North Carolina. Eighty of these sites are recommended not eligible for listing in the NRHP or otherwise do not require further investigations, including five postcontact cemeteries in North Carolina that will be avoided by the Project. The remaining 23 sites (11 in Virginia and 12 in

North Carolina) would require additional investigation to assess NRHP eligibility. The Project plans to avoid eight of those sites and conduct additional survey or evaluation of 15 of those sites.

The aboveground resources field surveys completed to date have resulted in the identification of 341 aboveground resources: 74 in Virginia and 267 in North Carolina. No historic districts or historic cultural landscapes have been identified. Of the 341 aboveground resources, four are listed on or will be recommended eligible for the NRHP, while the eligibility status of an additional 21 above ground resources is presently considered undetermined. The Project recommends the remaining 316 aboveground resources in North Carolina as not eligible for the NRHP.

The results of those surveys are provided in Appendices 4-D through 4-F and have been submitted to the VDHR, NC HPO, and those Native American groups expressing interest in the Southgate Project. The results of additional surveys and site evaluations will be submitted as addenda reports as they are available. Due to the sensitive nature of some of the material within the reports, those reports will be labeled "**CUI//PRIV – DO NOT RELEASE**" in accordance with FERC procedures and 36 CFR Part 800.11(c)(1).

The Southgate Project's goal is to build and operate the Project without adverse effects to NRHP-listed and -eligible cultural resources. If any NRHP-listed or -eligible resources cannot be avoided and will be adversely affected by the Project, the Project will develop and implement appropriate treatment plans in consultation with the FERC, the VDHR or NC HPO, interested Native American groups, and other interested parties as appropriate.

4.6 PLAN FOR UNANTICIPATED DISCOVERIES OF HISTORIC PROPERTIES AND HUMAN REMAINS

The Southgate Project has developed a *Plan for Unanticipated Discoveries of Historic Properties and Human Remains, Virginia and North Carolina* (Appendix 4-C). The plan (or information on its availability) was provided to the VDHR, NC HPO, and Native American groups for review and comment in August 2018. As of October 15, 2018, the VDHR, NC HPO, and Catawba Indian Nation have approved of the plan.

4.7 REFERENCES

Federal Energy Regulatory Commission (FERC). 2017a. Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects.

Federal Energy Regulatory Commission (FERC). 2017b. Guidance Manual for Environmental Report Preparation.

North Carolina Historic Preservation Office (NC HPO). 2016. Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106-110 Compliance Reports in North Carolina. North Carolina Historic Preservation Office, Raleigh.

North Carolina Historic Preservation Office (NC HPO). 2017. Archaeological Investigation Standards and Guidelines. North Carolina Historic Preservation Office/Office of State Archaeology, Raleigh.

Virginia Department of Historic Resources (VDHR). 2017. Guidelines for Conducting Historic Resources Surveys in Virginia. Virginia Department of Historic Resources, Richmond.

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

TABLES SECTION

LIST OF TABLES

Table 4.3-1

Federally-Recognized Native American Groups Contacted for the MVP Southgate Project (current as of October 15, 2018)

Tribe Name	Date(s) Contacted (includes meetings)	Date(s) Response Received (includes meetings)
Catawba Indian Nation	5/31/2018, 6/1/2018, 6/28/2018, 7/11/2018, 8/31/2018/ 9/5/2018/ 9/28/2018	5/31/2018, 7/12/2018, 9/28/2018
Cherokee Nation of Oklahoma	8/31/2018	No response received to date
Cheyenne River Sioux Tribe	6/6/2018, 7/11/2018, 8/31/2018	No response received to date
Chickahominy Tribe	5/31/2018, 6/1/2018, 6/12/2018, 6/14/2018, 6/25/2018, 6/29/2018, 7/11/2018, 8/31/2018, 9/6/2018	5/31/2018, 6/14/2018, 9/6/2018
Chickahominy Tribe Eastern Division	5/31/2018, 6/1/2018, 6/12/2018, 6/14/2018, 8/21/2018, 8/31/2018, 9/6/2018	5/31/2018, 6/14/2018, 9/6/2018
Delaware Nation	6/6/2018, 7/11/2018, 8/31/2018	No response received to date
Delaware Tribe of Indians	6/6/2018, 7/11/2018	6/7/2018
Eastern Band of Cherokee Indians	5/31/2018, 6/1/2018, 6/11/2018, 6/29/2018, 7/11/2018, 8/31/2018	5/31/2018, 10/15/2018
Eastern Shawnee Tribe of Oklahoma	6/6/2018, 7/11/2018, 8/31/2018	No response received to date
Monacan Indian Nation*	5/31/2018, 6/1/2018, 6/12/2018, 6/27/2018, 7/11/2018, 8/9/2018, 8/15/2018, 8/31/2018, 10/9/2018	5/31/2018, 6/12/2018, 8/7/2018, 10/9/2018
Muscogee (Creek) Nation	6/6/2018, 7/11/2018, 8/31/2018	6/8/2018
Nansemond Tribe	5/31/2018, 6/1/2018, 6/11/2018, 6/26/2018, 7/11/2018, 8/31/2018, 9/6/2018	5/31/2018, 6/11/2018, 9/6/2018
Pamunkey Tribe	5/31/2018, 8/31/2018	No response received to date
Rappahannock Tribe	5/31/2018, 6/5/2018, 7/11/2018, 8/31/2018, 9/6/2018	9/6/2018
Rosebud Sioux Tribe of Indians	6/6/2018, 6/7/2018, 7/11/2018, 8/31/2018	No response received to date
Tuscarora Nation	6/6/2018, 7/11/2018, 8/31/2018	No response received to date
Upper Mattaponi Tribe	5/30/2018, 6/12/2018, 6/25/2018, 7/11/2018, 8/31/2018, 9/6/2018	9/6/2018

* See also Monacan Indian Nation, Cheyenne River Sioux Tribe, and Rosebud Sioux Tribe communications with the FERC referenced in text.

Table 4.3-2

Non-federally Recognized Native American Groups Contacted for the MVP Southgate Project (current as of October 15, 2018)

Tribe Name	Date(s) Contacted (includes meetings)	Date(s) Response Received (includes meetings)
Cheroenhaka (Nottoway) Tribe	8/3/2018, 8/31/2018	No response received to date
Mattaponi Tribe	8/3/2018, 8/31/2018	No response received to date
Nottoway of Virginia	8/3/2018, 8/31/2018	No response received to date
Patawomeck Tribe	8/3/2018, 8/31/2018	No response received to date
North Carolina Commission on Indian Affairs	7/12/2018, 7/25/2018, 7/31/2018, 8/22/2018, 8/31/2018, 9/7/2018	7/31/2018, 8/27/2018, 9/7/2018
Cohare Tribe	8/3/2018, 8/31/2018	No response received to date
Haliwa-Saponi Indian Tribe	8/3/2018, 8/31/2018	No response received to date
Lumbee Tribe	8/3/2018, 8/31/2018	No response received to date
Meherrin Indian Tribe	8/3/2018, 8/31/2018	No response received to date
Occaneechi Band of the Saponi Nation*	8/3/2018, 8/6/2018, 8/14/2018, 8/20/2018, 8/31/2018, 10/2/2018, 10/4/2018	8/17/2018, 8/24/2018, 10/5/2018
Sappony Tribe*	8/3/2018, 8/9/2018, 8/15/2018, 8/31/2018, 10/9/2018	8/7/2018, 10/9/2018
Waccamaw Siouan Tribe	8/3/2018, 8/31/2018	No response received to date

* See also Sappony Tribe and Occaneechi Band of the Saponi Nation communications with the FERC referenced in text.

Table 4.3-3

Other Virginia State and Local Agency Cultural Resources Coordination for the MVP Southgate Project (current as of October 15, 2018)

Organization	Date(s) Contacted	Date(s) Response Received
City of Danville (CLG)	7/6/2018	No response received to date
Pittsylvania Historical Society	7/6/2018, 7/24/2018, 8/17/2018	7/21/2018

Table 4.3-4

Other North Carolina State and Local Agency Cultural Resources Coordination for the MVP Southgate Project (current as of October 15, 2018)

Organization	Date(s) Contacted	Date(s) Response Received
Town of Eden (CLG)	7/6/2018	No response received to date
Alamance County Historical Properties Commission (CLG)	7/6/2018, 7/31/2018, 8/3/2018	7/30/2018, 7/31/2018, 8/3/2018
Rockingham County Historical Society	9/5/2018, 10/3/2018	10/2/2018, 10/4/2018
Alamance County Historical Museum	7/6/2018	No response received to date
Graham Historical Museum	7/6/2018, 7/23/2018	7/21/2018
Haw River Historical Society Museum	8/7/2018	No response received to date
Mebane Historical Society and Museum	7/6/2018	No response received to date
Textile Heritage Museum	7/6/2018	No response received to date
Virginia-North Carolina Piedmont Genealogical Society	8/19/2018	No response received to date
Afro-American Historical and Genealogical Society of North Carolina, Piedmont Triad Chapter	8/21/2018	No response received to date

Table 4.3-5

Potential Cultural Resources Reported in Public Comments

Resource Number	Resource Name	Distance from CL/Facility	Applicant's NRHP Recommendation	Applicant's Effects Recommendation
071-0036	Little Cherrystone Manor	Property is crossed by CL	NRHP Listed	Assess effects and mitigate as necessary
071-0002	Bachelors Hall Plantation	8100 feet from TA-PI-052	VDHR determined eligible	No effect; resource is outside indirect effects APE
071-0020	Oak Ridge Plantation	8000 feet from TA-PI-054	NRHP listed	No effect; resource is outside indirect effects APE
071-0026; 44PY0040	Oak Hill Plantation	2780 feet from TA-PI-063	NRHP listed but demolished	No effect; resource is outside indirect effects APE
071-0035	Windsor Plantation	2000 feet from CL	NRHP listed	No effect; resource is outside indirect effects APE
071-0006	Berry Hill Plantation	1070 feet from workspace	NRHP listed	No effect; resource is outside indirect effects APE
AM0003	Glencoe Mill Village	1500 feet from CL	NRHP Listed Historic District	No effect; resource is outside indirect effects APE
NCAMt242/ NCAM243	Arches Grove United Church of Christ	2420 feet from CL	Not Eligible	No effect; resource is outside indirect effects APE
None	Moore property – 1810 farmhouse	~1400 feet from CL	Unassessed; property has not been accessed for above ground resources survey	Unknown but likely no effect due to distance and vegetative screening
None	Moore property - family cemetery	Unknown	Unassessed/	No Effect; property is not within direct effects APE
None	Moore property – Native American sites	Unknown	Unassessed/	No Effect; property is not within direct effects APE
31AM431	Archaeological Site 31AM431	700 feet from PA-AL-174	Unassessed	No Effect; property is not within direct effects APE
None	Burlington-Hillsborough Stage Coach Trail	800+ feet from CL	Unassessed	No Effect; property is not within direct effects APE
None	William Fonville Family House	900 feet from CL	Unassessed; property has not been accessed for above ground resources survey	No recommendation possible at present
AM0555	Aldridge building – Anderson House	11,500 feet from TAR-AL-79A	Unassessed (on NC HPO study list)	No effect; resource is outside indirect effects APE
AM0196	Aldridge building – Jacob Holt House	10,000 feet from TAR-AL-79A	Unassessed (on NC HPO study list)	No effect; resource is outside indirect effects APE
None known	Aldridge cemetery #1	Unknown; at least 9,000 feet from TAR-AL-79A	Unassessed	No effect; resource is outside direct effects APE
None known	Aldridge cemetery #2	Unknown; at least 9,000 feet from TAR-AL-79A	Unassessed	No effect; resource is outside direct effects APE
AM0464	Kerr Scott Farm	1500 feet from CL	NRHP Listed	No effect; resource is outside indirect effects APE

Table 4.5-1

Previously Recorded Archaeological Resources within 0.5-mile of Project Components in Virginia (updated September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
44PY0115	Postcontact farmstead	180	Lyle Browning/ Browning & Assoc.	11/5/2003	None Provided	Not Evaluated
44PY0215	Precontact lithic scatter	2100	Lyle Browning/ Browning & Assoc.	7/20/2001	None Provided	Not Evaluated
44PY0219	Precontact campsite; Postcontact farmstead	1800	URS	9/1/2001	None Provided	Not Eligible
44PY0220	Postcontact farmstead	1800	Matt Jorgensen/ URS	9/12/2001	None Provided	Not Eligible
44PY0242	Postcontact farmstead	590	Lyle Browning/ Browning & Assoc.	11/5/2003	None Provided	Not Evaluated
44PY0243	Postcontact farmstead	780	Lyle Browning/ Browning & Assoc.	11/5/2003	None Provided	Not Evaluated
44PY0244	Postcontact farmstead	915	Lyle Browning/ Browning & Assoc.	11/5/2003	None Provided	Not Evaluated
44PY0245	Postcontact farmstead	1440	Lyle Browning/ Browning & Assoc.	11/5/2003	None Provided	Not Evaluated
44PY0258	Postcontact artifact scatter	100	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0259	Precontact campsite	0	Louis Berger Group	10/1/2006	None Provided	Not Eligible
44PY0260	Precontact artifact scatter; Postcontact homestead	0	Louis Berger Group	10/1/2006	None Provided	Eligible
44PY0261	Postcontact artifact scatter	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0262	Precontact campsite	90	Louis Berger Group	10/1/2006	None Provided	Not Eligible
44PY0263	Postcontact artifact scatter	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0264	Precontact campsite	0	Louis Berger Group	10/1/2006	None Provided	Not Eligible
44PY0265	Precontact campsite	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0266	Postcontact artifact scatter	110	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0267	Postcontact artifact scatter	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0268	Precontact lithic scatter	200	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0270	Precontact campsite	0	Louis Berger Group	10/1/2006	None Provided	Not Eligible
44PY0271	Precontact campsite	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0272	Postcontact cemetery	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0273	Postcontact cemetery	50	Louis Berger Group	3/30/2006	None Provided	Not Eligible

Table 4.5-1

Previously Recorded Archaeological Resources within 0.5-mile of Project Components in Virginia (updated September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
44PY0274	Postcontact cemetery	0	Louis Berger Group	3/30/2006	None Provided	Eligible
44PY0275	Postcontact cemetery	25	Louis Berger Group	3/30/2006	None Provided	Not Evaluated
44PY0277	Postcontact homestead	0	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0278	Postcontact campsite	440	Louis Berger Group	3/30/2006	None Provided	Not Eligible
44PY0279	Precontact lithic scatter	60	Louis Berger Group	11/1/2005	None Provided	Not Evaluated
44PY0280	Postcontact homestead	35	Louis Berger Group	3/30/2006	None Provided	Not Evaluated
44PY0281	Precontact lithic scatter	125	Louis Berger Group	12/1/2006	None Provided	Not Evaluated
44PY0282	Postcontact cemetery	1075	Louis Berger Group	12/1/2005	None Provided	Not Evaluated
44PY0283	Postcontact cemetery	365	Louis Berger Group	12/1/2005	None Provided	Not Evaluated
44PY0284	Postcontact cemetery	0	Louis Berger Group	12/1/2005	None Provided	Not Evaluated
44PY0307	Precontact lithic scatter	2500	Lyle Browning/ Browning & Assoc.	3/01/2007	None Provided	Not Eligible
44PY0308	Precontact lithic scatter	165	Lyle Browning/ Browning & Assoc.	6/01/2006	None Provided	Not Eligible
44PY0309	Precontact lithic scatter	2030	Lyle Browning/ Browning & Assoc.	6/01/2006	None Provided	Not Eligible
44PY0317	Postcontact farmstead	1200	Lyle Browning/ Browning & Assoc.	9/20/2009	None Provided	Not Evaluated
44PY0318	Postcontact farmstead	2230	Lyle Browning/ Browning & Assoc.	9/20/2009	None Provided	Not Evaluated
44PY0319	Postcontact farmstead	2050	Craig Rose/ Browning & Assoc.	9/20/2009	None Provided	Not Evaluated
44PY0320	Precontact lithic scatter; Postcontact farmstead	2550	Craig Rose/ Browning & Assoc.	9/20/2009	None Provided	Not Evaluated
44PY0321	Precontact lithic scatter	2300	Craig Rose/ Browning & Assoc.	9/20/2009	No Further Work	Not Evaluated
44PY0324	Postcontact mill	1450	Lyle Browning/ Browning & Assoc.	8/1/2010	Potentially Eligible	Potentially Eligible
44PY0325	Precontact lithic scatter; Postcontact homestead, mill	1100	Lyle Browning/ Browning & Assoc.	8/1/2010	Potentially Eligible	Potentially Eligible
44PY0326	Postcontact homestead	750	Lyle Browning/ Browning & Assoc.	8/1/2010	No Further Work	Not Evaluated
44PY0327	Postcontact homestead	325	Lyle Browning/ Browning & Assoc.	8/1/2010	No Further Work	Not Evaluated
44PY0328	Postcontact homestead	800	Lyle Browning/ Browning & Assoc.; Tracy Jones/ Louis Berger Group	8/1/2010 5/1/2014	Further Work Needed; Not Eligible	Not Eligible

Table 4.5-1

Previously Recorded Archaeological Resources within 0.5-mile of Project Components in Virginia (updated September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
44PY0329	Postcontact homestead	0	Lyle Browning/ Browning & Assoc.	8/1/2010	Not Eligible; Destroyed	Not Eligible
44PY0334	Postcontact homestead	0	Lyle Browning/ Browning & Assoc.	8/1/2010	Not Eligible; Destroyed	Not Evaluated
44PY0335	Postcontact farmstead	2500	Lyle Browning/ Browning & Assoc.; Tracy Jones/ Louis Berger Group	8/1/2010 5/14/2014	Further Work Needed; Not Eligible	Not Evaluated
44PY0350	Precontact campsite	2170	Summer Chaffman/ Browning & Associates	3/1/2011	None Provided	Not Evaluated
44PY0351	Precontact campsite	1000	Summer Chaffman/ Browning & Associates	4/1/2011	None Provided	Not Evaluated
44PY0352	Precontact lithic scatter; Postcontact artifact scatter	1000	Summer Chaffman/ Browning & Associates	4/1/2011	None Provided	Not Evaluated
44PY0353	Precontact lithic scatter; Postcontact artifact scatter	670	Summer Chaffman/ Browning & Associates	4/1/2011	None Provided	Not Evaluated
44PY0354	Precontact lithic scatter; Postcontact artifact scatter	1300	Summer Chaffman/ Browning & Associates	4/1/2011	None Provided	Not Evaluated
44PY0355	Precontact lithic scatter	1450	Summer Chaffman/ Browning & Associates	4/1/2011	None Provided	Not Evaluated
44PY0356	Precontact lithic scatter; Postcontact industrial	630	Summer Chaffman/ Browning & Associates	4/1/2011	None Provided	Not Evaluated
44PY0357	Precontact lithic scatter	960	Summer Chaffman/ Browning & Associates	5/1/2011	None Provided	Not Evaluated
44PY0358	Precontact lithic scatter; Postcontact artifact scatter	65	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	3/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0359	Precontact lithic scatter	0	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	3/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0360	Precontact lithic scatter; Postcontact artifact scatter	700	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	3/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible

Table 4.5-1

Previously Recorded Archaeological Resources within 0.5-mile of Project Components in Virginia (updated September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
44PY0371	Postcontact artifact scatter	150	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	3/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0373	Precontact lithic scatter; Postcontact homestead	0	Summer Chaffman/ Browning & Associates; Stuart Fiedel/Louis Berger Group	4/1/2011 8/3/2016	None Provided; Not Eligible	Not Evaluated
44PY0374	Precontact lithic scatter; Postcontact homestead	0	Summer Chaffman/ Browning & Associates; Stuart Fiedel/Louis Berger Group	4/1/2011 8/3/2016	None Provided; Not Eligible	Not Evaluated
44PY0375	Precontact lithic scatter; Postcontact artifact scatter	0	Summer Chaffman/ Browning & Associates; Stuart Fiedel/Louis Berger Group	4/1/2011 8/3/2016	None Provided; Not Eligible	Not Evaluated
44PY0376	Precontact campsite; Postcontact homestead	1550	Summer Chaffman/ Browning & Associates; Stuart Fiedel/Louis Berger Group	5/1/2011 8/3/2016	None Provided; Not Eligible	Not Evaluated
44PY0377	Postcontact artifact scatter	50	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	5/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0378	Precontact lithic scatter; Postcontact homestead	330	Summer Chaffman/ Browning & Associates	3/1/2011	None Provided	Not Evaluated
44PY0379	Postcontact homestead	1500	Summer Chaffman/ Browning & Associates	3/1/2011	None Provided	Not Evaluated
44PY0380	Precontact lithic scatter; Postcontact farmstead	900	Summer Chaffman/ Browning & Associates	5/1/2011	None Provided	Potentially Eligible
44PY0381	Precontact lithic scatter; Postcontact farmstead	2500	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	5/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0383	Postcontact farmstead	1600	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	5/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0384	Postcontact farmstead	190	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	5/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible
44PY0385	Precontact lithic scatter; Postcontact farmstead	330	Summer Chaffman/ Browning & Associates; Lee Tippett/Louis Berger Group	4/1/2011 4/23/2014	None Provided; Not Eligible	Not Eligible

Table 4.5-1

Previously Recorded Archaeological Resources within 0.5-mile of Project Components in Virginia (updated September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
44PY0431	Precontact artifact scatter	1500	Jacob Freedman, SEARCH	6/15/2015	Further Survey (shovel testing)	Not Evaluated
44PY0432	Precontact artifact scatter	1000	Jacob Freedman, SEARCH	6/15/2015	Not Eligible	Not Evaluated
44PY0438	Precontact lithic scatter	640	Gail Hellman, Tetratech	12/14/2015	None Provided	Not Evaluated
44PY0439	Precontact lithic scatter	425	Gail Hellman, Tetratech	12/14/2015	None Provided	Not Evaluated
44PY0441	Precontact lithic scatter	1450	Randy Lichtenberger, Hurt & Proffitt	2/16/2016	None Provided	Not Evaluated
44PY0442	Precontact lithic scatter; Postcontact homestead	0	Gail Hellman, Tetratech	11/1/2016	None Provided	Not Evaluated

Table 4.5-2

Previously Recorded Archaeological Sites within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
31RK44	Precontact habitation	0	Wake Forest University	2/5/1979	Rich site, burials present"	Unassessed
31RK45	Precontact artifact scatter	900	Wake Forest University	2/5/1979	None Provided	Unassessed
31RK46	Precontact lithic scatter; Postcontact artifact scatter	1500	Wake Forest University	2/5/1979	None Provided	Unassessed
31RK69	Precontact habitation	2350	Pete Adkins/ no affiliation	Unknown	None Provided	Unassessed
31RK70	Precontact habitation	1925	R. Shearin/UNC-Chapel Hill	4/29/1986	Further Work Needed	Unassessed
31RK90	Precontact habitation	1800	Pete Adkins/ no affiliation	1/21/1987	None Provided	Unassessed
31RK92	Precontact habitation	725	Pete Adkins/ no affiliation	1/21/1987	None Provided	Unassessed
31RK93	Precontact habitation	1830	Pete Adkins/ no affiliation	1/21/1987	None Provided	Unassessed
31RK94	Precontact habitation	1300	Pete Adkins/ no affiliation	1/21/1987	None Provided	Unassessed
31RK97	Precontact unknown	350	Pete Adkins/ no affiliation	1/21/1987	None Provided	Unassessed
31RK129	Precontact lithic scatter	0	Gerold Glover/ NCDOT	5/5/1994	No Further Work	Unassessed
31RK134	Precontact lithic scatter	160	Gerold Glover/ NCDOT	5/9/1994	No Further Work	Not Eligible
31RK136	Postcontact sluice	375	Butler & Clauser/ OSA	12/15/1983	Eligible	NRHP Listed
31RK139	Postcontact sluice	2550	Butler & Clauser/ OSA	12/15/1983	Eligible	NRHP Listed
31RK141/Sugar Loaf Mound	Precontact mound	1200	No information available	11/6/1995	No information available	Unassessed
31RK162	Precontact artifact scatter	200	Jill Olsen/ Brockington &Associates	3/19/2001	Further Work Needed	Unassessed
31RK167	Precontact lithic scatter; Postcontact homestead	2200	Matthew Jorgenson /URS	1/8/2002	Limited Potential, Postcontact component is modern.	Not Eligible
31RK169	Precontact habitation	1700	Matthew Jorgenson /URS	1/18/2002	Potentially Eligible	Unassessed
31RK170	Precontact habitation	1550	Matthew Jorgenson /URS	2/18/2002	Not Eligible	Not Eligible
31RK171	Precontact habitation	2150	Matthew Jorgenson /URS	2/18/2002	Likely Not Eligible	Unassessed
31RK180	Precontact: Isolated find	0	Michael O'Neal/ Brockington & Associates	6/6/2002	No Further Work	Not Eligible

Table 4.5-2

Previously Recorded Archaeological Sites within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
31RK181	Precontact lithic scatter	0	Dawn Reid/ Brockington & Associates	11/19/2002	No Further Work	Not Eligible
31RK185	Precontact habitation	1550	Matthew Jorgenson /URS	3/5/2003	Potentially Eligible	Unassessed
31RK186	Precontact artifact scatter; Postcontact: artifact scatter	1550	Matthew Jorgenson /URS	3/28/2003	No Further Work	Not Eligible
31RK187	Precontact long-term habitation	1800	Matthew Jorgenson /URS	4/1/2003	No Further Work	Not Eligible
31RK188	Precontact lithic scatter	750	Karl Franz/URS	2/11/2003	No Further Work	Not Eligible
31RK189	Precontact artifact scatter	0	Karl Franz/URS	2/23/2003	No Further Work	Not Eligible
31RK205	Precontact lithic scatter	0	GAI Consultants, Inc.	6/4/2013	No Further Work	Not Eligible
31RK206	Precontact lithic scatter	0	GAI Consultants, Inc.	6/4/2013	No Further Work	Not Eligible
31RK207	Precontact lithic scatter	15	GAI Consultants, Inc.	6/4/2013	No Further Work	Not Eligible
31RK251	Postcontact unknown	280	Terri Russ, ESI	2018	No information available	Unassessed
31AM20	Precontact isolated find	2575	Wake Forest University	9/15/1975	No Further Work	Unassessed
31AM142	Postcontact mill	1500	NCDOT	9/22/1982	No Further Work	Unassessed
31AM145	Precontact lithic scatter	530	Unknown/Amateur	Unknown	None Provided	Unassessed
31AM187	Precontact lithic scatter	330	UNC-Chapel Hill	2/10/1986	Further Work Needed	Unassessed
31AM200	Precontact lithic scatter	550	UNC-Chapel Hill	1/23/1986	Further Work Needed	Unassessed
31AM210	Precontact lithic scatter	280	UNC-Chapel Hill	4/4/1986	No Further Work	Not Eligible
31AM219	Precontact lithic workshop	1090	UNC-Chapel Hill	4/15/1986	Further Work Needed	Unassessed
31AM228	Precontact lithic scatter	1550	UNC-Chapel Hill	5/2/1986	No Further Work	Unassessed
31AM243	Precontact lithic scatter	900	NCDOT	8/6/1986	No Further Work	Not Eligible
31AM245	Precontact lithic scatter	1300	NCDOT	7/12/1986	No Further Work	Not Eligible
31AM246	Precontact lithic scatter	770	NCDOT	8/12/1986	No Further Work	Not Eligible
31AM247	Precontact lithic scatter	990	NCDOT	8/12/1986	No Further Work	Not Eligible
31AM248	Precontact lithic scatter; Postcontact farmstead	1500	NCDOT	/8/12/1986	No Further Work	Not Eligible

Table 4.5-2

Previously Recorded Archaeological Sites within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
31AM249	Precontact lithic scatter	1220	NCDOT	8/12/1986	No Further Work	Not Eligible
31AM342	Precontact artifact scatter	1750	NCDOT	4/21/1994	No Further Work	Not Eligible
31AM345	Precontact lithic scatter	980	NCDOT	4/28/1994	No Further Work	Not Eligible
31AM346	Precontact lithic scatter	50	NCDOT	4/28/1994	No Further Work	Not Eligible
31AM347	Precontact lithic scatter	0	NCDOT	4/28/1994	No Further Work	Not Eligible
31AM348	Precontact lithic scatter; Postcontact homestead	920	NCDOT	4/28/1994	No Further Work	Not Eligible
31AM349	Precontact lithic scatter	780	NCDOT	4/28/1994	No Further Work	Not Eligible
31AM350	Precontact lithic scatter	990	NCDOT	4/28/1994	No Further Work	Not Eligible
31AM351	Precontact lithic workshop	1415	NCDOT	4/29/1994	No Further Work	Not Eligible
31AM359	Precontact lithic scatter	2015	NCDOT	7/27/1994	Further Work Needed	Unassessed
31AM389	Precontact lithic scatter; Postcontact farmstead	2600	NCDOT	6/9/2000	No Further Work	Not Eligible
31AM398	Postcontact wall	1200	William E. Trout/ no affiliation	1/28/2010	None Provided	Unassessed
31AM399	Postcontact sluice	600	William E. Trout/ no affiliation	5/28/2010	None Provided	Unassessed
31AM400	Postcontact sluice	360	William E. Trout/ no affiliation	5/28/2010	None Provided	Unassessed
31AM401	Postcontact sluice	650	William E. Trout/ no affiliation	5/28/2010	None Provided	Unassessed
31AM402	Postcontact sluice	500	William E. Trout/ no affiliation	5/28/2010	None Provided	Unassessed
31AM403	Postcontact sluice	1000	William E. Trout/ no affiliation	5/28/2010	None Provided	Unassessed
31AM404	Postcontact sluice	1135	William E. Trout/ no affiliation	5/28/2010	None Provided	Unassessed
31AM431	Precontact lithic scatter	700	Abby Faulkner/ landowner	9/7/2018	None Provided	Unassessed

Table 4.5-3

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in Virginia (updated September 25, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
071-0004/ Belle Grove/ Tunstall House	House and Outbuildings	175	Robert Wiggins/ NPS; Mike Pulice/DHR	4/1/1958; 4/5/2014	Recommended Eligible (Criteria C and D)	Not Evaluated
071-0006/ Berry Hill	Plantation Complex	1070	Robert Wiggins/ NPS; Dell Upton/DHR	4/1/1958 3/5/1976 1/11/1977	None Provided	NRHP Listed, VLR Listed
071-0025/ Mountain View	House and Outbuildings	0	WPA of Virginia; Robert Wiggins/ VHLC	8/20/1936 4/1/1958 6/1/1979	None Provided	NRHP Listed, VLR Listed
071-0028/ Oakland	House	1900	Robert Wiggins/ NPS	4/1/1958	None Provided	Not Evaluated
071-0035/ Samuel Pannill Wilson House / Windsor	House and Outbuildings	2000	Robert Wiggins/ NPS; T. Curtler VDHR/VHLC	4/1/1958 8/1/1968 4/1/1980	None Provided	NRHP Listed, VLR Listed
071-0036/ Little Cherrystone Manor/ Wooding House	House	0	Robert Wiggins/VHLC	4/1/1958 7/25/1969	None Provided	NRHP Listed, VLR Listed
071-0062/ Stony Mill	Mill	1470	Randy Lichtenberger/ VDOT; Mike Pulice /DHR	6/27/2008 12/10/2013	Recommended Eligible (Criteria A and C)	Not Evaluated
071-0064/ Luke Payne Cabin	House	1770	Randy Lichtenberger/ VDOT	6/27/2008	Destroyed	Not Evaluated
071-0067	Barn	1370	Anne Carter Lee	12/1/1972	None Provided	Not Evaluated
071-0068	Allan Holder Cabin	2150	Unknown	1972	None Provided	Not Evaluated
071-0136/ Sandy Creek Bridge	Bridge	1840	Unknown	1/1/1991	None Provided	Not Evaluated
071-0137/ White Oak Mountain Wildlife Management Area	Game Reserve/ Wildlife Management Area	0	Jim Bowman/ DHR	1/1/1992	None Provided	Not Evaluated
071-5033/ Belle Grove Church	Church	100	K. Houston/ VDOT	6/10/1997	No Further Work	Not Eligible

Table 4.5-3

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in Virginia (updated September 25, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
071-5107/ Bridge #6276	Bridge	1700	Virginia Transportation Research Council	1/1/1994	None Provided	Not Eligible
071-5135	House	2120	Caleb Christopher/ URS	11/2/2001	None Provided	Not Evaluated
071-5136	House	2170	Caleb Christopher/ URS	11/2/2001	None Provided	Not Evaluated
071-5140	House	2220	Caleb Christopher/ URS	11/2/2001	None Provided	Not Evaluated
071-5141	House	820	Caleb Christopher/ URS	11/2/2001	None Provided	Not Evaluated
071-5142	House	1100	Caleb Christopher/ URS	11/2/2001	None Provided	Not Evaluated
071-5195	Hunting Cabin (poss. Slave Quarters)	280	Lyle Browning/ Browning & Associates	11/5/2003	None Provided	Not Evaluated
071-5196	House	675	Lyle Browning/ Browning & Associates	11/5/2003	None Provided	Not Evaluated
071-5197	Log Building	880	Lyle Browning/ Browning & Associates	11/5/2003	None Provided	Not Evaluated
071-5198	House and Outbuildings	880	Lyle Browning/ Browning & Associates	11/5/2003	None Provided	Not Evaluated
071-5199	Ruins	1400	Lyle Browning/ Browning & Associates	11/5/2003	None Provided	Not Evaluated
071-5208	House	80	Megan Rupnik/ Louis Berger Group	10/29/2005	Not Eligible	Not Eligible
071-5209	House	0	Megan Rupnik/ Louis Berger Group	10/29/2005	Not Eligible	Not Eligible
071-5210	House	0	Megan Rupnik/ Louis Berger Group	10/29/2005	Not Eligible	Not Eligible
071-5211	Abandoned Farm,	0	Megan Rupnik/ Louis Berger Group	10/29/2005	Not Eligible	Not Eligible
071-5212/ Worely Farmstead	Farmstead	0	Megan Rupnik/ Louis Berger Group	10/18/2006	Potentially Eligible	Eligible
071-5216	House	880	Megan Rupnik/ Louis Berger Group	2/2/2006	Not Eligible	Not Evaluated
071-5217	Farm	25	Megan Rupnik/ Louis Berger Group	2/2/2006	Not Eligible	Not Evaluated
071-5218	House	50	Megan Rupnik/ Louis Berger Group	2/2/2006	Not Eligible	Not Evaluated
071-5219	Barn	0	Megan Rupnik/ Louis Berger Group	2/2/2006	Not Eligible	Not Evaluated
071-5220	Log House	10	Megan Rupnik/ Louis Berger Group	2/2/2006	Not Eligible	Not Evaluated
071-5221	Farm	0	Megan Rupnik/ Louis Berger Group	2/2/2006	Potentially Eligible	Not Eligible

Table 4.5-3

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in Virginia (updated September 25, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
071-5222/ Giles Log House	House	100	Megan Rupnik/ Louis Berger Group	2/2/2006	Potentially Eligible	Eligible
071-5223/ Jones/Keen Cemetery	Cemetery	980	Ned Moore/ Louis Berger Group	2/1/2006	Not Eligible	Not Evaluated
071-5224/ Fulton Cemetery	Cemetery	250	Ned Moore/ Louis Berger Group	2/1/2006	Not Eligible	Not Evaluated
071-5225/ Wells Cemetery	Cemetery	50	Ned Moore/ Louis Berger Group	2/1/2006	Not Eligible	Not Evaluated
071-5226	Cemetery	50	Ned Moore/ Louis Berger Group	2/1/2006	Not Eligible	Not Eligible
071-5227/ Wallor Cemetery	Cemetery	50	Ned Moore/ Louis Berger Group	2/1/2006	Not Eligible	Not Eligible
071-5228/ 44PY0375/ Berry Hill Building Set 14	Ruins	0	Caitlin Merritt/ Louis Berger Group	8/10/2018	Not Eligible	Not Evaluated
071-5245/ Baker Tenant House	House	1500	Lyle Browning/ Browning & Associates	2/7/2007	None Provided	Not Eligible
071-5246/ Cassady House	House	0	Lyle Browning/ Browning & Associates	2/7/2007	None Provided	Not Eligible
071-5258/ Culvert	Concrete Railroad Culvert	650	Elizabeth Andre	11/15/2007	Potentially Eligible	Not Evaluated
071-5300/ Hairston Cemetery Number 1	Cemetery	2500	Lyle Browning/ Browning & Associates	3/1/2010	Potentially Eligible	Not Evaluated
071-5302/ Canter Tenant House	House	2400	Lyle Browning/ Browning & Associates; Camilla Deiber/ Louis Berger Group	8/1/2010 5/12/2014	Not Eligible; Not Eligible	Not Evaluated
071-5303/ Hairston Cemetery Number 2	Cemetery	720	Lyle Browning/ Browning & Associates	8/11/2010	Not Eligible	Not Evaluated
071-5304/ Adams/Wilson Cemetery	Cemetery	985	Lyle Browning/ Browning & Associates	8/1/2010	Avoidance Recommended	Not Evaluated

Table 4.5-3

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in Virginia (updated September 25, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
071-5305	House	0	Lyle Browning/ Browning & Associates	8/1/2010	Not Eligible	Not Evaluated
071-5313/ Berry Hill Building Sets 12 and 13	Farmstead	0	Summer Chaffman/ Browning & Associates; Caitlin Merritt/ Louis Berger Group	5/1/2011 8/10/2016	Unable to Asses; Not Eligible	Not Evaluated
071-5316	House	2400	Summer Chaffman/ Browning & Associates; Camilla Deiber/ Louis Berger Group	5/1/2011 5/12/2014	Unable to Asses; Not Eligible	Not Evaluated
071-5317	Tobacco Barns	20000	Summer Chaffman/ Browning & Associates; Camilla Deiber/ Louis Berger Group	5/1/2011 5/12/2014	Unable to Asses; Not Eligible	Not Evaluated
071-5318	Tobacco Barn	270	Summer Chaffman/ Browning & Associates; Camilla Deiber/ Louis Berger Group	5/1/2011 5/12/2014	Unable to Asses; Not Eligible	Not Evaluated
071-5319	Farmstead	760	Summer Chaffman/ Browning & Associates; Camilla Deiber/ Louis Berger Group	5/1/2011 5/12/2014	Unable to Asses-Potentially Eligible; Not Eligible	Not Evaluated
071-5322	Farm Complex	2500	Summer Chaffman/ Browning & Associates; Camilla Deiber/ Louis Berger Group	5/1/2011 5/12/2014	Unable to Asses; Not Eligible	Not Evaluated
071-5329/ Lynskey House	House	2500	Lyle Browning/ Browning & Associates	1/1/2011	None Provided	Not Evaluated
071-5330	House	900	Lyle Browning/ Browning & Associates	1/1/2011	Not Eligible	Not Evaluated
071-5331	House	2500	Lyle Browning/ Browning & Associates	1/1/2011	Not Eligible	Not Evaluated
071-5332/ Keatts House	House	2340	Lyle Browning/ Browning & Associates	1/1/2011	Not Eligible	Not Evaluated
071-5333	Farmstead	0	Lyle Browning/ Browning & Associates	1/1/2011	Not Eligible	Not Evaluated
071-5335/ Harmony Methodist Church	Church	1200	Lyle Browning/ Browning & Associates	1/1/2011	None Provided	Not Evaluated
071-5336	House	2400	Summer Chaffman/ Browning & Associates; Camilla Deiber/ Louis Berger Group	5/1/2011 5/12/2014	Unable to Assess; Not Eligible	Not Evaluated

Table 4.5-3

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in Virginia (updated September 25, 2018)

Resource Number/Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
071-5413/ Jones Farm	Farm	0	Sonja Ingram/ Preservation Virginia	12/17/2012	Recommended for Further Survey	Eligible for ER purpose only
071-5499	Shed Ruin	360	Tetra Tech/New South Associates	4/2/2015	Not Eligible	Not Eligible
071-5524/ Transco Transfer Station No. 165	Transfer Station	0	Ellen Turco/New South Associates	7/10/2015	Not Eligible	Not Evaluated
071-5525	Cemetery	50	Gail Hellman/New South Associates	5/25/2016	Not Eligible	Not Eligible
071-5526/ Gafford House Ruins	Ruins	0	Gail Hellman/New South Associates	5/25/2016	Not Eligible	Not Eligible
071-5529/ 44PY0376/ Berry Hill Building Set 15	Ruins	2300	Caitlin Merritt/ Louis Berger Group	8/10/2016	Not Eligible	Not Evaluated
071-5530/ 44PY0373/ Berry Hill Building Set 11	Ruins	0	Caitlin Merritt/ Louis Berger Group	8/10/2016	Not Eligible	Primary Resource is no longer extant
071-5543	House	830	Crystal Castleberry/ Cardno	05/15/2018	Not Eligible	Eligible for ER purpose only
071-5544	Farm	630	Crystal Castleberry/ Cardno	05/15/2018	Further Investigation	Eligible for ER purpose only
071-5545	House	360	Crystal Castleberry/ Cardno	05/15/2018	Further Investigation	Not Eligible
071-5546	Farm	775	Crystal Castleberry/ Cardno	05/15/2018	Further Investigation	Not Eligible
071-5547	House	1180	Crystal Castleberry/ Cardno	05/15/2018	Not Eligible	Not Eligible
071-5548	House	1385	Crystal Castleberry/ Cardno	05/15/2018	Not Eligible	Not Eligible
071-5549	House	1200	Crystal Castleberry/ Cardno	05/15/2018	Not Eligible	Not Eligible
071-5550	House	1490	Crystal Castleberry/ Cardno	05/15/2018	Not Eligible	Not Eligible
071-5551	House	1995	Crystal Castleberry/ Cardno	05/15/2018	Not Eligible	Not Eligible

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
RK0001/ Cascade Plantation	Plantation House	1400	Department of Archives & History	Unknown	Eligible	NRHP Listed
RK0003	High Rock Farm	2000	Woodard	2003	NRHP Listed	NRHP Listed
RK0620	House	1500	John R. Harrington	3/15/1984	None Provided	Unassessed (Survey Only)
RK0621	House	2000	John R. Harrington	3/15/1984	None Provided	Demolished
RK0622	House	2000	John R. Harrington	3/15/1984	None Provided	Unassessed (Survey Only)
RK0624	House	2000	John R. Harrington	3/15/1984	None Provided	Unassessed (Survey Only)
RK0627/ Draper Mill Houses (Centerpoint)	Mill Houses	2200	Claudia Brown	1984	None Provided	Unassessed (Survey Area Only)
RK0630/ St. Paul's Church	Church	2600	Steve Hodges	12/10/1983	None Provided	Unassessed (Survey Only)
RK0632/ Sunshine School	School	2600	Steve Hodges	12/10/1983	None Provided	Unassessed (Survey Only)
RK1017	Hickory Grove (Nelson Farm) (Gone)	1200	Unknown	Unknown	Unknown	Demolished
RK1086	Barn	0	Unknown	Unknown	None Provided	Unassessed (Survey Only)
RK1395	House	2000	S. Woodard	8/15/2002	None Provided	Demolished
RK1396	House	275	S. Woodard	8/15/2002	None Provided	Unassessed (Survey Only)
RK1397	House	250	S. Woodard	8/15/2002	None Provided	Unassessed (Survey Only)
RK1398/ Ed and Eloise Moore House	House	1350	S. Woodard	8/15/2002	None Provided	Unassessed (Survey Only)
RK1400	House	1700	Jeff Smith	8/16/2002	None Provided	Unassessed (Survey Only)
RK1416	House	2040	S. Woodard	8/25/2002	None Provided	Unassessed (Survey Only)

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
RK1529/ Walker Farm	Farm	820	S. Woodard	11/13/2002	None Provided	Unassessed (Survey Only)
RK1530/ Dixon House	House	770	Jeff Smith	11/13/2002	None Provided	Unassessed (Survey Only)
RK1531/ Settle Family Cemetery	Cemetery	350	Jeff Smith	11/13/2002	Potentially Eligible	Unassessed (Study List)
RK1534/ Tucker Cross Farm	Farm	950	Jeff Smith	11/14/2002	Potentially Eligible	Unassessed (Study List)
RK1566/ Josiah Settle House	House	1400	S. Woodard	1/29/2003	Deteriorated	Demolished
RK1570	House	2550	S. Woodard	6/04/2003	None Provided	Unassessed (Survey Only)
GF 1822	House	2100	Unknown	1995	None Provided	Unassessed (Survey Only)
AM----/ Quackenbush House (current site)	House (moved)	385	Unknown	1989; moved 1993	Unknown	Unassessed (Survey Only)
AM0003/AM1515/ Glencoe Mill Village Historic District	Mill Village	1500	NR Form: Department of Archives and History LHD Documentation: Charles Kenwood/ Preservation Foundation of North Carolina; Jeff Triezenberg/ City of Burlington Planning Department; Helen Walton/ Burlington Historic Preservation Commission	1979 1999	Eligible Eligible	National Register Listed Historic District; Local Historic District
AM0010/ Charles Thomas Holt House	House	1200	Linda Marquez-Frees	11/06/1980	Eligible	National Register Listed
AM0015/ Charles Albright House	House	2350	Carl Lounsbury/ Alamance County Historic Properties Commission	3/1/1980	None Provided	Unassessed (Survey Only)
AM0020/ Henry Albright House (Gone)	House (Gone)	2400	Carl Lounsbury/ Alamance County Historic Properties Commission	12/0/1978	None Provided	Demolished

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
AM0031/ James Anderson House	James Anderson House	795	Carl Lounsbury/ Alamance County Historic Properties Commission	11/1/1978	None Provided	Unassessed (Survey Only)
AM0046/ Squire Blackmon House (Gone)	House (Gone)	125	Unknown	10/1/1978	None Provided	Demolished
AM0047/ William Blanchard House	House	720	Unknown	11/1/1978	None Provided	Unassessed (Survey Only)
AM0067/ Thomas Bullard House	House	1000	Carl Lounsbury/ Alamance County Historic Properties Commission	Unknown	None Provided	Unassessed (Survey Only)
AM0122/ Chesley Dickey House	House	280	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0129/ Dixon-Thompson House (Gone)	House (Gone)	720	Carl Lounsbury/ Alamance County Historic Properties Commission	12/1/1978	Potentially Eligible	Demolished
AM0133/ S.L. Faucette Log House (Gone)	House (Gone)	900	Carl Lounsbury/ Alamance County Historic Properties Commission	11/1/1978	None Provided	Demolished
AM0153/ Gem Theater (Gone)	Theater (Gone)	20	Carl Lounsbury/ Alamance County Historic Properties Commission	11/1/1978	None Provided	Demolished
AM0157/ Gilliam Academy	School	1360	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0158/ Gilliam Church (Gone)	Church (Gone)	1130	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Demolished
AM0160/ J.H. Gilliam House	House	1280	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0183/ Haw River Christian Church (Gone)	Church (Gone)	450	Unknown	09/1/1978	None Provided	Demolished

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
AM0184/ North Carolina Railroad Bridge Pier	Bridge Pier	1510	Ruth Little-Stokes Benjamin Briggs	7/1/1979 3/27/2002	None Provided	Unassessed (Survey Only)
AM0185/ Southern Railway Overpass	Railway Overpass	2400	Ruth Little-Stokes	7/1/1979	None Provided	Unassessed (Survey Only)
AM0203/ AM1516 T.M. Holt Mfg. Company	Mill	200	Carl Lounsbury/ Alamance County Historic Properties Commission	10/01/1978	None Provided	Unassessed (Survey Only)
AM0204/ Holt Chapel Methodist Church	Church	2100	Carl Lounsbury/ Alamance County Historic Properties Commission	10/01/1978	Potentially Eligible	Unassessed (Study List)
AM0205/ Holt Mill House (Gone)	House (Gone)	650	Carl Lounsbury/ Alamance County Historic Properties Commission	11/11978	None Provided	Demolished
AM0209/ John Huffines House	House	470	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0219/ Christian Iseley House	House	1000	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0225/ Holt Mill House/ Johnston House	House	70	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0235/ J.P. Kerr House (Gone)	House (Gone)	800	Carl Lounsbury/ Alamance County Historic Properties Commission	12/1/1978	None Provided	Demolished
AM0241/ Lee Lewis House (Gone)	House (Gone)	50	Carl Lounsbury/ Alamance County Historic Properties Commission	12/1/1978	None Provided	Demolished
AM0251/ Jacob Long House (Gone)	House	2200	Carl Lounsbury/ Alamance County Historic Properties Commission	11/1/1982	None Provided	Unassessed (Survey Only)
AM0266/ McClure House	House	50	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
AM0267/ McCracken School	School	1840	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1976	None Provided	Unassessed (Survey Only)
AM0299/ Morris House	House	2100	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0323/ Over the River Holt Mill Houses	Mill Houses	1980	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0335/ Pearson House	House	1150	Carl Lounsbury/ Alamance County Historic Properties Commission; Benjamin Briggs	10/1/1978 3/27/2002	None Provided	Unassessed (Survey Only)
AM0337/ Lawson Perry House	House	1800	Carl Lounsbury/ Alamance County Historic Properties Commission	9/1/1978	None Provided	Unassessed (Survey Only)
AM0347/ Ray House (Gone)	House (Gone)	1470	Unknown	10/1/1978	None Provided	Demolished
AM0350/ Robertson House	House	100	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0360/ Chesley Roney House	House	430	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0362/ John Roney House	House	550	Carl Lounsbury/ Alamance County Historic Properties Commission	9/1/1978	None Provided	Unassessed (Survey Only)
AM0387/ Haywood-Simpson House	House	650	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0389/ William Simpson House	House	1600	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM0417/ Ben Sutton House (Gone)	House (Gone)	2200	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Demolished
AM0440/ Trolinger Grist Mill (Gone)	Grist Mill (Gone)	1300	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Demolished
AM0447/ Captain Sam Vest House	House	310	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
AM0454/ Alexander Walker House	House	2400	Carl Lounsbury/ Alamance County Historic Properties Commission; Benjamin Briggs	10/1/1978 1/9/2002	None Provided	Unassessed (Survey Only)
AM0460/ Watlington Log House	House	2480	Carl Lounsbury/ Alamance County Historic Properties Commission	12/1/1978	None Provided	Unassessed (Survey Only)
AM0464/ Kerr Scott Farm	Farm	1500	Linda Marques-Frees	11/12/1980	Eligible	NRHP Listed
AM0470/ Whittemore-Murray House	House	1110	Carl Lounsbury/ Alamance County Historic Properties Commission	9/1/1978	None Provided	Unassessed (Survey Only)
AM0867/ Granite Mill	Granite Mill	0	Linda Marques-Frees	11/6/1980	Eligible	National Register Listed
AM1189/ Sam Phibbs House	Sam Phibbs House	720	Benjamin Briggs	11/15/2001	None Provided	Unassessed (Survey Only)
AM1210/ Jimmy Ross House (Gone)	Jimmy Ross House (Gone)	1620	Unknown	Unknown	None Provided	Demolished
AM1324/ NC Railroad Bridge	NC Railroad Bridge	600	Carl Lounsbury/ Alamance County Historic Properties Commission	10/1/1978	None Provided	Unassessed (Survey Only)
AM1520/ J.M. Jordan House	House	65	Benjamin Briggs	11/15/2001	None Provided	Unassessed (Survey Only)
AM1521/ Buckner Mobile Home Park	Mobile Home Park	2600	Benjamin Briggs	11/15/2001	None Provided	Unassessed (Survey Only)
AM1522/ G.L. Lewis Farm	Farm	970	Benjamin Briggs	11/15/2001	None Provided	Unassessed (Survey Only)
AM1523/ Shiloh Church & Cemetery	Church & Cemetery	2070	Benjamin Briggs	11/15/2001	None Provided	Unassessed (Survey Only)
AM1525	Claude Gerringer House	2500	Benjamin Briggs	1/9/2002	None Provided	Unassessed (Survey Only)
AM1526/ J.S. & Mrs. M.J. Gilliam House	House	1420	Benjamin Briggs	1/9/2002	None Provided	Unassessed (Survey Only)

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
AM1527/ Primitive Baptist Library	Library	1340	Benjamin Briggs	1/9/2002	Potentially Eligible	Unassessed (Study List)
AM1528/ J.D. Kernodle House (Gone)	House (Gone)	1230	Benjamin Briggs	1/9/2002	None Provided	Demolished
AM1529/ J.A. Gilliam House	House	1770	Benjamin Briggs	1/9/2002	None Provided	Unassessed (Survey Only)
AM1535/ J.D. Simpson House	House	250	Benjamin Briggs	1/17/2002	None Provided	Unassessed (Survey Only)
AM1536/ William Boone House	House	1000	Benjamin Briggs	1/17/2002	None Provided	Unassessed (Survey Only)
AM1544/ J.T. Smith Grocery	Grocery	1700	Benjamin Briggs	1/31/2002	Potentially Eligible	Unassessed (Study List)
AM1584/ Glencoe School (Gone)	School (Gone)	250	Benjamin Briggs Heather Wagner	3/7/2002; 2010	Eligible	Demolished (previously National Register Listed)
AM1592/ Red Slide Mill Village	Mill Village	1200	Benjamin Briggs	3/25/2002	None Provided	Unassessed (Survey Area Only)
AM1593/ Haw River United Methodist Church	Church	1900	Benjamin Briggs	3/25/2002	None Provided	Unassessed (Survey Only)
AM1595/ Haw River Central Business District	Business District	200	Benjamin Briggs	3/27/2002	None Provided	Unassessed (Survey Area Only)
AM1596/ Corner Gas Station	Gas Station	1300	Benjamin Briggs	3/27/2002	None Provided	Unassessed (Survey Only)
AM1597/ Hideaway Farm (Gone)	Farm (Gone)	2400	Benjamin Briggs	3/27/2002	None Provided	Demolished
AM1600/ Kerr Place	Farm	780	Benjamin Briggs	3/27/2002	None Provided	Unassessed (Survey Only)

Table 4.5-4

Previously Recorded Aboveground Resources within 0.5-mile of Project Components in North Carolina (current as of September 26, 2018)

Resource Number/ Name	Resource Type	Distance (feet)	Recorder/ Organization	Date	Recorder Evaluation	SHPO Evaluation
AM1603/ Deep Creek Primitive Baptist Church	Church	100	Benjamin Briggs	2/14/2002	Potentially Eligible	Unassessed (Study List)
AM1670/ Bridge No. 72 (Replaced)	Bridge (Replaced)	1630	Bridge Department-NC State Highway Comm.; Unknown	6/26/1963; Unknown	None Provided	Demolished
AM1671/ Bridge No. 73 (Replaced)	Bridge (Replaced)	1400	Bridge Department-NC State Highway Comm.; Unknown	6/26/1963; Unknown	None Provided	Demolished
AM2407/AM2408 Cora Mill/ Tabardrey Mills Warehouses	Mill	0	Unknown	2005?	Unknown	Unassessed (Survey Only)

Table 4.5-5

Cultural Resources Survey Status of Pipeline Route (current as of September 20, 2018)

		Milepost		
Facility	**County, State**	**Start**	**End**	**Survey Status/Scheduled Completion Date**
H-605 Pipeline	Pittsylvania, VA	0	0.15	Surveyed
H-605 Pipeline	Pittsylvania, VA	0.15	0.25	Pending survey completion/ December 2018
H-605 Pipeline	Pittsylvania, VA	0.25	0.35	Surveyed
H-605 Pipeline	Pittsylvania, VA	0.35	0.44	Pending survey completion/ December 2018
H-650 Pipeline	Pittsylvania, VA	0	9.72	Surveyed
H-650 Pipeline	Pittsylvania, VA	9.72	9.84	Pending survey completion/ December 2018
H-650 Pipeline	Pittsylvania, VA	9.84	11.08	Surveyed
H-650 Pipeline	Pittsylvania, VA	11.08	11.23	Pending survey completion/ December 2018
H-650 Pipeline	Pittsylvania, VA	11.23	20.01	Surveyed
H-650 Pipeline	Pittsylvania, VA	20.01	20.33	Pending survey completion/ December 2018
H-650 Pipeline	Pittsylvania, VA	20.33	26.09	Surveyed
H-650 Pipeline	Rockingham, NC	26.09	27.02	Surveyed
H-650 Pipeline	Rockingham, NC	27.02	28.28	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	28.28	30.83	Surveyed
H-650 Pipeline	Rockingham, NC	30.83	31.11	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	31.11	32.37	Surveyed
H-650 Pipeline	Rockingham, NC	32.37	32.43	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	32.43	33.60	Surveyed
H-650 Pipeline	Rockingham, NC	33.60	33.88	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	33.88	37.52	Surveyed
H-650 Pipeline	Rockingham, NC	37.52	37.84	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	37.84	38.74	Surveyed
H-650 Pipeline	Rockingham, NC	38.74	38.81	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	38.81	43.09	Surveyed
H-650 Pipeline	Rockingham, NC	43.09	43.15	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	43.15	49.32	Surveyed
H-650 Pipeline	Rockingham, NC	49.32	49.35	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	49.35	49.53	Surveyed
H-650 Pipeline	Rockingham, NC	49.53	49.67	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	49.67	49.93	Surveyed
H-650 Pipeline	Rockingham, NC	49.93	50.13	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	50.13	50.32	Surveyed
H-650 Pipeline	Rockingham, NC	50.32	50.79	Pending survey completion/ December 2018
H-650 Pipeline	Rockingham, NC	50.79	52.63	Surveyed
H-650 Pipeline	Alamance, NC	52.63	52.76	Surveyed

Table 4.5-5

Cultural Resources Survey Status of Pipeline Route (current as of September 20, 2018)

		Milepost		
Facility	**County, State**	**Start**	**End**	**Survey Status/Scheduled Completion Date**
H-650 Pipeline	Alamance, NC	52.76	53.05	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	53.05	53.89	Surveyed
H-650 Pipeline	Alamance, NC	53.89	53.90	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	53.90	54.92	Surveyed
H-650 Pipeline	Alamance, NC	54.92	55.00	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	55.00	55.30	Surveyed
H-650 Pipeline	Alamance, NC	55.30	55.32	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	55.32	57.86	Surveyed
H-650 Pipeline	Alamance, NC	57.86	58.53	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	58.53	58.69	Surveyed
H-650 Pipeline	Alamance, NC	58.69	59.72	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	59.72	61.15	Surveyed
H-650 Pipeline	Alamance, NC	61.15	61.39	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	61.39	62.35	Surveyed
H-650 Pipeline	Alamance, NC	62.35	62.46	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	62.46	63.64	Surveyed
H-650 Pipeline	Alamance, NC	63.64	65.59	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	65.59	65.92	Surveyed
H-650 Pipeline	Alamance, NC	65.92	67.47	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	67.47	67.61	Surveyed
H-650 Pipeline	Alamance, NC	67.61	67.74	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	67.74	67.89	Surveyed
H-650 Pipeline	Alamance, NC	67.89	68.23	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	68.23	68.47	Surveyed
H-650 Pipeline	Alamance, NC	68.47	68.65	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	68.65	69.47	Surveyed
H-650 Pipeline	Alamance, NC	69.47	69.82	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	69.82	69.83	Surveyed
H-650 Pipeline	Alamance, NC	69.83	69.92	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	69.92	71.87	Surveyed
H-650 Pipeline	Alamance, NC	71.87	72.19	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	72.19	72.84	Surveyed
H-650 Pipeline	Alamance, NC	72.84	72.86	Pending survey completion/ December 2018
H-650 Pipeline	Alamance, NC	72.86	73.00	Surveyed
H-650 Pipeline	Alamance, NC	73.00	73.03	Pending survey completion/ December 2018

Table 4.5-5

Cultural Resources Survey Status of Pipeline Route (current as of September 20, 2018)

		Milepost		
Facility	**County, State**	**Start**	**End**	**Survey Status/Scheduled Completion Date**
H-650 Pipeline	Alamance, NC	73.03	73.06	Surveyed
H-650 Pipeline	Alamance, NC	73.06	73.11	Pending survey completion/ December 2018
Note: Mainline valves and pig launcher/receiver locations are included within the survey corridor for the H-650 pipeline.				

Table 4.5-6

Cultural Resources Survey Status of Aboveground Facilities (current as of September 20, 2018)

Facility	Approximate Milepost	County, State	Area (acres) Required for Construction	Survey Status/Scheduled Completion Date
Lambert Compressor Station / Interconnect / MLV 1	0.0	Pittsylvania, VA	18.6	Pending survey completion/ December 2018
LN 3600 Interconnect	28.2	Rockingham, NC	3.5	Pending survey completion/ December 2018
T-15 Dan River Interconnect / MLV 4	30.4	Rockingham, NC	5.2	Surveyed
T-21 Haw River Interconnect / MLV 8	73.1	Alamance, NC	3.6	Pending survey completion/ December 2018

Table 4.5-7

Archaeological Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (in feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
H-650 PIPELINE[1] Pittsylvania/VA					
44PY0261	Postcontact artifact scatter	0	Not Eligible	No further investigations	None to date (previously determined Not Eligible)
44PY0270	Precontact artifact scatter (Woodland)	0	Unassessed (potential for deep deposits)	Additional testing	None to date (previously determined Not Eligible)
44PY0271	Precontact isolated find (nondiagnostic lithic)	0	Unassessed (potential for deep deposits)	Additional testing	None to date (previously determined Not Eligible)
44PY0281	Precontact lithic scatter (nondiagnostic)	45	Unassessed	Avoidance	None to date
44PY0358	Precontact lithic scatter (nondiagnostic); Postcontact isolated find	70	Unassessed	No further investigations (no substantial deposits to be affected)	None to date (previously determined Not Eligible)
44PY0375	Precontact lithic scatter (nondiagnostic); Postcontact ruins and artifact scatter	0	Unassessed	Additional testing	None to date
44PY0445	Postcontact structure ruin and artifact scatter	0	Unassessed	Additional testing	None to date
44PY0446	Precontact lithic scatter (Woodland)	0	Not Eligible	No further investigations	None to date
44PY0447	Precontact artifact scatter (Late Archaic/Woodland)	0	Unassessed	Avoidance	None to date
44PY0448	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date

Table 4.5-7

Archaeological Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (in feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
44PY0449	Precontact artifact scatter (Woodland)	0	Unassessed (potential for deep deposits)	Additional testing	None to date
44PY0450	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
44PY0451	Precontact lithic scatter (Woodland); Postcontact structure ruins and artifact scatter	0	Unassessed	Additional testing	None to date
44PY0452	Precontact artifact scatter (Archaic/Woodland)	0	Unassessed	No further investigations (no substantial deposits to be affected)	None to date
44PY0453	Precontact lithic scatter (nondiagnostic); Postcontact isolated find	0	Not Eligible	No further investigations	None to date
44PY0454	Postcontact ruins	50	Unassessed	Avoidance	None to date
44PY0455	Postcontact ruins	0	Unassessed	Additional testing	None to date
44PY0458	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
VA FS 01[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
VA FS 05[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
VA FS 15[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
VA FS 19[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
VA FS 21[2]	Precontact isolated find (unidentified lithic)	0	Not Eligible	No further investigations	None to date
VA FS 27[2]	Precontact isolated find (Archaic)	0	Not Eligible	No further investigations	None to date
VA FS 28[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
VA FS 30[2]	Precontact isolated find or lithic scatter (Woodland)	100	Unassessed	Complete survey (shovel testing)	None to date

Table 4.5-7

Archaeological Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (in feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
VA FS 31[2]	Precontact isolated find (Woodland)	0	Not Eligible	No further investigations	None to date
VA FS 35[2]	Precontact isolated find (nondiagnostic)	0	Not Eligible	No further investigations	None to date
VA FS 37[2]	Postcontact isolated find	5	Not Eligible	No further investigations	None to date
VA FS 40[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
VA FS 49[2]	Precontact isolated find (nondiagnostic)	0	Not Eligible	No further investigations	None to date
VA FS 51[2]	Precontact isolated find (Woodland)	0	Not Eligible	No further investigations	None to date
H-605 PIPELINE [1] Pittsylvania/VA					
VA FS 11[2]	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
LAMBERT COMPRESSOR STATION / INTERCONNECT / MLV 1 (INCLUDING WORKSPACE)[1] Pittsylvania/VA					
44PY0456	Precontact lithic scatter (Woodland); Postcontact artifact scatter	0	Not Eligible	No further investigations	None to date
44PY0459	Precontact lithic scatter (Archaic)	0	Not Eligible	No further investigations	None to date
44PY0460	Precontact lithic scatter (Archaic)	0	Not Eligible	No further investigations	None to date
CONTRACTOR YARDS[1] Pittsylvania/VA					
44PY0442	Postcontact ruins	0	Not Eligible	No further investigations	None to date (previously determined Not Eligible)
ACCESS ROADS[1] Pittsylvania/VA					

Table 4.5-7

Archaeological Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (in feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
VA FS 09[2]	Precontact isolated find (Early Woodland)	0	Unassessed	No further investigations (no substantial deposits to be affected)	None to date
VA FS 23[2]	Precontact isolated find (unidentified lithic)	0	Unassessed	No further investigations (no substantial deposits to be affected)	None to date
VA FS 24[2]	Precontact isolated find (nondiagnostic lithic)	0	Unassessed	No further investigations (no substantial deposits to be affected)	None to date
44PY0457	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
VA FS 45[2]	Precontact isolated find (unidentified lithic)	0	Unassessed	No further investigations (no substantial deposits to be affected)	None to date

1. Each resource is only listed once. Any resources located on both the pipeline route and at other pipeline locations are listed under the pipeline route.
2. Isolated Find; no VDHR Site Number

Table 4.5-8

Archaeological Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
H-650 PIPELINE[1]					
Rockingham/NC					
31RK044	Precontact artifact scatter (Woodland); Postcontact artifact scatter	0	Unassessed	Avoidance	None to date
31RK217	Precontact artifact scatter (Woodland)	0	Unassessed	Additional testing	None to date
31RK218	Precontact isolated find (nondiagnostic)	0	Not Eligible	No further investigations	None to date
31RK220	Postcontact ruins and artifact scatter	0	Not Eligible	No further investigations	None to date
31RK221	Postcontact ruins and artifact scatter	0	Unassessed	Additional testing	None to date
31RK222	Precontact artifact scatter (Woodland)	0	Unassessed	Additional testing	None to date
31RK224	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK225	Precontact artifact scatter (Woodland)	0	Not Eligible	No further investigations	None to date
31RK226	Precontact lithic scatter (nondiagnostic)	60	Not Eligible	No further investigations	None to date
31RK227	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK228	Postcontact cemetery	50	Not Eligible	Avoidance	None to date
31RK229	Postcontact ruins and artifact scatter	0	Unassessed	Additional testing	None to date
31RK230	Postcontact ruins and artifact scatter	0	Unassessed	Avoidance	None to date
31RK231	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK232	Postcontact isolated find	0	Not Eligible	No further investigations	None to date

Table 4.5-8

Archaeological Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
31RK233	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK234/ Settle Cemetery	Postcontact cemetery	350	Not Eligible	Avoidance	None to date
31RK235	Precontact lithic scatter (Archaic, Woodland); Postcontact artifact scatter	0	Unassessed	Additional testing	None to date
31RK236	Postcontact cemetery	120	Not Eligible	Avoidance	None to date
31RK237	Postcontact cemetery	95	Not Eligible	Avoidance	None to date
31RK238	Precontact isolated find (nondiagnostic)	115	Unassessed (potential for deep deposits)	Additional testing	None to date
31RK239	Precontact lithic scatter (nondiagnostic)	10	Unassessed	Avoidance	None to date
31RK240	Precontact isolated find (nondiagnostic)	0	Unassessed (potential for deep deposits)	Avoidance	None to date
31RK241	Postcontact isolated find	75	Not Eligible	No further investigations	None to date
31RK242	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
31RK243	Precontact lithic scatter (Late Archaic)	0	Not Eligible	No further investigations	None to date
31RK244	Postcontact ruins and artifact scatter	25	Not Eligible	No further investigations	None to date
31RK245	Postcontact ruins and artifact scatter	0	Not Eligible	No further investigations	None to date
31RK246	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK247	Precontact lithic scatter (unidentified); Postcontact artifact scatter	0	Unassessed	Additional testing	None to date
31RK248	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date

Table 4.5-8

Archaeological Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
31RK249	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
31RK255	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK256	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK253	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK254	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31RK257	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
Alamance/NC					
31AM414	Precontact lithic scatter (Archaic); Postcontact isolated find)	0	Unassessed	Additional testing	None to date
31AM415	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31AM416	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
31AM417	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31AM418	Precontact isolated find (Middle Archaic)	0	Not Eligible	No further investigations	None to date
31AM419	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31AM420	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31AM421	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31AM422	Precontact isolated find (nondiagnostic lithic)	0	Not Eligible	No further investigations	None to date
31AM423	Precontact isolated find (nondiagnostic lithic)	200	Not Eligible	No further investigations	None to date

Table 4.5-8

Archaeological Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
31AM424	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
31AM425	Precontact lithic scatter (Archaic)	35	Not Eligible	No further investigations	None to date
31AM426	Precontact lithic scatter (nondiagnostic; Postcontact artifact scatter	0	Not Eligible	No further investigations	None to date
31AM427	Postcontact springhouse	0	Not Eligible	No further investigations	None to date
31AM428	Precontact artifact scatter (Woodland); Postcontact isolated find	0	Not Eligible	No further investigations	None to date
31AM432	Precontact lithic scatter (Woodland)	0	Not Eligible	No further investigations	None to date
31AM433	Precontact isolated find (Woodland)	0	Not Eligible	No further investigations	None to date
31AM434	Precontact isolated find (Archaic)	1300	Not Eligible	No further investigations	None to date
31AM436	Precontact isolated find (nondiagnostic); Postcontact isolated find	0	Not Eligible	No further investigations	None to date
31RK437	Precontact lithic scatter (nondiagnostic)	0	Not Eligible	No further investigations	None to date
LN 3600 INTERCONNECT[1] Rockingham/NC					
None	None	None	None	None	None
T-15 DAN RIVER INTERCONNECT / MLV 4[1] Rockingham/NC					
None	None	None	None	None	None
T-21 HAW RIVER INTERCONNECT / MLV 8[1] Alamance/NC					
None	None	None	None	None	None

Table 4.5-8

Archaeological Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
CONTRACTOR YARDS[1]					
Rockingham/NC					
None	None	None	None	None	None
Alamance/NC					
None	None	None	None	None	None
ACCESS ROADS[1]					
Rockingham/NC					
31RK216	Postcontact cemetery	17	Not Eligible	Avoidance	None to date
31RK219	Precontact isolated find (nondiagnostic)	0	Not Eligible	No further investigations	None to date
31RK223	Precontact isolated find (Woodland)	0	Not Eligible	No further investigations	None to date
Alamance/NC					
31AM435	Precontact lithic scatter (Archaic)	0	Not Eligible	No further investigations	None to date

1. Each resource is only listed once. Any resources located on both the pipeline route and at other pipeline locations are listed under the pipeline route.
2. Based on site characteristics within direct effects APE.

Table 4.5-9

Aboveground Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
H-650 PIPELINE[1] Pittsylvania/VA					
071-0036/ Little Cherrystone Manor/ Wooding House (including Wooding Cemetery [44PY0275])	Dwelling and cemetery	0	Eligible	Assess effects and mitigate as necessary	None to date (NRHP Listed VLR Listed)
071-5033/ Belle Grove Church	Church and cemetery	100	Not Eligible	No further investigations; Avoidance of cemetery	None to date (Previously Not Eligible)
071-5208	House	80	Not Eligible	No further investigations	Previously Not Eligible
071-5209	House	0	Not Eligible	No further investigations	Previously Not Eligible
071-5210	House	0	Not Eligible	No further investigations	Previously Not Eligible
071-5211	Abandoned farm	0	Not Eligible	No further investigations	Previously Not Eligible
071-5212	Farmstead and cemetery	0	Not Eligible	No further investigations; Avoidance of cemetery	None to date (Previously Eligible)
071-5218	House	50	Not Eligible	No further investigations	None to date (Previously Not Evaluated)
071-5224/ Fulton Cemetery	Cemetery	250	Not Eligible	No further investigations; Avoidance	None to date (Previously Not Evaluated)
071-5225/ 44PY0284 Wells Cemetery	Cemetery	50	Not Eligible	No further investigations; Avoidance	None to date (Previously Not Evaluated)
071-5226/ 44PY0272	Cemetery	50	Not Eligible	No further investigations; Avoidance	Previously Not Eligible
071-5227/ 44PY0273 Wallor Cemetery	Cemetery	50	Not Eligible	No further investigations; Avoidance	Previously Not Eligible
071-5566	Tobacco barn	100	Not Eligible	No further investigations	None to date

Table 4.5-9

Aboveground Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
071-5567	Farmstead	0	Not Eligible	No further investigations	None to date
071-5568	Dwelling	650	Not Eligible	No further investigations	None to date
071-5573	Former church	1250	Not Eligible	No further investigations	None to date
071-5574	Farmstead	700	Not Eligible	No further investigations	None to date
071-5575	Dwelling	250	Not Eligible	No further investigations	None to date
071-5576	Dwelling	500	Not Eligible	No further investigations	None to date
071-5577	Dwelling	1000	Not Eligible	No further investigations	None to date
071-5578	Farmstead/cemetery	500	Potentially Eligible	Determine eligibility; assess effects and mitigate as necessary	None to date
071-5579	Church	750	Not Eligible	No further investigations	None to date
071-5585	Dwelling	50	Not Eligible	No further investigations	None to date
071-5586	Dwelling	50	Not Eligible	No further investigations	None to date
071-5587	Commercial building	215	Not Eligible	No further investigations	None to date
071-5588	Dwelling	175	Not Eligible	No further investigations	None to date
071-5589	Dwelling	200	Not Eligible	No further investigations	None to date
071-5590	Dwelling	265	Not Eligible	No further investigations	None to date
071-5594	Dwelling	0	Not Eligible	No further investigations	None to date
071-5595	Farmstead	0	Not Eligible	No further investigations	None to date
071-5597	Dwelling	0	Not Eligible	No further investigations	None to date
071-5598	Railroad	0	Not Eligible	No further investigations	None to date
071-5599	Dwelling	0	Not Eligible	No further investigations	None to date
071-5600	Tobacco barn	200	Not Eligible	No further investigations	None to date
071-5601	Tobacco barn	0	Not Eligible	No further investigations	None to date
071-5602	Dwelling	0	Not Eligible	No further investigations	None to date
071-5603	Commercial building	0	Not Eligible	No further investigations	None to date
071-5604	Dwelling	0	Not Eligible	No further investigations	None to date
071-5605	Cemetery	370	Not Eligible	No further investigations; Avoidance	None to date

Table 4.5-9

Aboveground Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
071-5615	Dwelling	150	Not Eligible	No further investigations	None to date
071-5622	Cemetery	85	Not Eligible	Avoidance	None to date
071-5623	Cemetery	50	Not Eligible	Avoidance	None to date
H-605 PIPELINE Pittsylvania/VA					
None	None	None	None	None	None
LAMBERT COMPRESSOR STATION / INTERCONNECT (INCLUDING WORKSPACE)[1] Pittsylvania/VA					
None	None	None	None	None	None
CONTRACTOR YARDS Pittsylvania/VA					
071-5525	Cemetery	50	Not Eligible	No further investigations; Avoidance	None to date (Previously Not Evaluated)
071-5526/ Gafford House Ruins	House ruins	0	Not Eligible	No further investigations	None to date (Previously Not Evaluated)
ACCESS ROADS Pittsylvania/VA					
071-5217	Farmstead	25	Undetermined	Determine eligibility; Assess effects and mitigate as necessary	None to date (Previously Not Evaluated)
071-5221	Farmstead	0	Not Eligible	No further investigations	None to date (Previously Not Eligible)
071-5222/ Giles Log House	Log house	0	Potentially Eligible	Determine eligibility; Assess effects and mitigate as necessary	None to date (Previously Eligible)
071-5569	Outbuildings	70	Not Eligible	No further investigations	None to date
071-5570	Dwelling	0	Not Eligible	No further investigations	None to date
071-5571	Farmstead	0	Eligible	Assess effects and mitigate as necessary	None to date

Table 4.5-9

Aboveground Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
071-5572	Farmstead	0	Potentially Eligible	Determine eligibility; Assess effects and mitigate as necessary	None to date
071-5580	Dwelling	300	Potentially Eligible	Determine eligibility; Assess effects and mitigate as necessary	None to date
071-5581	Dwelling	0	Not Eligible	No further investigations	None to date
071-5582	Farmstead	0	Not Eligible	No further investigations	None to date
071-5583	Farmstead	0	Not Eligible	No further investigations	None to date
071-5584	Farmstead	0	Not Eligible	No further investigations	None to date
071-5591	Farmstead	100	Not Eligible	No further investigations	None to date
071-5592	Tobacco barn	0	Not Eligible	No further investigations	None to date
071-5593	Cemetery and tobacco barn	50	Not Eligible	No further investigations; Avoidance of cemetery	None to date
071-5596	Cemetery	10	Not Eligible	No further investigations; Avoidance of cemetery	None to date
071-5606	Farmstead	0	Not Eligible	No further investigations	None to date
071-5607	Farmstead	0	Not Eligible	No further investigations	None to date
071-5608	Dwelling	100	Not Eligible	No further investigations	None to date
071-5609	Farmstead	0	Not Eligible	No further investigations	None to date
071-5610	Dwelling	130	Not Eligible	No further investigations	None to date
071-5611	Dwelling	300	Not Eligible	No further investigations	None to date
071-5612	Farmstead	25	Not Eligible	No further investigations	None to date
071-5613	Dwelling	1100	Not Eligible	No further investigations	None to date
071-5614	Farmstead	25	Not Eligible	No further investigations	None to date
071-5617	Farmstead	60	Not Eligible	No further investigations	None to date
071-5618	Farmstead	0	Not Eligible	No further investigations	None to date
071-5619	Tobacco barn	35	Not Eligible	No further investigations	None to date
071-5620	Cemetery	115	Not Eligible	Avoidance	None to data
071-5621	Cemetery	65	Not Eligible	Avoidance	None to data

Table 4.5-9

Aboveground Resources Identified in Virginia (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)

1. Each resource is only listed once. Any resources located on both the pipeline route and at another pipeline location Is listed under the closest facility.
2. Distances are to property boundaries and not to individual buildings.

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
H-650 PIPELINE[1] Rockingham/NC					
RK0001	Willow Oaks Plantation, LLC	1700	NRHP Listed/Potentially Eligible	Assess effects and mitigate as necessary	NRHP listed
RK1530	Dixon House	887	Not Eligible	No further investigations	None to date
RK1531/ 31RK234	Settle Family Cemetery	350	Potentially Eligible	Avoidance	NC Study List
RK1534	Tucker-Cross Farm	900	Not Eligible	No further investigations	NC Study List
RK1656	Dwelling	350	Potentially Eligible	Assess effects and mitigate as necessary	None to date
RK1661	Dwelling	200	Not Eligible	No further investigations	None to date
RK1662	Dwelling	370	Not Eligible	No further investigations	None to date
RK1663	Farmstead	685	Not Eligible	No further investigations	None to date
RK1664	Commercial	35	Not Eligible	No further investigations	None to date
RK1665	Dwelling	427	Not Eligible	No further investigations	None to date
RK1667	Dwelling	732	Not Eligible	No further investigations	None to date
RK1668	Dwelling	178	Not Eligible	No further investigations	None to date
RK1669	Dwelling	419	Not Eligible	No further investigations	None to date
RK1670	Dwelling	635	Potentially Eligible	Assess effects and mitigate as necessary	None to date
RK1671	Dwelling	303	Not Eligible	No further investigations	None to date
RK1675	Dwelling	560	Not Eligible	No further investigations	None to date
RK1676	Tobacco Barn	N/A	Not Eligible (Demolished)	No further investigations	None to date
RK1679	Tobacco Barn	511	Not Eligible	No further investigations	None to date
RK1681	Farmstead (Ruins)	70	Not Eligible	No further investigations	None to date
RK1682	Farmstead	130	Not Eligible	No further investigations	None to date
RK1683	Dwelling	545	Not Eligible	No further investigations	None to date
RK1684	Dwelling	290	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
RK1685	Dwelling	180	Not Eligible	No further investigations	None to date
RK1686	Farmstead	480	Not Eligible	No further investigations	None to date
RK1687	Dwelling	235	Not Eligible	No further investigations	None to date
RK1689	Tobacco Barn	N/A	Not Eligible (Demolished)	No further investigations	None to date
RK1698	Dwelling	250	Not Eligible	No further investigations	None to date
RK1699	Dwelling	175	Not Eligible	No further investigations	None to date
RK1700	Dwelling	920	Not Eligible	No further investigations	None to date
RK1702	Commercial	185	Not Eligible	No further investigations	None to date
RK1708	Dwelling	150	Not Eligible	No further investigations	None to date
RK1710	Dwelling	360	Not Eligible	No further investigations	None to date
RK1711	Dwelling	190	Not Eligible	No further investigations	None to date
RK1712	Church	315	Not Eligible	No further investigations	None to date
RK1713	Dwelling	495	Not Eligible	No further investigations	None to date
RK1714	Dwelling	680	Not Eligible	No further investigations	None to date
RK1728	Dwelling	415	Not Eligible	No further investigations	None to date
RK1729	Dwelling	950	Not Eligible	No further investigations	None to date
RK1730	Dwelling	660	Not Eligible	No further investigations	None to date
RK1731	Dwelling	800	Not Eligible	No further investigations	None to date
RK1732	Dwelling	1000	Not Eligible	No further investigations	None to date
RK1733	Dwelling	280	Not Eligible	No further investigations	None to date
RK1735	Dwelling	530	Not Eligible	No further investigations	None to date
RK1736	Dwelling	420	Not Eligible	No further investigations	None to date
RK1737	Dwelling	300	Not Eligible	No further investigations	None to date
RK1747	Dwelling	350	Not Eligible	No further investigations	None to date
RK1752	Dwelling	800	Not Eligible	No further investigations	None to date
RK1757	Farmstead	700	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
RK1758	Farmstead	190	Not Eligible	No further investigations	None to date
RK1764	Pack House and Tobacco Barn	550	Not Eligible	No further investigations	None to date
RK1765	Dwelling	1500	Not Eligible	No further investigations	None to date
RK1766	Dwelling	1300	Not Eligible	No further investigations	None to date
RK1767	Dwelling	2260	Not Eligible	No further investigations	None to date
Alamance/NC					
AM0122	Chesley Dickey House	N/A	Not Eligible (Demolished)	No further investigations	None to date
AM0157	Gilliam Academy	1600	Not Eligible	No further investigations	None to date
AM0160	J.H. Gilliam House	2000	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM0203/ AM1516	T.M. Holt Mfg. Company/Holt-Tabardrey Mill	200	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM0225	Holt Mill House/Johnston House	230	Not Eligible	No further investigations	None to date
AM0266	McClure House	300	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM0350	Robertson House	250	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM0447	Captain Sam Vest House	65	Potentially Eligible	Assess effects and mitigate as necessary	NRHP listed
AM0867	Granite Mill	400	NRHP Listed	Assess effects and mitigate as necessary	NRHP listed
AM1520	J.M. Jordan House	50	Unassessed	Assess effects and mitigate as necessary	None to date
AM1522	G.L. Lewis Farm	1100	Not Eligible	No further investigations	None to date
AM1523	Shiloh Church & Cemetery	2200	Not Eligible	No further investigations	None to date
AM1527	Primitive Baptist Library	1700	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM1595	Haw River Central Business District	250	Not Eligible	No further investigations	None to date
AM2407/AM2408	Tabardrey Mills Warehouse	130	Potentially Eligible	Assess effects and mitigate as necessary	NC Study List
AM2490	Outbuildings	750	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
AM2491	Dwelling	2600	Not Eligible	No further investigations	None to date
AM2492	Dwelling	2400	Not Eligible	No further investigations	None to date
AM2493	Farmstead	1700	Not Eligible	No further investigations	None to date
AM2494	Dwelling	1300	Not Eligible	No further investigations	None to date
AM2495	Barn	800	Not Eligible	No further investigations	None to date
AM2496	Dwelling	1500	Not Eligible.	No further investigations	None to date
AM2497	Dwelling	1500	Not Eligible	No further investigations	None to date
AM2498	Cemetery	1200	Not Eligible	No further investigations	None to date
AM2499	Dwelling and Outbuilding	1000	Not Eligible	No further investigations	None to date
AM2500	Farmstead	1000	Not Eligible	No further investigations	None to date
AM2502	Dwelling	800	Not Eligible	No further investigations	None to date
AM2503	Farmstead	1200	Not Eligible	No further investigations	None to date
AM2504	Farmstead	450	Not Eligible	No further investigations	None to date
AM2505	Farmstead	600	Not Eligible	No further investigations	None to date
AM2506	Race Track	200	Not Eligible	No further investigations	None to date
AM2507	Service Station	1000	Not Eligible	No further investigations	None to date
AM2508	Dwelling	400	Not Eligible	No further investigations	None to date
AM2509	Farmstead	800	Not Eligible	No further investigations	None to date
AM2510	Dwelling	400	Not Eligible	No further investigations	None to date
AM2511	Dwelling	400	Not Eligible	No further investigations	None to date
AM2512	Dwelling	900	Not Eligible	No further investigations	None to date
AM2514	Farmstead	550	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM2515	Dwelling	850	Not Eligible	No further investigations	None to date
AM2516	Farmstead	570	Not Eligible	No further investigations	None to date
AM2517	Dwelling	300	Not Eligible	No further investigations	None to date
AM2518	Dwelling	600	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
AM2519	Dwelling	1000	Not Eligible	No further investigations	None to date
AM2520	Farmstead	950	Not Eligible	No further investigations	None to date
AM2524	Dwelling	1000	Not Eligible	No further investigations	None to date
AM2525	Dwelling	750	Not Eligible	No further investigations	None to date
AM2526	Dwelling	900	Not Eligible	No further investigations	None to date
AM2534	Dwelling	500	Not Eligible	No further investigations	None to date
AM2535	Dwelling	400	Not Eligible	No further investigations	None to date
AM2536	Dwelling	350	Not Eligible	No further investigations	None to date
AM2537	Dwelling	250	Not Eligible	No further investigations	None to date
AM2538	Dwelling	150	Not Eligible	No further investigations	None to date
AM2539	Dwelling	200	Not Eligible	No further investigations	None to date
AM2540	Farmstead	720	Not Eligible	No further investigations	None to date
AM2542	Dwelling	2000	Not Eligible	No further investigations	None to date
AM2543	Dwelling	300	Not Eligible	No further investigations	None to date
AM2544	Dwelling	160	Not Eligible	No further investigations	None to date
AM2545	Church and Cemetery	350	Not Eligible	No further investigations	None to date
AM2554	Dwelling	300	Not Eligible	No further investigations	None to date
AM2587	Dwelling	0	Not Eligible	No further investigations	None to date
AM2588	Dwelling/Commercial	150	Not Eligible	No further investigations	None to date
AM2589	Dwelling	100	Not Eligible	No further investigations	None to date
AM2590	Commercial	15	Not Eligible	No further investigations	None to date
AM2592	Commercial	75	Not Eligible	No further investigations	None to date
AM2593	Dwelling	85	Not Eligible	No further investigations	None to date
AM2594	Dwelling	100	Not Eligible	No further investigations	None to date
AM2595	Commercial	150	Not Eligible	No further investigations	None to date
AM2596	Commercial	230	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
AM2597	Commercial	200	Not Eligible	No further investigations	None to date
AM2598	Culvert	15	Not Eligible	No further investigations	None to date
AM2599	Civic	400	Not Eligible	No further investigations	None to date
AM2603	Railroad	0	Not Eligible	No further investigations	None to date
AM2604	Industrial	2000	Not Eligible	No further investigations	None to date
AM2609	Dwelling	300	Not Eligible	No further investigations	None to date
AM2610	Dwelling	150	Not Eligible	No further investigations	None to date
AM2611	Commercial	200	Not Eligible	No further investigations	None to date
AM2612	Dwelling	280	Not Eligible	No further investigations	None to date
AM2613	Commercial	200	Not Eligible	No further investigations	None to date
AM2616	Dwelling	230	Not Eligible	No further investigations	None to date
LN 3600 INTERCONNECT Rockingham/NC					
None	None	None	None	None	None
T-15 DAN RIVER INTERCONNECT / MLV 4 Rockingham/NC					
None	None	None	None	None	None
T-21 HAW RIVER INTERCONNECT / MLV 8 Alamance/NC					
None	None	None	None	None	None
ACCESS ROADS Rockingham/NC					
RK1396	House	435	Not Eligible	No further investigations	None to date
RK1655	Farmstead	150	Not Eligible	No further investigations	None to date
RK1657	Dwelling	140	Not Eligible	No further investigations	None to date
RK1658	Farmstead	476	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
RK1659	Farmstead	549	Not Eligible	No further investigations	None to date
RK1660	Farmstead	106	Not Eligible	No further investigations	None to date
RK1666	Dwelling	220	Not Eligible	No further investigations	None to date
RK1672	Dwelling	N/A	Not Eligible (Demolished)	No further investigations	None to date
RK1673	Dwelling	100	Not Eligible	No further investigations	None to date
RK1674	Farmstead	110	Not Eligible	No further investigations	None to date
RK1677	Dwelling	85	Not Eligible	No further investigations	None to date
RK1678	Dwelling	90	Not Eligible	No further investigations	None to date
RK1688	Dwelling	165	Not Eligible	No further investigations	None to date
RK1690	Dwelling	275	Not Eligible	No further investigations	None to date
RK1691	Dwelling	660	Not Eligible	No further investigations	None to date
RK1693	Dwelling	110	Not Eligible	No further investigations	None to date
RK1694	Dwelling	325	Not Eligible	No further investigations	None to date
RK1695	Dwelling	125	Not Eligible	No further investigations	None to date
RK1696	Dwelling	30	Not Eligible	No further investigations	None to date
RK1697	Dwelling	150	Not Eligible	No further investigations	None to date
RK1701	Dwelling	65	Not Eligible	No further investigations	None to date
RK1704	Industrial	400	Potentially Eligible	Assess effects and mitigate as necessary	None to date
RK1705	Dwelling	60	Not Eligible	No further investigations	None to date
RK1706	Dwelling	80	Not Eligible	No further investigations	None to date
RK1707	Dwelling	50	Not Eligible	No further investigations	None to date
RK1715	Dwelling	260	Not Eligible	No further investigations	None to date
RK1716	Dwelling	80	Not Eligible	No further investigations	None to date
RK1717	Dwelling	5	Not Eligible	No further investigations	None to date
RK1718	Dwelling	7	Not Eligible	No further investigations	None to date
RK1719	Dwelling	2	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
RK1720	Dwelling	12	Not Eligible	No further investigations	None to date
RK1721	Dwelling	18	Not Eligible	No further investigations	None to date
RK1722	Dwelling	20	Not Eligible	No further investigations	None to date
RK1723	Farmstead	70	Not Eligible	No further investigations	None to date
RK1724	Farmstead	820	Not Eligible	No further investigations	None to date
RK1725	Dwelling and Outbuilding	150	Not Eligible	No further investigations	None to date
RK1726	Dwelling	350	Not Eligible	No further investigations	None to date
RK1727	Dwelling	570	Not Eligible	No further investigations	None to date
RK1734	Commercial	130	Not Eligible	No further investigations	None to date
RK1738	Farmstead	30	Not Eligible	No further investigations	None to date
RK1739	Dwelling	80	Not Eligible	No further investigations	None to date
RK1740	Dwelling	350	Not Eligible	No further investigations	None to date
RK1741	Farmstead	250	Not Eligible	No further investigations	None to date
RK1742	Dwelling	515	Not Eligible	No further investigations	None to date
RK1743	Dwelling	650	Not Eligible	No further investigations	None to date
RK1744	Outbuilding	330	Not Eligible	No further investigations	None to date
RK1745	Dwelling	180	Not Eligible	No further investigations	None to date
RK1746	Dwelling	250	Not Eligible	No further investigations	None to date
RK1748	Farmhouse	65	Not Eligible	No further investigations	None to date
RK1749	Dwelling	100	Not Eligible	No further investigations	None to date
RK1750	Dwelling	300	Not Eligible	No further investigations	None to date
RK1751	Dwelling	160	Not Eligible	No further investigations	None to date
RK1753	Dwelling	10	Not Eligible	No further investigations	None to date
RK1754	Dwelling	130	Not Eligible	No further investigations	None to date
RK1755	Dwelling	165	Not Eligible	No further investigations	None to date
RK1756	Farmstead	350	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
RK1759	Farmstead	60	Not Eligible	No further investigations	None to date
RK1760	Farmstead	170	Not Eligible	No further investigations	None to date
RK1761	Dwelling	540	Not Eligible	No further investigations	None to date
RK1762	Dwelling	400	Not Eligible	No further investigations	None to date
RK1763	Farmhouse	400	Not Eligible	No further investigations	None to date
RK1768	Farmstead	20	Not Eligible	No further investigations	None to date
Alamance/NC					
AM1529	J.A. Gilliam House	2000	Potentially Eligible	Assess effects and mitigate as necessary	None to date
AM2501	Dwelling	350	Not Eligible	No further investigations	None to date
AM2513	Dwelling	250	Not Eligible	No further investigations	None to date
AM2521	Dwelling	200	Not Eligible	No further investigations	None to date
AM2522	Dwelling	500	Not Eligible	No further investigations	None to date
AM2523	Outbuildings	550	Not Eligible	No further investigations	None to date
AM2527	Farmstead	25	Not Eligible	No further investigations	None to date
AM2528	Dwelling	300	Not Eligible	No further investigations	None to date
AM2529	Dwelling	200	Not Eligible	No further investigations	None to date
AM2530	Dwelling	100	Not Eligible	No further investigations	None to date
AM2531	Dwelling	100	Not Eligible	No further investigations	None to date
AM2532	Dwelling	100	Not Eligible	No further investigations	None to date
AM2533	Dwelling	170	Not Eligible	No further investigations	None to date
AM2541	Dwelling	570	Not Eligible	No further investigations	None to date
AM2546	Dwelling	100	Not Eligible	No further investigations	None to date
AM2547	Dwelling	60	Not Eligible	No further investigations	None to date
AM2549	Farmstead	160	Potentially Eligible	No further investigations	None to date
AM2550	Dwelling	650	Not Eligible	No further investigations	None to date
AM2551	Dwelling	450	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
AM2552	Dwelling	350	Not Eligible	No further investigations	None to date
AM2553	Dwelling	230	Not Eligible	No further investigations	None to date
AM2555	Dwelling	200	Not Eligible	No further investigations	None to date
AM2556	Dwelling	300	Not Eligible	No further investigations	None to date
AM2557	Dwelling	80	Not Eligible	No further investigations	None to date
AM2558	Dwelling	50	Not Eligible	No further investigations	None to date
AM2559	Dwelling	90	Not Eligible	No further investigations	None to date
AM2560	Dwelling	50	Not Eligible	No further investigations	None to date
AM2561	Dwelling	35	Not Eligible	No further investigations	None to date
AM2562	Dwelling	40	Not Eligible	No further investigations	None to date
AM2563	Dwelling	50	Not Eligible	No further investigations	None to date
AM2564	Dwelling	50	Not Eligible	No further investigations	None to date
AM2565	Dwelling	50	Not Eligible	No further investigations	None to date
AM2566	Dwelling	50	Not Eligible	No further investigations	None to date
AM2567	Dwelling	50	Not Eligible	No further investigations	None to date
AM2568	Dwelling	50	Not Eligible	No further investigations	None to date
AM2569	Dwelling	50	Not Eligible	No further investigations	None to date
AM2570	Dwelling	50	Not Eligible	No further investigations	None to date
AM2571	Dwelling	50	Not Eligible	No further investigations	None to date
AM2572	Dwelling	50	Not Eligible	No further investigations	None to date
AM2573	Dwelling	50	Not Eligible	No further investigations	None to date
AM2574	Dwelling	50	Not Eligible	No further investigations	None to date
AM2575	Dwelling	50	Not Eligible	No further investigations	None to date
AM2576	Dwelling	50	Not Eligible	No further investigations	None to date
AM2577	Dwelling	50	Not Eligible	No further investigations	None to date
AM2578	Dwelling	50	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
AM2579	Dwelling	50	Not Eligible	No further investigations	None to date
AM2580	Dwelling	50	Not Eligible	No further investigations	None to date
AM2581	Dwelling	50	Not Eligible	No further investigations	None to date
AM2582	Dwelling	50	Not Eligible	No further investigations	None to date
AM2583	Dwelling	50	Not Eligible	No further investigations	None to date
AM2584	Dwelling	70	Not Eligible	No further investigations	None to date
AM2585	Church	170	Not Eligible	No further investigations	None to date
AM2586	Commercial	30	Not Eligible	No further investigations	None to date
AM2591	Dwelling	250	Not Eligible	No further investigations	None to date
AM2600	Dwelling	150	Potentially Eligible	No further investigations	None to date
AM2601	Dwelling	60	Potentially Eligible	No further investigations	None to date
AM2602	Dwelling	50	Not Eligible	No further investigations	None to date
AM2605	Dwelling	230	Not Eligible	No further investigations	None to date
AM2607	Dwelling	230	Not Eligible	No further investigations	None to date
AM2608	Dwelling	300	Not Eligible	No further investigations	None to date
AM2614	Dwelling	310	Not Eligible	No further investigations	None to date
AM2615	Dwelling	500	Not Eligible	No further investigations	None to date
CONTRACTOR YARDS Rockingham/NC					
RK1769	Railroad	50	Not Eligible	No further investigations	None to date
RK1770	Church	50	Not Eligible	No further investigations	None to date
RK1771	Dwelling	500	Not Eligible	No further investigations	None to date
RK1772	Dwelling	300	Not Eligible	No further investigations	None to date
RK1773	Dwelling	300	Not Eligible	No further investigations	None to date
RK1774	Dwelling	500	Not Eligible	No further investigations	None to date
RK1775	Dwelling	700	Not Eligible	No further investigations	None to date

Table 4.5-10

Aboveground Resources Identified in North Carolina (current as of September 20, 2018)

Facility/County/Resource Number	Resource Type	Distance (feet)[2]	Southgate Project NRHP Assessment	Southgate Project Recommendations	SHPO Comments (if available)
RK1776	Industrial	4400	Not Eligible	No further investigations	None to date
RK1777	Dwelling	4350	Not Eligible	No further investigations	None to date
RK1778	Dwelling	4300	Not Eligible	No further investigations	None to date
RK1779	Dwelling	4600	Not Eligible	No further investigations	None to date
RK1780	Commercial	4000	Not Eligible	No further investigations	None to date
Alamance/NC					
None	None	None	None	None	None

1. Each resource is only listed once. Any resources located on both the pipeline route and at other pipeline locations are listed under the pipeline route.
2. Distances are to property boundaries and not to individual structures.

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-A

Agency and Stakeholder Correspondence

(Note: Privileged and Confidential Information, CUI//PRIV, Correspondence Provided Under Separate Cover)

VDHR Correspondence

MVP Southgate Project VDHR Coordination. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient	Subject
VDHR (PRIV)	4/27/2018	letter (via ePIX)	Alex Miller, MVP Southgate	Roger Kirchen	Project introduction package and request for comment
VDHR	4/27/2018	email	VDHR ePIX auto response	Alex Miller, MVP Southgate	Auto-response with ER # (ER 2018-3545)
VDHR	5/17/2018	presentation	Alex Miller, MVP Southgate	VDHR staff	Powerpoint presentation on Project
VDHR	6/4/2018	letter	Alex Miller, MVP Southgate	Roger Kirchen	Historic structures work plan, shapefile submittal
VDHR	7/2/2018	email	Alex Miller, MVP Southgate	Roger Kirchen	Work plans
VDHR	8/3/2018	email	Paul Webb, TRC	Roger Kirchen	Plans to file RR 4 including Unanticipated Discoveries Plan; invitation to site visits
VDHR	8/10/2018	phone call	Paul Webb, TRC	Roger Kirchen	Plans to file RR 4, invitation to site visits
VDHR	8/13/2018	email	Paul Webb, TRC	Roger Kirchen	Public version of RR4, PRIV Figure 4-5.1
VDHR	8/13/2018	ftp	Paul Webb, TRC	Roger Kirchen	PRIV version of SHPO correspondence
VDHR	8/16/2018	letter	Alex Miller, MVP Southgate	Roger Kirchen	transmitting complete RR4
VDHR	9/14/2018	letter	Roger Kirchen	Alex Miller, MVP Southgate	RR4 satisfactorily describes work to date; Unanticipated Discoveries Plan satisfactory.
VDHR	10/3/2018	email	Paul Webb, TRC	Roger Kirchen	scheduling meeting
VDHR	10/4/2018	email	Roger Kirchen	Paul Webb, TRC	scheduling meeting

Correspondence Summary Sheet

Client: Mountain Valley Pipeline, LLC	**By:** Paul Webb
Project Name: MVP Southgate Project	**Talked With:** Roger Kirchen
Project Number:	
Date: August 10, 2018	**Of:** VDHR
Subject: RR4, Site Visit	**Telephone:**
	Email:
Supplemental Information Attached? NO	
Indicate Documentation Type: Telephone	

I called Roger Kirchen of VDHR to inform him that RR 4 was coming, and ask if the VDHR was interested in a site visit.

Roger asked if RR4 was coming to them directly, and I said that it was.

He said he didn't see any need for site visits at this time.

Webb, Paul

From: Webb, Paul
Sent: Monday, August 13, 2018 11:30 AM
To: Kirchen, Roger
Cc: Miller, Alex
Subject: MVP Southgate (2018-3545) Resource Report 4
Attachments: PUBLIC_MVP_Southgate_PF_RR4_August_2018.pdf; PRIV Figure 4.5-1 CR Progress 2018-08-08.pdf

Roger –

Per our conversation on Friday, MVP Southgate filed Resource Report 4 (cultural resources) with the FERC this morning. I am attaching a .pdf of the complete PUBLIC version of RR4 as filed (which includes Appendix 4-C, the Unanticipated Discoveries Plan) for your review. Also attached is Figure 4.5-1, which was filed as PRIVILEGED.

There is also a PRIVILEGED version of the SHPO correspondence, which I'll send via a FTP link due to its size.

We look forward to your review of these materials, including the Unanticipated Discoveries Plan. Also, please let me know if you have any difficulties with any of the files, need hard copies, or have any questions or concerns about the project.

Thanks,

Paul Webb
Cultural Resources Program Leader

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T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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Webb, Paul

From: Adhoctransferstatus@trcsolutions.com
Sent: Tuesday, August 14, 2018 11:11 AM
To: Webb, Paul
Subject: 1 Delivery Notifications

1 Delivery Notifications of 'MVP Southgate (2018-3545) Resource Report 4 - PRIV SHPO Correspondence'

Email subject: 'MVP Southgate (2018-3545) Resource Report 4 - PRIV SHPO Correspondence'
Name of file downloaded: PRIV - Appendix 4-A(a) SHPO Correspondence - 8-3-2018.pdf Downloaded by: roger.kirchen@dhr.virginia.gov Download start time (UTC): Tuesday, August 14, 2018 3:02:17 PM Download time: 3 minutes 23 seconds 405 milliseconds Download count: 1 Download status: Succeeded

COMMONWEALTH of VIRGINIA

Matt Strickler
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

September 14, 2018

Mr. Alex V. Miller
MVP Southgate
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

Re: MVP Southgate Project – Resource Report 4, Cultural Resources
Pittsylvania County, VA
DHR File No. 2018-3545; FERC Docket No. PF18-4-000

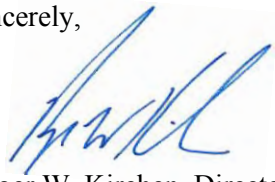
Dear Mr. Miller:

We have received for review the document referenced above. Our comments are provided as assistance to FERC in satisfying its responsibility pursuant to Section 106 of the National Historic Preservation Act.

We find that the report accurately documents consultation to date. Further, we accept the *Plan for Unanticipated Discoveries of Historic Properties and Human Remains* presented in Appendix 4-C of the report.

Thank you for the opportunity to review this document. Should you have any questions regarding these comments, please do not hesitate to contact me at roger.kirchen@dhr.virginia.gov.

Sincerely,



Roger W. Kirchen, Director
Review and Compliance Division

c: Mr. Paul Webb, TRC

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Webb, Paul

From: Webb, Paul
Sent: Wednesday, October 3, 2018 4:44 PM
To: 'roger.kirchen@dhr.virginia.gov'
Cc: 'Miller, Alex'
Subject: possible MVP Southgate - VDHR meeting

Roger (cc Alex) –

I hope all's well with you.

We wanted to see if you and other DHR staff would be interested in and available for a brief meeting on Monday, October 15th? Goal would be a brief discussion of work completed, results to date, and next steps, as well as an initial discussion of possible treatment options for a couple of likely eligible sites.

Please let me know if this would be of interest to you; if you're interested but that time doesn't work we'll see what we can work out.

Thanks,

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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Webb, Paul

From: Kirchen, Roger <roger.kirchen@dhr.virginia.gov>
Sent: Thursday, October 4, 2018 4:19 PM
To: Webb, Paul
Cc: Miller, Alex
Subject: Re: possible MVP Southgate - VDHR meeting
Attachments: image001.jpg

I'm out of the office the week of Oct 15. The earliest I could meet would be the afternoon of 10/24 or anytime 10/25.

_____
Roger W. Kirchen, Director
Review and Compliance Division
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221
phone: 804-482-6091
www.dhr.virginia.gov

On Wed, Oct 3, 2018 at 4:44 PM Webb, Paul <PWebb@trcsolutions.com> wrote:

> Roger (cc Alex) –
>
> I hope all's well with you.
>
> We wanted to see if you and other DHR staff would be interested in and available for a brief meeting on Monday, October 15th? Goal would be a brief discussion of work completed, results to date, and next steps, as well as an initial discussion of possible treatment options for a couple of likely eligible sites.
>
> Please let me know if this would be of interest to you; if you're interested but that time doesn't work we'll see what we can work out.
>
> Thanks,
>
> Paul Webb
>
> Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517

T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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NC HPO Correspondence

MVP Southgate Project NC HPO Coordination. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient	Subject
NC HPO	4/27/2018	letter (via email)	Alex Miller, MVP Southgate	Renee Gledhill-Earley, Env. Review Coordinator	Project introduction package and request for comment
NC HPO	4/27/2018	email	NC HPO ER auto response	Alex Miller, MVP Southgate	Auto-response with ER # (ER 18-1041)
NC HPO	5/10/2018	presentation	Alex Miller, MVP Southgate	NC HPO staff	Powerpoint presentation on Project
NC HPO	5/17/2018	emails	Susan Myers, NC HPO	Paul Webb, TRC	Info on other Cultural Resources Contacts
NC HPO	5/21/2018	letter	Renee Gledhill-Earley, Env. Review Coordinator	Alex Miller, MVP Southgate	Comments on Project introduction package
NC HPO	5/22/2018	emails	Susan Myers, NC HPO	Paul Webb, TRC	Info on other Cultural Resources Contacts
NC HPO	5/22/2018	emails	Renee Gledhill-Earley, Env. Review Coordinator	Alex Miller, MVP Southgate	Project filing update, tribal coordination
NC HPO	5/29/2018	emails	Renee Gledhill-Earley, Env. Review Coordinator	Alex Miller, MVP Southgate	Potential meeting, shapefile
NC HPO	6/4/2018	letter	Alex Miller, MVP Southgate	Renee Gledhill-Earley, Env. Review Coordinator	Detailed work plans, shapefile submittal
NC HPO	6/12/2018	phone call	Paul Webb, TRC	Susan Myers, NC HPO	Project update; transition to Rosie Blewitt-Golsch
NC HPO (PRIV)	7/3/2018	email	Paul Webb, TRC	Rosie Blewitt-Golsch, NC HPO	Site number request
NC HPO	7/5/2018	letter	Renee Gledhill-Earley, Env. Review Coordinator	Alex Miller, MVP Southgate	Comments on work plans, shape file
NC HPO (PRIV)	7/6/2018	email	Rosie Blewitt-Golsch, NC HPO	Paul Webb, TRC	Site numbers
NC HPO	7/24/2018	phone call	Paul Webb, TRC	John Mintz, NC HPO	Respond to website inquiry, discuss site visits
NC HPO	7/24/2018	email	Paul Webb, TRC	John Mintz, NC HPO	scheduling site visits
NC HPO	7/24/2018	email	John Mintz, NC HPO	Paul Webb, TRC	scheduling site visits
NC HPO	7/27/2018	email	Lindsay Ferrante, NC HPO	Paul Webb, TRC	scheduling site visits
NC HPO	7/27/2018	email	Paul Webb, TRC	Lindsay Ferrante, NC HPO	scheduling site visits
NC HPO	8/3/2018	email	Paul Webb, TRC	Renee Gledhill-Earley, John Mintz, Lindsay Ferrante, Rose Blewitt-Golsch	site visits; upcoming RR 4 and Unantipated Discoveries Plan submittal
NC HPO	8/13/2018	phone call	Katie Harville, NC HPO	Alex Miller, MVP Southgate	Call re: landowner contact concerning Kerr Scott Farm
NC HPO	8/13/2018	email	Paul Webb, TRC	Renee Gledhill-Earley, Env. Review Coordinator	Public version of RR4, PRIV Figure 4-5.1
NC HPO	8/13/2018	ftp	Paul Webb, TRC	Renee Gledhill-Earley, Env. Review Coordinator	sending PRIV version of SHPO correspondence
NC HPO	8/13/2018	email	Paul Webb, TRC	Renee Gledhill-Earley, Env. Review Coordinator	Revision of Archaeological Survey-Testing-Deep Testing Plan addressing July 5, 2018 HPO comment
NC HPO	8/21/2018	meeting record	Alex Miller, MVP Southgate; Paul Webb, Tracy Millis, TRC	Lindsay Ferrante, Rosie Blewitt-Golsch, Kim Urban, Katie Harville, NC HPO	Field visit
NC HPO	9/6/2018	letter	Renee Gledhill-Earley, Env. Review Coordinator	Alex Miller, MVP Southgate	Comments on revised work plan, RR4, and Unanticipated Discoveries Plan
NC HPO (PRIV)	9/11/2018	email	Paul Webb, TRC	Rosie Blewitt-Golsch, NC HPO	site numbers request
NC HPO	9/12/2018	email	Paul Webb, TRC	Rosie Blewitt-Golsch, NC HPO	requesting information on 31AM431
NC HPO (PRIV)	9/12/2018	email	Rosie Blewitt-Golsch, NC HPO	Paul Webb, TRC	Site numbers, 31AM431 site form
NC HPO (PRIV)	9/26/2018	email	Tracy Millis, TRC	Rosie Blewitt-Golsch, NC HPO	site numbers request
NC HPO (PRIV)	9/26/2018	email	Rosie Blewitt-Golsch, NC HPO	Tracy Millis, TRC	site numbers
NC HPO	10/2/2018	email	Paul Webb, TRC	Lindsay Ferrante, NC HPO, et al.	setting up October meeting
NC HPO	10/2/2018	email	Lindsay Ferrante, NC HPO, et al.	Paul Webb, TRC	setting up October meeting

MVP Southgate Project NC HPO Coordination. Updated through September 30, 2018

Affiliation	Date	Type	Sender	Recipient	Subject
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NC HPO	7/5/2018	letter	Renee Gledhill-Earley, Env. Review Coordinator	Alex Miller, MVP Southgate	Comments on work plans, shape file
NC HPO (PRIV)	7/6/2018	email	Rosie Blewitt-Golsch, NC HPO	Paul Webb, TRC	Site numbers
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NC HPO	7/24/2018	email	John Mintz, NC HPO	Paul Webb, TRC	scheduling site visits
NC HPO	7/27/2018	email	Lindsay Ferrante, NC HPO	Paul Webb, TRC	scheduling site visits
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NC HPO (PRIV)	9/11/2018	email	Paul Webb, TRC	Rosie Blewitt-Golsch, NC HPO	site numbers request
NC HPO	9/12/2018	email	Paul Webb, TRC	Rosie Blewitt-Golsch, NC HPO	requesting information on 31AM431
NC HPO (PRIV)	9/12/2018	email	Rosie Blewitt-Golsch, NC HPO	Paul Webb, TRC	Site numbers, 31AM431 site form
NC HPO (PRIV)	9/26/2018	email	Tracy Millis, TRC	Rosie Blewitt-Golsch, NC HPO	site numbers request
NC HPO (PRIV)	9/26/2018	email	Rosie Blewitt-Golsch, NC HPO	Tracy Millis, TRC	site numbers

Webb, Paul

From: Webb, Paul
Sent: Monday, August 13, 2018 12:33 PM
To: Environmental.Review@ncdcr.gov
Subject: MVP Southgate Project (ER 18-1041)
Attachments: PRIV Figure 4.5-1 CR Progress 2018-08-08.pdf; PUBLIC_MVP_Southgate_PF_RR4 _August_2018.pdf

Renee –

Per my earlier email, MVP Southgate filed Resource Report 4 (cultural resources) with the FERC this morning. I am attaching a .pdf of the complete PUBLIC version of RR4 as filed (which includes Appendix 4-C, the Unanticipated Discoveries Plan) for your review. Also attached is Figure 4.5-1, which was filed as PRIVILEGED.

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We look forward to your review of these materials, including the Unanticipated Discoveries Plan. Also, please let me know if you have any difficulties with any of the files, need hard copies, or have any questions or concerns about the project.

Thanks,

Paul Webb
Cultural Resources Program Leader

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T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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Webb, Paul

From: Webb, Paul
Sent: Monday, August 13, 2018 12:58 PM
To: Environmental.Review@ncdcr.gov
Cc: Miller, Alex
Subject: MVP Southgate (ER# 18-1041) Revised Archaeological survey-testing-deep testing plan
Attachments: MVP Southgate - NC HPO - Archaeological survey-testing-deep testing plan_ 8-13-2018.pdf

Renee –

Attached is a revised version of the MVP Southgate Archaeolgoical Survey-Testing-Deep Testing Plan addressing the comment provided in your July 5, 2018 review letter.

Please let us know if you or your staff have any questions concerning this additional information.

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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MVP SOUTHGATE PROJECT:
PROPOSED PROCEDURES FOR ARCHAEOLOGICAL SURVEY, SITE TESTING, AND DEEP TESTING INVESTIGATIONS IN NORTH CAROLINA

FERC PF 18-04, NC HPO ER# 18-1041

Submitted to:

NORTH CAROLINA HISTORIC PRESERVATION OFFICE
109 E. Jones Street
Raleigh, NC 27601

by:

TRC ENVIRONMENTAL CORPORATION
50101 Governors Drive, Suite 250
Chapel Hill, NC 27517

and

MVP Southgate
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

Updated – August 13, 2018

INTRODUCTION

These proposed procedures have been developed to guide archaeological survey, site testing, and deep testing investigations conducted by TRC Environmental Corporation (TRC) for the MVP Southgate Project (Project) in North Carolina. The methods presented follow those outlined in the North Carolina Office of State Archaeology's (OSA) *Archaeological Investigations Standards and Guidelines* (December 2017) and also take into account the nature of the Project.

PHASE I SURVEY

As discussed in a May 10, 2018 meeting between MVP Southgate representatives and the North Carolina Historic Preservation Office (HPO) staff, specified in Federal Energy Regulatory Commission (FERC 2017) procedures, and acknowledged in a May 21, 2018 letter from the HPO (Renee Gledhill-Earley, letter of May 21, 2018), MVP Southgate is conducting a comprehensive archaeological survey of areas to be potentially affected by the development of the Project, including the proposed pipeline corridor and related appurtenances (compressor and meter station sites, additional workspaces, construction yards, access roads, etc.).

Survey Areas

The archaeological survey areas (which represent the direct effects Area of Potential Effects (APE) for the Project) will typically consist of a 300-foot wide corridor centered along the proposed pipeline route (which will likely only utilize a 100-foot wide construction corridor) and 50-foot wide corridors centered along proposed access roads, as well as the limits of proposed compressor station sites, workspaces and other facilities. All survey areas will be located in the field using GIS data and aerial photographs, and labeled according to a sequential survey segment number or according to the proposed facility name. No survey or other archaeological investigations will be conducted in any area without approved landowner access or otherwise in accordance with state law, and any landowner restrictions will be noted and followed. The field survey teams will be provided with current data regarding previously recorded cultural resources in the vicinity of the survey area as well as the potential for previously undiscovered cultural resources based on landform characteristics, historical maps, and other data sources.

Survey Techniques

The archaeological survey will begin with a visual inspection of the ground surface and the systematic collection of surface artifacts. (If it is evident that shovel testing will be required and there are no other complicating factors, survey will begin with shovel testing and no walkover will be conducted.) If some portion of the original land surface has been completely destroyed by modern activities (such as grading or industrial development), then no further survey will be conducted in that area beyond developing written and photographic documentation of the destruction and a map indicating the location and extent of the destroyed area.

The archaeological survey will include surface examination of all areas with good ground surface visibility, including cultivated fields as well as areas of ground exposure related to animal burrows, tree falls, dirt roads, or firebreaks. If there is greater than 50% visibility, there is 0–15% slope, and there is no possibility of an accretional/depositional environment (i.e., alluvial or colluvial soil deposition), the surface survey will consist of systematic surface examination at no greater than 10-meter (m) (33 feet) intervals. Surface examination of landforms located on greater than 15% slope will be conducted at 30-m (98.4 feet) intervals.

Where at least some portion of the original land surface remains intact, the landform exhibits 0–15% slope, and sufficient surface visibility is lacking, systematic subsurface testing (shovel testing) will be conducted.

Shovel tests will be round and measure no less than 30 centimeters (cm) in diameter, and will generally be excavated at 30-m (98.4 feet) intervals along 30-m interval transects within the 300-foot study corridor or otherwise at 30-m intervals along access roads within survey areas; shovel tests may also be excavated at closer intervals (down to 5-m intervals) as needed to investigate particular landforms (especially narrow ridgetops and higher landforms near streams and creeks, etc.). Shovel tests will be excavated to 100 cm below surface (cmbs), to hydric soils, or at least 20 cm into the sterile B horizon in upland environments with no potential for alluvial or colluvial deposition.

Three shovel test transects will generally be required to complete the survey. In areas where the survey area includes 300 feet of greenfield (i.e., previously undeveloped) corridor, transects will be placed along the centerline and 100 feet to either side. In areas where the survey area is co-located with an existing utility corridor and includes 150 feet of new right-of-way and 150 feet of existing corridor, shovel test transects will be excavated along the centerline and 100 feet from the centerline within the new right-of-way.

All soil excavated from shovel test pits will be screened through ¼-inch mesh hardware cloth over tarps to facilitate backfilling; if the soil type (for example, heavy clay) prohibits screening, this will be noted in the field and discussed in the report. Sufficient shovel test locations will be recorded via GPS to allow documentation of the location of all transects and shovel tests. Data on each shovel test will be recorded on shovel tests forms using standard USDA terminology (for horizon and texture) and Munsell color terms, and representative soil profiles will be photographed and drawn to scale. All tests will be backfilled promptly.

All artifacts recovered from shovel tests or surface inspection will be collected and bagged in the field according to provenience and natural stratigraphy. Provenience information will be recorded on each bag and on field forms. At a minimum, the following information will be recorded:

- Project Name;
- Survey Segment;
- Field Site Number;
- Transect Number;
- Shovel Test or Surface Transect Number;
- Stratum and Depth (cm below surface);
- Description/Count of Artifacts Collected;
- Date; and
- Excavator's Name or Initials.

If apparent cultural features are encountered within a shovel test, notes will be taken concerning feature type, depth, appearance, etc. No attempt will be made to enlarge the shovel test to recover additional artifacts, but the location will be noted and will be considered as a possible test unit location during site testing.

If shovel tests in alluvial settings do not reach channel gravels (lag deposits), that fact will be noted and the area will be designated as a potential deep testing area (see proposed methods below). If other alternate methods of site detection, including, but not necessarily limited to, metal detecting, remote sensing, plowing and surface collecting, or mechanized stripping are considered necessary, MVP Southgate will consult with OSA staff prior to implementing those approaches. In general, however, such techniques will be reserved for site testing.

Site Delineation

All locations at which pre-modern artifacts (i.e., those over 50 years old) are recovered or cultural features (i.e., foundations, possible pit features, etc.) are identified will be considered archaeological sites regardless of artifact density, as will cemeteries with interments prior to 1968, railroad grades or bridge abutments, and similar features. Ephemeral road traces (i.e., farm or logging roads) or rock piles presumably resulting from historic period field clearing will be noted, but not recorded as archaeological sites.

All site delineation will be conducted on a coordinate system, with N500 E500 assigned to a positive shovel test or surface collection block located near the center of the site (and on the centerline if possible).

Minimally (in the event of a single positive shovel test), at least four additional subsurface tests will be excavated at 15-m intervals in the cardinal directions from the original productive test (tests at 30-m intervals will have been completed as part of the survey). If no other cultural materials are recovered and no other indications of an archaeological site are noted, no additional shovel tests will be excavated. If additional artifacts (or surface features indicative of an archaeological site) are identified, delineation of sites will continue until two negative shovel tests have been excavated or the limits of the direct effects APE are reached. For larger sites, full interior delineation will be conducted at 15-m intervals within the survey area.

Surface sites will be investigated and delineated by collecting artifacts along additional, close-interval transects (generally spaced 5-m apart). In order to assess the nature of subsurface deposits at surface sites, sites in areas with surface visibility of 50% or greater will also be investigated with shovel tests at a density of no less than four per acre, which is roughly comparable to excavating shovel tests at 30-m intervals on transects spaced 30 m apart. At a minimum, one shovel test will be excavated at the location of all surface sites.

Summary data on each resource will be recorded by the Crew Lead on the Project Site Summary Form, and additional notes will be taken as necessary. All shovel test locations will be recorded on a sketch map, and all delineation shovel test locations (positive and negative) will be recorded via GPS. Once site delineation is completed, the site boundaries will be recorded as specified above. Digital color photographs will be taken of the site locations and associated cultural features, as outlined above.

PHASE II TESTING

Research Objectives

In some instances, more intensive Phase II site evaluation/testing may be needed to further evaluate the National Register of Historic Places (NRHP) eligibility of archaeological sites. The purpose of the work will be to evaluate the site's significance in terms of the NRHP *Eligibility Criteria*, as outlined in 36 CFR 60.4 (USDOI 1991). The *Eligibility Criteria* state:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. That are associated with events that have made a significant contribution to the broad pattern of our history; or
>
> B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield information important to history or prehistory.

Archaeological sites that are deemed eligible for the NRHP are generally recommended under Criterion D. In order to assess each site's potential under Criterion D, TRC will evaluate the site's integrity as well as its potential for providing new or substantial additional data concerning locally, regionally, or nationally relevant research topics. The work will also consider potential site eligibility under Criteria A, B, and/or C, however, and the final eligibility recommendation will address all four criteria.

The proposed testing strategies will take into account the nature of each site, including the archaeological components present, the nature and depth of deposits, and the type of ground cover. The work will seek to provide documentation of site structure (i.e., the spatial relationships among objects and the sediment matrix) and the recovery of archaeological data (artifacts, floral and faunal remains, contextual information, etc.) that will provide a basis for interpretations of site chronology, integrity, and function. Recovering such data will require documentation of the depth and horizontal extent of deposits, the identification of discrete deposits such as middens, pits, or other features, and the identification and documentation of functionally and chronologically related materials, such as the artifacts that manifest an activity area.

Specific research questions will be developed for each testing project and will vary according to the site age and type. The following questions will be addressed for each component being evaluated, and additional component-specific questions will also be developed as appropriate.

- Does the site appear to represent a single occupation or multiple occupations?
- If multiple occupations are present, what is the apparent horizontal and vertical integrity of the deposits associated with each occupation? How do the current spatial distributions of the artifacts from each occupation present relate to their likely depositional contexts? Is there evidence of appreciable post-depositional disturbances that would restrict research potential, either through bioturbation or due to plowing, logging, etc.?
- What is the apparent chronology of each occupation? Can the site potentially provide absolute chronometric data that can provide more refined intervals for the various occupations and contribute to the refinement of culture-historical chronological sequences?
- Is it possible to separate (horizontally and/or vertically) the artifact signatures of the various occupations (if present)? If individual occupation areas can be distinguished, what types of activities do they appear to represent?
- Does the site contain (or is it likely to contain) discrete pit features or other contexts that can be associated with individual components? Does the site appear to have the potential to produce subsistence data?
- Is there any evidence of postholes, foundations, or other architectural remains, or any indications that any of the site components are associated with multi-seasonal or long-term occupations?
- How did the activities represented by each occupation articulate into the broader settlement and subsistence patterns during the time period(s) represented?
- How representative are the remains and artifact assemblages from each occupation when compared to other sites with similar temporal components?

- For historic sites, is additional written or oral history documentation available that will assist in site interpretation?

- Given these factors, what is the potential that this site can provide additional substantive data that would contribute to our understanding of local, regional, or national prehistory or history.

Supplemental Background Research

TRC is conducting general background research on the archaeology of Rockingham and Alamance counties and the northern North Carolina Piedmont, including gathering archaeological reports and site forms relating to previous investigations and sites along the pipeline corridor. As part of the site evaluations, however, TRC will conduct additional research regarding sites and components similar to those being evaluated. As part of this review, the researchers will consider the methods used to identify sites and define site boundaries, data on artifact types and distributions, and previous recommendations and determinations concerning site integrity and significance. In the event that a site has been previously recorded, TRC will attempt to examine the material previously recorded from the site. In addition, for historic period sites, TRC will conduct additional documentary research, including review of census records, deeds, etc., to gain an understanding of the history of the site and its inhabitants.

Field Methods

Site Mapping and Documentation. The arbitrary coordinate system established during site delineation will be used to record all new shovel tests and larger excavation units. The datum location and grid will be shown on all maps, and the grid coordinates will be included as part of the identification of specific units and their artifact contents. In addition, once the temporary site datum has been relocated and the grid reestablished, the locations of all Phase I shovel tests will be re-established. If individual Phase I shovel tests cannot be recognized, their approximate locations will be identified with a GPS unit with sub-meter accuracy and the locations flagged.

A detailed site map will be prepared based on the Phase I map and will show the locations of the datum, prominent cultural and natural features, all relocated Phase I shovel tests, and all Phase II shovel test and test unit locations. Positive and negative shovel test locations will be differentiated, as will Phase I versus Phase II shovel tests. Any historic cultural features and other landscape features (such as logging roads, streams, etc.) also will be mapped. The final version of this map will be professionally drawn and will include an appropriate legend, a scale, and a north arrow.

All field activities will be documented in a field notebook maintained by the Field Director in which he/she will record daily observations and impressions concerning the progress and results of the work, as well as other relevant data. Standard forms will also be used to document specific aspects of the work, including Shovel Test Forms, Unit Level Forms, Unit Summary Forms, Feature Forms, Bag Lists, and Photo Logs, among others.

A variety of overview photographs will be taken, including general site photographs, photographs of significant cultural and natural features, photographs of various testing activities in progress, and photographs of excavation units and cultural features.

Remote Sensing. Remote sensing (including metal detecting and other techniques) may be employed if appropriate, especially to search for metal artifacts and/or subsurface features on potential early historic period or military sites.

Systematic Shovel Testing. Site testing will generally begin with completion of delineation efforts (if necessary) within the portion of the site situated within the environmental survey corridor (or within 15 m

of the narrower construction corridor if that has been defined). A limited number of additional tests may be placed at 5- to 10-m intervals around high-density tests to gather additional data, define the spatial dimensions of artifact concentrations, and determine the spatial relationships of inferred occupations or components at the site.

Shovel testing methods will follow those outlined above. Data on shovel test provenience and field artifact counts by artifact class and raw material will be entered into an Excel spreadsheet to assist in guiding subsequent investigations. Field assessment of artifacts will permit preliminary assessments of activity areas and component.

Test Unit Excavation. A limited number of larger, hand-excavated test units will then be excavated to gather additional artifact samples and stratigraphic information, and/or to investigate apparent features.

Test units will measure at least 1 × 1 m and will be excavated at least two sterile 10-cm levels deeper than the maximum depth of artifacts recovered in adjacent shovel tests to ensure that the lower deposits are sterile (except in the case of historic sites where excavations may stop at the base of the plowzone or occupation level once the stratigraphy is well understood). All units will be excavated in natural levels and will be subdivided into arbitrary levels so that no excavation layer is thicker than 10 cm, with the exception of the plowzone, which will generally be excavated as a single level. All excavated soil (except for feature contents, see below) will be screened through ¼-inch mesh for uniform artifact recovery, and soil and flotation samples will be taken as appropriate.

The number of units to be excavated will vary according to site size and the number of components or artifact concentrations present. In general, however, TRC anticipates excavation of from four to 16 1 × 1 m units to investigate a typical site.

Each excavated level will be documented on a Level Form, and the base of each level will be cleaned and examined for indications of archaeological features or other disturbance before excavation proceeds. Plan views will be drawn when warranted, and at least one wall profile of each unit will be drawn to scale as well as photographed. All soil horizons and strata will be described in standard scientific terms, including USDA terminology for soil horizons and soil texture, and Munsell color terminology. A catalog of field lot numbers will be maintained to keep track of the number of bags recovered and the date of recovery of artifacts, soil samples, radiocarbon samples, etc. from each test unit. A Unit Summary Form will also be completed for each unit excavated, and all units will be backfilled.

Digital color photographs will be taken to record significant data and information. All photographs will contain a scale, direction indicator (north arrow), and information (written on a menu board with plastic letters and numbers) identifying the site, date, and subject. The north arrow and information boards will be clearly readable in the photographs, but placed so as to not obscure the subject. Photo logs will be maintained for all photographs taken and will include the digital file number, direction of view, subject matter, and date.

Mechanized Stripping. Depending on the site type, vegetation cover, landowner permission, and safety concerns, limited mechanized stripping may be conducted to search for pit features and structural remains. Any stripping will utilize a Gradall or trackhoe equipped with a smooth-bladed bucket to remove the plowzone and search for cultural features at the top of the B horizon. At least one archaeologist will monitor all stripping, clean (shovel shave) the stripped surface as necessary, and identify potential features and postholes. All potential features and postholes will be marked with color-coded pin flags and mapped with a total station or a real-time kinematic (RTK) GPS unit, with appropriate information collected in the data collector. After appropriate investigation, all stripped areas will be returned to as close to their original contours as possible.

Cultural Feature Identification and Excavation. Special attention will be paid to the identification of potential cultural features, including prepared facilities (hearths, pits, wells, etc.), the remains of a discrete and/or narrow range of activities (such as a broken ceramic vessel or lithic debris from tool manufacture), or of a broader range of activities associated with a narrow time interval (such as a sheet midden or refuse-filled pit).

All possible cultural features encountered during unit excavation or stripping will be numbered consecutively, drawn and photographed in plan view, and investigated individually. Slightly different techniques will be used to excavated and record features depending on their size and class (or apparent association with structure patterns). Initially, each feature will be carefully defined by troweling or shovel shaving and mapped using a total station; more detailed individual plan maps will also be drawn of all substantial pits or other features. Photographs will be taken of the feature in plan. Each non-post feature (except those that appear potentially to be human graves) will be cross-sectioned along its long axis. The initial half will be excavated by natural strata (fill zones) if these can easily be recognized, or removed in a single unit if not. The feature will then be mapped and photographed in cross-section, and the remainder of the fill will be excavated by zone. If at any time a feature is determined to be non-cultural in origin (e.g., rodent burrow, tree root), excavation will be terminated. Rock cluster features (such as hearths) will be treated in similar fashion.

All information generated from feature excavation will be recorded on a feature form. Standard soil descriptions will be completed for each fill zone, and data will be recorded concerning form, evidence of burning, etc. Flotation samples (minimal 10 liters in volume) will be taken from each fill zone or feature, depending on its type and significance. The remaining feature fill will be screened through either 1/4-inch mesh or 1/16-inch mesh (window screen), depending on its provenience and logistical concerns. The finer 1/16-inch mesh will be used to maximize recovery of small faunal elements and such diagnostic artifacts as glass beads when appropriate.

Larger flotation samples (up to one half of the feature) will be taken from selected contexts that are known or believed to be rich in archaeobotanical remains. For rock clusters, a representative sample of soil will be retained from within the area of the rocks and immediately below the rocks. Radiocarbon samples will also be taken as appropriate.

Apparent postholes (stains less than 25 cm in diameter that do not appear to be smudge pits or other specialized pit types) that are not part of recognizable structure patterns will be cross-sectioned, and information recorded on diameter, cross-section form, fill type, depth, and associated artifacts. The fill from these posts will be screened through 1/4-inch or 1/16-inch mesh. Potential posts will be categorized as cultural, possibly cultural, or non-cultural based on their shape and other factors.

All posts making up possible structure patterns or palisade lines will be completely described and excavated, and the fill screened or taken for flotation samples as appropriate. Special care will be taken to recover charred wood samples from these posts for species identification or radiocarbon dating when possible. Structure-specific maps will be hand drawn and tied to the total station data. Photographs will also be taken of each individual structure and of representative sections of any palisade lines.

If large numbers of cultural features or postholes are identified and it is clear that the site is eligible for the NRHP, excavations will be limited to that necessary to confirm the integrity of the deposits, assess artifact density, and identify the potential for the preservation of subsistence remains. If the excavations encounter unusual soils or potential depositional environments, we will consult with a geomorphologist regarding the appropriate interpretation of site stratigraphy.

DEEP TESTING

Research Objectives

In some instances, more intensive mechanized deep testing may be needed to search for sites in deep alluvial deposits or to further evaluate the NRHP eligibility of archaeological sites. The nature and scale of deep testing at any specific location will be determined based on site and soil characteristics as well landowner concerns. Should major changes to these methods be needed, TRC will consult with OSA staff prior to their implementation.

Field Methods

Documentation. The location of all deep testing excavations will be recorded via GPS and according to the site grid, if appropriate. All deep testing will be conducted by a Project archaeologist skilled in the interpretation of soil stratigraphy and under the supervision of a geomorphologist. The location, depth, and stratigraphy of each excavated trench or probe will be recorded and documented through digital photography.

Mechanized Trenching. The deep testing will generally consist of the excavation of one or more trenches using a backhoe or trackhoe (preferably equipped with a smooth-bladed bucket), and may be supplemented by hand or mechanical coring or augering. Trenches will measure at least 30 inches in width and will be stepped or shored according to OSHA (2015) standards and TRC safety procedures.

Trenches will generally be placed in a single transect oriented along the proposed project centerline, although supplemental trenches may be placed elsewhere within the workspace as appropriate. Trenches will likely be discontinuous, with individual trench segments placed as necessary to assist in interpreting landform development. No trenches will be placed in wetlands or within 20 feet of a river or stream.

At least one wall of each trench will be cleaned as necessary to record and interpret stratigraphy. Soil profiles will be drawn and photographed, and soil samples will be taken for grain size analysis, AMS dating, and other analyses as appropriate. Should archaeological deposits or potential buried soil horizons be identified, a 50 × 50 cm soil column may be excavated and screened to evaluate potential artifact content. If appropriate, additional soil columns or shovel tests may also be excavated in the floor of the trench. Any cultural features identified will be isolated as feasible and excavated according to the procedures outlined above.

At the conclusion of the excavations, all trenches will be backfilled and the ground surface restored to grade as much as possible.

LABORATORY METHODS

Laboratory Analyses

In most cases, all recovered artifacts will be removed from the field for analysis in the laboratory using standard procedures (see below). If requested by the landowner, however, analyses may be conducted in the field and the artifacts replaced in the individual shovel test or on the surface, as appropriate. Any such in-field analyses will include counts of artifacts by type and provenience along with detailed descriptions and photographs of temporally diagnostic artifacts, but may lack the level of detail that could be obtained in a laboratory setting.

Artifact process and analyses will begin concurrent with the fieldwork and continue until completed. Details of all analytical techniques employed will be provided in the technical report, and a detailed

catalog/inventory of all artifacts by provenience will be provided as an appendix to the report and in electronic format.

Artifact Check-In and Washing. All artifact and sample bags will be inventoried at the end of each day of fieldwork, and all provenience data will be checked against field records at that time. All artifacts and samples will then be boxed according to the type of processing necessary and transferred to the laboratory for washing and analysis. All artifacts will then be washed, stabilized as necessary, and sorted by rough category to facilitate subsequent analysis.

Artifact Analyses. All artifacts will be systematically identified, classified, and analyzed using regionally- and temporally-relevant classification schemes that are appropriate to each particular artifact class.

The Native American ceramic assemblage (if present) will first be sorted into size categories. Sherds smaller than two cm will be counted, weighed, and examined for the presence of pipe fragments or unusual attributes, but will not be subjected to further analysis, unless such analysis is deemed crucial to defining chronologically sensitive attributes from certain discrete features or select unit level contexts. All sherds larger than 2 cm will be subjected to detailed analysis. Each sherd will be characterized according to surface treatment (e.g., net impressed, plain, etc.), adjunct decoration, and location of the extant fragment(s) in the original vessel (e.g., rim, neck, body, etc.). Where relevant, the rim profile configuration, type of rim, and type and location of any decorative elements will be recorded. The temper type and size of the aplastic (inclusion) content will be documented for each ceramic according to raw material type. The type of interior surface treatment will be recorded. The surface decoration and aplastic content from the preliminary analysis will be compared to published type descriptions and regional type collections, and type names will be applied as appropriate.

Lithic artifacts will first be sorted into a number of general categories, including chipped stone tools, chipped stone debitage, groundstone, and fire cracked rock. Chipped stone tools will then be described by general type (e.g., projectile point, biface, unifacial scraper, etc.). When possible, projectile points will be assigned type names based on those developed by previous regional researchers. Relevant measurements (including length, shoulder width, thickness, stem length, neck width, and base width for stemmed points) will be obtained for diagnostic and unbroken specimens, the raw material will be recorded (see below), and the artifact will be weighed. Other chipped stone tools and cores will be described using standard terminology (e.g., Stage II biface fragment, multifacial core, etc.).

Chipped stone debitage will be sorted by size and classified according to reduction stage. All chipped stone artifacts will then be classified by raw material category, which will be defined according to material type and such factors as color, texture, presence of inclusions, etc. as appropriate. Operational definitions for raw material types and other variables will be included in the report, along with primary references for all temporally diagnostic artifact types.

All soapstone (chlorite schist or steatite) and other ground stone artifacts will be individually described. Soapstone artifacts will be described according to form and apparent function, such as vessel fragment, perforated boiling slab, pipe, waste fragment, etc. Fire cracked rock (FCR) and apparent unmodified rock fragments from all contexts will be counted, weighed, and then discarded. This process may take place in the field for non-feature materials; materials from features will be washed and examined in the laboratory before being discarded. Representative samples of FCR from feature contexts may be retained for possible future analyses.

Historic artifacts will be initially divided into principal categories based on composition (i.e., ceramic, glass, metal, etc.) and function, using standardized and well-defined sorting criteria, and then classified according to published artifact descriptions. In addition, date ranges will be assigned to historic artifacts where

possible based on period of manufacture and/or commonly attributable period of usage. Most modern artifacts encountered will be noted, but not generally collected.

Specialized Analyses. If intact pre-modern cultural features or intact cultural strata are discovered, soil samples will be collected for various specialized analyses, including flotation processing and archaeobotanical analysis and radiocarbon/AMS analysis. Flotation samples will be processed using a Flote-Tech soil flotation system, and light and heavy fractions will be bagged separately and selected samples will be analyzed.

Archaeobotanical analysis will be conducted on botanical materials recovered from pre-modern features, identifying specimens to the most specific taxa possible to provide information regarding the use of plants by the site's occupants. Selected recovered faunal remains will be analyzed according to standard analytical techniques, concentrating on identifying the economic use(s) of the specimens by the site's inhabitants.

AMS or conventional radiocarbon samples from features or other selected contexts may be submitted for dating. All samples will be identified by the archaeobotanist prior to dating. Whenever possible, an attempt will be made to conduct AMS dating of identifiable botanical remains (i.e., individual nutshell fragments, maize cupules, etc.) rather than multiple wood charcoal fragments.

Curation. It is anticipated that most of the recovered artifacts will be returned to landowners at the conclusion of the project. If requested by OSA staff, however, MVP Southgate will attempt to procure selected collections for curation in the Office of State Archaeology Research Collection (OSARC) or elsewhere.

REPORTING

Draft and Final Reports. The complete descriptive, analytical, and interpretative results of the background research, fieldwork, and laboratory and data analyses, as well as an assessment of potential project effects on the site, will be provided in the form of a comprehensive draft final report. The report will be fully illustrated with appropriate maps and photographs, and will be professionally edited.

TRC will respond to all agency review comments in a timely manner, and the required printed and electronic copies of the Final Report will be provided.

All site eligibility recommendations will reference all four NRHP criteria, and will be only made for the portion of the site that was investigated for the Project. If any site is recommended eligible for the NRHP, the researchers will also provide an assessment of potential adverse effects to the site as well as recommendations concerning site avoidance or treatment options (including a preliminary research design addressing the information that could potentially be provided by data recovery excavations).

DISCOVERIES OF GRAVES OR HUMAN REMAINS

It is possible that human graves, potential graves, or human remains will be identified during any stage of the archaeological investigations.

If marked graves are identified, Project archaeologists will record the approximate cemetery boundary using GPS, and will record data concerning the number and age of the interments. No shovel tests or other excavations will be conducted within 25 feet of the apparent cemetery boundary without the approval of the North Carolina State Archaeologist. All cemeteries containing graves older than 50 years will be recorded as archaeological sites per OSA procedures.

In the event that potential graves (generally, oval to rectangular pit features containing mottled subsoil and organic fill) are identified during excavations, fieldwork will be halted within 25 feet of the location. Information regarding their number, location, and likely cultural affiliation will be provided to the State Archaeologist and the FERC Archaeologist assigned to the Project, and subsequent tribal notifications will be conducted at their direction. MVP Southgate anticipates that potential grave pits will be drawn, photographed, and re-covered with soil without any additional investigation. These locations will be recorded via GPS and an appropriate avoidance plan will be developed in association with the State Archaeologist. Although care will be taken to keep any specific potential grave locations confidential, if appropriate the potential grave location and a suitable buffer area will be marked in the field and shown on project mapping to ensure its protection.

If human remains or potential funerary objects are exposed during the work, the remains and/or funerary objects will be re-covered and work within 25 feet will stop immediately. TRC will immediately notify the North Carolina State Archaeologist and the FERC archaeologist. The State Archaeologist will then conduct additional notifications and consultation as needed in accordance with North Carolina General Statute 70-3, *The Unmarked Human Burial and Skeletal Remains Protection Act*, and additional tribal notifications and consultations will also be conducted following FERC procedures.

Throughout the fieldwork, analysis, and reporting, TRC will ensure that the treatment of any human remains and associated funerary objects discovered within the project area complies with all applicable state and federal laws and the Advisory Council on Historic Preservation's (2007) *Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects*.

REFERENCES CITED

Advisory Council on Historic Preservation (ACHP)
2007 Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects. http://www.achp.gov/docs/hrpolicy0207.pdf.

Federal Energy Regulatory Commission (FERC)
2017 Guidelines for Reporting on Cultural Resource Investigations for Natural Gas Projects. https://www.ferc.gov/industries/gas/enviro/guidelines/cultural-guidelines-final.pdf.

Occupational Safety and Health Administration (OSHA)
2015 Trenching and Excavation Safety. https://www.osha.gov/Publications/osha2226.pdf.

Office of State Archaeology (OSA)
2017 Archaeological Investigations Standards and Guidelines. https://files.nc.gov/dncr-arch/OSA_Guidelines_Dec2017.pdf.

United States Department of Interior (USDOI)
1991 National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Washington, D.C.

MVP Southgate Project
Meeting Minutes

Meeting Date:	August 21, 2018
Meeting Location:	MVP Southgate Corridor
Meeting Leader:	Alex Miller, NextEra, Environmental Specialist
Minutes Prepared By:	Paul Webb, TRC Cultural Resources Lead
Participants:	Lindsay Ferrante, HPO/Office of State Archaeology (OSA) Katie Harville, HPO Rosie Blewitt-Golsch, HPO/OSA Kim Urban, HPO/OSA Tracy Millis, TRC, Cultural Resources Field Coordinator

Meeting Purpose:

Provide NC HPO staff with an opportunity to view MVP Southgate archaeological fieldwork. Participants visited ongoing deep testing/Phase II work at site 31RK222 in the Dan River vicinity and an historic cemetery (31RK234).

Discussion Points:

- HPO staff appreciated opportunity to visit fieldwork. MVP Southgate will keep HPO informed and arrange additional visits depending on site findings and any HPO concerns.
- HPO would like minimal 25 foot buffer at historic cemeteries; additional buffers may be appropriate depending on certainty regarding boundaries.
- HPO staff will likely report on visit at upcoming NC Commission on Indian Affairs meeting (Sept 7).

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

September 6, 2018

Paul Webb
TRC Solutions
50101 Governors Drive, Suite 250
Chapel Hill, NC 27517

pwebb@trcsolutions.com

Subject: MVP Southgate Project, Construct Interstate Pipeline, Rockingham and Alamance Counties, ER 18-1041

Dear Mr. Webb:

Thank you for your letter of August 13, 2018, transmitting the draft resource report. We have reviewed the materials submitted and offer the following comments.

The archaeological survey is ongoing and has already resulted in the identification of 58 sites. Eleven of these sites are recommended unassessed for the National Register of Historic Places (NRHP) and 47 sites are recommended not eligible for the NRHP. We look forward to reviewing the report on the results of this survey work when it is submitted with the Certificate application. Five cemeteries have been identified in the project area. We note the inclusion of an amended work plan for Project Archaeological Survey, Testing, and Deep Testing Investigations in North Carolina that answers our previous question regarding how cemeteries will be marked in the field and on route plans to ensure they are avoided during construction. The Unanticipated Discovery Protocol, both for cultural resources that involve human remains or funerary objects and those that do not, are adequate for the protection of unexpected discoveries that may occur during construction. We look forward to continued work with TRC on this project.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. Remember to use the above assigned tracking number for any correspondence or questions concerning this undertaking. Failure to do so may cause delays in our response. We appreciate your time and consideration.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

cc: Alex Miller, alex.miller@nexteraenergy.com

Webb, Paul

From: Webb, Paul
Sent: Tuesday, September 11, 2018 8:31 PM
To: Blewitt, Rosemarie
Cc: Millis, Tracy
Subject: MVP Southgate ER 18-1041 site number request #2
Attachments: Select_FS54_60.zip; FS54_55_58_NC.pdf; FS56_NC.pdf; FS57_59_NC.pdf; FS60_NC.pdf; Copy of Nextera_MVP Southgate NC permanent site numbers FS54-60.xlsx

Rosie –

We'd like to request seven more site numbers for MVP Southgate; a spreadsheet, maps, and a shape file are attached.

Please let me know if you need anything else. Thanks much,

Paul Webb
Cultural Resources Program Leader

TRC
Results you can rely on

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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Contains CUI//PRIVILEGED INFORMATION – DO NOT RELEASE

From: Webb, Paul
To: Blewitt, Rosemarie
Subject: 31AM431
Date: Wednesday, September 12, 2018 1:28:00 PM

Rosie –

We're gotten an enquiry about 31AM431, which was apparently recorded on a landowner property recently. We'll be coming back over to do more research asap, but in the meantime is there any way you could provide a copy of the form? Any info welcomed, thanks...

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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Webb, Paul

From: Blewitt, Rosemarie <Rosemarie.Blewitt@ncdcr.gov>
Sent: Wednesday, September 12, 2018 3:03 PM
To: Webb, Paul
Cc: Millis, Tracy
Subject: RE: [External] MVP Southgate ER 18-1041 site number request #2
Attachments: Copy of Copy of Nextera_MVP Southgate NC permanent site numbers FS54-60.xlsx; AM431.pdf

Hi Paul,

I've attached your table with the permanent site numbers added. I've also attached the amateur site form for 31AM431. The landowner filled out a site form. She reported finding artifacts over the years on her property.

Best,
Rosie

Rosie Blewitt-Golsch
Assistant State Archaeologist and Site Registrar
Office of State Archaeology

109 E Jones St MSC 4619 Raleigh, NC 27699-4619
919 807 6558 *office*
919 715 2671 *fax*
rosemarie.blewitt@ncdcr.gov

From: Webb, Paul <PWebb@trcsolutions.com>
Sent: Tuesday, September 11, 2018 8:31 PM
To: Blewitt, Rosemarie <Rosemarie.Blewitt@ncdcr.gov>
Cc: Millis, Tracy <TMillis@trcsolutions.com>
Subject: [External] MVP Southgate ER 18-1041 site number request #2

Rosie –

We'd like to request seven more site numbers for MVP Southgate; a spreadsheet, maps, and a shape file are attached.

Please let me know if you need anything else. Thanks much,

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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Contains CUI//PRIVILEGED INFORMATION – DO NOT RELEASE

From:	Millis, Tracy
To:	Blewitt, Rosemarie
Cc:	Webb, Paul
Subject:	MVP Southgate ER 18-1041 site number request #3
Date:	Tuesday, September 25, 2018 1:41:53 PM
Attachments:	FS49_50_NC.PDF FS61_NC.PDF FS62_NC.PDF Select_FS49_50_61_62.zip MVP Southgate NC permanent site numbers table 092518.xlsx

---

Rosie –

We'd like to request four more site numbers for MVP Southgate; a spreadsheet, maps, and a shape file are attached.

Please let me know if you need anything else. Thanks much,

Tracy L. Millis
Senior Archaeologist/Senior Project Manager

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x224 | F: 919.530.8525 | C: 919.414.3420

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Contains CUI//PRIVILEGED INFORMATION – DO NOT RELEASE

From:	Blewitt, Rosemarie
To:	Millis, Tracy
Cc:	Webb, Paul
Subject:	RE: [External] MVP Southgate ER 18-1041 site number request #3
Date:	Wednesday, September 26, 2018 4:05:42 PM
Attachments:	image001.png Copy of MVP Southgate NC permanent site numbers table 092518.xlsx

Hi Tracy,

Your site numbers have been added to the attached spreadsheet.

Best,
Rosie

Please note, effective October 9, 2018, my phone number will change to 919.814.6558

Rosie Blewitt-Golsch
Assistant State Archaeologist and Site Registrar
Office of State Archaeology

109 E Jones St MSC 4619 Raleigh, NC 27699-4619
919 807 6558 *office*
919 715 2671 *fax*
rosemarie.blewitt@ncdcr.gov

Facebook Twitter Instagram YouTube

From: Millis, Tracy <TMillis@trcsolutions.com>
Sent: Tuesday, September 25, 2018 1:39 PM
To: Blewitt, Rosemarie <Rosemarie.Blewitt@ncdcr.gov>
Cc: Webb, Paul <PWebb@trcsolutions.com>
Subject: [External] MVP Southgate ER 18-1041 site number request #3

Rosie –

We'd like to request four more site numbers for MVP Southgate; a spreadsheet, maps, and a shape

file are attached.

Please let me know if you need anything else. Thanks much,

Tracy L. Millis
Senior Archaeologist/Senior Project Manager

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x224 | F: 919.530.8525 | C: 919.414.3420

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Contains CUI//PRIVILEGED INFORMATION – DO NOT RELEASE

Webb, Paul

From: Ferrante, Lindsay <lindsay.ferrante@ncdcr.gov>
Sent: Tuesday, October 2, 2018 1:41 PM
To: Webb, Paul
Cc: Mintz, John; Blewitt, Rosemarie
Subject: RE: [External] RE: MVP Southgate meeting - Oct 15 or 16?

Hi Paul,

I am free both days with the exception of midday on the 15th (not available 10:30 – 12:15).

Our conference room is already booked on the 15th (1-2PM) and the 16th (2-3PM) but is free the rest of the time.

Lindsay

Lindsay Flood Ferrante
Office of State Archaeology
Deputy State Archaeologist

(919) 807-6553
Please note, effective October 3rd, my phone number will change to 919-814-6553
109 East Jones Street | 4619 Mail Service Center | Raleigh, North Carolina 27699-4619

Facebook Twitter Instagram YouTube

From: Webb, Paul <PWebb@trcsolutions.com>
Sent: Tuesday, October 2, 2018 1:37 PM
To: Mintz, John <john.mintz@ncdcr.gov>; Ferrante, Lindsay <lindsay.ferrante@ncdcr.gov>
Subject: [External] RE: MVP Southgate meeting - Oct 15 or 16?
Importance: High

You guy's up for this?; MVP certainly wants to do it….

If so are there any times that would work?

From: Webb, Paul
Sent: Tuesday, September 25, 2018 10:16 AM
To: 'john.mintz@ncdcr.gov' <john.mintz@ncdcr.gov>; Ferrante, Lindsay <lindsay.ferrante@ncdcr.gov>
Subject: MVP Southgate meeting - Oct 15 or 16?

John/Lindsay –

Can you guys check on your availability (and I guess Rosie's?) for a meeting in your office on Oct 15 or 16; goal would be a project update, with a focus on the Phase II and deep testing work done to date….

Thanks,

Paul

Federally-Recognized Tribes Correspondence

MVP Southgate Project Coordination with Federally-Recognized Tribes. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient(s)	Subject
Upper Mattaponi Tribe	5/30/2018	Call	Agnes Ramsey, MVP Southgate	W. Frank Adams	Coordination of introductory mee. ng.
Catawba Indian Nation	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Wenonah G. Haire	Call to discuss project and introductory visit.
Chickahominy Tribe	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Stephen Adkins	Call to discuss project and introductory visit.
Chickahominy Tribe, Eastern Division	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Gene Adkins	Left message regarding project coordination and company introduction.
Eastern Band of Cherokee Indians	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Russell Townsend	Call to discuss project and introductory visit.
Monacan Nation	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Dean Branham	Call to discuss project and introductory visit.
Nansemond Tribe	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Lee Lockamy	Call to discuss project and introductory visit.
Pamunkey Tribe	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Robert Gray	Left message regarding project coordination and company introduction.
Rappahannock Tribe	5/31/2018	Call	Agnes Ramsey, MVP Southgate	Anne Richardson	Left message regarding project coordination and company introduction.
Catawba Indian Nation	6/1/2018	Email	Agnes Ramsey, MVP Southgate	Wenonah G. Haire; Caitlyn Haire Totherow	Initial project outreach message
Chickahominy Tribe	6/1/2018	Email	Agnes Ramsey, MVP Southgate	Stephen Adkins	Initial project outreach message
Eastern Band of Cherokee Indians	6/1/2018	Email	Agnes Ramsey, MVP Southgate	Russell Townsend	Initial project outreach message
Monacan Nation	6/1/2018	Email	Agnes Ramsey, MVP Southgate	Dean Branham	Initial project outreach message
Nansemond Tribe	6/1/2018	Email	Agnes Ramsey, MVP Southgate	Lee Lockamy	Initial project outreach message
Upper Mattaponi Tribe	6/1/2018	Email	Agnes Ramsey, MVP Southgate	Frank Adams	Initial project outreach message
Rappahannock Tribe	6/5/2018	Email	Agnes Ramsey, MVP Southgate	Anne Richardson	Initial project outreach message
Cheyenne River Sioux Tribe	6/6/2018	Call; Email	Agnes Ramsey, MVP Southgate	Steve Vance	Initial project outreach message
Delaware Nation	6/6/2018	Email	Agnes Ramsey, MVP Southgate	Kim Penrod	Initial project outreach message
Delaware Tribe of Indians	6/6/2018	Email	Agnes Ramsey, MVP Southgate	Brice Obermeyer	Initial project outreach message
Eastern Shawnee Tribe of Oklahoma	6/6/2018	Email	Agnes Ramsey, MVP Southgate	Brett Barnes	Initial project outreach message
Muscogee (Creek) Nation	6/6/2018	Email	Agnes Ramsey, MVP Southgate	Rae Lynn Butler; Corain Lowe Zepeda	Initial project outreach message
Rosebud Sioux Tribe	6/6/2018	Call; Email	Agnes Ramsey, MVP Southgate	Ben Rhodd	Initial project outreach message
Tuscarora Nation (Haudenosaunee)	6/6/2018	Email	Agnes Ramsey, MVP Southgate	Bryan Printup	Initial project outreach message
Delaware Tribe of Indians	6/7/2018	Email	Brice Obermeyer	Agnes Ramsey, MVP Southgate	Project is outside historic area of interest.
Rosebud Sioux Tribe	6/7/2018	Call; Email	Agnes Ramsey, MVP Southgate	Benjamin Young	Initial project outreach message
Muscogee (Creek) Nation	6/8/2018	Email	LeeAnne Wendt	Agnes Ramsey, MVP Southgate	Project is outside historic area of interest.
Eastern Band of Cherokee Indians	6/11/2018	Email	Agnes Ramsey, MVP Southgate	Holly Austin; Russell Townsend; Miranda Panther	Discuss date/time for meeting
Nansemond Tribe	6/11/2018	Email	Lee Lockamy	Agnes Ramsey, MVP Southgate	Question in regards to consultation
Nansemond Tribe	6/11/2018	Call	Agnes Ramsey, MVP Southgate	Lee Lockamy	Discuss date/time for meeting
Chickahominy Tribe	6/12/2018	Email	Agnes Ramsey, MVP Southgate	Stephen Adkins	Meeting invitation
Monacan Nation	6/12/2018	Call	Agnes Ramsey, MVP Southgate	Dean Branham	Discuss date/time for meeting
Upper Mattaponi Tribe	6/12/2018	Call	Agnes Ramsey, MVP Southgate	Frank Adams	Discuss date/time for meeting
Chickahominy Tribe	6/14/2018	Email	Agnes Ramsey, MVP Southgate	Stephen Adkins	Finalizing Meeting Date
Chickahominy Tribe	6/14/2018	Call; Email	Agnes Ramsey, MVP Southgate	Stephen Adkins	Discuss date/time for meeting
Chickahominy Tribe, Eastern Division	6/14/2018	Call	Agnes Ramsey, MVP Southgate	Jerry Stewart	Left Message in regards to meeting
Chickahominy Tribe	6/25/2018	Meeting	Agnes Ramsey, MVP Southgate	Stephen Adkins	Introductory Meeting; Chickahominy request futher coordination
Upper Mattaponi Tribe	6/25/2018	Meeting	Agnes Ramsey, MVP Southgate	Frank Adams	Introductory Meeting; Upper Mattaponi request further coordination
Nansemond Tribe	6/26/2018	Conf. Call	Agnes Ramsey, MVP Southgate	Lee Lockamy	Introductory Meeting
Monacan Nation	6/27/2018	Conf. Call	Agnes Ramsey, MVP Southgate	Dean Branham	Introductory Meeting
Catawba Indian Nation	6/28/2018	Meeting	Agnes Ramsey, MVP Southgate	Wenonah G. Haire	Brief Meeting to leave Southgate Materials
Eastern Band of Cherokee Indians	6/29/2018	Meeting	Agnes Ramsey, MVP Southgate	Russell Townsend, Holly Austin, Miranda Panther, Johi Griffin, Beau Carroll	Brief Meeting to leave Southgate Materials
Chickahominy Tribe	6/29/2018	Call	Agnes Ramsey, MVP Southgate	Stephen Adkins	Reminder call about Monday, June 25th meeting
Upper Mattaponi Tribe	6/29/2018	Call	Agnes Ramsey, MVP Southgate	William Frank Adams	Reminder call for Monday morning meeting on June 25th.
Chickahominy Tribe	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Stephen Adkins	Forward Work Plans for review and comment.
Delaware Nation, Oklahoma	7/11/2018	Event	Agnes Ramsey, MVP Southgate	Kim Penrod	Forward Work Plans for review and comment.
Upper Mattaponi Tribe	7/11/2018	Email	Agnes Ramsey, MVP Southgate	William Frank Adams	Forward Work Plans for review and comment.
Tuscarora Nation (Haudenosaunee)	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Bryan Printup	Forward Work Plans for review and comment.
Cheyenne River Sioux Tribe	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Steve Vance	Forward Work Plans for review and comment.
Nansemond Tribe	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Lee Lockamy	Forward Work Plans for review and comment.
Monacan Nation	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Dean Branham	Forward Work Plans for review and comment.
Muscogee (Creek) Nation	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Rae Lynn Butler	Forward Work Plans for review and comment.
Eastern Shawnee Tribe of Oklahoma	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Brett Barnes	Forward Work Plans for review and comment.
Catawba Cultural Preservation Project;#Catawba Indian Nation	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Wenonah G. Haire & Caitlyn Tetherow	Forward Work Plans for review and comment.
Rappahannock Tribe	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Anne Richardson	Forward Work Plans for review and comment.
Eastern Band of Cherokee Indians	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Russell Townsend	Forward Work Plans for review and comment.

MVP Southgate Project Coordination with Federally-Recognized Tribes. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient(s)	Subject
Delaware Tribe of Indians	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Brice Obermeyer	Forward Work Plans for review and comment.
Rosebud Sioux Tribe	7/11/2018	Email	Agnes Ramsey, MVP Southgate	Ben Rhodd & Benjamin Young	Forward Work Plans for review and comment.
Catawba Indian Nation	7/12/2018	Email	Caitlin Rogers	MVP mailbox	Catawba Nation wishes to be consulting party and to receive hard copies of project information.
Monacan Nation	8/7/2018	email	Marion Werkheiser, Cultural Heritage Partners	Agnes Ramsey, NextEra	introductory email from Ms. Werkheiser stating that her firm is representing Monacan Indian Nation regarding MVP Southgate
Monacan Nation	8/9/2018	call, email	Agnes Ramsey, NextEra	Marion Werkheiser, Cultural Heritage Partners	coordinating upcoming call
Monacan Nation	8/15/2018	call, email	Agnes Ramsey, NextEra	Marion Werkheiser, Cultural Heritage Partners	introductory discussion regarding role of Ms. Werkheiser and interest of tribe in the project
Chickahominy Tribe	8/21/2018	Call	Agnes Ramsey, MVP Southgate	Stephen Adkins	Call to schedule follow-up meeting with Virginia tribes
Upper Mattaponi Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	W. Frank Adams	availability of RR 4 and request for tribal comment
Catawba Indian Nation	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Wenonah G. Haire	availability of RR 4 and request for tribal comment
Chickahominy Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Stephen Adkins	availability of RR 4 and request for tribal comment
Eastern Band of Cherokee Indians	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Russell Townsend	availability of RR 4 and request for tribal comment
Monacan Nation	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Dean Branham	availability of RR 4 and request for tribal comment
Nansemond Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Lee Lockamy	availability of RR 4 and request for tribal comment
Pamunkey Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Robert Gray	availability of RR 4 and request for tribal comment
Rappahannock Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Anne Richardson	availability of RR 4 and request for tribal comment
Muscogee (Creek) Nation	8/31/2018	Email	Agnes Ramsey, MVP Southgate	LeeAnne Wendt	availability of RR 4 and request for tribal comment
Rosebud Sioux Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Ben Rhodd	availability of RR 4 and request for tribal comment
Tuscarora Nation (Haudenosaunee)	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Bryan Printup	availability of RR 4 and request for tribal comment
Rosebud Sioux Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Benjamin Young	availability of RR 4 and request for tribal comment
Eastern Shawnee Tribe of Oklahoma	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Brett Barnes	availability of RR 4 and request for tribal comment
Delaware Nation	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Kim Penrod	availability of RR 4 and request for tribal comment
Cheyenne River Sioux Tribe	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Steve Vance	availability of RR 4 and request for tribal comment
Cherokee Nation of Oklahoma	8/31/2018	Email	Agnes Ramsey, MVP Southgate	Elizabeth Toombs	availability of RR 4 and request for tribal comment
Catawba Indian Nation	9/5/2018	letter	Alex Miller, MPV Southgate	Wenonah G. Haire	transmitting hard copy of RR4
Chickahominy Tribe	9/6/2018	meeting	Agnes Ramsey, MVP Southgate	Tribal representative	presented information to tribal representatives
Chickahominy Tribe (Eastern Division)	9/6/2018	meeting	Agnes Ramsey, MVP Southgate	Tribal representative	presented information to tribal representatives
Nansemond Tribe	9/6/2018	meeting	Agnes Ramsey, MVP Southgate	Tribal representative	presented information to tribal representatives
Rappahannock Tribe	9/6/2018	meeting	Agnes Ramsey, MVP Southgate	Tribal representative	presented information to tribal representatives
Upper Mattaponi Tribe	9/6/2018	meeting	Agnes Ramsey, MVP Southgate	Tribal representative	presented information to tribal representatives
Catawba Indian Nation	9/28/2018	letter	Wenonah G. Haire/Caitlin Rogers	Alex Miller, MVP Southgate	No immediate concerns; notify tribe if artifacts or human remains are discovered
Catawba Indian Nation	9/28/2018	email	Agnes Ramsey, MVP Southgate	Caitlin Rogers	Thank you for comments
Monacan Nation	10/9/2018	call	Marion Werkheiser/Ellen Chapman, Cultural Heritage Partners	Agnes Ramsey, MVP Southgate	Monacan are interested in all Virginia counties; would like continued discussion and updated route maps
Eastern Band of Cherokee Indians	10/15/2018	email	Stephen Yerka, EBCI THPO	Agnes Ramsey, MVP Southgate	EBCI defer to other tribes and SHPOs

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

September 5, 2018

Dr. Wenonah Haire
THPO
Catawba Indian Nation
1536 Tom Steven Road
Rock Hill, SC 29730

Via FedEx

RE: MVP Southgate Project, Virginia and North Carolina.

Dear Dr. Haire:

As requested, we are pleased to provide you with hard and digital copies of the prefiling draft of MVP Southgate Project Resource Report 4, which was filed with the FERC on August 13, 2018. Please note that this version of Resource Report 4 includes some pages marked CUI//PRIV that contain sensitive cultural resource information and were omitted from the publically filed document.

We look forward to your review of this material, including the Project Unanticipated Discoveries Plan. Please don't hesitate to contact me at (713) 374-1599 or via email at alex.miller@nee.com, or Paul Webb of TRC at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com, with any questions or concerns that you or your staff might have.

Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Paul Webb, TRC

Attachments:
1) MVP Southgate Project - Resource Report 4 prefiling draft

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791

September 28, 2018

Attention: Alex V. Miller
MVP Southgate
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

Re. THPO #	TCNS #	Project Description
2018-1055-2		Prefiling draft of MVP Southgate Project Resource Report 4

Dear Mr. Miller,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

If you have questions please contact Caitlin Rogers at 803-328-2427 ext. 226, or e-mail caitlinh@ccppcrafts.com.

Sincerely,

Caitlin Rogers for

Wenonah G. Haire
Tribal Historic Preservation Officer

From: Ramsey, Agnes
To: Caitlin Haire (caitlinh@ccppcrafts.com)
Cc: Miller, Alex; Webb, Paul
Subject: MVP Southgate
Date: Friday, September 28, 2018 12:29:11 PM

Caitlin,
Thank you for forwarding the Concurrence Letter on MVP Southgate. We really appreciate the time and effort that you put into your review.

Agnes S. Ramsey
Project Manager - Tribal Relations
NextEra Energy
Phone (561) 691-2820
Cell (561) 385-9018

Webb, Paul

From: Miller, Alex <Alex.Miller@nexteraenergy.com>
Sent: Monday, October 15, 2018 7:17 PM
To: Webb, Paul
Subject: Fwd: MVP Southgate Update

FYI

---------- Forwarded message ----------
From: "**Stephen Yerka**" <syerka@nc-cherokee.com>
Date: Mon, Oct 15, 2018 at 6:15 PM -0400
Subject: RE: MVP Southgate Update
To: "Ramsey, Agnes" <Agnes.Ramsey@nexteraenergy.com>, "Russell Townsend" <RussellT@nc-cherokee.com>
Cc: "Miller, Alex" <Alex.Miller@nexteraenergy.com>

CAUTION - EXTERNAL EMAIL

Dear Agnes,
Thank you for contacting the Eastern Band of Cherokee Indians, Tribal Historic Preservation Office (EBCI THPO) to engage in communications early in the process of planning for the Southgate project extension for the MVP. After following the link to your website to find the location of the projects, I can confirm that the counties: Pittsylvania, VA; Rockingham, NC; and Alamance, NC are outside of the designated Traditional Territory for the EBCI THPO. As such we will differ to the appropriate SHPOs and Native groups that have an interest in the project. If no other Tribal entities elect to participate in consultation, please let us know and we may choose to rejoin the consultation process as the project moves forward. If the project locations are modified or are discovered to be in additional counties please contact our office to potentially reinitiate consultation. Of primary concern to the EBCI THPO is that the remains of Native people are not disturbed. Thank you again for the opportunity to participate in this process.
Have you already contacted the Cherokee Nation and United Keetoowah Band of Cherokee Indians? While the extent of the boundary that the EBCI THPO is very similar to the extent of those Nations, there are some minor differences since the perimeters are generally delineated by modern county political boundaries.

Thank you,
Stephen

Stephen J. Yerka
Historic Preservation Specialist, THPO
Eastern Band of Cherokee Indians (https://ebci.com/)
syerka@nc-cherokee.com
(828) 359-6852

Stephen J. Yerka
Historic Preservation Specialist, THPO

Eastern Band of Cherokee Indians (https://ebci.com/)
syerka@nc-cherokee.com
(828) 359-6852

-----Original Message-----
From: Stephen Yerka
Sent: Friday, June 29, 2018 11:42 AM
To: agnes.ramsey@NEE.com
Subject: Contact information

Hi Agnes,
It was so nice meeting you! Spatial data for the South Gate project please.
Thank you,
Stephen

Stephen Yerka
Historic Preservation Specialist
THPO, EBCI
(828) 359-6852

From: Ramsey, Agnes <Agnes.Ramsey@nexteraenergy.com>
Sent: Thursday, August 30, 2018 1:17 PM
To: Russell Townsend <RussellT@nc-cherokee.com>; Miranda Panther <mirapant@nc-cherokee.com>; Stephen Yerka <syerka@nc-cherokee.com>
Cc: Miller, Alex <Alex.Miller@nexteraenergy.com>
Subject: MVP Southgate Update

Russ, Miranda and Stephen,

MVP Southgate is requesting your review and comment on our draft resource reports, as they pertain to the Eastern Band of Cherokee's area of interest, within the next couple weeks. This will allow us to address concerns prior to filing our application to the Federal Energy Regulatory Commission (FERC) in early November. For public convenience, the resource reports were placed on our company webpage: http://www.mvpsouthgate.com/news-info/. They can also be found in the FERC eLibrary on the MVP Southgate docket PF18-4-000.

Please feel free to reach out to me at agnes.ramsey@nee.com or 561-691-2820, or you can contact my colleague, Alex Miller at alex.miller@nee.com or 713-374-1599, with any questions or concerns you have while performing your review.

Thank you in advance for your time,

Agnes S. Ramsey
Project Manager - Tribal Relations
NextEra Energy
Phone (561) 691-2820
Cell (561) 385-9018

Other Cultural Correspondence

MVP Southgate Project Other Cultural Resource Agency Coordination. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient	Subject
City of Danville (CLG)	7/6/2018	letter	Alex Miller, MVP Southgate	Kenneth C. Gillie, Jr., Director of Community Development	Project introduction package and request for comment
Town of Eden (CLG)	7/6/2018	letter	Alex Miller, MVP Southgate	Debra Galloway, Planner	Project introduction package and request for comment
Alamance County Historical Properties Commission (CLG)	7/6/2018	letter	Alex Miller, MVP Southgate	Jessica Dockery, Planner	Project introduction package and request for comment
Pittsylvania Historical Society	7/6/2018	letter	Alex Miller, MVP Southgate	Larry Aaron, President	Project introduction package and request for comment
Rockingham County Historical Society	7/6/2018	letter	Alex Miller, MVP Southgate	Jordan Rossi, Executive Director	Project introduction package and request for comment
Alamance County Historical Museum	7/6/2018	letter	Alex Miller, MVP Southgate	Dr. William Murray Vincent, Director	Project introduction package and request for comment
Textile Heritage Museum	7/6/2018	letter	Alex Miller, MVP Southgate	Jerri Nall	Project introduction package and request for comment
Haw River Historical Association Museum	7/6/2018	letter	Alex Miller, MVP Southgate	Gail Knauff, Director	Project introduction package and request for comment
Graham Historical Museum	7/6/2018	letter	Alex Miller, MVP Southgate	Jeanette Beaudry, Chair	Project introduction package and request for comment
Mebane Historical Society and Museum	7/6/2018	letter	Alex Miller, MVP Southgate	Traci Davenport	Project introduction package and request for comment
Graham Historical Museum	7/21/2018	email	Elaine Murrin	Alex Miller, MVP Southgate	Thank you for materials; updated contact information
Pittsylvania Historical Society	7/21/2018	email	Mary Plaster	Paul Webb, TRC	Request for more detailed mapping; updated contact information
Graham Historical Museum	7/23/2018	email	Paul Webb, TRC	Elaine Murrin	Acknowledgment of contact change; website info
Pittsylvania Historical Society	7/24/2018	phone call	Paul Webb, TRC	Mary Plaster	Acknowledge contact change, appreciate interest
Pittsylvania Historical Society	7/24/2018	email	Paul Webb, TRC	Mary Plaster	Mapping is on website
Alamance County Historical Properties Commission (CLG)	7/30/2018	email	Katherine Liles	Paul Webb, TRC	Interested in commenting; request GIS layer
Alamance County Historical Properties Commission (CLG)	7/31/2018	email	Paul Webb, TRC	Katherine Liles	Best available mapping is on website
Alamance County Historical Properties Commission (CLG)	7/31/2018	email	Marlena Isley	Paul Webb, TRC	Request GIS shapefile of Alamance County portion of route
Alamance County Historical Properties Commission (CLG)	8/3/2018	phone calls	Alex Miller, MVP Southgate	Marlena Isley	MVP Southgate to provide requested shapefile
Alamance County Historical Properties Commission (CLG)	8/3/2018	email	Alex Miller, MVP Southgate	Marlena Isley	MPV Southgate providing shapefiles
Haw River Historical Association Museum	8/7/2018	letter	Alex Miller, MVP Southgate	Buddy Boggs	resending project introduction package
Rockingham County Historical Society	8/7/2018	letter	Alex Miller, MVP Southgate	Jordan Rossi, Executive Director	resending project introduction package
Pittsylvania Historical Society	8/17/2018	email	Paul Webb, TRC	Mary Plaster	Follow-up email inquiring progress of map review
Virginia-North Carolina Piedmont Genealogical Society	8/19/2018	letter	Alex Miller, MVP Southgate	Diane Barbour, President	Project introduction package and request for comment
Afro-American Historical and Genealogical Society of North Carolina, Piedmont Triad Chapter	8/21/2018	letter	Alex Miller, MVP Southgate	Piedmont Triad Chapter	Project introduction package and request for comment
Rockingham County Historical Society	9/5/2018	letter	Alex Miller, MVP Southgate	Jordan Rossi, Executive Director	resending project introduction package
Rockingham County Historical Society	10/2/2018	voicemail	Jordan Rossi, Executive Director	Alex Miller, Paul Webb, MVP Southgate	request for more detailed mapping
Rockingham County Historical Society	10/3/2018	email	Paul Webb, TRC	Jordan Rossi, Executive Director	transmitting more detailed mapping
Rockingham County Historical Society	10/4/2018	email	Jordan Rossi, Executive Director	Paul Webb, TRC	acknowledging receipt of mapping

Webb, Paul

From: Miller, Alex <Alex.Miller@nexteraenergy.com>
Sent: Friday, August 03, 2018 4:50 PM
To: Marlena Isley
Cc: Webb, Paul; Katherine Liles
Subject: RE: MVP Southgate
Attachments: a0000000a.gdbindexes; a0000000a.gdbtable; a0000000a.gdbtablx; a0000000a.spx; a0000000b.FDO_globalid.atx; a0000000b.gdbindexes; a0000000b.gdbtable; a0000000b.gdbtablx; a0000000b.spx; a00000001.freelist; a00000001.gdbindexes; a00000001.gdbtable; a00000001.gdbtablx; a00000001.TablesByName.atx; a00000002.gdbtable; a00000002.gdbtablx; a00000003.gdbindexes; a00000003.gdbtable; a00000003.gdbtablx; a00000004.CatItemsByPhysicalName.atx; a00000004.CatItemsByType.atx; a00000004.FDO_UUID.atx; a00000004.freelist; a00000004.gdbindexes; a00000004.gdbtable; a00000004.gdbtablx; a00000004.spx; a00000005.CatItemTypesByName.atx; a00000005.CatItemTypesByParentTypeID.atx; a00000005.CatItemTypesByUUID.atx; a00000005.gdbindexes; a00000005.gdbtable; a00000005.gdbtablx; a00000006.CatRelsByDestinationID.atx; a00000006.CatRelsByOriginID.atx; a00000006.CatRelsByType.atx; a00000006.FDO_UUID.atx; a00000006.freelist; a00000006.gdbindexes; a00000006.gdbtable; a00000006.gdbtablx; a00000007.CatRelTypesByBackwardLabel.atx; a00000007.CatRelTypesByDestItemTypeID.atx; a00000007.CatRelTypesByForwardLabel.atx; a00000007.CatRelTypesByName.atx; a00000007.CatRelTypesByOriginItemTypeID.atx; a00000007.CatRelTypesByUUID.atx; a00000007.gdbindexes; a00000007.gdbtable; a00000007.gdbtablx; gdb; timestamps

I pulled out the contents from the file. Please confirm you received them.

From: Marlena Isley <Marlena.Isley@alamance-nc.com>
Sent: Friday, August 3, 2018 3:39 PM
To: Miller, Alex <Alex.Miller@nexteraenergy.com>
Cc: 'Webb, Paul' <PWebb@trcsolutions.com>; Katherine Liles <Katherine.Liles@alamance-nc.com>
Subject: RE: MVP Southgate

Hi Alex,
Thank you for sending the files. However, our email stripped the zip file. Can you un-zip and please resend the file?

v/r,
Marlena

From: Miller, Alex [mailto:Alex.Miller@nexteraenergy.com]
Sent: Friday, August 03, 2018 4:24 PM
To: Marlena Isley <Marlena.Isley@alamance-nc.com>
Cc: 'Webb, Paul' <PWebb@trcsolutions.com>; Katherine Liles <Katherine.Liles@alamance-nc.com>
Subject: RE: MVP Southgate

Hi Ms. Isley,

Thank you in advance for your review; please find the attached zip drive that includes shapefiles of our currently proposed route. As discussed, this route is subject to change and intended for the use of your office only. I look forward to connecting with you on Monday morning.

Have a great weekend,

Alex V. Miller
MVP Southgate Environmental Permitting Lead
Gas Infrastructure | NEXTera Energy Resources, LLC
O: 713.374.1599 C: 713.204.3729
Alex.Miller@NextEraEnergy.com

From: Marlena Isley <Marlena.Isley@alamance-nc.com>
Sent: Tuesday, July 31, 2018 2:11 PM
To: 'Webb, Paul' <PWebb@trcsolutions.com>; Katherine Liles <Katherine.Liles@alamance-nc.com>; Miller, Alex <Alex.Miller@nexteraenergy.com>
Cc: Teresa Harvey <Teresa.Harvey@alamance-nc.com>; Sherry Hook <Sherry.Hook@alamance-nc.com>; Katie Harper <Katie.Harper@alamance-nc.com>
Subject: RE: MVP Southgate

Hi Paul,

Is there a shapefile, feature class, or gis service layer of the Proposed Route? The online map does not include parcels which would help considerably to know which sites will be impacted.
Katherine can be reached at 336-570-4052 or I can be reached 336-570-4102.

Very Respectfully,
Marlena Isley, GISP
GIS Director | Alamance County
124 West Elm Street, Graham, NC 27253
336 570-4102 (office) | 336 266-2001 (cell)
Marlena.isley@alamance-nc.com | http://www.alamance-nc.com/

From: Webb, Paul [mailto:PWebb@trcsolutions.com]
Sent: Tuesday, July 31, 2018 3:04 PM
To: Katherine Liles <Katherine.Liles@alamance-nc.com>; alex.miller@nee.com
Cc: Teresa Harvey <Teresa.Harvey@alamance-nc.com>; Sherry Hook <Sherry.Hook@alamance-nc.com>; Marlena Isley <Marlena.Isley@alamance-nc.com>; Katie Harper <Katie.Harper@alamance-nc.com>
Subject: RE: MVP Southgate

Dear Ms. Liles –

Thanks very much for your response; we very appreciate your interest in the MVP Southgate Project.

The best available mapping is on the project website - http://www.mvpsouthgate.com/; if you go to the maps page - http://www.mvpsouthgate.com/maps/ - there is a scalable map of the route; you can zoom in and out and also change the background to an aerial photograph.

Hopefully this be useful as you look at the project in relation to historic properties. If you'd like more information or to discuss your concerns, please pass along a phone number and Alex Miller or I will give you a call.

Thanks,

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: Katherine Liles [mailto:Katherine.Liles@alamance-nc.com]
Sent: Monday, July 30, 2018 10:51 AM
To: Webb, Paul <PWebb@trcsolutions.com>; alex.miller@nee.com
Cc: Teresa Harvey <Teresa.Harvey@alamance-nc.com>; Sherry Hook <Sherry.Hook@alamance-nc.com>; Marlena Isley <Marlena.Isley@alamance-nc.com>; Katie Harper <Katie.Harper@alamance-nc.com>
Subject: MVP Southgate

Good Morning,

Alamance County is in receipt of your letter of July 6th containing initial information to request input on the proposed pipeline's potential for historic impacts within the planning area. Alamance County does contain significant cultural resources and we would like to ensure that we participate in the siting process to ensure their protection.

The attached map is very generic and it would be difficult to use for planning purposes. Could you send us a GIS layer for Alamance County with your project planning area? This would help us better match data which would provide for more meaningful input.

Thank you,
Kathy Liles
Interim Planning Director

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

August 7, 2018

Mr. Buddy Boggs
Haw River Historical Association Museum
PO Box 103
Haw River, NC 27258

RE: MVP Southgate Project, Alamance County, North Carolina

Dear Mr. Boggs:

The purpose of this letter is to provide initial information to the Haw River Historical Association Museum regarding the proposed MVP Southgate Project (Project) and to request input regarding the Project from your organization under the provisions of the National Historic Preservation Act (NHPA, 54 U.S.C. 300101 et seq.) and its implementing regulations (36 CFR Part 800 [Protection of Historic Properties]).

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission pursuant to Section 7(c) of the Natural Gas Act to construct and operate the Project. The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina (Attachment 1). Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States.

On May 3, 2018, Mountain Valley filed a request with the Federal Energy Regulatory Commission ("FERC") to use the National Environmental Policy Act pre-filing process ("Pre-filing Process") for the MVP Southgate Project and the FERC issued a Pre-Filing docket number (PF18-4-000) to place information related to the Project into the public record. On May 15, 2018, the FERC granted Mountain Valley's Pre-Filing request. The Pre-filing Process provides all stakeholders (including federal, state and local agencies, landowners, and local citizens) the opportunity for early cooperation and involvement in evaluating the project prior to filing a formal application with the FERC. Following the Pre-filing Process, Mountain Valley will file a formal application for review and approval from the FERC, and numerous other agencies. The permit proceedings, which will be conducted by these agencies, will provide additional opportunity for public input and involvement. The FERC application is currently targeted to be filed in November 2018. All other federal agency applications are planned to be filed in a similar time frame.

In North Carolina, the proposed Project facilities include approximately 26 and 20 miles of 24-inch-diameter natural gas pipeline in Rockingham and Alamance County, respectively. Aboveground facilities in Rockingham County include the Russell Compressor Station in Rockingham County, a pig launcher, two mainline valves, and two meter stations. In Alamance County, the aboveground facilities include a pig receiver, three mainline valves, and one meter station.

The Project cultural resource investigations in North Carolina will be conducted in accordance with federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the North Carolina State Historic Preservation Office's Archaeological Investigations Standards and Guidelines (2017), Architectural Survey Manual (2008), and Report Standards for

Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina.

Via this letter, we would like to solicit any information that your organization may have regarding cultural resources that could potentially be affected by the project or regarding any other concerns that you might have. Please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com. Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to receiving any input that you might have.

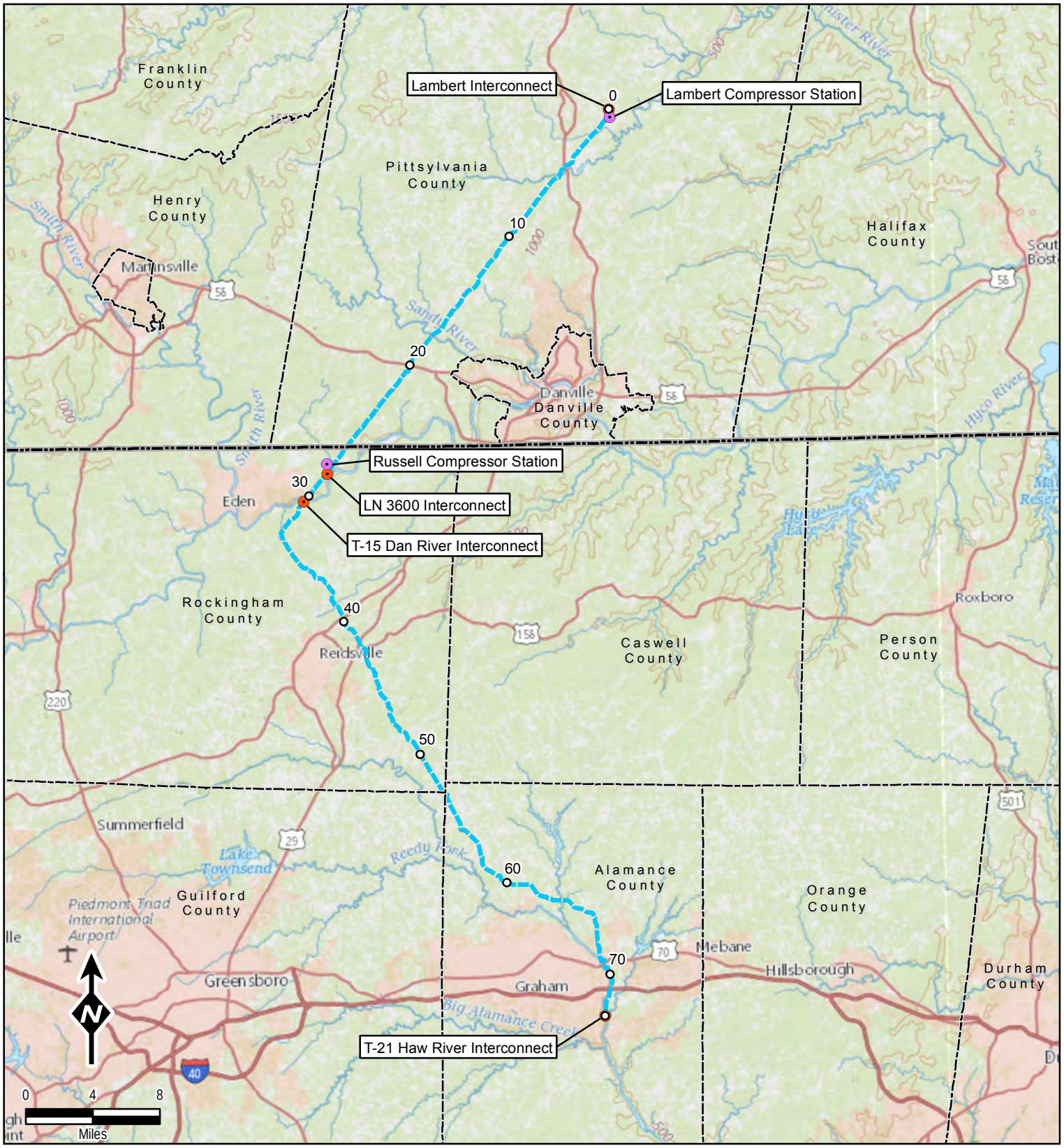
Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Richard W. Estabrook MVP Southgate
John Zimmer, TRC
Paul Webb, TRC

Attachment:
1) Project Location Map

MVP SOUTHGATE



Legend

- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Meter Station
- County Boundary
- State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Project Overview Map

TRC
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_SouthgateAgency_Consult_Project_Overview.mxd

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

August 7, 2018

Ms. Jordan Rossi
Executive Director
Rockingham County Historical Society
1086 NC Highway 65
Reidsville, NC 27320

RE: MVP Southgate Project, Rockingham County, North Carolina

Dear Ms. Rossi:

The purpose of this letter is to provide initial information to the Rockingham County Historical Society regarding the proposed MVP Southgate Project (Project) and to request input regarding the Project from your organization under the provisions of the National Historic Preservation Act (NHPA, 54 U.S.C. 300101 et seq.) and its implementing regulations (36 CFR Part 800 [Protection of Historic Properties]).

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission pursuant to Section 7(c) of the Natural Gas Act to construct and operate the Project. The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina (Attachment 1). Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States.

On May 3, 2018, Mountain Valley filed a request with the Federal Energy Regulatory Commission ("FERC") to use the National Environmental Policy Act pre-filing process ("Pre-filing Process") for the MVP Southgate Project and the FERC issued a Pre-Filing docket number (PF18-4-000) to place information related to the Project into the public record. On May 15, 2018, the FERC granted Mountain Valley's Pre-Filing request. The Pre-filing Process provides all stakeholders (including federal, state and local agencies, landowners, and local citizens) the opportunity for early cooperation and involvement in evaluating the project prior to filing a formal application with the FERC. Following the Pre-filing Process, Mountain Valley will file a formal application for review and approval from the FERC, and numerous other agencies. The permit proceedings, which will be conducted by these agencies, will provide additional opportunity for public input and involvement. The FERC application is currently targeted to be filed in November 2018. All other federal agency applications are planned to be filed in a similar time frame.

In North Carolina, the proposed Project facilities include approximately 26 and 20 miles of 24-inch-diameter natural gas pipeline in Rockingham and Alamance County, respectively. Aboveground facilities in Rockingham County include the Russell Compressor Station in Rockingham County, a pig launcher, two mainline valves, and two meter stations. In Alamance County, the aboveground facilities include a pig receiver, three mainline valves, and one meter station.

The Project cultural resource investigations in North Carolina will be conducted in accordance with federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the North Carolina State Historic Preservation Office's Archaeological Investigations Standards and Guidelines (2017), Architectural Survey Manual (2008), and Report Standards for

Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina.

Via this letter, we would like to solicit any information that your organization may have regarding cultural resources that could potentially be affected by the project or regarding any other concerns that you might have. Please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com. Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to receiving any input that you might have.

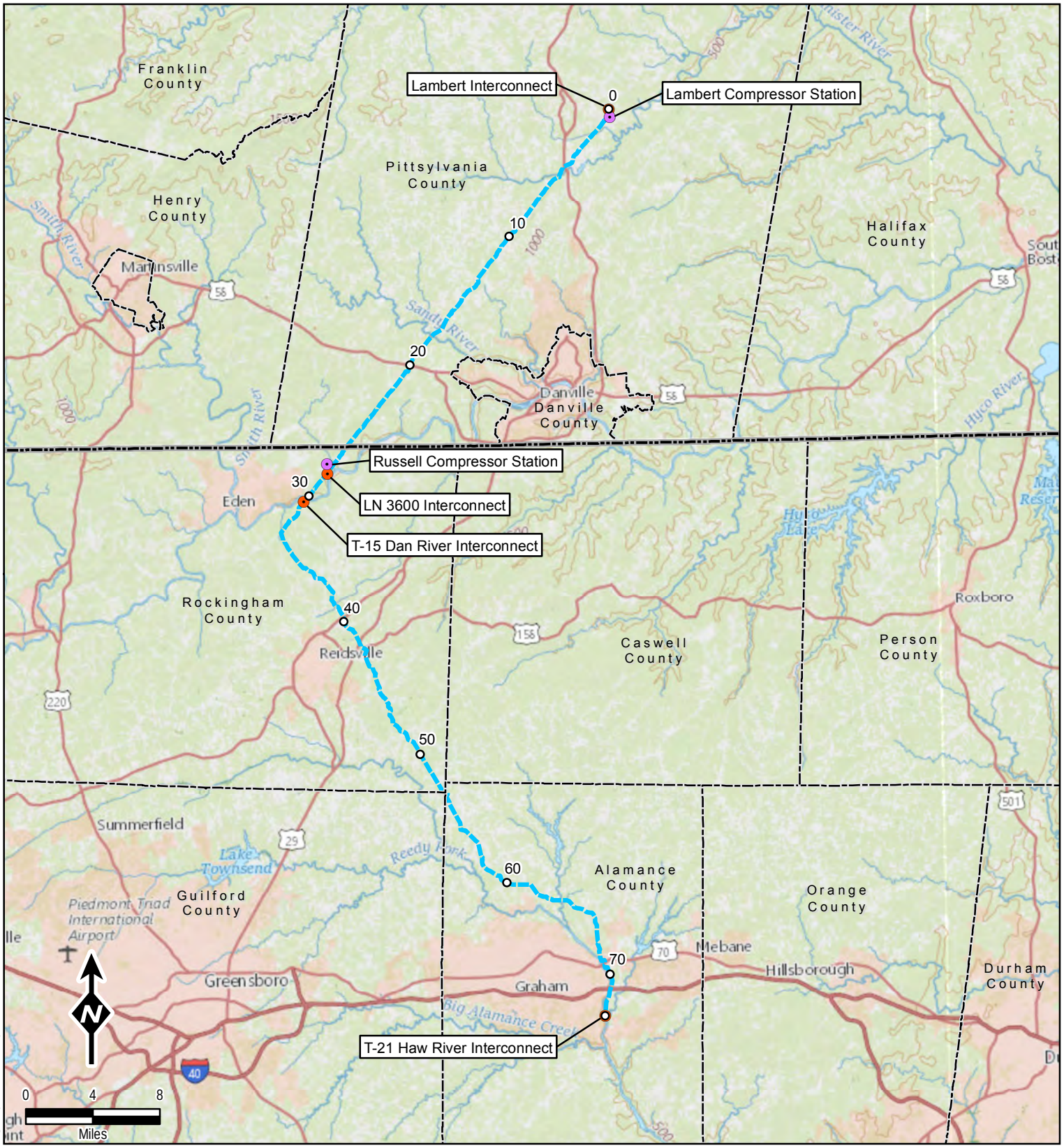
Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Richard W. Estabrook MVP Southgate
John Zimmer, TRC
Paul Webb, TRC

Attachment:
1) Project Location Map

MVP SOUTHGATE



Legend

- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Meter Station
- County Boundary
- State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Project Overview Map

TRC
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_SouthgateAgency_Consult_Project_Overview.mxd

Webb, Paul

From: Webb, Paul
Sent: Friday, August 17, 2018 1:55 PM
To: marycp5@verizon.net
Subject: FW: MVP southgate project location map

Dear Ms. Plaster –

I hope all is well with you; I just wanted to check and see if you had the information that you needed for the Society's review.

Also, if you are interested we can try to arrange to have someone from the project attend to provide an overview and answer any questions, just let me know.

Thanks,

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

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From: Webb, Paul
Sent: Tuesday, July 24, 2018 9:43 AM
To: RS PLASTER <marycp5@verizon.net>
Cc: alex.miller@nee.com
Subject: RE: MVP southgate project location map

Dear Ms. Plaster –

I enjoyed speaking with you this morning, and appreciate the Historical Society's interest in the MVP Southgate Project.

As we discussed, the best available mapping is on the project website - http://www.mvpsouthgate.com/; if you go to the maps page - http://www.mvpsouthgate.com/maps/ - there is a scalable map of the route; you can zoom in and out and also change the background to an aerial photograph.

I hope this is useful and look forward to hearing the Society's input; if you have any problems with the map or any questions feel free to contact me via phone or email.

Thanks,

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

Follow us on LinkedIn or Twitter | www.trcsolutions.com

From: RS PLASTER [mailto:marycp5@verizon.net]
Sent: Saturday, July 21, 2018 2:48 PM
To: Webb, Paul <PWebb@trcsolutions.com>
Cc: alex.miller@nee.com
Subject: MVP southgate project location map

As President of the Pittsylvania Historical Society, I respond to your July, 2018 certified mail (to former President Larry Aaron – now a nursing home resident) to request a more definitive map (with appropriate designations and/or descriptions) of the 26 miles depicted by a blue line for Pittsylvania County, Virginia, in the "Project Overview Map." Our organization's next meeting will be the third Monday in August. We wish to consider input about the proposed route, as requested. However, more precise information is required to determine designated sites before addressing impact and proximity to historic properties. I contacted Pittsylvania County administration to learn it has no additional map information from you to share. Therefore, know our appreciation for your consideration of this notice requesting assistance for a prompt reply.

Mary Catherine Plaster 434-432-8945

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

August 19, 2018

Ms. Diane Barbour
Virginia-North Carolina Piedmont Genealogical Society
P.O. Box 1103
Danville, VA 24543-1103

RE: MVP Southgate Project, Pittsylvania County, Virginia

Dear Ms. Barbour:

The purpose of this letter is to provide initial information to the Virginia-North Carolina Piedmont Genealogical Society regarding the proposed MVP Southgate Project (Project) and to request input regarding the Project from your organization under the provisions of the National Historic Preservation Act (NHPA, 54 U.S.C. 300101 et seq.) and its implementing regulations (36 CFR Part 800 [Protection of Historic Properties]).

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission pursuant to Section 7(c) of the Natural Gas Act to construct and operate the Project. The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina (Attachment 1). Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States.

On May 3, 2018, Mountain Valley filed a request with the Federal Energy Regulatory Commission ("FERC") to use the National Environmental Policy Act pre-filing process ("Pre-filing Process") for the MVP Southgate Project and the FERC issued a Pre-Filing docket number (PF18-4-000) to place information related to the Project into the public record. On May 15, 2018, the FERC granted Mountain Valley's Pre-Filing request. The Pre-filing Process provides all stakeholders (including federal, state and local agencies, landowners, and local citizens) the opportunity for early cooperation and involvement in evaluating the project prior to filing a formal application with the FERC. Following the Pre-filing Process, Mountain Valley will file a formal application for review and approval from the FERC, and numerous other agencies. The permit proceedings, which will be conducted by these agencies, will provide additional opportunity for public input and involvement. The FERC application is currently targeted to be filed in November 2018. All other federal agency applications are planned to be filed in a similar time frame.

In Virginia, the proposed Project facilities in Pittsylvania County include approximately 26 miles of 24-inch-diameter natural gas pipeline, the Lambert Compressor Station, a pig launcher and receiver, three mainline valves, and one meter station. The Project cultural resource investigations in Virginia will be conducted in accordance with federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the VDHR's Guidelines for Conducting Historic Resources Survey in Virginia (2017).

Via this letter, we would like to solicit any information that your organization may have regarding cultural resources that could potentially be affected by the project or regarding any other concerns that you might have. Please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com.

Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to receiving any input that you might have.

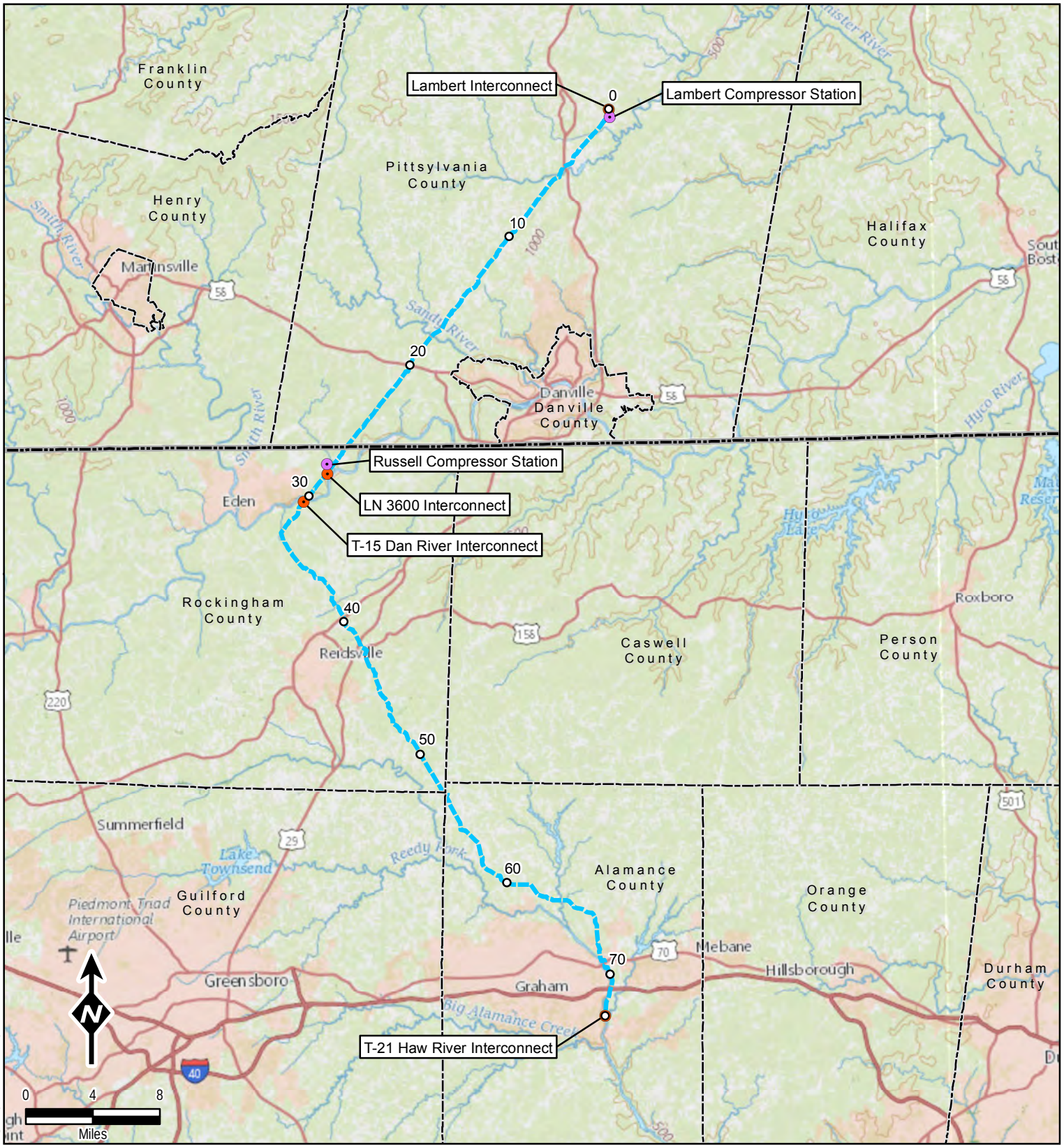
Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Richard W. Estabrook MVP Southgate
John Zimmer, TRC
Paul Webb, TRC

Attachment:
1) Project Location Map

MVP SOUTHGATE



Legend

- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Meter Station
- County Boundary
- State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Project Overview Map

TRC
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_SouthgateAgency_Consult_Project_Overview.mxd

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

August 21, 2018

Afro-American Historical and Genealogical Society of North Carolina, Inc.
P.O. Box 36254
Greensboro, NC 27416

RE: MVP Southgate Project, Rockingham and Alamance Counties, North Carolina

Dear Sir or Madam:

The purpose of this letter is to provide initial information to the North Carolina Piedmont Triad Chapter of the Afro-American Historical and Genealogical Society of North Carolina regarding the proposed MVP Southgate Project (Project) and to request input regarding the Project from your organization, under the provisions of the National Historic Preservation Act (NHPA, 54 U.S.C. 300101 et seq.) and its implementing regulations (36 CFR Part 800 [Protection of Historic Properties]).

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission pursuant to Section 7(c) of the Natural Gas Act to construct and operate the Project. The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina (Attachment 1). Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States.

On May 3, 2018, Mountain Valley filed a request with the Federal Energy Regulatory Commission ("FERC") to use the National Environmental Policy Act pre-filing process ("Pre-filing Process") for the MVP Southgate Project and the FERC issued a Pre-Filing docket number (PF18-4-000) to place information related to the Project into the public record. On May 15, 2018, the FERC granted Mountain Valley's Pre-Filing request. The Pre-filing Process provides all stakeholders (including federal, state and local agencies, landowners, and local citizens) the opportunity for early cooperation and involvement in evaluating the project prior to filing a formal application with the FERC. Following the Pre-filing Process, Mountain Valley will file a formal application for review and approval from the FERC, and numerous other agencies. The permit proceedings, which will be conducted by these agencies, will provide additional opportunity for public input and involvement. The FERC application is currently targeted to be filed in November 2018. All other federal agency applications are planned to be filed in a similar time frame.

In North Carolina, the proposed Project facilities include approximately 26 and 20 miles of 24-inch-diameter natural gas pipeline in Rockingham and Alamance County, respectively. Aboveground facilities in Rockingham County include the Russell Compressor Station in Rockingham County, a pig launcher, two mainline valves, and two meter stations. In Alamance County, the aboveground facilities include a pig receiver, three mainline valves, and one meter station.

The Project cultural resource investigations in North Carolina will be conducted in accordance with federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the North Carolina State Historic Preservation Office's Archaeological Investigations Standards and Guidelines (2017), Architectural Survey Manual (2008), and Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina.

Via this letter, we would like to solicit any information that your organization may have regarding cultural resources that could potentially be affected by the project or regarding any other concerns that you might have. Please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com. Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to receiving any input that you might have.

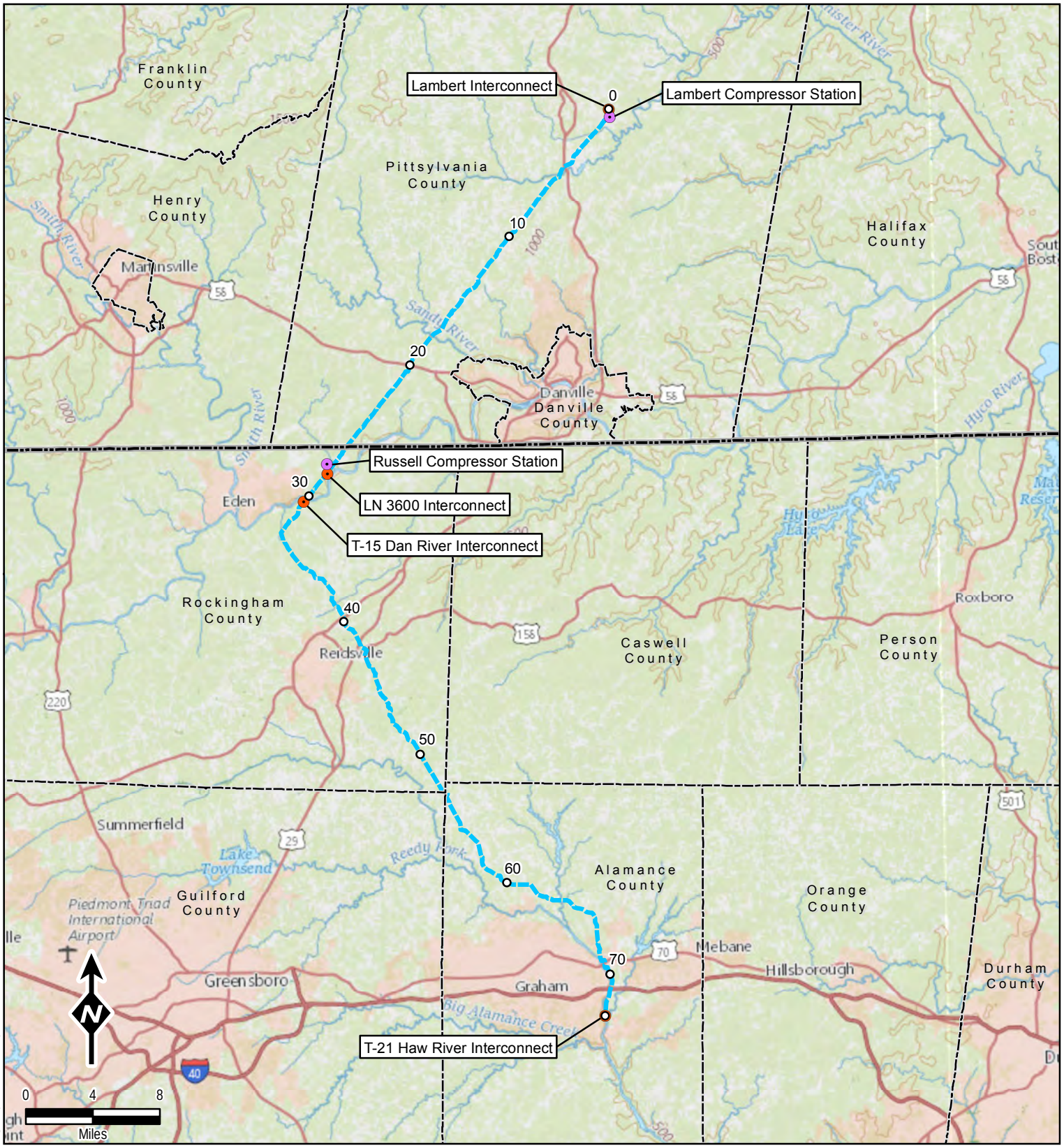
Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Richard W. Estabrook MVP Southgate
John Zimmer, TRC
Paul Webb, TRC

Attachment:
1) Project Location Map

MVP SOUTHGATE



Legend

- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Meter Station
- County Boundary
- State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Project Overview Map

TRC
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_SouthgateAgency_Consult_Project_Overview.mxd

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

September 5, 2018

Ms. Jordan Rossi
Executive Director
Rockingham County Historical Society
PO Box 84
Wentworth, NC 27375

RE: MVP Southgate Project, Rockingham County, North Carolina

Dear Ms. Rossi:

The purpose of this letter is to provide initial information to the Rockingham County Historical Society regarding the proposed MVP Southgate Project (Project) and to request input regarding the Project from your organization under the provisions of the National Historic Preservation Act (NHPA, 54 U.S.C. 300101 et seq.) and its implementing regulations (36 CFR Part 800 [Protection of Historic Properties]).

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission pursuant to Section 7(c) of the Natural Gas Act to construct and operate the Project. The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina (Attachment 1). Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States.

On May 3, 2018, Mountain Valley filed a request with the Federal Energy Regulatory Commission ("FERC") to use the National Environmental Policy Act pre-filing process ("Pre-filing Process") for the MVP Southgate Project and the FERC issued a Pre-Filing docket number (PF18-4-000) to place information related to the Project into the public record. On May 15, 2018, the FERC granted Mountain Valley's Pre-Filing request. The Pre-filing Process provides all stakeholders (including federal, state and local agencies, landowners, and local citizens) the opportunity for early cooperation and involvement in evaluating the project prior to filing a formal application with the FERC. Following the Pre-filing Process, Mountain Valley will file a formal application for review and approval from the FERC, and numerous other agencies. The permit proceedings, which will be conducted by these agencies, will provide additional opportunity for public input and involvement. The FERC application is currently targeted to be filed in November 2018. All other federal agency applications are planned to be filed in a similar time frame.

In North Carolina, the proposed Project facilities include approximately 26 and 20 miles of 24-inch-diameter natural gas pipeline in Rockingham and Alamance County, respectively. Aboveground facilities in Rockingham County include the Russell Compressor Station in Rockingham County, a pig launcher, two mainline valves, and two meter stations. In Alamance County, the aboveground facilities include a pig receiver, three mainline valves, and one meter station.

The Project cultural resource investigations in North Carolina will be conducted in accordance with federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the North Carolina State Historic Preservation Office's Archaeological Investigations Standards and Guidelines (2017), Architectural Survey Manual (2008), and Report Standards for

Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina.

Via this letter, we would like to solicit any information that your organization may have regarding cultural resources that could potentially be affected by the project or regarding any other concerns that you might have. Please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com. Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to receiving any input that you might have.

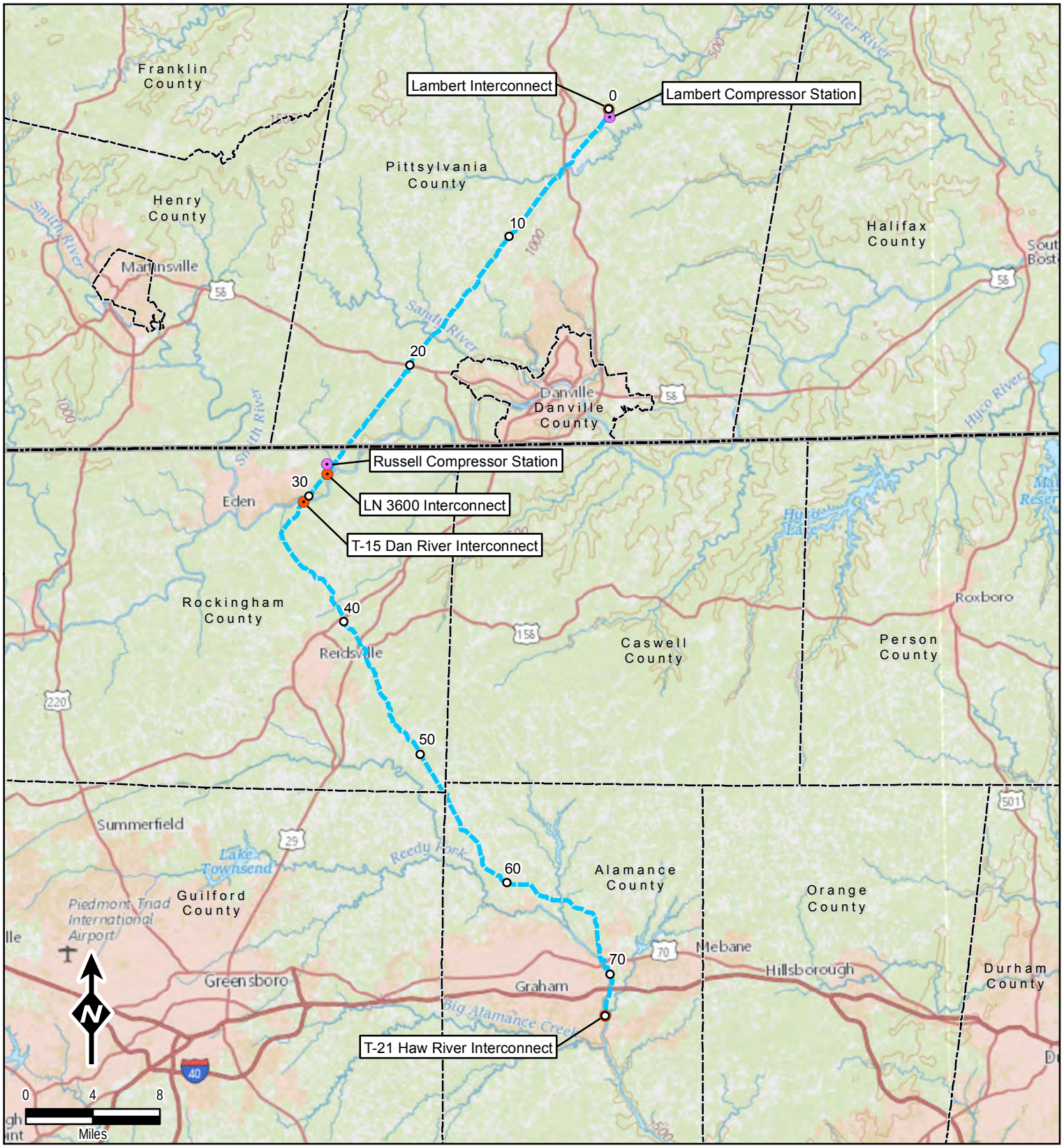
Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Richard W. Estabrook MVP Southgate
John Zimmer, TRC
Paul Webb, TRC

Attachment:
1) Project Location Map

MVP SOUTHGATE



Legend

- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Meter Station
- County Boundary
- State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Project Overview Map

TRC
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_SouthgateAgency_Consult_Project_Overview.mxd

Webb, Paul

From: Webb, Paul
Sent: Wednesday, October 3, 2018 3:48 PM
To: 'jordan@themarconline.org'
Cc: 'Miller, Alex'
Subject: MVP Southgate .kmz file
Attachments: MVP_Southgate_ctrline_20180817.kmz

Dear Ms. Rossi –

Alex Miller passed along your request for more detailed mapping of the MPV Southgate route for use by the Museum and Archives of Rockingham County/Rockingham Historical Society in examining the potential route and its relationship to historic sites and other cultural resources.

I'm attaching a .kmz of the centerline that can be viewed in Google Earth in the hopes that it will be helpful; if you have any questions or comments, or need anything, please don't hesitate to let one of us know.

Thanks,

Paul Webb
Cultural Resources Program Leader

50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418

Follow us on LinkedIn or Twitter | www.trcsolutions.com

Webb, Paul

From: Jordan Rossi <jordanelrossi@gmail.com>
Sent: Thursday, October 4, 2018 11:29 AM
To: Webb, Paul
Subject: Re: MVP Southgate .kmz file
Attachments: image001.jpg

Thank you for sending this along.

Jordan

On Wed, Oct 3, 2018 at 3:48 PM Webb, Paul <PWebb@trcsolutions.com> wrote:

> Dear Ms. Rossi –
>
> Alex Miller passed along your request for more detailed mapping of the MPV Southgate route for use by the Museum and Archives of Rockingham County/Rockingham Historical Society in examining the potential route and its relationship to historic sites and other cultural resources.
>
> I'm attaching a .kmz of the centerline that can be viewed in Google Earth in the hopes that it will be helpful; if you have any questions or comments, or need anything, please don't hesitate to let one of us know.
>
> Thanks,
>
> Paul Webb
>
> Cultural Resources Program Leader
>
> 50101 Governors Drive, Suite 250, Chapel Hill, NC 27517
>
> T: 919.530.8446 x222| F: 919.530.8525 | C: 919.414.3418
>
> Follow us on LinkedIn or Twitter | www.trcsolutions.com

--
Jordan Rossi, *Executive Director*
Museum and Archives of Rockingham County
(336) 634-4949
www.themarconline.org

Non-Federally Tribal Correspondence

MVP Southgate Project Coordination with Non-Federally - Recognized Tribes. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient(s)	Subject
NC Commission on Indian Affairs	7/12/2018	email	Agnes Ramsey, NextEra	Gregory Richardson	MVP Southgate Pipeline Project - Tribal Relations Outreach
NC Commission on Indian Affairs	7/25/2018	Call	Agnes Ramsey, NextEra	Gregory Richardson	Coordination of project introduction call
NC Commission on Indian Affairs	7/31/2018	Call	Agnes Ramsey, NextEra	Gregory Richardson	Phone Discussion of Southgate Project and outreach plans, guidance to reach out to each individual tribe recognized by the state of NC
NC Commission on Indian Affairs	7/31/2018	email	Gregory Richardson	Agnes Ramsey, NextEra	Thank you for coordination call and invitation to participate in the NC CoIA Annual Meeting in September, 2018
Cohaire Tribe	8/2/2018	email	Agnes Ramsey, NextEra	Greg Jacobs	Call regarding upcoming project introductory package
Haliwa-Saponi Indian Tribe	8/2/2018	email	Agnes Ramsey, NextEra	Archie Lynch	Call regarding upcoming project introductory package
Lumbee Tribe	8/2/2018	email	Agnes Ramsey, NextEra	Dr. Frieda Porter	Call regarding upcoming project introductory package
Meherrin Indian Tribe	8/2/2018	email	Agnes Ramsey, NextEra	Chief Wayne Brown	Call regarding upcoming project introductory package
Occaneechi Band of the Saponi Nation	8/2/2018	email	Agnes Ramsey, NextEra	Tony Hayes	Call regarding upcoming project introductory package
Sappony Tribe	8/2/2018	email	Agnes Ramsey, NextEra	Dante Desiderio	Call regarding upcoming project introductory package
Waccamaw Siouan Tribe	8/2/2018	email	Agnes Ramsey, NextEra	Brenda Moore	emailing project introductory package
Cheroenhaka (Nottoway) Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Chief Walt "Red Hawk" Brown	emailing project introductory package
Cohaire Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Greg Jacobs	emailing project introductory package
Haliwa-Saponi Indian Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Archie Lynch	emailing project introductory package
Lumbee Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Dr. Frieda Porter	emailing project introductory package
Mattaponi Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Chief Mark Custalow	emailing project introductory package
Meherrin Indian Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Chief Wayne Brown	emailing project introductory package
Nottoway of Virginia	8/3/2018	email	Agnes Ramsey, NextEra	Chief Lynette Alston	emailing project introductory package
Occaneechi Band of the Saponi Nation	8/3/2018	email	Agnes Ramsey, NextEra	Tony Hayes	emailing project introductory package
Patawomeck Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Chief John R. Lightner	emailing project introductory package
Sappony Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Dante Desiderio	emailing project introductory package
Waccamaw Siouan Tribe	8/3/2018	email	Agnes Ramsey, NextEra	Brenda Moore	emailing project introductory package
Occaneechi Band of the Saponi Nation	8/6/2018	meeting	Agnes Ramsey, NextEra	Tony Hayes	Introduction at Alamance County Commission meeting; made plans to meet
Sappony Tribe	8/7/2018	email	Marion Werkheiser, Cultural Heritage Partners	Agnes Ramsey, NextEra	introductory email from Ms. Werkheiser stating that her firm is representing Sappony Tribe and Monacan Indian Nation regarding MVP Southgate
Sappony Tribe	8/9/2018	call, email	Agnes Ramsey, NextEra	Marion Werkheiser, Cultural Heritage Partners	coordinating upcoming call
Occaneechi Band of the Saponi Nation	8/14/2018	email	Agnes Ramsey, NextEra	Tony Hayes	follow-up on review of materials sent
Sappony Tribe	8/15/2018	call, email	Agnes Ramsey, NextEra	Marion Werkheiser, Cultural Heritage Partners	introductory discussion regarding role of Ms. Werkheiser and interest of tribe in the project
Occaneechi Band of the Saponi Nation	8/17/2018	email	Tony Hayes	Agnes Ramsey, NextEra	CC: of letter sent by Mr. Hayes to Alamance County Commission
Occaneechi Band of the Saponi Nation	8/20/2018	email	Agnes Ramsey, NextEra	Tony Hayes	setting up call to discuss Occaneechi Band letter to Alamance County commission
Occaneechi Band of the Saponi Nation	8/20/2018	call	Agnes Ramsey, NextEra	Tony Hayes	Call to discuss Occaneechi Band letter to Alamance County commission
NC Commission on Indian Affairs	8/22/2018	call	Agnes Ramsey, NextEra	Gregory Richardson	checking on status of NC Commission on Indian Affairs meeting
Occaneechi Band of the Saponi Nation	8/24/2018	call	Tony Hayes	Agnes Ramsey, NextEra	Invitation to speak at next Occaneechi Band meeting on September 13, 2018
NC Commission on Indian Affairs	8/27/2018	email	Gregory Richardson	Agnes Ramsey, NextEra	confirmation of MVP Southgate presentation at NC Commission on Indian Affairs meeting
NC Commission on Indian Affairs	8/31/2018	email	Agnes Ramsey, NextEra	Gregory Richardson	availability of RR 4 and request for tribal comment
Occaneechi Band of the Saponi Nation	8/31/2018	email	Agnes Ramsey, NextEra	Tony Hayes, Vickie Jeffers	availability of RR 4 and request for tribal comment
Cohaire Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Greg Jacobs	availability of RR 4 and request for tribal comment
Haliwa-Saponi Indian Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Archie Lynch	availability of RR 4 and request for tribal comment
Lumbee Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Dr. Frieda Porter	availability of RR 4 and request for tribal comment
Meherrin Indian Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Chief Wayne Brown	availability of RR 4 and request for tribal comment
Sappony Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Dante Desiderio	availability of RR 4 and request for tribal comment
Waccamaw Siouan Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Brenda Moore	availability of RR 4 and request for tribal comment

MVP Southgate Project Coordination with Non-Federally - Recognized Tribes. Updated through October 15, 2018

Affiliation	Date	Type	Sender	Recipient(s)	Subject
Cheroenhaka (Nottoway) Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Chief Walt "Red Hawk" Brown	availability of RR 4 and request for tribal comment
Mattaponi Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Chief Mark Custalow	availability of RR 4 and request for tribal comment
Nottoway of Virginia	8/31/2018	email	Agnes Ramsey, NextEra	Chief Lynette Alston	availability of RR 4 and request for tribal comment
Patawomeck Tribe	8/31/2018	email	Agnes Ramsey, NextEra	Chief John R. Lightner	availability of RR 4 and request for tribal comment
NC Commission on Indian Affairs	9/7/2018	meeting	Kyle Martin, Agnes Ramsey, Nextera	North Carolina Commission on Indian Affairs; North Carolina state- and federally-recognized tribes	presentation on project
Occaneechi Band of the Saponi Nation	10/2/2018	call	Agnes Ramsey, NextEra	Tony Hayes	brief discussion of planned Occaneechi Band letter to the FERC
Occaneechi Band of the Saponi Nation	10/4/2018	email	Agnes Ramsey, NextEra	Tony Hayes	planning presentation to Occaneechi band on November 8, 2018
Occaneechi Band of the Saponi Nation	10/5/2018	email	Tony Hayes	Agnes Ramsey, NextEra	planning presentation to Occaneechi band on November 8, 2018
Sappony Tribe	10/9/2018	call	Marion Werkheiser/Ellen Chapman, Cultural Heritage Partners	Agnes Ramsey, MVP Southgate	Sappony are interested in Dan, Haw, and Hyco River watersheds; would like continued discussion and updated route maps

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-B

Project Map Showing Survey Areas and Survey Status

(Privileged and Confidential Information, CUI//PRIV)

(Provided Under Separate Cover)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-C

Plan for Unanticipated Discoveries of Historic Properties and Human Remains

Appendix 4-C

Plan for Unanticipated Discoveries of Historic Properties and Human Remains

MVP Southgate Project

FERC Docket No. CP19-XX-000

November 2018

TABLE OF CONTENTS

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Southgate Project" or "Project"). The Southgate Project facilities will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina.

Mountain Valley recognizes that, despite the extensive archaeological field investigations that are conducted prior to Project construction, it is possible that potentially significant cultural resources could be discovered during construction, especially during excavation activities. The Southgate Project recognizes its role to protect and preserve cultural resources that may be found during construction in accordance with federal and state regulations. Cultural resources in this context are defined as archaeological sites, objects, and features and include human remains and associated or unassociated funerary objects.

This *Plan for Unanticipated Discoveries of Historic Properties and Human Remains* ("Plan") was developed on behalf of the Southgate Project and in consultation with the Virginia Department of Historic Resources ("VDHR") and the North Carolina Historic Preservation Office ("NC HPO"), which represent the State Historic Preservation Officers ("SHPOs") in Virginia and North Carolina, respectively. This Plan summarizes the approach the Project will follow to address the discovery of archaeological finds or human remains during construction activities within the Project's Area of Potential Effects ("APE").

2.0 GUIDELINES, REGULATIONS, AND LEGISLATION FOR UNANTICIPATED DISCOVERIES OF CULTURAL RESOURCES AND HUMAN REMAINS

The stipulations of the Plan as set forth below are in accordance with the current guidelines detailed in the following federal and state guidelines, regulations, and legislation:

2.1 Federal

- Section 106 of the *National Historic Preservation Act ("NHPA"),* as amended (54 United States Code ("USC") 306101 et seq.)
- Secretary of the Interior's *Standards for Archeology and Historic Preservation* (48 FR 44716-42)
- Advisory Council for Historic Preservation's ("ACHP's"): *Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects* (ACHP February 23, 2007)
- Federal Energy Regulatory Commission's ("FERC") Office of Pipeline Regulations *Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects* (FERC 2017);

2.2 Virginia

- VDHR's *Guidelines for Conducting Historic Resources Survey in Virginia* (2017)
- Virginia Antiquities Act, (§ 10.1-2305 Code of Virginia), "Permit required for the archaeological excavation of human remains;"

2.3 North Carolina

- North Carolina Office of State Archaeology's ("OSA's") *Archaeological Investigations Standards and Guidelines* (OSA December 2017)

- North Carolina General Statute 70-3, *The Unmarked Human Burial and Skeletal Remains Protection Act.*

3.0 CONSULTATION WITH SHPOS AND NATIVE AMERICAN TRIBES

The Southgate Project initiated consultation with VDHR and NC HPO on April 27, 2018. The Project is also contacting federally-recognized Native American Tribes to solicit their concerns and input regarding potential Project effects to historic properties, tribal resources, and human remains. Contact information for the VDHR, NC HPO, and the tribes is included in Section 5.0 of this Plan. In the event that cultural resources and/or human remains are encountered during construction, the Project will notify the VDHR or NC HPO (as applicable), those tribes that have asked to be consulted in the event of a discovery ("Interested Tribes"), any other consulting parties for the Project (potentially including non-federally recognized tribes or other organizations), and/or law enforcement, as outlined below.

4.0 UNANTICIPATED DISCOVERY PROTOCOL

4.1 Cultural Resources Training

The Southgate Project requires that its employees and contractors have a basic understanding of the nature of cultural resources, and all Project inspectors and construction contractor personnel will be given basic training in cultural resource site recognition prior to beginning work on the Project.

The cultural resource training will review the Project's commitments regarding cultural resources compliance and provide examples of the types of archaeological resources that may be encountered during construction. In addition, the training program will emphasize the exact procedures to be followed, as outlined in this Plan, regarding actions to be taken and notifications required in the event of a significant site discovery or a discovery of human remains during construction.

The training will ensure that Southgate Project personnel and construction contractors understand the extent of the archaeological survey program that has been performed for the Project and are fully aware of the distinction between sites that have been located and "cleared" under the cultural resource program (i.e., sites that have determined to be non-significant after different levels of investigation or have already undergone data recovery excavations) and new discoveries that may be made during the construction process.

4.2 Notification and Assessment Procedures (Not Involving Human Remains or Funerary Objects)

The following steps will to be followed in the event an unanticipated discovery (not involving human remains or funerary objects) is made during Southgate Project construction:

1 The Contractor will immediately notify the Lead Environmental Inspector ("EI") (or Chief Inspector, if the Lead EI is not immediately available) of an unanticipated discovery.

2 The Lead EI or Chief Inspector will direct a *Stop Task Order* to the Contractor's Site Foreman to ensure that the activity within 100 feet of the unanticipated discovery ceases and will instruct the Contractor to flag or fence off the discovery location and take any necessary measures to ensure site security. Any unanticipated discovery made on a weekend or overnight hours will be protected with security fencing until all appropriate parties are notified of the discovery. The

Contractor will not restart work in the area of the find until the Chief Inspector has agreed in writing that work can resume.

3 The Lead EI will inform the Project Archaeologist ("PA") of the discovery. If the PA determines that the location is not an archaeological site, or determines that the find is a previously known and cleared archaeological resource and that the find would not alter the current understanding of the resource, the PA will report that documentation to the Lead EI. The Lead EI will document that determination and notify the Chief Inspector to resume work.

4 If the PA determines that the find is not a previously known and cleared resource, or potentially represents information that would alter the current understanding of a previously known and cleared archaeological resource, she/he will notify the Project. Within 24 hours of notification, the PA will conduct a preliminary field assessment of the discovery to determine if it is potentially a significant archaeological site.

5 If based on that inspection the PA determines that the discovery is an isolated find or otherwise not a potentially significant archaeological site, the PA will report that determination to the EI. The Lead EI will document that determination and notify the Chief Inspector to resume work.

6 If the PA determines that the find is a newly identified archaeological site, or represents information that would alter the current understanding of a previously known and cleared archaeological resource, the PA will inform the Southgate Project, the Lead EI, and the Chief Inspector of that determination.

   a. Within 24 hours of that determination, the Project will notify the FERC, the relevant SHPO, and the Interested Tribes of the determination. Work within the flagged or fenced off discovery location will not resume until authorized by the FERC.

   b. Following consultation with the relevant SHPO, the FERC, and Interested Tribes, the PA will evaluate the discovery and assess its horizontal and vertical extent, cultural association(s), and integrity.

   c. The PA will inform the Project, the Lead EI, the Chief Inspector, the FERC, the relevant SHPO, and the Interested Tribes of the findings and recommendations. If the FERC, in consultation with the SHPO and Interested Tribes, determines that the find is not eligible for the NRHP, the Chief Inspector will grant clearance for construction to resume. If the FERC determines that the find is eligible for the NRHP, the Project will authorize the PA or their designee to develop an archaeological treatment plan that will be submitted to the FERC, the relevant SHPO, and Interested Tribes (if appropriate) for review and comment.

   d. Upon authorization by the FERC, the Project will implement the treatment plan.

   e. At the conclusion of archaeological fieldwork, a meeting or site visit may be held with the FERC, the Project, the relevant SHPO, and the Interested Tribes to review the results of the work accomplished.

f. Upon receiving written acceptance of the results of the implemented treatment from the FERC, the Lead EI and Chief Inspector will grant clearance to the construction team to resume work.

4.3 Notification and Treatment Procedures (Human Remains or Funerary Objects)

The Southgate Project will treat any human remains encountered during the Project in a manner guided by the ACHP's *Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects* (2007) and by the relevant state laws and guidelines. In particular, human remains must be treated with the utmost dignity and respect at all times. Human remains and/or associated artifacts (including grave markers, coffin hardware, or funerary objects) will be left in place and not disturbed, and no unnecessary photographs will be taken. No skeletal remains or materials associated with the remains will be collected or removed until appropriate consultation has taken place and a plan of action has been developed. All personnel involved with the discovery will maintain confidentiality concerning the remains, and any press contacts will be referred to appropriate Project or agency personnel.

The following measures will be taken in the event an unanticipated discovery of potential or confirmed human remains or funerary objects is made during Project construction.

1 The Contractor will immediately notify the Lead EI (or Chief Inspector, if the Lead EI is not immediately available) of the discovery.

2 The Lead EI or Chief Inspector will direct a *Stop Task Order* to the Contractor's Site Foreman to ensure that work within 100 feet of the discovery ceases. The Lead EI or Chief Inspector will instruct the Contractor to flag or fence off the discovery location and take any necessary measures to ensure site security. Work will not resume in the area of the find until the Chief Inspector grants clearance to recommence work (see below).

3 All human remains and/or funerary items will be left in place and treated with dignity and respect. All efforts will be made to exclude the general public from viewing any gravesites and/or funerary objects.

4 The Lead EI will contact the Project and the PA on the day of the discovery, and the PA will examine the discovery within 24 hours of notification. If the PA determines that the finds are human remains or funerary items, the PA will immediately notify the Project.

   For finds in Virginia, the Project will immediately notify the FERC, the landowner, and the VDHR of the find, as well as the Virginia State Police.

   For finds in North Carolina, the Project will immediately notify the FERC, the landowner, the County Medical Examiner, and the North Carolina State Archaeologist, who shall conduct further notifications per North Carolina General Statute 70-3, *The Unmarked Human Burial and Skeletal Remains Protection Act.*

5 If, upon inspection by the appropriate legal authorities, the remains are determined to be a criminal matter and not archaeological, the Project will await clearance by the appropriate legal authorities before resuming construction.

6 If the find is determined not to be a criminal matter, the Southgate Project will comprehensively evaluate the potential to avoid and/or minimize the Project's effects to the human remains.

a. If human remains are determined to be Native American, the remains will be left in place and protected from further disturbance with security fencing and if necessary, a security guard until a site-specific work plan for their avoidance or, if necessary, their removal can be generated. Note that avoidance is the preferred choice of the SHPOs and Tribes. The Project will contact FERC, the appropriate SHPO, and the Interested Tribes to develop a plan of action.

b. If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance with security fencing and if necessary, a security guard until a site-specific work plan for their avoidance or removal can be generated. Please note that avoidance is the preferred choice of the SHPOs. Consultation with the SHPO and other appropriate parties, in accordance with Virginia or North Carolina state law, will be required to determine a treatment plan.

c. In Virginia, if human skeletal remains must be removed, the Project will obtain a Permit for *Archaeological Removal of Human Burials* from the VDHR and consultation will be conducted with Interested Tribes, and lineal descendants, as appropriate. In North Carolina, any removal of human remains would be done in accordance with *The Unmarked Human Burial and Skeletal Remains Protection Act* and other relevant state statutes, and through consultation with the NC HPO, Interested Tribes, and lineal descendants, as appropriate.

d. The Project will be responsible for all costs associated with the discovery, evaluation and agency consultation, excavation, investigation and study, disinterment, repatriation, re-interment, reporting, and curation of any human remains and associated funerary items encountered during Project construction.

e. Project construction may resume within the flagged or fenced off discovery location only after successful implementation of the treatment plan and after the Project receives written approval by the FERC, the relevant SHPO, and the Interested Tribes.

5.0 CONTACTS

FEDERAL AGENCY CONTACTS	
Federal Energy Regulatory Commission Paul Friedman Office of Energy Projects 888 First Street, NE Washington, D.C. 20426 Tel: (202) 502-8059 Email: paul.friedman@ferc.gov	
STATE HISTORIC PRESERVATION OFFICE CONTACTS	
Virginia	
Virginia Department of Historic Resources Roger W. Kirchen, Director Division of Review and Compliance 2801 Kensington Avenue Richmond, VA 23221 Tel: (804) 482-6091 Email: roger.kirchen@dhr.virginia.gov	
North Carolina	
North Carolina Historic Preservation Office Ms. Renee Gledhill-Earley Environmental Review Coordinator 109 E. Jones Street Raleigh, NC 27601 Tel: (919) 814-6579 Email: renee.gledhill-earley@ncdcr.gov	**North Carolina Office of State Archaeology** Mr. John Mintz North Carolina State Archaeologist Office of State Archaeology 109 E. Jones Street Raleigh, NC 27601 Tel: (919) 814-6555 Email: John.mintz@ncdcr.gov
TRIBAL CONTACTS	
Catawba Indian Nation Dr. Wenonah G. Haire THPO and Director, Catawba Cultural Preservation Project 1536 Tom Steven Road Rock Hill, SC 29730 Tel: (803) 328-2427 Email: wenonahh@ccppcrafts.com	**Cheyenne River Sioux Tribe** Mr. Steve Vance Tribal Historic Preservation Officer PO Box 590 Eagle Butte, SD 57625 Tel: (605) 964-7554 Email: steve.vance@crst-nsn.gov
Chickahominy Tribe The Honorable Stephen Adkins, Chief 8200 Lott Cary Road Providence Forge, VA 23140 Tel: (804) 829-2027 Email: chiefstephenadkins@gmail.com	**Chickahominy Tribe, Eastern Division** The Honorable Gene Pathkiller Adkins, Chief Chickahominy Tribe, Eastern Division 2895 Mt. Pleasant Road Providence Forge, VA 23140 Tel: (804) 966-7815 Email: pathlane@ix.netcom.com

The Delaware Nation Ms. Kim Penrod Director of Cultural Resources The Delaware Nation P.O. Box 825 Andarko, OK 73005 Tel: (405)-247-2448, x. 1403 Email: kpenrod@delawarenation.com	**Delaware Tribe of Indians** Dr. Brice Obermeyer Historic Preservation Director Delaware Tribe of Indians Roosevelt Hall, Rm 212 1200 Commercial Street Emporia, KS 66801 Tel: (918) 335-7026 Email: bobermeyer@delawaretribe.org
Eastern Band of Cherokee Indians Mr. Russell Townsend THPO 2877 Governors Island Road Bryson City, NC 28713 Tel: (828) 359-6851 Email: russtown@nc-cherokee.com	**Eastern Shawnee Tribe of Oklahoma** Mr. Brett Barnes Tribal Historic Preservation Officer 12705 East 705 Road Wyandotte, OK 74370 Tel: (918) 666-2435, x 1845 Email: bbarnes@estoo.net
Monacan Indian Nation The Honorable Dean Branham, Chief P.O. Box 1136 Madison Heights, VA 24572 Tel: (434) 946-0389 Email: Mnation538@aol.com	**Muscogee (Creek) Nation** Ms. RaeLynn Butler Manager, Historic and Cultural Preservation P.O. Box 580 Okmulgee, OK 74447 Tel: (918) 732-7678 Email: raebutler@MCN-nsn.gov
Nansemond Indian Tribal Association The Honorable Barry Bass, Chief Nansemond Indian Tribal Association 1001 Pembroke Land Suffolk, VA 23434	**Pawmunkey Indian Tribe** The Honorable Robert Gray, Chief Pawmunkey Indian Tribe 1054 Pocahontas Trail King William, VA 23086 Tel: (804) 339-1629 Email: Rgray58@hughes.net
Rappahannock Tribe The Honorable Anne Richardson, Chief 5036 Indian Neck Road Indian Neck, VA 23148 Tel: (804) 769-0260 Email: chiefannerich@aol.com	**Rosebud Sioux Tribe of Indians** Mr. Ben Rhodd Tribal Historic Preservation Officer Rosebud Sioux Tribe of Indians Rosebud, SD 57570 Tel: (605) 747-4255 Email: rstthpo@yahoo.com
Tuscarora Nation The Honorable Bryan Printup, Representative 5226 Walmore Road Lewiston, NY 14092 Tel: (716) 264-6011 Email: Bprintup@HETF.org	**Upper Mattaponi Tribe** The Honorable Kenneth Adams, Chief P.O. Box 184 King William, VA 23086 Tel: (804) 370-5249

LAW ENFORCEMENT CONTACTS	
Virginia	
Virginia State Police Area 43 Office (County of Pittsylvania) 19255 U. S. Route 29 Chatham, VA 24531 Tel: (434) 432-7287	
North Carolina	
North Carolina Office of the Chief Medical Examiner (Rockingham and Alamance Counties) 4312 District Drive Raleigh, NC 27607 Tel: (919) 743-9000	

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-D

Phase I Archaeological Survey Report for Virginia

(Privileged and Confidential Information, CUI//PRIV)

(Provided Under Separate Cover)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-E

Phase I Archaeological Survey Report for North Carolina

(Privileged and Confidential Information, CUI//PRIV)

(Provided Under Separate Cover)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-F

Phase I Aboveground Resources Survey Report for Virginia

(Privileged and Confidential Information, CUI//PRIV)

(Provided Under Separate Cover)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 4

Appendix 4-G

Phase I Aboveground Resources Survey Report for North Carolina

(Privileged and Confidential Information, CUI//PRIV)

(Provided Under Separate Cover)

Appendix L

Correspondence from Virginia Department of Historic Resources (SHPO)

1. Letter from Roger W. Kirchen, Director, Review and Compliance Division, VDHR, to Paul Webb, TRC Environmental Corp (February 13, 2019)

2. Letter from Roger W. Kirchen, Director, Review and Compliance Division, VDHR, to Paul Webb, TRC Environmental Corp (July 30, 2019)

3. Letter from Roger W. Kirchen, Director, Review and Compliance Division, VDHR, to Paul Webb, TRC Environmental Corp (November 8, 2019)

4. Letter from Roger W. Kirchen, Director, Review and Compliance Division, VDHR, to Paul Webb, TRC Environmental Corp (January 15, 2020)

COMMONWEALTH of VIRGINIA

Matt Strickler
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

February 13, 2019

Mr. Paul Webb
TRC Environmental Corp.
50101 Governor's Drive, Suite 250
Chapel Hill, NC 27517

Re: (1) *Phase I Archaeological Survey for the MVP Southgate Pipeline Project, Pittsylvania County, Virginia* (November 2018)
(2) *Historic Architectural Survey for the MVP Southgate Pipeline Project, Pittsylvania County, Virginia* (November 2018)
DHR File No. 2018-3545; FERC Docket No. PF18-4-000

Dear Mr. Webb:

The Virginia Department of Historic Resources (DHR) has received for review the reports referenced above prepared by TRC Environmental Corporation (TRC) for MVP Southgate, LLC (MVP). We have reviewed the documents and supporting documentation and provide the following comments as assistance to MVP and the Federal Energy Regulatory Commission (FERC) in meeting their responsibilities under Section 106 of the National Historic Preservation Act.

Archaeological Survey

The draft report addresses the archaeological potential of 25.5 miles of pipeline, .05 miles of lateral, 21.6 miles of access roads, one (1) compressor station, two (2) MLV sites, and one (1) contractor yard. The remaining length of pipeline and other ancillary facilities will be considered in future reports. The survey documented 23 archaeological sites and 19 isolated finds. No further work is recommended for the isolated finds except for VA-FS-30. Isolated Find VA-FS-30 should be investigated with shovel tests when access to the property is granted. An additional 13 previously recorded sites are mapped within the project area but were not relocated as part of this study and no further consideration of these resources is warranted.

Of the 23 sites identified, TRC recommends, and DHR concurs, that the following 11 sites are *not eligible* for listing in the National Register of Historic Places (NRHP): **44PY0261**, **44PY0442**, **44PY0446**, **44PY0448**, **44PY0450**, **44PY0453**, **44PY0456**, **44PY0457**, **44PY0458**, **44PY0459**, and **44PY0460**. Further, TRC recommends, and DHR concurs, that the following sites warrant no additional consideration in regards to this project, but should be managed as *unevaluated* for NRHP eligibility: **44PY0358** and **44PY0452**.
DHR recommends the following sites a *potentially eligible* for NRHP listing: **44PY0270**, **44PY0281**, **44PY0375**, **44PY0445**, **44PY0447**, **44PY0449**, **44PY0451**, **44PY0454**, and **44PY0455**. Finally, DHR concurs that **44PY0271** warrants further investigation for this project, but is currently unevaluated. The nine

(9) potentially eligible sites should be avoided or subject to Phase II evaluation. We agree that impacts to site 44PY0447 will be avoided through the alternative presented in the report.

Historic Architectural Survey

The draft report records and evaluates for NRHP listing 74 architectural properties which are fifty years old or older located within the project's Area of Potential Effects (APE). Of these 74 properties, 17 were previously identified while 57 are newly recorded. It should be noted that TRC acknowledges that there remain an additional 19 previously documented architectural properties within the APE that are not considered in this report; however, these resources require additional survey and documentation. They will be addressed in a future report.

Among the 74 recorded architectural resources, the consultant identified one (1), Little Cherrystone Manor/Wooding House (DHR ID #071-0036), as being listed in the NRHP. TRC also recommends five (5) properties, Giles Log House (DHR ID #071-5222), Farmstead, Batterman Lane (DHR ID #071-5571), House, Batterman Road (DHR ID #071-5572), Farmstead, Woodlawn Academy Road (DHR ID #071-5578), and Farmhouse, Woodlawn Academy Road (DHR ID #071-5580), as potentially eligible for listing in the NRHP and one building, Farm, Route 868 (DHR ID #071-5217), as "Undetermined" due to the consultant's limited access to the resource. The consultant recommends the remaining 67 architectural resources not NRHP eligible.

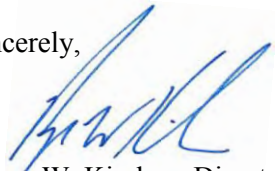
DHR concurs with TRC that **071-0036** should retain its NRHP-*listed* status. We further agree with the consultant that **071-5222** is *potentially eligible* for NRHP listing under Criterion C for its architectural merit; and **071-5580** is *potentially eligible* for NRHP listing under Criterion A for settlement and Criterion C for architecture. DHR disagrees with the recommendations for **071-5571**, **071-5572** and **071-5578** and recommend these resources as *not eligible* for NHRP listing. It is our opinion that these buildings are stylistically unremarkable and have undergone modern alterations including window replacement and the addition of vinyl siding. DHR recommends treating **071-5217** as *potentially eligible* for NRHP listing for Section 106 purposes until the property can be properly surveyed and evaluated.

The DHR concurs with TRC's recommendation that the following architectural properties are *not eligible* for listing in the NRHP: **071-5033**, **071-5208 through 071-5211 (inclusive)**, **071-5218**, **071-5221**, **071-5224**, **071-5225**, **071-5226**, **071-5525**, **071-5526**, **071-5566 through 071-5570 (inclusive)**, **071-5573 through 071-5577 (inclusive)**, **071-5579**, **071-5581 through 071-5597 (inclusive)**, **071-5599 through 071-5619 (inclusive)**, **071-5621**, **071-5622**, and **071-5623**.

DHR disagrees that 071-5212 is no longer eligible for the NRHP due to its outbuildings being removed. The farmhouse was previously determined to be eligible under Criterion C, architecture. Although it is unfortunate that the farmstead's agricultural outbuildings are no longer extant, this does not diminish the architectural merit of the main house. We believe **071-5212** should still be considered NRHP *eligible*. We also believe the late-19th century railroad (DHR ID #**071-5598**) should either be subjected to a *Phase II (Intensive) Level Survey or be considered eligible* for listing in the NRHP for Section 106 purposes under Criterion A, transportation. Finally, DHR recommends that Wallor Cemetery (DHR ID #**071-5227**) and Cemetery, off Hopewell Road (DHR ID #**071-5620**) should either be *treated as NRHP eligible or evaluated under a Phase II (Intensive) Level Survey*. Both these cemeteries contain unusual headstone designs which are, to our knowledge, unknown elsewhere in Virginia.

Thank you for the opportunity to review these documents. If you have any questions regarding these comments, please do not hesitate to contact me at roger.kirchen@dhr.virginia.gov.

Sincerely,



Roger W. Kirchen, Director
Review and Compliance Division

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

COMMONWEALTH of VIRGINIA

Matt Strickler
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

July 30, 2019

Mr. Paul Webb
TRC Environmental Corp.
50101 Governor's Drive, Suite 250
Chapel Hill, NC 27517

Re: *Historic Architectural Survey for the MVP Southgate Pipeline Project, Pittsylvania County, Virginia* (revised July 2019)
DHR File No. 2018-3545; FERC Docket No. PF18-4-000

Dear Mr. Webb:

The Virginia Department of Historic Resources (DHR) has received for review the report referenced above prepared by TRC Environmental Corporation (TRC) for MVP Southgate, LLC (MVP). This revised report was prepared in response to DHR's February 13, 2019 comments. It is our opinion that the revised report addresses our previous comments. We look forward to receiving your assessment of effects for those properties determined or treated as eligible for listing in the National Register of Historic Places.

Thank you for your continued consideration of historic properties in the planning of this project. If you have any questions regarding these comments or our review of this project, please do not hesitate to contact me at roger.kirchen@dhr.virginia.gov.

Sincerely,

Roger W. Kirchen, Director
Review and Compliance Division\

c. Alex Miller, MVP Southgate
Tracy Millis, TRC

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

COMMONWEALTH of VIRGINIA

Matt Strickler
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

November 8, 2019

Mr. Paul Webb
TRC Environmental Corp.
50101 Governor's Drive, Suite 250
Chapel Hill, NC 27517

Re: *Addendum 1, Historic Archaeological Survey for the MVP Southgate Pipeline Project, Pittsylvania County, Virginia* (September 2019)
DHR File No. 2018-3545; FERC Docket No. PF18-4-000

Dear Mr. Webb:

The Virginia Department of Historic Resources (DHR) has received for review the report referenced above prepared by TRC Environmental Corporation (TRC) for MVP Southgate, LLC (MVP). It is our opinion that this report meets DHR's *Survey Guidelines* and other applicable standards. Our comments are provided as assistance to MVP and the Federal Energy Regulatory Commission in meeting their collective responsibility under Section 106 of the National Historic Preservation Act.

This study represents the archaeological survey of 37 pipeline corridor segments (6.25 linear miles), three (3) contractor yards, seven (7) ATWS, and 27 access roads. The survey identified six (6) sites and four (4) isolated finds within the study area. The isolated finds are, by definition, not eligible for listing in the National Register of Historic Places (NRHP) and no further consideration of these resources is warranted. We concur that site **44PY0477** is *potentially eligible* for NRHP listing and should be avoided or subject to Phase II evaluation. Further, we concur that sites **44PY0473**, **44PY0474**, **44PY0475**, and **44PY0478** are *not eligible* for NRHP listing. Finally, we concur that site **44FY0476** remains *unevaluated*, but does not contain significant deposits within the project and warrants no further work in support of this project.

If you have any questions regarding these comments or our review of this project, please do not hesitate to contact me at roger.kirchen@dhr.virginia.gov.

Sincerely,

Roger W. Kirchen, Director
Review and Compliance Division

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

COMMONWEALTH of VIRGINIA

Matt Strickler
Secretary of Natural Resources

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

January 15, 2020

Mr. Paul Webb
TRC Environmental Corp.
50101 Governor's Drive, Suite 250
Chapel Hill, NC 27517

Re: *Addendum Report, Historic Architectural Survey for the MVP Southgate Pipeline Project, Pittsylvania County, Virginia* (September 2019)
DHR File No. 2018-3545; FERC Docket No. PF18-4-000

Dear Mr. Webb:

The Virginia Department of Historic Resources (DHR) has received for review the report referenced above prepared by TRC Environmental Corporation (TRC) for MVP Southgate, LLC (MVP). It is our opinion that this report meets DHR's *Survey Guidelines* and other applicable standards. Our comments are provided as assistance to MVP and the Federal Energy Regulatory Commission in meeting their collective responsibility under Section 106 of the National Historic Preservation Act.

This supplemental architectural survey identified 23 previously recorded and 33 newly recorded resources within the study area. DHR concurs with TRC that Mountain View (**071-0025**) should remain *listed* in the National Register of Historic Places (NRHP). We also agree that Belle Grove (**071-0004**), Farmstead and Cemetery (**071-5720**), Railroad Corridor Segment (**071-5727**), and Farmstead (**071-5732**) are *potentially eligible* for NRHP listing. It should be noted that the report's Management Summary (Page i) states that these four (4) properties are eligible for NRHP listing under Criterion C for their architectural merit. The accompanying V-CRIS forms and report narratives on the four potentially NRHP eligible properties have different recommendations. The narrative for Belle Grove (071-0004) states it is eligible under Criterion A for its significance in early Pittsylvania County settlement, Criterion B for its association with William P. Tunstall, and Criterion C as an excellent example of Federal style architecture. Additionally, a 2014 survey update by DHR staff member Michael Pulice also ascribed Criterion D to its significance. The report narrative and V-CRIS form recommends Farmstead and Cemetery (071-5720) potentially eligible under Criterion A "for its significance in the area of agriculture". Similarly, Railroad Corridor Segment (071-5727) is recommended in the narrative and V-CRIS form as potentially eligible under Criterion A for transportation. Only Farmstead (071-5732) is recommended by TRC as eligible solely under Criterion C. It is our opinion that the Management Summary reference to Criterion C being the only reason these properties

are eligible is in error. We concur with the recommendations for NRHP eligibility found in the report's individual property narratives and V-CRIS forms.

TRC also recommend the discontiguous cemetery associated with Little Cherrystone Manor/Wooding House (**071-0036**), a property listed in the NRHP, to be *contributing* to the larger property. The cemetery (44PY0274) is located approximately 2,900 feet northeast of the Little Cherrystone Manor/Wooding House property, which is outside the project APE. The DHR agrees that the cemetery should be considered contributing to the NRHP-listed resource.

One resource (**071-5544**) was inaccessible and remains *unevaluated*. DHR concurs with the consultant that the remaining 49 surveyed properties listed below are *not eligible* for listing in the NRHP:

071-5195	071-5305	071-5711	071-5722	071-5735
071-5196	071-5313	071-5712	071-5723	071-5736
071-5197	071-5333	071-5713	071-5724	071-5737
071-5198	071-5499	071-5714	071-5725	071-5738
071-5199	071-5524	071-5715	071-5726	071-5739
071-5219	071-5530	071-5716	071-5728	071-5740
071-5220	071-5545	071-5717	071-5730	071-5741
071-5228	071-5546	071-5718	071-5731	071-5742
071-5245	071-5621	071-5719	071-5733	071-5743
071-5246	071-5710	071-5721	071-5734	

It does not appear that TRC completed a V-CRIS form for Belle Grove (071-0004). DHR requests TRC revise the existing 2014 V-CRIS form completed by Mr. Pulice and provide us with a hardcopy of the document.

Thank you for the opportunity to review this work. If you have any questions regarding these comments or our review of this project, please do not hesitate to contact me at roger.kirchen@dhr.virginia.gov.

Sincerely,

Roger W. Kirchen, Director
Review and Compliance Division

Appendix M

MVP Southgate Project

Plan for Unanticipated Discoveries of Historic Properties and Human Remains

Appendix 4-C

Plan for Unanticipated Discoveries of Historic Properties and Human Remains

MVP Southgate Project

FERC Docket No. CP19-14-000

November 2018; Updated May 2019

TABLE OF CONTENTS

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Southgate Project" or "Project"). The Southgate Project facilities will be located in Pittsylvania County, Virginia and Rockingham, Alamance, Guilford, and Caswell counties, North Carolina.

Mountain Valley recognizes that, despite the extensive archaeological field investigations that are conducted prior to Project construction, it is possible that potentially significant cultural resources could be discovered during construction, especially during excavation activities. The Southgate Project recognizes its role to protect and preserve cultural resources that may be found during construction in accordance with federal and state regulations. Cultural resources in this context are defined as archaeological sites, objects, and features and include human remains and associated or unassociated funerary objects.

This *Plan for Unanticipated Discoveries of Historic Properties and Human Remains* ("Plan") was developed on behalf of the Southgate Project and in consultation with the Virginia Department of Historic Resources ("VDHR") and the North Carolina Historic Preservation Office ("NC HPO"), which represent the State Historic Preservation Officers ("SHPOs") in Virginia and North Carolina, respectively. This Plan summarizes the approach the Project will follow to address the discovery of archaeological finds or human remains during construction activities within the Project's Area of Potential Effects ("APE").

2.0 GUIDELINES, REGULATIONS, AND LEGISLATION FOR UNANTICIPATED DISCOVERIES OF CULTURAL RESOURCES AND HUMAN REMAINS

The stipulations of the Plan as set forth below are in accordance with the current guidelines detailed in the following federal and state guidelines, regulations, and legislation:

2.1 Federal

- Section 106 of the *National Historic Preservation Act ("NHPA"),* as amended (54 United States Code ("USC") 306101 et seq.)
- Secretary of the Interior's *Standards for Archeology and Historic Preservation* (48 FR 44716-42)
- Advisory Council for Historic Preservation's ("ACHP's"): *Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects* (ACHP February 23, 2007)
- Federal Energy Regulatory Commission's ("FERC") Office of Pipeline Regulations *Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects* (FERC 2017);

2.2 Virginia

- VDHR's *Guidelines for Conducting Historic Resources Survey in Virginia* (2017)
- Virginia Antiquities Act, (§ 10.1-2305 Code of Virginia), "Permit required for the archaeological excavation of human remains;"

2.3 North Carolina

- North Carolina Office of State Archaeology's ("OSA's") *Archaeological Investigations Standards and Guidelines* (OSA December 2017)

- North Carolina General Statute 70-3, *The Unmarked Human Burial and Skeletal Remains Protection Act.*

3.0 CONSULTATION WITH SHPOS AND NATIVE AMERICAN TRIBES

The Southgate Project initiated consultation with VDHR and NC HPO on April 27, 2018. The Project is also contacting federally-recognized Native American Tribes to solicit their concerns and input regarding potential Project effects to historic properties, tribal resources, and human remains. Contact information for the VDHR, NC HPO, and the tribes is included in Section 5.0 of this Plan. In the event that cultural resources and/or human remains are encountered during construction, the Project will notify the VDHR or NC HPO (as applicable), those tribes that have asked to be consulted in the event of a discovery ("Interested Tribes"), any other consulting parties for the Project (potentially including non-federally recognized tribes or other organizations), and/or law enforcement, as outlined below.

4.0 UNANTICIPATED DISCOVERY PROTOCOL

4.1 Cultural Resources Training

The Southgate Project requires that its employees and contractors have a basic understanding of the nature of cultural resources, and all Project inspectors and construction contractor personnel will be given basic training in cultural resource site recognition prior to beginning work on the Project.

The cultural resource training will review the Project's commitments regarding cultural resources compliance and provide examples of the types of cultural resources that may be encountered during construction. In addition, the training program will emphasize the exact procedures to be followed, as outlined in this Plan, regarding actions to be taken and notifications required in the event of a significant site discovery or a discovery of human remains or funerary objects during construction.

The training will ensure that Southgate Project personnel and construction contractors understand the extent of the archaeological survey program that has been performed for the Project and are fully aware of the distinction between sites that have been located and "cleared" under the cultural resource program (i.e., sites that have been determined to be non-significant after different levels of investigation or have already undergone data recovery excavations) and new discoveries that may be made during the construction process.

4.2 Notification and Assessment Procedures (Not Involving Human Remains or Funerary Objects)

The following steps will be followed in the event an unanticipated discovery of artifacts or other indications of a cultural resource (not involving human remains or funerary objects) is made during Southgate Project construction:

1 The Contractor or relevant party will immediately notify the Lead Environmental Inspector ("EI") (or Chief Inspector, if the Lead EI is not immediately available) of an unanticipated discovery.

2 The Lead EI or Chief Inspector will direct a *Stop Task Order* to the Contractor's Site Foreman to ensure that the activity within 100 feet of the unanticipated discovery ceases and will instruct the Contractor to flag or fence off the discovery location and buffer and take any necessary measures to ensure site security. Any unanticipated discovery made on a weekend or overnight

hours will be protected with security fencing until all appropriate parties are notified of the discovery. The Contractor will not restart work in the area of the find until the Chief Inspector has agreed in writing that work can resume.

3 The Lead EI will inform the Project Archaeologist ("PA") of the discovery. If the PA determines that the location is not an archaeological site, or determines that the find is a previously known and cleared archaeological resource and that the find would not alter the current understanding of the resource, the PA will report that documentation to the Lead EI. The Lead EI will document that determination and notify the Chief Inspector to resume work.

4 If the PA determines that the find is not a previously known and cleared resource, or potentially represents information that would alter the current understanding of a previously known and cleared archaeological resource, she/he will notify the Project. If the find is not determined insignificant by the PA within 24 hours of notification, the PA will conduct a preliminary field assessment of the discovery to determine if it is potentially a significant archaeological site.

5 If based on that inspection or further review the PA determines that the discovery is an isolated find or otherwise not a potentially significant archaeological site (e.g., lacks the type of archaeological features, intact contacts, or patterned artifact distributions that could provide substantive information concerning prehistory or history), the PA will document that determination and report the determination to the Lead EI. The Lead EI will then notify the Chief Inspector to resume work.

6 If the PA determines that the find is a newly identified and potentially significant archaeological site, or represents information that would alter the current understanding of a previously known and cleared archaeological resource, the PA will inform the Southgate Project, the Lead EI, and the Chief Inspector of that determination.

   a. Within 24 hours of that determination, the Project will notify the FERC, the relevant SHPO, and the Interested Tribes of the determination.

   b. Following notification of the FERC, the relevant SHPO, and the Interested Tribes, the PA will evaluate the discovery and assess its horizontal and vertical extent, cultural association(s), and integrity. If the find appears to be significant, the PA will also evaluate potential strategies (i.e., the installation of protective fencing or matting) that would allow the passage of construction equipment through the discovery area pending treatment of the resource. Apart from the potential installation of matting or other protective measures, further ground disturbing activities within the flagged or fenced off discovery location will not resume until authorized by the FERC.

   c. The PA will inform the Project, the Lead EI, the Chief Inspector, the FERC, the relevant SHPO, and the Interested Tribes of the findings and recommendations regarding site significance and, if necessary, the implementation of protective measures. If the FERC, in consultation with the SHPO and Interested Tribes, determines that the find is not eligible for the NRHP, the Chief Inspector will grant clearance for construction to resume. If the FERC determines that the find is eligible for the NRHP, the PA or their designee will develop an archaeological treatment plan

that will be submitted to the FERC, the relevant SHPO, and Interested Tribes (if appropriate) for review and comment.

d. Upon authorization by the FERC, the Project will implement the treatment plan.

e. At the conclusion of archaeological fieldwork, a meeting or site visit may be held with the FERC, the Project, the relevant SHPO, and the Interested Tribes to review the results of the work accomplished.

f. Upon receiving written acceptance of the results of the implemented treatment from the FERC, the Lead EI and Chief Inspector will grant clearance to the construction team to resume ground-disturbing activities within the discovery area.

4.3 Notification and Treatment Procedures (Human Remains or Funerary Objects)

The Southgate Project will treat any human remains encountered during the Project in a manner guided by the ACHP's *Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects* (2007) and by the relevant state laws and guidelines. In particular, human remains must be treated with the utmost dignity and respect at all times. Human remains and/or associated artifacts (including grave markers, coffin hardware, or funerary objects) will be left in place and not disturbed, and no unnecessary photographs will be taken. No skeletal remains or materials associated with the remains will be collected or removed until appropriate consultation has taken place and a plan of action has been developed. All personnel involved with the discovery will maintain confidentiality concerning the remains, and any press contacts will be referred to appropriate Project or agency personnel.

The following measures will be taken in the event an unanticipated discovery of potential or confirmed human remains or funerary objects is made during Project construction.

1 The Contractor will immediately notify the Lead EI (or Chief Inspector, if the Lead EI is not immediately available) of the discovery.

2 The Lead EI or Chief Inspector will direct a *Stop Task Order* to the Contractor's Site Foreman to ensure that work within 100 feet of the discovery ceases. The Lead EI or Chief Inspector will instruct the Contractor to flag or fence off the discovery location and buffer and take any necessary measures to ensure site security. Work will not resume in the area of the find until the Chief Inspector grants clearance to recommence work (see below).

3 All human remains and/or funerary items will be left in place and treated with dignity and respect, and protected from the elements. All efforts will be made to prevent the general public from viewing any gravesites and/or funerary objects.

4 The Lead EI will contact the Project and the PA on the day of the discovery, and the PA will examine the discovery within 24 hours of notification. If the PA determines that the finds are human remains or funerary items, the PA will immediately notify the Project.

For finds in Virginia, the Project will immediately notify the FERC, the landowner, and the VDHR of the find, as well as the Virginia State Police.

For finds in North Carolina, the Project will immediately notify the FERC, the landowner, the County Medical Examiner, and the North Carolina State Archaeologist, who shall conduct

further notifications per North Carolina General Statute 70-3, *The Unmarked Human Burial and Skeletal Remains Protection Act.*

5 If, upon inspection by the appropriate legal authorities, the remains are determined to be a criminal matter and not archaeological, the Project will await clearance by the appropriate legal authorities before resuming construction.

6 If the find is determined not to be a criminal matter, the Southgate Project will comprehensively evaluate the potential to avoid and/or minimize the Project's effects to the human remains.

a. If human remains are determined to be Native American, the remains will be left in place and protected from further disturbance with security fencing and if necessary, a security guard until a site-specific work plan for their avoidance or, if necessary, their removal can be generated. Note that avoidance is the preferred choice of the SHPOs and Tribes. The Project will assist the FERC, the appropriate SHPO, and the Interested Tribes in their consultation to develop a plan of action.

b. If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance with security fencing and if necessary, a security guard until a site-specific work plan for their avoidance or removal can be generated. Please note that avoidance is the preferred choice of the SHPOs. Consultation with the SHPO and other appropriate parties, in accordance with Virginia or North Carolina state law, will be required to determine a treatment plan.

c. In Virginia, if human skeletal remains must be removed, the Project will obtain a Permit for *Archaeological Removal of Human Burials* from the VDHR and consultation will be conducted with Interested Tribes, and lineal descendants, as appropriate. In North Carolina, any removal of human remains would be done in accordance with *The Unmarked Human Burial and Skeletal Remains Protection Act* and other relevant state statutes, and through consultation with the NC HPO, Interested Tribes, and lineal descendants, as appropriate.

d. The Project will be responsible for all costs associated with the discovery, evaluation and agency consultation, excavation, investigation and study, disinterment, repatriation, re-interment, reporting, and curation of any human remains and associated funerary items encountered during Project construction.

e. Project construction may resume within the flagged or fenced off discovery location only after successful implementation of the treatment plan and after the Project receives written approval by the FERC, the relevant SHPO, and the Interested Tribes.

5.0 CONTACTS

FEDERAL AGENCY CONTACTS	
Federal Energy Regulatory Commission Paul Friedman Office of Energy Projects 888 First Street, NE Washington, D.C. 20426 Tel: (202) 502-8059 Email: paul.friedman@ferc.gov	
STATE HISTORIC PRESERVATION OFFICE CONTACTS	
Virginia	
Virginia Department of Historic Resources Roger W. Kirchen, Director Division of Review and Compliance 2801 Kensington Avenue Richmond, VA 23221 Tel: (804) 482-6091 Email: roger.kirchen@dhr.virginia.gov	
North Carolina	
North Carolina Historic Preservation Office Ms. Renee Gledhill-Earley Environmental Review Coordinator 109 E. Jones Street Raleigh, NC 27601 Tel: (919) 814-6579 Email: renee.gledhill-earley@ncdcr.gov	**North Carolina Office of State Archaeology** Mr. John Mintz Ms. Rosie Blewitt North Carolina State Archaeologist Office of State Archaeology 109 E. Jones Street Raleigh, NC 27601 Tel: (919) 814-6555 Email: John.mintz@ncdcr.gov; rosemarie.blewitt@ncdcr.gov
TRIBAL CONTACTS	
Catawba Indian Nation Dr. Wenonah G. Haire THPO and Director, Catawba Cultural Preservation Project 1536 Tom Steven Road Rock Hill, SC 29730 Tel: (803) 328-2427 Email: wenonahh@ccppcrafts.com	**Cheyenne River Sioux Tribe** Mr. Steve Vance Tribal Historic Preservation Officer PO Box 590 Eagle Butte, SD 57625 Tel: (605) 964-7554 Email: steve.vance@crst-nsn.gov

Chickahominy Tribe The Honorable Stephen Adkins, Chief 8200 Lott Cary Road Providence Forge, VA 23140 Tel: (804) 829-2027 Email: chiefstephenadkins@gmail.com	**Chickahominy Tribe, Eastern Division** The Honorable Gerald A. Stewart, Chief Chickahominy Tribe, Eastern Division 2895 Mt. Pleasant Road Providence Forge, VA 23140 Tel: (804) 966-7815 Email: pathlane@ix.netcom.com
The Delaware Nation Ms. Dana Kelly The Delaware Nation P.O. Box 825 Andarko, OK 73005 Tel: (405)-247-2448, x. 1403	**Delaware Tribe of Indians** Dr. Brice Obermeyer Historic Preservation Director Delaware Tribe of Indians Roosevelt Hall, Rm 212 1200 Commercial Street Emporia, KS 66801 Tel: (918) 335-7026 Email: bobermeyer@delawaretribe.org
Eastern Band of Cherokee Indians Mr. Russell Townsend THPO 2877 Governors Island Road Bryson City, NC 28713 Tel: (828) 359-6851 Email: russtown@nc-cherokee.com	**Eastern Shawnee Tribe of Oklahoma** Mr. Brett Barnes Tribal Historic Preservation Officer 12705 East 705 Road Wyandotte, OK 74370 Tel: (918) 666-2435, x 1845 Email: bbarnes@estoo.net
Monacan Indian Nation The Honorable Pam Thompson, Acting Chief P.O. Box 960 Amherst, VA 24521 Tel: (434) 363-4864 Email: tribaloffice@monacannation.com	**Muscogee (Creek) Nation** Ms. RaeLynn Butler Manager, Historic and Cultural Preservation P.O. Box 580 Okmulgee, OK 74447 Tel: (918) 732-7678 Email: raebutler@MCN-nsn.gov
Nansemond Indian Tribal Association The Honorable Sam Bass, Chief Nansemond Indian Tribal Association 1001 Pembroke Land Suffolk, VA 23434	**Pawmunkey Indian Tribe** The Honorable Robert Gray, Chief Pawmunkey Indian Tribe 1054 Pocahontas Trail King William, VA 23086 Tel: (804) 339-1629 Email: Rgray58@hughes.net
Rappahannock Tribe The Honorable Anne Richardson, Chief 5036 Indian Neck Road Indian Neck, VA 23148 Tel: (804) 769-0260 Email: chiefannerich@aol.com	**Rosebud Sioux Tribe of Indians** Mr. Ben Rhodd Tribal Historic Preservation Officer Rosebud Sioux Tribe of Indians Rosebud, SD 57570 Tel: (605) 747-4255 Email: rstthpo@yahoo.com

Tuscarora Nation The Honorable Bryan Printup, Representative 5226 Walmore Road Lewiston, NY 14092 Tel: (716) 264-6011 Email: Bprintup@HETF.org	**Upper Mattaponi Tribe** The Honorable Frank Adams, Chief P.O. Box 184 King William, VA 23086 Tel: (804) 769-0041
LAW ENFORCEMENT CONTACTS	
Virginia	
Virginia State Police Area 43 Office (County of Pittsylvania) 19255 U. S. Route 29 Chatham, VA 24531 Tel: (434) 432-7287	
North Carolina	
North Carolina Office of the Chief Medical Examiner (All Project counties) 4312 District Drive Raleigh, NC 27607 Tel: (919) 743-9000	

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL ENERGY REGULATORY COMMISSION, THE VIRGINIA STATE HISTORIC PRESERVATION OFFICE, AND THE NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICE, REGARDING THE SOUTHGATE PROJECT

FERC Docket Number CP19-14-000

WHEREAS, the Federal Energy Regulatory Commission (FERC) may issue an authorization to Mountain Valley Pipeline LLC (Mountain Valley) under Section 7 of the Natural Gas Act (NGA, Title 15 United States Code [U.S.C.] § 717) to construct and operate the Southgate Project (Undertaking), in Virginia and North Carolina, in FERC Docket No. CP19-14-000; and

WHEREAS, the Undertaking would consist of about 75 miles of new 24-inch- and 16-inch-diameter natural gas transmission pipeline in Pittsylvania County, Virginia and Rockingham and Alamance Counties, North Carolina, one new compressor station in Pittsylvania County, Virginia, four interconnections with existing systems, and ancillary facilities including pig launchers and receivers, mainline block valves, and cathodic protection; and

WHEREAS, FERC is the lead federal agency for compliance with the National Environmental Policy Act (NEPA, 42 U.S.C. § 4371) and the National Historic Preservation Act (NHPA, 54 U.S.C. § 306108) under Section 15 of the NGA, and in accordance with the May 2002 Interagency Agreement;[1] and

WHEREAS, under authority delegated to FERC's Director of the Office of Energy Projects, FERC staff is tasked with implementing the environmental conditions appended to any forthcoming Order that authorizes the Undertaking, which ensures that FERC's responsibilities under Section 106 of the NHPA are fulfilled; and

WHEREAS, the status of compliance with Section 106 of the NHPA for the Undertaking was summarized in section 4.10 of the final Environmental Impact Statement (EIS) issued by FERC on February 14, 2020. FERC staff defined the Undertaking's area of

[1] *Interagency Agreement on Early Coordination of Required Environmental and Historic Preservation Reviews Conducted in Conjunction with the Issuance of Authorizations to Construct and Operate Interstate Natural Gas Pipelines Certificated by the Federal Energy Regulatory Commission* (May 2002) signed by the FERC, Advisory Council on Historic Preservation, Council on Environmental Quality, U.S. Environmental Protection Agency, U.S. Department of Agriculture, U.S. Department of the Army, U.S. Department of Commerce, U.S. Department of Energy, U.S. Department of Interior, and U.S. Department of Transportation.

potential effect (APE) in section 4.10.2.1 of the EIS. There would be about 27 miles of pipeline route in Virginia and about 48 miles in North Carolina. Along the pipeline route the direct APE is a corridor about 200 feet on each side of the centerline, and 50 feet from yards, and along proposed access roads. Construction of the Undertaking would impact a total of about 564 acres in Virginia and 903 acres in North Carolina; and

WHEREAS, at the end of December 2019, Mountain Valley had conducted cultural resources[2] inventories of about 70.5 miles of pipeline route (94 percent), 30.3 acres at aboveground facilities including the Lambert Compressor Station and interconnects (100 percent), 119.2 acres at yards (68 percent), 1.1 acres at cathodic protection beds (66 percent), and 29.9 miles of access roads (93 percent). During those inventories, Mountain Valley identified 30 archaeological sites and 78 historic architectural structures in the direct APE in Virginia, and 51 archaeological sites and 163 historic architectural structures in the direct APE in North Carolina (see tables 4.10-8, 4.10-9, 4.10-10, and 4.10-11 of the EIS); and

WHEREAS, about 4.6 miles of pipeline route (0.2 mile in Virginia and 4.4 miles in North Carolina), 0.6 acre at cathodic protect beds, 55.6 acres at yards, and 2.4 miles along access roads remain to be surveyed in the future. Mountain Valley shall complete future identification and evaluation investigations, and treatment at any newly found historic properties[3] that cannot be avoided, in accordance with the stipulations of this Programmatic Agreement (PA), prior to FERC allowing construction of any facilities; and

WHEREAS, FERC is using this PA to clarify the framework that will be followed to identify historic properties, and resolve adverse effects for those properties that would be adversely affected by the Undertaking, in accordance with Title 36 Code of Federal Regulations (CFR) Part 800.6(c), the regulations for implementing Section 106 of the NHPA; and

WHEREAS, Mountain Valley has indicated that all National Register of Historic Places (NRHP) listed or eligible or potentially eligible sites identified in the direct APE would be avoided, except five sites in Virginia (44PY270, 44PY477, 44PY479, 71-5598, and

[2] Cultural resources are locations of human activity, occupation, or use. According to FERC's Office of Energy Projects "Guidelines for Reporting on Cultural Resources Investigations for National Gas Projects," "cultural resources include any prehistoric or historic archaeological site, district, object, cultural feature, building or structure, cultural landscape, or traditional cultural property." Although "cultural resources" are not defined in 36 CFR 800, it is a term-of-art in the field of historic preservation and archaeological research. Some Indian tribes believe that cultural resources could include natural resources, such as plants and animals of traditional importance to tribes, and topographic features and viewsheds that may be sacred.

[3] Historic properties include any prehistoric or historic district, site, building, structure, or object, and properties of traditional religious or cultural importance to Indian tribes, listed on or eligible for listing on the National Register of Historic Places, as defined in Part 800.16(l).

71-5727), and four sites in North Carolina (AM452, 31RK97, 31RK259, and RK1770). Except for affected historic property Site 31RK259, addressed below, Mountain Valley shall either conduct additional investigations at those sites and other unevaluated sites, in accordance with Stipulation II of this PA, or submit avoidance plans for those sites, in accordance with Stipulation III; and

WHEREAS, FERC staff has determined that the Undertaking will have adverse effects on historic properties, and has consulted with the Virginia State Historic Preservation Office (VASHPO) and the North Carolina State Historic Preservation Office (NCSHPO).[4] The respective SHPOs have reviewed survey and testing reports, and avoidance and treatment plans submitted by Mountain Valley, and provided FERC with their assessments of NRHP eligibility for individual sites. In accordance with Part 800.6(c)(1)(ii), the VASHPO and NCSHPO are required as signatories to execute this PA; and

WHEREAS, FERC staff and NCSHPO agree that Site 31RK259, in Rockingham County, North Carolina, is eligible for nomination to the NRHP, cannot be avoided, and would be adversely affected by the Undertaking. Mountain Valley produced a Treatment Plan for Site 31RK259, that was reviewed by FERC staff and NCSHPO. This PA stipulates that prior to construction, Mountain Valley must implement the measures outlined in the Treatment Plan to resolve adverse effects at Site 31RK259; and

WHEREAS, the U.S. Army Corps of Engineers (COE), Norfolk and Wilmington Districts, are responsible for issuing permits under Section 404 of the Clean Water Act (CWA, 33 U.S.C. § 1251 et seq.) and Sections 10 and 14 of the Rivers and Harbors Act (RHA, 33 U.S.C. § 407 and § 408) for the undertaking. The COE is a cooperating agency in the production of the EIS (in accordance with 40 CFR Part 1501.6, regulations for implementing NEPA), has responsibilities under the NHPA, and was consulted by FERC regarding the effects of this Undertaking on historic properties. However, the COE is not a land-managing agency for the Undertaking. Therefore, per Part 800.6(c)(3), the COE is invited to be concurring party to this PA; and

WHEREAS, FERC consulted with 33 Indian tribes[5] (listed on table 4.10.2 of the EIS) about this Undertaking.[6] Indian tribes that expressed an interest in the Undertaking

[4] The VASHPO is represented by the Department of Historic Resources (VADHR); while the NCSHPO is housed within the Department of Natural and Cultural Resources (NCDNCR) which also includes the North Carolina Office of State Archaeology (NCOSA). Consultations and communications between the respective SHPOs and FERC and Mountain Valley are documented in section 4.10.1.1 of the EIS for this Project.

[5] Indian tribes are defined in Part 800.16(m) as: "an Indian tribe, band, nation, or other organized group or community, including a Native village, Regional Corporation, or Village Corporation, as those terms are defined in Section 3 of the Alaska Native Claims Settlement Act (43 U.S.C. 1602), which is recognized as eligible for the special programs and services provided by the United States to Indians because of their special status as Indians."

[6] Consultations between FERC and Indian tribes are documented in section 4.10.1.2 of the EIS.

(including the Monacan Indian Nation, Nansemond Indian Tribe, and Upper Mattaponi Tribe) were provided copies of cultural resources investigations reports for review. The Monacan Indian Nation, Nansemond Indian Tribe, and Upper Mattaponi Tribe are considered to be consulting parties,[7] and are invited to be concurring parties to this PA, in accordance with Part 800.6(c)(3); and

WHEREAS, the North Carolina state-recognized Sappony Tribe and Occaneechi Band of the Saponi Nation have made comments on the record about the Undertaking and communicated with FERC staff and Mountain Valley, are considered to be consulting parties in accordance with Part 800.2(c)(6), and are invited to be concurring parties to this PA; and

WHEREAS, Mountain Valley would be responsible for constructing and operating the Undertaking and implementing certain stipulations under this PA. Mountain Valley may prepare information, analyses, and recommendations for this Undertaking, in accordance with Part 800.2(a)(3), including conducting additional cultural resources investigations (such as surveys and testing), and implementing treatment plans at affected historic properties. Therefore, per Part 800.6(c)(3), Mountain Valley is invited to be a concurring party to this PA; and

WHEREAS, FERC notified the affected counties and local governments listed on table 4.10-4 of the EIS about the Undertaking, and no counties or local governments requested to be consulting parties; and

WHEREAS, FERC notified local historical organizations listed on table 4.10-5 of the EIS about the Undertaking, and no organizations or individuals requested to be consulting parties. However, Mountain Valley provided copies of cultural resources reports and maps of the pipeline route to organizations and individuals who requested such data, as indicated in table 4.10-7 of the EIS; and

WHEREAS, FERC notified the public about the Undertaking through its Notice of Intent issued August 9, 2018, and Notice of Application issued November 19, 2018. Public scoping sessions were held by FERC in August 2018. The public also had the opportunity to comment on the Undertaking's potential impacts on historic properties in response to the draft EIS issued July 2019, and public sessions to take comments on the draft EIS were held by FERC in August 2019. In accordance with Part 800.2(d), FERC considered the views of the public, and addressed comments on the draft EIS in the final EIS; and

[7] Consulting parties are defined in Part 800.2(c).

WHEREAS, in accordance with Part 800.6(a)(1), in a letter dated November 14, 2019 FERC invited the Advisory Council on Historic Preservation (ACHP) to participate in the development of this PA, and the ACHP, in a letter to FERC staff dated December 10, 2019, has chosen not to participate in the consultation process pursuant to Part 800.6(a)(1)(iii); and

NOW, THEREFORE, FERC, VASHPO, and NCSHPO agree that the Undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the Undertaking on historic properties.

STIPULATIONS

FERC shall ensure that the following measures are carried out:

I. STANDARDS

A. All archaeological fieldwork and treatment measures shall be conducted by cultural resources professionals who meet, at a minimum, the Secretary of the Interior's "Draft Historic Preservation Professional Qualification Standards" (*Federal Register* [FR] 20 June 1997, Vol. 62, No. 119; 36 CFR 61, section 112(a)(1)).

B. All archaeological fieldwork and treatment measures, and reports and plans generated for this Undertaking shall be consistent with applicable cultural resources state guidelines,[8] the U.S. Secretary of the Interior's "Standards and Guidelines" (48 FR 44716-42, 29 September 1983), the U.S. Department of the Interior National Park Service (NPS) *Bulletin* series, the ACHP's publication "Treatment of Archaeological Properties," and FERC Office of Energy Project's "Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects" (July 2017 version).

C. While FERC staff shall coordinate overall activities under this PA, Mountain Valley and its cultural resources consultants shall conduct fieldwork, and prepare information, analyses, and recommendations, in accordance with Part 800(2)(a)(3), and shall distribute all reports and plans to FERC staff, appropriate SHPO, COE, applicable consulting Indian tribes, and other consulting parties, and conduct other tasks associated with this PA, as necessary. Mountain Valley shall be responsible for covering all costs related to activities stipulated in this PA,

[8] Such as, in Virginia, VADHR's "Guidelines for Conducting Historic Resources Survey in Virginia" (Revised September 2017), and in North Carolina, NCOSA's "Archaeological Investigation Standards and Guidelines" (December 2017) and NCDNCR's "Report Standards for Historic Structure Survey Reports" (30 September 2019).

including fieldwork, analyses, curation, report production, public outreach, and dissemination of information.

D. The signatories and concurring parties to this PA acknowledge that public disclosure of the location of cultural sites may expose resources to harm. Therefore, the signatories and concurring parties agree to treat site locational information in a confidential manner as privileged or sensitive data, use their best efforts to not publicly disclose such data, and protect cultural resources, consistent with Section 304 of the NHPA and Part 800.6(a)(5), and other applicable federal and state laws and regulations.

E. For those portions of the Undertaking where the provisions of this PA have been met, and that would function to achieve the Undertaking's objectives of transporting natural gas to interstate markets, FERC staff may provide Mountain Valley with a notice to proceed with construction. Construction shall not proceed on portions of the Undertaking until after the applicable provisions of this PA, including survey and evaluation studies, and the implementation of measures outlined in treatment plans to resolve adverse effects at affected historic properties, have been carried out for those portions.

II. IDENTIFICATION AND EVALUATIONS

A. Future phased identification and evaluation efforts will be conducted for the Undertaking, in accordance with Part 800.4(b)(2), because access to some areas may be restricted until after FERC has issued a Certificate of Public Convenience and Necessity, or at portions of the Undertaking where cultural resources investigations have not yet been completed. The reporting of additional survey and evaluation investigations shall be in accordance with Stipulation VII of this PA.

B. Mountain Valley and its cultural resources consultants are responsible for conducting future inventories for all areas in the APE that have not been previously surveyed (including along the pipeline route, staging areas and additional temporary extra workspaces, yards, new or improved access roads, and new workspace variances or route realignments). All changes to the construction rights-of-way/ancillary areas not authorized in the FERC Order, including areas needed for emergency actions, would require the review and approval of FERC staff.

C. All archaeological sites and historic architectural structures, and traditional cultural properties, found/revisited during surveys for this Undertaking need to be fully reported on. Appropriate state site forms shall be submitted by Mountain

Valley and its cultural resources contractors to the appropriate SHPO for any newly recorded or revisited sites, with copies filed with FERC. Mountain Valley and its contractors should also submit to the appropriate SHPO Geographic Information System (GIS) shape files of the facilities, areas actually surveyed, and site locations; however, GIS data does not have to be filed with FERC.

D. Following directions from FERC staff, Mountain Valley may conduct future archaeological testing or other investigations to assess the NRHP eligibility of previously unevaluated sites. Mountain Valley and/or its cultural resources contractors shall evaluate all recorded sites in terms of NRHP criteria (36 CFR 60.4) and assess effects on individual resources consistent with Part 800.5.

E. Unless they can be avoided, in accordance with Stipulation III below, Mountain Valley shall conduct additional investigations to evaluate NRHP eligibility and assess potential effects at previously recorded sites 44PY270, 44PY477, 44PY479, 71-5598, and 71-5727 in Virginia, and sites AM452, 31RK97 and RK1770 in North Carolina. The results of those investigations shall be provided by Mountain Valley in reports filed with FERC, and also submitted to the appropriate SHPO, COE, appropriate consulting Indian tribes, and other consulting parties, in accordance with Stipulation VII below.

F. FERC staff will make recommendations on NRHP eligibility and effects, based on data filed by Mountain Valley, after consultations with the appropriate SHPO. For those resources where FERC staff and the appropriate SHPO agree that NRHP criteria are not met, no further consideration will be required. If FERC staff and the appropriate SHPO are unable to agree on a determination, FERC will follow the regulations at Part 800.4(c)(2). Those properties that are determined eligible for the NRHP and would be adversely affected by the Undertaking will be treated in accordance with Stipulation IV below.

III. AVOIDANCE

A. Whenever feasible, avoidance of historic properties shall be the preferred option. Mountain Valley will identify the means by which these properties would be avoided and request concurrence from the appropriate SHPO and FERC staff. Avoidance measures can include, but are not limited to, route re-alignments, use of a horizontal directional drill or bore, narrowing the width of the right-of-way, re-configuration of or not using a temporary workspace, re-designing or not using a specific yard or access road, and exclusionary fencing.

B. As of the date of the preparation of this PA, Mountain Valley has indicated that it intends to avoid 35 sites (archaeological sites 44PY281, 44PY358, 44PY447,

44PY449, 44PY452, 44PY454, and 44PY477/71-5732 in Virginia, and archaeological sites 31RK44, 31RK222, 31RK228, 31RK230, 31RK234, 31RK237, 31RK239, 31RK261, and 31AM441, and 31AM443/AM1603 in North Carolina; and historic architectural sites 71-4, 7-25, 71-36/44PY274/44PY275, 71-5212, 71-5222, 71-5225/44PY284, 71-5226/44PY272, 71-5227, 71-5525, 71-5593, 71-5595, 71-5596, 71-5620, 71-5622, 71-5623, 71-5731, and 71-5735 in Virginia and site AM867 in North Carolina). Mountain Valley shall document in a filing with FERC that it submitted avoidance plans for all these sites to the appropriate SHPO, and file with FERC the SHPOs' comments on those plans.

C. For sites identified during future investigations that would be avoided, Mountain Valley shall produce site-specific avoidance plans for the review of FERC staff and the appropriate SHPO. The documentation of avoidance of historic properties during construction shall be reported in the comprehensive Treatment Report required under Stipulation VII below.

IV. TREATMENT OF ADVERSELY AFFECTED HISTORIC PROPERTIES

A. Prior to construction, Mountain Valley shall implement the measures outlined in the Treatment Plan to resolve adverse effects on Site 31RK259 in Rockingham County, North Carolina. Mountain Valley shall document the completion of treatment fieldwork at Site 31RK259 through a Management Summary letter report and comprehensive final Treatment Report, in accordance with Stipulation VII of this PA.

B. For historic properties identified during future investigations that cannot be avoided, Mountain Valley shall develop site-specific treatment plans to mitigate any adverse effects as per Part 800.6(b), including any visual effects for those properties where the viewshed is part of the historic significance. Mountain Valley shall submit the treatment plans to FERC staff, appropriate SHPO, COE, applicable consulting Indian tribes, and other consulting parties, for review and comment, in accordance with Stipulation VII.

C. Mountain Valley may not begin implementing the measures of any treatment plans or construct any facilities without the explicit written permission of FERC.

V. POST-PA DISCOVERIES

If human remains, funerary objects, sacred objects, and objects of cultural patrimony[9] are discovered during archaeological investigations, or if cultural resources or human remains are discovered during construction, or if unanticipated effects on historic properties are found, Mountain Valley shall implement the measures outlined in its accepted Unanticipated Discovery Plan (UDP).[10] A copy of the UDP is attached as an appendix to this PA.

VI. CURATION

A. All materials and records resulting from archaeological investigations related to this Undertaking shall be curated in a manner consistent with 36 CFR 79, particularly the standards at Parts 79.9 and 79.10. The comprehensive final Treatment Report (required under Stipulation VII below) shall include an artifact catalog of all cultural materials collected during all post-PA archaeological investigations, giving their provenience, place of curation or disposition, and photographs or drawings of culturally diagnostic or unique items.

B. Mountain Valley shall encourage landowners to donate artifacts recovered on private lands to appropriate museums or curation facilities agreed to by the signatories. In Virginia collected artifacts can be donated to the Virginia Department of Historic Resources State Collection Management Facility, while artifacts recovered in North Carolina should be donated to the North Carolina Office of State Archaeology Research Center. In addition, Mountain Valley will provide to landowners contact information for consulting Indian tribes so that landowners would have the opportunity to donate collected materials to tribes if they so choose; with the approval of the signatories. Mountain Valley shall document in its comprehensive final Treatment Report the donation of all archaeological materials (except human remains, funerary objects, sacred objects, and objects of cultural patrimony), or the return of artifacts to landowners who do not donate them. No human remains, funerary objects, sacred objects, and objects of cultural patrimony collected shall be curated, publicly displayed, or sold.

[9] As defined in the Native American Graves Protection and Repatriation Act (NAGPRA, 25 U.S.C. 3001-3013, 43 CFR Part 10).

[10] Mountain Valley filed its UDP as Appendix 4-C of Resource Report 4 in its November 6, 2018 application to FERC. The UDP was originally reviewed and approved by the VASHPO and NCSHPO on September 6 and 14, 2018, respectively; and a revised version filed by Mountain Valley with FERC on May 22, 2019 was approved by the VASHPO and NCSHPO on October 8 and August 19, 2019, respectively. FERC staff agrees with the SHPOs that the UDP is acceptable.

Human remains, funerary objects, sacred objects, and objects of cultural patrimony shall be treated in accordance with the UDP; and repatriated to appropriate consulting Indian tribes or reburied after analysis, as determined by consultations among the signatories to this PA.

VII. REPORTING REQUIREMENTS AND REVIEWS

A. All reports and plans produced by Mountain Valley and/or its cultural resources contractors, in regards to the measures stipulated in this PA, shall be filed with FERC, with separate copies simultaneously also provided by Mountain Valley to the appropriate SHPO, COE, applicable consulting Indian tribes, and other consulting parties. Mountain Valley shall provide FERC staff, the appropriate SHPO, COE, applicable consulting Indian tribes, and other consulting parties with one (1) hard-copy of each report, and an electronic copy (.pdf file). Electronic copies of reports can be provided by emails. All materials filed with FERC containing **location, character, and ownership** information about archaeological resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "**CUI//PRIV- DO NOT RELEASE**."

B. The time period for review and comments on all draft reports and plans shall begin with the receipt of the hard-copy version. Any consulting party can provide comments on any draft report or plan resulting from this PA to FERC staff and Mountain Valley. FERC staff shall take the comments of consulting parties into consideration prior to making any determinations, and providing its comments on draft reports/plans to Mountain Valley. The standard review period for comments shall be thirty (30) calendar days after receipt of reports/plans, unless the signatories agree to another schedule. If timely comments are not received during the review period, FERC can assume that the non-responding parties have no comments, and may proceed based on consideration of comments received from other responsive parties within the review period.

C. For all cultural resources documents (e.g., inventory reports, testing reports, avoidance plans, and treatment plans, etc.) submitted by Mountain Valley to the consulting parties prior to April 2020, where comments on reports/plans were not previously filed with FERC, the consulting parties shall provide FERC staff with comments on each individual document within thirty (30) calendar days after execution of this PA. Lack of comments by the conclusion of this review period shall be deemed by FERC staff as concurrence by the non-responsive parties with the recommendations in those documents.

D. Mountain Valley shall file draft reports documenting additional post-PA inventories. Additional inventory reports shall make recommendations on NRHP eligibility (including justifications about how sites could qualify according to the criteria at 36 CFR 60.4), potential effects, and future work. Within thirty (30) calendar days after receiving comments on drafts from FERC staff, Mountain Valley shall file final inventory reports that address all comments on draft reports.

E. If FERC staff and appropriate SHPO agree that additional post-PA investigations are necessary at any site to assess its NRHP eligibility, Mountain Valley shall file draft site-specific testing or research plans. Within thirty (30) calendar days after receiving FERC staff comments on drafts, Mountain Valley shall file final testing/research plans that address all comments on draft plans.

F. Mountain Valley shall conduct the post-PA evaluative investigations, in accordance with the approved site-specific testing/research plan, after receiving written notice to proceed from FERC. Mountain Valley shall file draft reports documenting the results of archaeological testing or other evaluative studies, including raw data from the studies, and recommendations of NRHP eligibility and potential effects. The VASHPO and NCSHPO, in their respective reviews of post-PA evaluation reports, shall specify if they consider a property eligible for the NRHP, and apply the criteria of adverse effect, pursuant to Part 800.5(a). Within thirty (30) calendar days after receiving comments on drafts from FERC staff, Mountain Valley shall file final testing/evaluation reports that addresses all comments on draft reports.

G. For any sites that can be avoided, Mountain Valley shall file site-specific avoidance plans. Within thirty (30) calendar days after receiving comments on drafts from FERC staff, Mountain Valley shall file with final avoidance plans that address all comments on draft plans.

H. For any sites that FERC staff determines eligible or listed on the NRHP (with concurrence from appropriate SHPO), and cannot be avoided, Mountain Valley shall file draft site-specific treatments plans that would mitigate adverse effects. Within thirty (30) calendar days after receiving comments on drafts from FERC staff, Mountain Valley shall file final treatment plans that addresses all comments on draft plans.

I. Within thirty (30) calendar days after the completion of the treatment fieldwork at an individual affected historic property, a Management Summary letter report briefly describing results, and documenting that all the measures outlined in the site-specific treatment plan were implemented, shall be filed by Mountain Valley.

J. Starting with the execution of this PA until its termination, Mountain Valley shall yearly file a Cultural Resources Annual Report (by the end of February for the previous calendar year). The Annual Report shall summarize all cultural resources fieldwork and reports and plans submitted within the previous year, the current status of investigations and reviews, and a schedule for upcoming work, plans, and reports.

K. A draft comprehensive Treatment Report detailing the results of the treatment program shall be filed by Mountain Valley no later than one (1) year after the completion of treatment fieldwork, unless the signatories agree to a different date. Within six (6) months after receiving comments on the draft from FERC staff, Mountain Valley shall file a final comprehensive Treatment Report that addresses all comments on the draft.

VIII. PUBLIC OUTREACH AND EDUCATION

A. Mountain Valley shall develop a program for cultural resources public outreach and education for the Undertaking. The Public Outreach and Education Program Plan can disseminate information to the general public through a variety of media, including but not limited to brochures, books, articles, lectures, exhibits, school-based activities, participation in data recovery excavations, videos, and interactive web sites, and other means.

B. Within sixty (60) calendar days after FERC issues any forthcoming Order authorizing the Undertaking, Mountain Valley shall file a draft Public Outreach and Education Program Plan. Within thirty (30) calendar days after receiving comments on the draft plan from FERC staff, Mountain Valley shall a revised final Public Outreach and Education Program Plan that addresses all comments on the draft. Mountain Valley shall implement the measures outlined in the plan upon receiving written notice from FERC.

IX. OTHER TERMS AND CONDITIONS

A. This PA may be signed by the parties on photocopy, facsimile, e-mail, pdf, or counterpart signature pages. FERC shall distribute copies of all signed pages to all parties to this PA once the PA is executed. FERC shall provide the ACHP with a copy of the executed PA including all signed signature pages, and a copy of the executed PA shall also be filed in FERC's public record docket for these proceedings.

B. This PA is limited in scope to the Southgate Project, in FERC Docket Nos. CP19-14-000. If FERC decides not to authorize this Undertaking, this PA is null and void on the date of FERC's decision.

C. The signatories to this PA shall review its terms and conditions, and the status of activities conducted under the PA, within three (3) years after its execution. At that time, the signatories shall consult and agree that progress is satisfactory, or a signatory may suggest an amendment, in accordance with Stipulation XII, or raise an objection which shall be resolved according to Stipulation XI.

X. DURATION

This PA shall remain in effect until all stipulations and requirements for fieldwork, treatment, analyses, reporting, curation, public outreach, and dissemination of information have been meet. However, this PA will expire if its terms are not carried out within six (6) years from the date of its execution. Prior to such time, FERC staff may consult with the other signatories to reconsider the terms of the PA and amend it in accordance with Stipulation XII.

XI. DISPUTE RESOLUTION

Should any signatory object at any time to any actions stipulated in this PA, or the manner in which its terms are implemented, FERC staff shall consult with such party to resolve the objection. If FERC determines that such objection cannot be resolved, FERC will:

A. Forward all documentation relevant to the dispute, including FERC's proposed resolution, to the ACHP. The ACHP shall provide FERC with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FERC staff shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and

provide them with a copy of this written response. FERC will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FERC may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FERC staff shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties, and provide them and the ACHP with a copy of such written response.

C. If at any time during implementation of the measures stipulated in the PA, an objection pertaining to an action under the PA should be raised by a member of the public, FERC staff shall take the objection into account, communicate with the objector regarding potential resolutions, and notify the parties to the PA about the objection and recommendations for resolutions.

D. FERC's responsibility to carry out all other actions subject to the terms of this PA that are not the subject of the dispute remain unchanged.

XII. AMENDMENTS

This PA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

XIII. TERMINATION

A. If any signatory determines that the terms of the PA will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment per Stipulation XII. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the PA upon written notification to the other signatories.

B. Once the PA is terminated, and prior to work continuing on the Undertaking, FERC must either (1) execute an agreement pursuant to Part 800.6 or (2) request, take into account, and respond to the comments of the ACHP under Part 800.7. FERC shall notify the signatories as to the course of action it will pursue.

XIV. EXECUTION

A. This PA is considered executed when signed by FERC and the VASHPO and NCSHPO, in accordance with Part 800.6(b)(1)(iv). The effective date of execution of this PA is the date of the last signature affixed by a signatory.

B. Execution of this PA by FERC and the VASHPO and NCSHPO, and implementation of its terms and stipulations, is evidence that FERC has taken into account the effects of this Undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

FEDERAL ENERGY REGULATORY COMMISSION

By: _____ Date:
Title: Rich McGuire, Director, Division of Gas - Environment and Engineering

VIRGINIA STATE HISTORIC PRESERVATION OFFICE

By: _____ Date:
Title:

NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICE

By: _____ Date:
Title:

CONCURRING PARTIES:

MOUNTAIN VALLEY PIPELINE LLC

By _____ Date:
Title:

U.S. DEPARTMENT OF THE ARMY - CORPS OF ENGINEERS
Wilmington District

By _____ Date:
Title:

U.S. DEPARTMENT OF THE ARMY - CORPS OF ENGINEERS
Norfolk District

By _____ Date:
Title:

MONACAN INDIAN NATION

By _____ Date:
Title:

NANSEMOND INDIAN TRIBE

By _____ Date:
Title:

UPPER MATTAPONI INDIAN TRIBE

By _____ Date:
Title:

SAPPONY TRIBE

By _____ Date:
Title:

OCCANEECHI BAND OF THE SAPONI NATION

By _____ Date:
Title:

APPENDIX – UNANTICIPATED DISCOVERY PLAN

SIGNATORIES:

FEDERAL ENERGY REGULATORY COMMISSION

By: _____ Date:
Title: Rich McGuire, Director, Division of Gas - Environment and Engineering

VIRGINIA STATE HISTORIC PRESERVATION OFFICE

By: Julie V. Langan Date: 5/17/2020
Title: DIRECTOR

NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICE

By: _____ Date:
Title:

SIGNATORIES:

FEDERAL ENERGY REGULATORY COMMISSION

By: Rich McGuire Date: March 9, 2020
Title: Rich McGuire, Director, Division of Gas - Environment and Engineering

VIRGINIA STATE HISTORIC PRESERVATION OFFICE

_____ Date:

NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICE

By: Kevin Cherry
Title: SHPO

Date: 3/24/2020

CONCURRING PARTIES:

MOUNTAIN VALLEY PIPELINE LLC by and through its operator, EQM Gathering Opco, LLC

By DocuSigned by: _____ Date: March 30, 2020
532695EA866C4CC...

DS ME Title: Vice President

U.S. DEPARTMENT OF THE ARMY - CORPS OF ENGINEERS
Wilmington District

By _____ Date:
Title:

U.S. DEPARTMENT OF THE ARMY - CORPS OF ENGINEERS
Norfolk District

By _____ Date:
Title:

MONACAN INDIAN NATION

By _____ Date:
Title:

NANSEMOND INDIAN TRIBE

By _____ Date:
Title:

UPPER MATTAPONI INDIAN TRIBE

By _____ Date:
Title:

SAPPONY TRIBE

By _____ Date:
Title:

Document Content(s)

Appendix N

MVP Southgate Project

Resource Report 9 – Air and Noise Quality

(November 2018)

Mountain Valley PIPELINE LLC

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 9 – Air and Noise Quality

November 2018

MVP Southgate Project
Resource Report 9 – Air and Noise Quality

Resource Report 9 – Filing Requirements	
Information	**Location in Resource Report**
Minimum Filing Requirements	
1. Describe existing air quality in the vicinity of the project. (§ 380.12(k)(1)) • Identify criteria pollutants that may be emitted above EPA-identified significance levels.	Section 9.2.1
2. Quantify the existing noise levels (day-night sound level (Ldn) and other applicable noise parameters) at noise sensitive areas and at other areas covered by relevant state and local noise ordinances. (§ 380.12(k)(2)) • If new compressor station sites are proposed, measure or estimate the existing ambient sound environment based on current land uses and activities. • For existing compressor stations (operated at full load), include the results of a sound level survey at the site property line and nearby noise-sensitive areas. • Include a plot plan that identifies the locations and duration of noise measurements. • All surveys must identify the time of day, weather conditions, wind speed and direction, engine load, and other noise sources present during each measurement.	Section 9.3.3
3. Quantify existing and proposed emissions of compressor equipment, plus construction emissions, including nitrogen oxides (NOx) and carbon monoxide (CO), and the basis for these calculations. Summarize anticipated air quality impacts for the project. (§ 380.12(k)(3)) • Provide the emission rate of NOx from existing and proposed facilities, expressed in pounds per hour and tons per year for maximum operating conditions, include supporting calculations, emission factors, fuel consumption rate, and annual hours of operation.	Section 9.2.2, Appendix 9-A, Appendix 9-B, Appendix 9-C, Appendix 9-D
4. Describe the existing compressor units at each station where new, additional, or modified compressor units are proposed, including the manufacturer, model number, and horsepower of the compressor units. For proposed new, additional, or modified compressor units include the horsepower, type, and energy source. (§ 380.12(k)(4))	There are no existing compressor units
5. Identify any nearby noise-sensitive area by distance and direction from the proposed compressor unit building/enclosure. (§ 380.12(k)(4))	Section 9.3.3
6. Identify any applicable state or local noise regulations. (§ 380.12(k)(4)) • Specify how the facility will meet the regulations.	Section 9.3.2
7. Calculate the noise impact at noise-sensitive areas of the proposed compressor unit modifications or additions, specifying how the impact was calculated, including manufacturer's data and proposed noise control equipment. (§ 380.12(k)(4))	Section 9.3.5
Additional Information Often Missing and Resulting in Data Requests	
8. Include climate information as part of the air quality information provided for the project area.	Section 9.2.1.1
9. Identify potentially applicable federal and state air quality regulations.	Section 9.2.4
10. Provide construction emissions (criteria pollutants, hazardous air pollutants, greenhouse gases) for proposed pipelines and aboveground facilities.	Section 9.2.5, Appendix 9-A
11. Provide copies of state and federal applications for air permits.	Appendix 9-C

Resource Report 9 – Filing Requirements	
Information	**Location in Resource Report**
12. Provide operation and fugitive emissions (criteria pollutants, hazardous air pollutants, greenhouse gases) for pipelines and aboveground facilities.	Section 9.2.5.2, Appendix 9-B
13. Provide air quality modeling for entire compressor stations.	Appendix 9-D
14. Identify temporary and permanent emissions sources that may have cumulative air quality effects in addition to those resulting from the project.	Section 9.2.6, Table 9.2-9
Noise and Vibration (see further discussion below)	
15. Describe the existing noise environment and ambient noise surveys for compressor stations, liquefied natural gas facilities, meter and regulation facilities, and drilling locations.	Section 9.3.3
16. Identify any state or local noise regulations applicable to construction and operation of the project.	Section 9.3.2
17. Indicate whether construction activities would occur over 24-hour periods.	Section 9.3.4
18. Discuss construction noise impacts and quantify construction noise impacts from drilling, pile driving, dredging, etc.	Section 9.3.4.3
19. Quantify operation noise from aboveground facilities, including blowdowns.	Section 9.3.5
20. Describe the potential for the operation of the proposed facilities to result in an increase in perceptible vibration and how this would be prevented.	Section 9.3.5.4
21. Identify temporary and permanent noise sources that may have cumulative noise effects in addition to those resulting from the project.	Section 9.3.7

RESOURCE REPORT 9
AIR AND NOISE QUALITY

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RESOURCE REPORT 9
AIR AND NOISE QUALITY

LIST OF ACRONYMS AND ABBREVIATIONS

AQCR	air quality control region
BACT	Best Available Control Technology
Btu	British thermal unit
CAA	Clean Air Act
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CSR	Virginia Code of State Rules
dB	decibels
dBA	A-weighted decibels
ESD	emergency shutdown
FERC or Commission	Federal Energy Regulatory Commission
GHG	greenhouse gas
HAP	hazardous air pollutant
HDD	horizontal directional drill
hp	horsepower
Hz	Hertz
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_P	sound pressure level
L_W	sound power level
MACT	Maximum Available Control Technology
MMBtu/hr	million British thermal units per hour
Mountain Valley	Mountain Valley Pipeline, LLC
MRR	Greenhouse Gas Mandatory Reporting Rule
NAAQS	National Ambient Air Quality Standards
NCAC	North Carolina Administrative Code
NCDC	National Climatic Data Center's
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSR	Nonattainment NSR
NO_2	nitrogen dioxide
NO_X	nitrogen oxide
NSAs	noise sensitive areas
NSPS	New Source Performance Standards
NSR	New Source Review

O_3	ozone
OGI	optical gas imaging
Pb	lead
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
Project or Southgate Project	MVP Southgate Project
PSD	Prevention of Significant Deterioration
SO_2	sulfur dioxide
SOP	State operating permits
Title V	Federal Title V operating permit program
tpy	tons per year
Transco	Transcontinental Gas Pipe Line Company, LLC
U.S.	United States
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compounds

RESOURCE REPORT 9
AIR AND NOISE QUALITY

9.1 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Southgate Project" or "Project"). The Southgate Project facilities will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina. See Resource Report 1 (General Project Description) for additional Project information.

9.1.1 Environmental Resource Report Organization

Resource Report 9 includes discussion of Air Quality and Noise in the Southgate Project area as well as potential Project-related impacts. Resource Report 9 is prepared and organized according to the FERC *Guidance Manual for Environmental Report Preparation* issued February 2017. Air quality resources and potential air impacts associated with the Southgate Project are discussed in Section 9.2. A summary of the regional climate and existing air quality is provided in Section 9.2.1, and a discussion of Project-related emissions is located in Section 9.2.2. An overview of the air permitting requirements are discussed in Section 9.2.3, a discussion of applicable regulatory requirements in Section 9.2.4, an analysis of General Conformity in Section 9.2.5, and a summary of air quality mitigation measures in Section 9.2.6. Noise quality resources and potential impacts from the Southgate Project are discussed in Section 9.3. Section 9.3.1 provides background information on noise, Section 9.3.2 provides a description of the applicable regulatory requirements applicable to noise, Section 9.3.3 identifies the existing in-air acoustic conditions and presents noise modeling results, Section 9.3.4 discusses construction noise, Section 9.3.5 discusses Project operation noise, Section 9.3.6 discusses post-construction sound survey, and Section 9.3.7 discusses cumulative effects.

9.2 AIR QUALITY

Potential short-term and temporary air quality impacts may result from construction activities necessary to install the pipeline, metering and regulating sites, and compressor station. Long-term air impacts may result from the operation of the turbines and other equipment. From a regulatory standpoint, the emissions and associated air quality impacts are addressed in two separate ways:

1) Construction Permitting – Construction (and operation) permitting addresses the emissions and associated impacts from the operational equipment and sources at the Southgate Project facilities. Depending on the major/minor status of the Project and the location of the Project, Prevention of Significant Deterioration ("PSD"), Nonattainment NSR ("NNSR"), and/or associated state permitting programs ensure that the proposed installation of new air emissions sources (i.e., operational equipment) meet required emission levels, install appropriate control technologies, and meet other regulatory requirements, where appropriate. The regulatory applicability of permitting programs to the Project is discussed in Section 9.2.4. The Project performed air quality modeling of the emissions of all criteria pollutants resulting from the Project. This modeling assessment demonstrates that all National Ambient Air Quality Standards ("NAAQS") standards are met during operation of the Project. The modeling approach and results are

assessed in detail in Appendix 9-D (Modeling Report) and are not discussed further as part of the regulatory requirements and compliance demonstrations of Sections 9.2.4 through 9.2.6.

2) General Conformity – General Conformity addresses the sources of emissions not covered by permitting actions (e.g., construction activities or an increase in traffic to the sites) and ensures that they comply with the applicable State Implementation Plan(s). Generally, these include the short-term/temporary emissions from construction activities and new emissions increases from non-permitted emission sources such as mobile sources. General Conformity, discussed in Section 9.2.5, is only applicable in maintenance/non-attainment areas. All counties that are impacted by the Southgate Project are in attainment for all criteria pollutants (USEPA, 2018). As such, General Conformity does not apply. However, the Southgate Project has included the construction emissions per the FERC's *Guidance Manual for Environmental Report Preparation* issued February 2017.

9.2.1 Existing Air Quality

9.2.1.1 Climate

The climate in the Southgate Project area is primarily continental in character but is subject to modification by the Atlantic Ocean; the proper classification for the climate is "modified continental." The mid- latitude site location and proximity to the Atlantic Ocean exposes the region to a variety of meteorological conditions and events. Varying weather conditions can occur in the Project area including tropical storms and hurricanes, thunderstorms, and droughts. The mid-latitude location exposes the area to large annual ranges in temperatures. Cold outbreaks originating from the northern latitudes contrast significantly with the heat and humidity that is often transported from the Gulf of Mexico. The primary interaction point between these mid-latitude regions results in weather characterized by frequent, sometimes powerful, change. At times, mesoscale influences alter this meteorological variety.

Southcentral Virginia and northern North Carolina have a varied climate. The eastern half of each state, including the eastern shores, lie within the Humid Subtropical climate zone. This region experiences hot, humid summers and mild to cool winters, with evenly dispersed precipitation. The western half of the states are within the transition zone between the Humid Subtropical and Humid Continental zones, with more mild summertime temperatures and colder winters that experience frequent subfreezing low temperatures and moderate snowfall (Britannica, 2018).

In the Southgate Project area, summers are warm and humid and winters are cold, but not severe. Thunderstorms can occur at any time but are most frequent during the late spring and summer. The storms are most often accompanied by downpours and gusty winds but are not usually severe. Tornadoes, which infrequently occur, have resulted in significant damage. Severe hailstorms have occurred in the spring. Tropical storms can bring heavy rain, high winds and flooding in the late summer and fall.

The National Climatic Data Center's ("NCDC") 1981-2010 Climate Normals (NCDC, 2012) were evaluated from meteorological stations located in Chatham, Pittsylvania County, Virginia, and in Reidsville, Rockingham County, North Carolina. Temperatures near the Project facilities are generally highest in July and lowest in January. Maximum temperatures of 90 degrees Fahrenheit (°F) or higher occur about 20-28 days per year on average, while minimum temperatures of 0°F or lower occur less than one day per year on average. The mean annual precipitation is about 45 to 46 inches, with monthly average precipitation ranging from a low of about 3.0 inches in February to a maximum of about 4.8

inches in July. Precipitation of 0.01 inch or greater occurs on about 115 days per year on average. Precipitation of 1.0 inch or greater occurs on average about 12 days per year. The average annual snowfall for the region is approximately 4 to 9 inches. The average annual wind speed for Chatham, VA is 7.4 miles per hour, with a prevailing wind direction from the west-southwest. The average annual wind speed for Reidsville, NC is 7.1 miles per hour, with a prevailing wind direction from the southwest.

Table 9.2-1 provides a summary of the climate parameters associated with the Southgate Project compressor station.

Table 9.2-1

Climate Parameters at the Compressor Station Location

Compressor Station	Monitoring Station	ID	Approximate Distance and Direction from Existing Monitoring Station to Compressor Station	Average Daily Minimum Temperature – January (°F)	Average Daily Maximum Temperature – July (°F)	Annual Precipitation (inches)
Lambert	Chatham, VA	USC00441614	6 km west	22.8	86.3	45.2

km = kilometer

9.2.1.2 National Ambient Air Quality Standards

NAAQS have been established for each of the following criteria air pollutants: particulate matter with an aerodynamic diameter of 10 microns or less ("PM_{10}"), particulate matter with an aerodynamic diameter of 2.5 microns or less ("$PM_{2.5}$"), sulfur dioxide ("SO_2"), ozone ("O_3"), nitrogen dioxide ("NO_2"), carbon monoxide ("CO"), and lead ("Pb"). Standards are designated as primary or secondary. Primary standards are set at a level designed to protect public health. Secondary standards are set to protect welfare values such as vegetation, visibility, and property values. NAAQS values are listed in the Code of Federal Regulations ("CFR") at 40 CFR Part 50. The current NAAQS for these criteria pollutants are summarized in Table 9.2-2. Footnotes to Table 9.2-2 explain how compliance with each NAAQS is assessed.

Note that both states have adopted State Ambient Air Quality Standards that are equivalent to the NAAQS.

Table 9.2-2

National Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Period	Standards	
		Primary	Secondary
SO_2	1-hour [l,m]	75 ppb 196 µg/m³	--
	3-hour [b]	--	0.5 ppm 1300 µg/m³
	Annual [a,m]	0.03 ppm 80 µg/m³	--
	24-hour [b,m]	0.14 ppm 365 µg/m³	--
PM_{10}	24-hour [d]	150 µg/m³	150 µg/m³
$PM_{2.5}$ (2012 Standard)	Annual [e,]	12.0 µg/m³	15.0 µg/m³
$PM_{2.5}$ (2006 Standard)	24-hour [f]	35 µg/m³	35 µg/m³
NO_2	Annual [a]	0.053 ppm (53 ppb) 100 µg/m³	0.053 ppm (53 ppb) 100 µg/m³
	1-hour [c]	100 ppb 188 ug/m³	--
CO	8-hour [b]	9 ppm 10,000 µg/m³	--
	1-hour [b]	35 ppm 40,000 µg/m³	--
O_3 (2008 Standard)	8-hour [g,h]	0.075 ppm	0.075 ppm
O_3 (2015 Standard)	8-Hour[i]	0.070 ppm	0.070 ppm
O_3	1-hour [j,k]	0.12 ppm	0.12 ppm
Pb	Rolling 3-month [a]	0.15 µg/m³	0.15 µg/m³

Table 9.2-2

National Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Period	Standards	
		Primary	Secondary

Notes:
a/ Not to be exceeded.
b/ Not to be exceeded more than once per year.
c/ Compliance based on 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area.
d/ Not to be exceeded more than once per year on average over 3 years.
e/ Compliance based on 3-year average of weighted annual mean $PM_{2.5}$ concentrations at community-oriented monitors.
f/ Compliance based on 3-year average of 98th percentile of 24-hour concentrations at each population-oriented monitor within an area.
g/ Compliance based on 3-year average of fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area.
h/ The 2008 8-hour ozone standard will remain in effect until one year after an area is designated for the 2015 8-hour ozone standard, which corresponds with January 16, 2019 based upon attainment designations for the 2015 ozone standard issued on January 16, 2018.
i/ Permit applications that have not met U.S. Environmental Protection Agency's ("USEPA's") grandfathering criteria would have to demonstrate that the proposed project does not cause or contribute to a violation of any revised ozone standards that are in effect when the permit is issued, including the 2015 revised standards.
j/ Maximum 1-hour daily average not to be exceeded more than one day per calendar year on average.
k/ The 1-hour ozone standard has been revoked in all areas in which Project activities will occur.
l/ Compliance based on 3-year average of 99th percentile of the daily maximum 1-hour average at each monitor within an area.
m/ The 24-hour and annual average primary standards for SO_2 have been revoked.

ppm = parts per million by volume.
ppb = parts per billion by volume.
$\mu g/m^3$ = micrograms per cubic meter.

9.2.1.3 Section 107 Attainment Status Designations

The standard method for characterizing existing air quality in a given area is to identify the attainment status of the air quality control region ("AQCR") in which it is located. An AQCR, as defined in Section 107 of the Clean Air Act ("CAA"), is a federally-designated area in which NAAQS must be met. An implementation plan is developed for each AQCR describing how ambient air quality standards will be achieved and maintained.

The U.S. Environmental Protection Agency ("USEPA") designates the attainment status of an area on a pollutant-specific basis based on whether an area meets the NAAQS. Areas that meet the NAAQS are termed "attainment areas." Areas that do not meet the NAAQS are termed "nonattainment areas." Areas for which insufficient data are available to determine attainment status are termed "unclassified areas." Areas formerly designated as nonattainment areas that have subsequently reached attainment are termed "maintenance areas."

The attainment status designations appear at 40 CFR Part 81. The attainment status of a region, in conjunction with projected emission rates or emissions increases, determines the regulatory review

process for a new project. The Lambert Compressor Station and associated pipeline in Virginia is located in AQCR 143, the Central Virginia Intrastate AQCR. These facilities are in a region that is designated as attainment/unclassifiable for all criteria air pollutants (USEPA, 2018).

The pipeline in North Carolina is located in AQCR 150, the Northern Piedmont Intrastate AQCR. This region is designated as attainment/unclassifiable for all criteria air pollutants (USEPA, 2018).

9.2.1.4 Existing Ambient Background Levels

The Southgate Project is located in Pittsylvania County, Virginia and in Rockingham and Alamance counties, North Carolina. These counties contain ambient air quality monitors that collect data concerning existing levels of various air pollutants. Summary data from the USEPA AirData database were reviewed to characterize existing concentrations at the Project for comparison with NAAQS. Specifically, data from the closest ambient air quality monitoring stations were used to represent existing air quality at the Project. If no county data were available, data from a nearby county were used as a substitute (USEPA, 2017).

Ambient air quality monitoring data from the 3-year period 2015-2017 are summarized in Table 9.2-3 for monitoring stations nearest to the Southgate Project. Table 9.2-3 lists the maximum annual mean concentration and/or a near-maximum short-term concentration by station. Second-high short-term concentrations are listed for most pollutants, but Table 9.2-3 includes the fourth-highest 8-hour average concentration for ozone, the 98th percentile 1-hour average concentration for NO_2, the 98th percentile 24-hour average concentration for $PM_{2.5}$, and the 99th percentile 1-hour average concentration for SO_2, consistent with the structure of the NAAQS for those pollutants and averaging periods.

Table 9.2-3

Existing Ambient Background Levels in the Vicinity of the Lambert Compressor Station

Pollutant	Averaging Period	Monitoring Station	AQS Site ID	County	State	Approx. Distance from Facility (km)	Background Concentration	Primary NAAQS	Units a/
Ozone	8-hour	Reidsville	37-033-0001	Caswell	NC	59	0.064	0.070	ppm
CO	1-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	1.1	35	ppm
CO	8-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	0.7	9	ppm
NO_2	1-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	33.3	100	ppb
NO_2	Annual	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	5.7	53	ppb
PM_{10}	24-hour	Mendenhall School	37-081-0013	Guilford	NC	90	35	150	ug/m^3
$PM_{2.5}$	24-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	15.7	35	ug/m^3
$PM_{2.5}$	Annual	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	7.0	12	ug/m^3
SO_2	1-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	4.0	75	ppb
SO_2	24-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	2.8	140	ppb
SO_2	Annual	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	0.4	30	ppb

a/ ppm = parts per million by volume. ppb = parts per billion by volume. µg/m3 = micrograms per cubic meter.

9.2.1.5 Federal Class I Areas

Federal Class I areas are certain areas established by Congress, such as wilderness areas and national parks, that are afforded special protection under the Clean Air Act. Once designated as a Class I area, an area cannot be re-designated to another (lower) classification. Class I areas are allowed the smallest degree of air quality deterioration through New Source Review ("NSR") / PSD permitting, and special considerations must be made in the NSR permitting process when a Class I area is located close to a site. The Southgate Project is not anticipated to require major source PSD review and thus, Class I air quality modeling will not be required. Regardless, the Class I areas nearest to the location of the Lambert Compressor Station have been identified. The Class I areas are listed in Table 9.2-4.

Table 9.2-4
Federal Class I Areas Closest to the Lambert Compressor Station

Class I Area	Managing Agency	Direction from Lambert	Distance to Compressor Station	
			Kilometers	Miles
James River Face Wilderness Area, VA	U.S. Forest Service	North	81	50
Shenandoah National Park, VA	National Park Service	North	143	89

9.2.2 Project Emissions

9.2.2.1 Construction

Construction activities associated with the Southgate Project will result in temporary increases in emissions of some pollutants due to the use of non-stationary equipment powered by diesel fuel or gasoline engines; the temporary generation of fugitive dust due to disturbance of the ground surface, vegetation clearing, and other dust generating actions; and indirect emissions attributable to workers commuting to and from work sites during construction. Detailed construction emissions calculations along with the methodology and emissions factors used are provided in Appendix 9-A.

These sources are not considered stationary sources, and their impacts will generally be temporary and localized. Therefore, the emissions are not required to be evaluated as part of the PSD or NNSR major source determination analysis. Furthermore, the emissions from construction activities are not expected to cause or significantly contribute to an exceedance of the NAAQS.

Potential emissions from construction of the Southgate Project are presented in Section 9.2.5.

9.2.2.2 Operation (including maintenance and malfunctions)

The following sections list the equipment to be installed at the Lambert Compressor Station. Emission calculations have been performed and are presented in Appendix 9-B for these emission sources. The Southgate Project has included volatile organic compounds ("VOC") and greenhouse gas ("GHG") emissions from blowdown events at the compressor station using the following assumptions:

- While only 8 blowdown events are planned per year, due to system testing and maintenance activities, permitting will reflect 16 for the compressors in case additional blowdown events become necessary.

Lambert Compressor Station

The Lambert Compressor Station will involve the installation of:

- Two (2) turbines for the compression and transmission of natural gas;
- Five (5) microturbines to provide power;
- One (1) fuel gas heater;
- Two (2) produced fluids tanks and associated loadout; and
- Associated piping and components.

Operational emission estimates associated with fugitive gas releases from the pipeline, valves, meter stations, regulation facilities, and pig launcher/receivers along the pipeline are provided in Appendix 9-B. The calculations in Appendix 9-B are based on a methodology described in Interstate Natural Gas Association of America guidelines[1] and a representative natural gas sample, which is also included in Appendix 9-B.

9.2.2.3 Decommissioning

Decommissioning is not currently planned. Mountain Valley will obtain the necessary state and federal permits for decommissioning at the end of the useful Project life.

9.2.3 Air Permitting Requirements

The Virginia Code of State Rules ("CSR") require sources of air contamination to notify the state and receive a permit to construct, modify, relocate and operate the stationary source, unless otherwise exempt. The Southgate Project will submit the necessary construction permit applications and other relevant documentation prior to construction. A copy of the minor source air permit application for Lambert Station is included in Appendix 9-C [*Note: Appendix 9-C to be provided in a supplemental filing*].

9.2.4 Regulatory Review and Applicability

This section lists federal and state air quality regulations that may be applicable to the Southgate Project.

9.2.4.1 Prevention of Significant Deterioration Source Classification

Federal construction permitting programs regulate new and modified sources of attainment pollutants under PSD and new and modified sources of non-attainment pollutants under NNSR. PSD regulations apply when a new source is constructed in which emissions exceed PSD major source thresholds, an existing minor source undergoes a modification in which emission increases exceed PSD major source

[1] Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage, Volume 1 - GHG Emission Estimation Methodologies and Procedures, Interstate Natural Gas Association of America, September 28, 2005

thresholds, or an existing major source undergoes a modification in which emission increases exceed PSD significant emission rates. The Lambert Compressor Station will be designed as a minor source with respect to PSD, as shown in Table 9.2-5. As such, PSD permitting is not triggered.

Table 9.2-5

Emissions from Compressor Station versus NSR Major Source Thresholds

Pollutant	Lambert Compressor Station Site-Wide PTE (TPY) a/	Major Source Threshold (TPY)	NSR Program	Subject to Major NSR?
NO_2	55.58	250	PSD	NO
PM_{10}	14.96	250	PSD	NO
$PM_{2.5}$	14.96	250	PSD	NO
CO	66.08	250	PSD	NO
SO_2	5.25	250	PSD	NO
VOC	9.07	250	PSD	NO

a/ PTE includes emissions from fugitive sources. PTE = potential to emit

NNSR regulations apply only in areas designated as non-attainment. The compressor station will be located in Pittsylvania County, Virginia, which is designated as attainment/unclassifiable areas for all criteria pollutants (USEPA, 2018) Therefore, NNSR regulations do not apply.

9.2.4.2 Title V Operating Permit Program

Title 40 of the Code of Federal Regulations, Chapter 70 (40 CFR 70) establishes the Federal Title V operating permit program ("Title V"). Virginia has incorporated the provisions of this federal program in its Title V operating permit program in Virginia 45 CSR 30. The major source thresholds with respect to the Virginia and North Carolina Title V operating permit program regulations are 10 tons per year ("tpy") of a single hazardous air pollutant ("HAP"), 25 tpy of any combination of HAP and 100 tpy of all other regulated pollutants, except GHG.[2]

The potential emissions of all regulated pollutants at the Lambert Compressor Station will be below the corresponding Title V thresholds. Therefore, the Lambert Compressor Station is not anticipated to be a major source for Title V purposes.

9.2.4.3 New Source Performance Standards

New Source Performance Standards ("NSPS"), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the facilities.

[2] On June 23, 2014, the U.S Supreme Court decision in the case of *Utility Air Regulatory Group v. EPA* effectively changed the permitting procedures for GHGs under the PSD and Title V programs.

NSPS Subpart Dc – Steam Generating Units

Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, applies to all steam generating units with a heat input greater than or equal to 10 million British thermal units per hour ("MMBtu/hr") and less than 100 MMBtu/hr. No units at the facilities meet the definition of a steam generating unit nor have a heat input greater than 10 MMBtu/hr; therefore, the requirements of this subpart will not apply.

NSPS Subpart GG – Stationary Gas Turbines

Subpart GG, Standards of Performance for Stationary Gas Turbines, applies to all gas turbines with a heat input at peak load greater than or equal to 10 MMBtu/hr based on the lower heating value of the fuel fired. This standard was promulgated in 1979. The applicability of Subpart KKKK, promulgated in 2006, is similar to that of Subpart GG and applies to stationary combustion turbines that commence construction after February 18, 2005. Turbines subject to Subpart KKKK are specifically exempt from the requirements of Subpart GG per 40 CFR § 60.4305(b). As such, this subpart does not apply to the proposed Solar turbines at the compressor station, which are subject to the requirements of Subpart KKKK as discussed in the below section. The proposed generators have a heat input less than 10 MMBtu/hr and are not subject to the requirements of Subpart GG.

NSPS Subparts K, Ka, and Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka to those constructed, reconstructed, or modified prior to 1984. All storage tanks located at the compressor station will be constructed after these dates; therefore, the requirements of Subparts K and Ka do not apply. Subpart Kb applies to volatile organic liquid storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (approximately 19,813 gallons). All storage tanks at the compressor station will be new construction but will not have a capacity greater than 75 m^3. Therefore, Subpart Kb does not apply to the storage tanks at the compressor station.

NSPS Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, applies to manufacturers, owners and operators of stationary spark engines. There will be no stationary spark engines installed at the compressor station. Therefore, this subpart is not applicable to the Southgate Project.

NSPS Subpart KKKK – Stationary Combustion Turbines

Subpart KKKK, Standards of Performance for Stationary Combustion Turbines, applies to stationary combustion units with a heat input at peak load equal to or greater than 10 MMBtu/hr, based on the higher heating value of the fuel, commencing construction after February 18, 2005. The generators at the compressor station will each have a heat input less than 10 MMBtu/hr. Therefore, they are not subject to this standard.

The proposed Solar turbines for the Lambert Compressor Station will be subject to the nitrogen oxide ("NO_X") emissions limitations in NSPS KKKK. Turbines with a rated capacity between 50 to 850 MMBtu/hr at peak load are limited to NO_X emissions of 25 ppm at 15 percent O_2 when firing natural gas. The Solar turbines that will be installed at the station are equipped with lean pre-mix combustion technology and are guaranteed by the manufacturer to emit a maximum of 15 ppm of NO_X at 15 percent O_2 under variable turbine load conditions when firing on natural gas. This vendor guarantee is below the NSPS KKKK standard.

The Southgate Project will perform annual performance tests in accordance with §60.4340(a) and§ 60.4400 to demonstrate compliance with the NO_X emission limitations, or as an alternative, will continuously monitor the appropriate parameters to determine whether each turbine is operating in low-NO_X mode in accordance with §60.4340(b)(2)(ii) and §60.4355(a). The Solar turbines will also comply with the SO_2 emission limits in NSPS KKKK. The Southgate Project will comply with the SO_2 requirements by the exclusive use of natural gas which contains total potential sulfur emissions less than 0.060-pound SO_2/MMBtu heat input in accordance with §60.4330(a)(2).

NSPS Subpart OOOO – Natural Gas Production, Transmission, and Storage

Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, applies to facilities that commenced construction, reconstruction, or modification after August 23, 2011 and on or before September 18, 2015. This NSPS was published in the Federal Register on August 16, 2012 and was subsequently amended. The list of potentially affected facilities includes:

- Gas wellheads;
- Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment;
- Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment;
- Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of greater than 6 standard cubic feet per hour located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment (excluding natural gas processing plants);
- Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants;
- Storage vessels in the production, processing, or transmission and storage segments; and
- Sweetening units located onshore that process natural gas produced from either onshore or offshore wells.

Since the compressor station will be constructed after September 18, 2015, this subpart does not apply to any sources at the facility.

NSPS Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

40 CFR Part 60, Subpart OOOOa applies to sources that are constructed/modified/reconstructed after September 18, 2015 including centrifugal compressors, reciprocating compressors, pneumatic controllers, pneumatic pumps, storage vessels, equipment leaks and sweetening units within the crude oil and natural gas sector. In the natural gas transmission segment, Subpart OOOOa defines standards for each of these affected facilities, except for pneumatic pumps and sweetening units.

Centrifugal compressors with wet seals constructed after September 18, 2015 are subject to the control, recordkeeping, and reporting requirements of Subpart OOOOa. Mountain Valley will not be installing any centrifugal compressors with wet seals as part of the Southgate Project. Any new natural gas pneumatic controller installed will have a bleed rate less than or equal to six standard cubic feet per hour, as required by Subpart OOOOa.

The regulatory standards applicable to storage vessels are detailed in 40 CFR §60.5395a. The only tanks that fall under the Subpart's definition of a "storage vessel" are the produced fluid storage tanks; however, these tanks will have potential VOC emissions below 6 tpy each. As such, per §60.5365a(e), these tanks are not storage vessel affected facility under the rule.

Subpart OOOOa has added Leak Detection and Repair requirements for new or modified compressor stations in the transmission segment. For equipment leaks, Subpart OOOOa requires quarterly surveys using optical gas imaging ("OGI") technology and subsequent repair of any identified leaks. The Southgate Project will comply with all applicable leak detection provisions of Subpart OOOOa.

9.2.4.4 National Emission Standards for Hazardous Air Pollutants

Regulatory requirements for facilities subject to National Emission Standards for Hazardous Air Pollutants ("NESHAP") standards, otherwise known as Maximum Available Control Technology ("MACT") Standards for source categories, are contained in 40 CFR Part 63. 40 CFR Part 61 NESHAP standards are defined for specific pollutants while Part 63 NESHAPs are defined for source categories where allowable emission limits are established on the basis of a MACT determination for a particular major source. A major source of HAP is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. Area sources consist of smaller-size facilities that release lesser quantities of toxic pollutants into the air and are defined as sources that emit less than 10 tpy of a single air toxin or less than 25 tpy of a combination of air toxins. Part 63 NESHAPs apply to sources in specifically-regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type.

Potential HAP emissions from the compressor station will be below the major source thresholds (i.e., less than 10 tpy of individual HAP and 25 tpy of total HAP) and therefore, the facility will be an area source of HAP. The potential applicability of specific MACT standards to the compressor station is discussed below.

NESHAP Subpart HH – Natural Gas Production Facilities

This standard applies to sources at natural gas production facilities that are major or area sources of HAP emissions. The Lambert Compressor Station is a transmission facility; therefore, the facility will not be subject to Subpart HH.

NESHAP Subpart HHH – Natural Gas Transmission and Storage Facilities

This standard applies to sources at natural gas transmission and storage facilities that are major sources of HAP emissions located downstream of the point of custody transfer (after processing and/or treatment in the production sector), but upstream of the distribution sector. The Lambert Compressor Station is a transmission facility and an area (not major) source of HAP emissions. Therefore, the facility will not be subject to Subpart HHH.

NESHAP Subpart YYYY – Stationary Combustion Turbines.

Stationary combustion turbines located at facilities that are major sources of HAPs are potentially subject to Subpart YYYY, NESHAP for Stationary Combustion Turbines. Subpart YYYY establishes emissions and operating limitations for lean premix gas-fired, lean premix oil-fired, diffusion flame gas-fired and diffusion flame oil-fired stationary combustion turbines. The Lambert Compressor Station is an area (not major) source of HAP and therefore is not subject to the requirements of this subpart.

NESHAP Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

Stationary reciprocating internal combustion engines at both area and major sources of HAP emissions are potentially subject to Subpart *ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines*. There are no proposed stationary reciprocating internal combustion engines at the compressor station. Therefore, the station is not subject to this subpart.

NESHAP Subpart DDDDD – Industrial, Commercial, and Institutional Boilers and Process Heaters (Major Source Boiler MACT)

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at major sources of HAP. The facility is an area (not major) source of HAP; therefore, the requirements of this subpart will not apply.

NESHAP Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers (Area Source Boiler MACT)

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types. The rule does not apply to natural gas fired boilers and does not apply to process heaters at area sources. The fuel heaters are natural gas-fired and are specifically exempt from this subpart. Therefore, the requirements of this subpart will not apply.

9.2.4.5 Greenhouse Gas Reporting Rule

Per 40 CFR §98.2(a)(2), facilities that contain a source category listed in Table A-4 and emit 25,000 metric tons or more per year of carbon dioxide equivalent ("CO_2e") in combined emissions from stationary fuel combustion units, miscellaneous uses of carbonate, and all applicable source categories in Tables A-3 and A-4 are subject to reporting under the Greenhouse Gas Mandatory Reporting Rule

("MRR"). Table A-4 of 40 CFR 98 Subpart A includes Petroleum and Natural Gas Systems. Greenhouse gas emissions from the compressor station are over 25,000 metric tpy on a potential basis. The actual emissions will be calculated annually following support W applicability and calculation methodology and compared with the 25,000 metric tpy of CO_2 to address the applicability of the rule. The Southgate Project will meet all requirements of the MRR for the new compressor station, as applicable. No other subparts under the MRR are applicable to the compressor station.

9.2.4.6 Virginia Air Quality Regulations

The Lambert Compressor Station is subject to regulations contained in the Virginia CSR, which requires sources of air contamination to notify the state and receive a permit to construct, modify, relocate and operate the stationary source, unless otherwise exempt. The air quality regulations for the Commonwealth of Virginia are codified in Title 9 of the Virginia Administrative Code (9 VAC) Agency 5, State Air Pollution Control Board. The following sections present a discussion of potentially applicable Virginia air quality regulations.

9 VAC 5-20: General Provisions on Air Pollution Control

The General Provisions on Air Pollution Control contain provisions to secure and maintain all air quality levels in Virginia. Under 9 VAC 5-20-170, the air pollution control board may require an owner of a stationary source to submit a control program, in a form and manner satisfactory to the board, showing how compliance shall be achieved. For cases of equipment maintenance or malfunctions, 9 VAC 5-20-180 will require the facility record and notify the board of such instances.

9 VAC 5-30: Ambient Air Quality Standards

Ambient air quality standards are required to assure that ambient concentrations of air pollutants are consistent with established criteria and shall serve as the basis for effective and reasonable management of the air resources. Depending on the ambient air quality concentrations, air dispersion modeling may be required. State operating permits ("SOP") are covered in 9 VAC 5-80, which is discussed in more detail below.

9 VAC 5-50: New and Modified Sources

The owner or operator of a new or modified emission source must achieve compliance with all standards of performance prescribed under this chapter within 60 days of achieving maximum production rate, but no later than 180 days after initial startup. Upon the request of the board, the owner or operator may be requested to continuously monitor emissions and process parameters by procedures and methods acceptable to the board. Performance tests will include odor, toxic pollutants, dust, and visible emissions testing. Recordkeeping and reporting requirements include notification of startup, shutdown, malfunction, performance tests, monitoring device malfunctions or repairs, monitoring start and end times. Records must be kept for at least 5 years.

In addition, new or modified stationary sources under Article 6 may be required to demonstrate the use of Best Available Control Technology ("BACT") under 9 VAC 5-50-260. A copy of the air permit application for Lambert Station, which includes BACT applicability and assessment is included in Appendix 9-C.

9 VAC 5-50-80: Visible Emission Standards

Standards for visible emissions from affected facilities are included within 9 VAC 5-50-80. This standard prohibits affected facilities from operating equipment with visible emissions, which exhibit greater than 20 percent opacity, except for one six-minute period in any one hour with no more than 30 percent opacity. Emissions units at the Lambert Compressor Station will comply with the visible emissions standard using EPA Method 9, except during start-up, shutdown, and malfunction.

9 VAC 5-50-90: Fugitive Dust Emissions

The 9 VAC 5-50-90 rule states that during construction and operation of an affected facility, an owner or operator should take reasonable precautions to prevent particulate matter from becoming airborne from any materials or property to be handled, transported, stored, used, constructed, altered, or repaired. The Lambert Compressor Station will be constructed using the fugitive dust mitigation measures discussed in Section 9.2.6 to minimize fugitive dust emissions.

9 VAC 5-60: Hazardous Air Pollutant Sources

Standards and criteria on regulated HAPs are included within 9 VAC 5-60. Emissions testing and recordkeeping is also included in this chapter. A source is exempt from this chapter if the source emits less than the Federal standards for HAP emissions. Air dispersion modeling is required based on the site-specific emissions calculations.

9 VAC 5-80-50: Federal Operating Permits

A Federal operating permit is required for any major source or an area source subject to a standard, limitation, or other requirement under Sections 111-112 of the Clean Air Act, unless otherwise exempt. A copy of the air permit application for Lambert Station, which includes an applicability assessment for major source federal operating permits is included in Appendix 9-C.

9 VAC 5-80: State Operating Permits

Article 6 permitting must be completed before construction of a new source, per 9 VAC 5-80-1100. Virginia's SOPs are most often used by stationary sources to establish federally enforceable limits on potential emissions to avoid major NSR permitting (PSD and NNSR permits), Title V permitting, and/or major source MACT applicability. When a source chooses to use a SOP to limit their emissions below major source permitting thresholds, it is commonly referred to as a "synthetic minor" source. SOPs can also be used to combine multiple permits from a stationary source into one permit or to implement emissions trading requirements.

A copy of air permit application for Lambert Station, which includes an applicability assessment for SOP regulations is included in Appendix 9-C.

9 VAC 5-80-1100: Construction Permits

Article 6 permitting must be completed before construction of a new source. The required Form 7 application forms and attachments are included in the VADEQ air permit application provided in Appendix 9-C to satisfy this requirement for the construction of sources at the facility.

9 VAC 5-85: Permits for Stationary Sources of Pollutants Subject To Regulation

This chapter contains definitions and general provisions which are essentially identical to those discussed in chapter 5-20 above.

9 VAC 5-130: Open Burning

Open burning is permitted on site for the destruction of clean burning waste and debris waste resulting from the development or modification of roads and highways, pipelines, buildings, or from any other clearing operations. Open burning is prohibited from May 1 through September 30. The contractor(s) may utilize open burning as a means of disposing of land-clearing waste during construction of the Southgate Project. The Project's contractor(s) will comply with the provisions of 9 VAC 5-130 during construction.

9.2.4.7 Chemical Accident Prevention Provisions

EPA has established accidental release prevention and risk management plan requirements as part of 40 CFR Part 68 (Chemical Accident Prevention Provisions). Part 68 lists regulated substances along with thresholds for determining the applicability of the associated requirements. If a regulated substance is handled, stored, or processed in greater than threshold quantities at a stationary source, then a risk management plan must be prepared (40 CFR Sections 68.10(a) and 68.12(a)).

Except for constituents of natural gas, such as ethane and methane, the Southgate Project is not expected to produce, process, handle, or store any substance regulated under Part 68 in quantities exceeding applicability thresholds.

9.2.4.8 North Carolina Air Quality Regulations

15A NCAC 02D.1900: Open Burning

This rule outlines the requirements for permissible open burning during land clearing and right of way maintenance. Contractor(s) may utilize open burning as a means of disposing of land-clearing waste during construction of the Southgate Project. This rule regulates items such as the timing, location, meteorological conditions, and type of waste for burning. The Project's contractor(s) will comply will all provisions of 15A NCAC 02D.1900 during construction.

9.2.5 General Conformity

Under the Clean Air Act, a General Conformity analysis is required for any project that requires federal action. General Conformity applies to those emission generating activities resulting from the Project that are not already covered by permitting and located in an area that is designated as nonattainment or a maintenance area (40 CFR 93.153(b)).

The Lambert Compressor Station and pipeline in Virginia is located in AQCR 143, the Central Virginia Intrastate AQCR. These facilities are in a region that is designated as attainment/unclassifiable for all criteria air pollutants. The pipeline in North Carolina is located in AQCR 150, the Northern Piedmont Intrastate AQCR. This region is designated as attainment/unclassifiable for all criteria air pollutants. Therefore, a General Conformity analysis is not required for the Southgate Project.

Construction emissions are presented in Section 9.2.5.1 per FERC's *Guidance Manual for Environmental Report Preparation* issued February 2017. Operation emissions are presented in Section 9.2.5.2.

9.2.5.1 Construction Emissions

The use of equipment to construct the Southgate Project will result in temporary, short-term emissions of air pollutants that will be restricted to the construction period for the compressor station and pipeline and will terminate once construction has been completed. Construction for the Project is expected to take place in 2020. In addition, some right-of-way restoration will occur in 2021.

Construction activities can generally be categorized into the following activities:

- Construction Equipment Engines – Emissions associated with off-road construction equipment such as air compressors, backhoes, cranes, and other construction equipment;
- On-Road Vehicle Travel – Emissions from commuter buses, passenger vehicles, and diesel or gasoline trucks;
- Construction Vehicle Travel – Emissions associated with on-road vehicle travel by dump trucks, light/medium duty trucks, and water/fuel trucks;
- Earthmoving Fugitives – Emissions resulting from bulldozing, grading, and land disturbance; and
- Wind Erosion – Emissions resulting from soil piles.

Emissions from these source categories were calculated using emission factors and USEPA models from the following sources:

- WRAP Fugitive Dust Handbook, Countess Environmental, September 2006;
- USEPA NONROAD2008a Model; and
- USEPA MOVES2014a Vehicle Emission Modeling Software.

Note that fugitive dust emissions from on-road construction equipment and on-road commuter traffic are included in the emission calculations provided in Appendix 9-A. Additionally, note that for the types of sources of GHG emissions associated with Southgate Project construction, total carbon dioxide ("CO_2") is essentially the same as carbon dioxide equivalents (CO_2e) because the CO_2 component of CO_2e for these sources is much greater than 99 percent.

Compressor Station and Meter Station Emissions

Emissions from the compressor station and meter stations were estimated based on the type of construction activity occurring and the length of time that type of activity was expected to last at each station. The total emissions are based on the year the construction is expected to occur at each station and exhibited in Tables 9.2-6 through 9.2-7. Detailed construction emissions calculations along with the methodology and emissions factors used are provided in Appendix 9-A.

Pipeline Emissions

Emissions from the construction of the pipeline are calculated based on the length of pipeline being constructed in each county. Emissions were estimated based on the type of construction activity occurring and the length of time that type of activity was expected to last within each county of pipeline construction. The total emissions expected to occur for each construction year by county are exhibited in Tables 9.2-6 through 9.2-7. Detailed construction emissions calculations along with the methodology and emissions factors used are provided in Appendix 9-A.

9.2.5.2 Operations Emissions

Emissions from operating the equipment at the new Lambert Compressor Station are a result of combustion of natural gas in compressor turbines at the station. The main emission sources at the compressor station are the natural gas turbines and the generators. Emissions of all pollutants have been minimized through the selection of the most fuel-efficient turbines. Larger turbines, with greater horsepower ("hp") output, are more efficient. More efficient models use less fuel and produce fewer emissions for the same hp output. The new compressor station will utilize the largest, most efficient turbines that meet the pipeline operational requirements. The generators that will be installed as part of the Southgate Project have very low emissions compared to viable alternatives, such as reciprocating internal combustion engines. Table 9.2-8 presents the operational emissions potential to emit in tons per year.

For the natural gas turbines, the Southgate Project is planning to purchase and install Solar turbines at the compressor station which are equipped with SoLoNOx, Solar's emission reduction technology. SoLoNOx is a lean, pre-mixed technology that controls the air to fuel ratio and the temperature of the flame to reduce NOX emissions without significantly increasing CO. As noted in section 9.2.4.3, the manufacturer's guaranteed NOX emissions of 15 ppm are below the 25 ppm limit of NSPS Subpart KKKK. Further, the Project will further mitigate these emissions through the development and implementation of an Operation and Maintenance Plan that is consistent with the manufacturer's recommendations for good combustion practices. Proper operation and preventative maintenance activities will ensure that emissions from the turbines will be minimized and continue to meet or exceed the applicable emission standards.

Table 9.2-6

Estimated Construction Emissions from the MVP Southgate Project – 2020

SOURCE	2020 CONSTRUCTION EMISSIONS (TPY)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
Lambert Compressor Station/Interconnect:								
Construction Equipment Engines	7,664	15.26	22.16	1.64	1.64	0.0413	3.13	0.18
On-Road Vehicle Travel	470	3.77	0.46	0.09	0.02	0.0033	0.13	0.05
Off-Road Vehicle Travel	1,766	5.78	3.87	0.46	0.20	0.0144	0.50	0.11
Earthmoving Fugitives	N/A	N/A	N/A	12.28	1.23	N/A	N/A	N/A
Wind Erosion	N/A	N/A	N/A	1.77	0.27	N/A	N/A	N/A
Open Burning	65	2.88	0.08	0.35	0.35	N/A	0.49	N/A
Lambert Total	**9,966**	**27.68**	**26.57**	**16.58**	**3.71**	**0.0589**	**4.25**	**0.34**

Table 9.2-6

Estimated Construction Emissions from the MVP Southgate Project – 2020

SOURCE	2020 CONSTRUCTION EMISSIONS (TPY)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
Meter Stations:								
Construction Equipment Engines	4,411	7.61	13.04	0.91	0.91	0.0238	1.71	0.10
On-Road Vehicle Travel	150	1.26	0.13	0.03	0.01	0.0010	0.04	0.02
Off-Road Vehicle Travel	1,855	4.52	4.46	0.51	0.24	0.0155	0.53	0.11
Earthmoving Fugitives	N/A	N/A	N/A	3.36	0.34	N/A	N/A	N/A
Wind Erosion	N/A	N/A	N/A	0.48	0.07	N/A	N/A	N/A
Open Burning	4	0.17	0.005	0.02	0.02	N/A	0.03	N/A
Meter Station Total	**6,420**	**13.56**	**17.64**	**5.31**	**1.58**	**0.0403**	**2.31**	**0.22**
Pipeline:								
Construction Equipment Engines	83,586	71.95	196.60	11.22	11.22	0.4379	24.76	1.92
On-Road Vehicle Travel	2,822	25.24	2.10	0.50	0.10	0.0190	0.75	0.32
Off-Road Vehicle Travel	1,464	6.50	2.77	0.36	0.15	0.0115	0.41	0.11
Earthmoving Fugitives	N/A	N/A	N/A	935.18	93.52	N/A	N/A	N/A
Wind Erosion	N/A	N/A	N/A	134.61	20.19	N/A	N/A	N/A
Open Burning	8,805	387.62	11.07	47.07	47.07	N/A	66.45	N/A
Pipeline Total	**96,677**	**491.31**	**212.55**	**1128.93**	**172.25**	**0.4684**	**92.37**	**2.35**
Pipeline in Pittsylvania, VA	32,549	176.77	71.28	21.29	21.08	0.1564	33.01	0.78
Pipeline in Rockingham, NC	32,502	177.58	71.15	21.39	21.20	0.1558	33.16	0.78
Pipeline in Alamance, NC	31,626	136.96	70.11	16.46	16.26	0.1562	26.19	0.78
2020 TOTAL:	**113,062**	**532.5**	**256.8**	**1150.8**	**177.5**	**0.6**	**98.9**	**2.9**

N/A indicates that the specific pollutant emissions are not expected from that source.

Table 9.2-7

Estimated Construction Emissions from the MVP Southgate Project – 2021

SOURCE	2021 CONSTRUCTION EMISSIONS (TPY)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
Lambert Compressor Station/Interconnect:								
Construction Equipment Engines	1,929	2.14	4.46	0.34	0.34	0.0101	0.69	0.04
On-Road Vehicle Travel	95	0.65	0.12	0.02	0.01	0.0007	0.03	0.01
Off-Road Vehicle Travel	233	0.84	0.49	0.06	0.03	0.0019	0.07	0.02
Earthmoving Fugitives	N/A	N/A	N/A	6.14	0.61	N/A	N/A	N/A
Wind Erosion	N/A	N/A	N/A	0.88	0.13	N/A	N/A	N/A
Open Burning	0	0	0	0	0	N/A	0	N/A
Lambert Total	**2,257**	**3.62**	**5.07**	**7.44**	**1.12**	**0.0126**	**0.78**	**0.07**
Meter Stations:								
Construction Equipment Engines	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
On-Road Vehicle Travel	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
Off-Road Vehicle Travel	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00

Table 9.2-7

Estimated Construction Emissions from the MVP Southgate Project – 2021

SOURCE	2021 CONSTRUCTION EMISSIONS (TPY)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
Earthmoving Fugitives	N/A	N/A	N/A	0.00	0.00	N/A	N/A	N/A
Wind Erosion	N/A	N/A	N/A	0.00	0.00	N/A	N/A	N/A
Open Burning	0	0	0	0	0	N/A	0	N/A
Meter Station Total	**0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.0000**	**0.00**	**0.00**
Pipeline:								
Construction Equipment Engines	4,417	2.21	5.93	0.32	0.32	0.0221	1.14	0.10
On-Road Vehicle Travel	292	1.75	0.43	0.06	0.02	0.0022	0.08	0.03
Off-Road Vehicle Travel	131	0.60	0.24	0.03	0.01	0.0010	0.04	0.01
Earthmoving Fugitives	N/A	N/A	N/A	545.52	54.55	N/A	N/A	N/A
Wind Erosion	N/A	N/A	N/A	78.52	11.78	N/A	N/A	N/A
Open Burning	0	0	0	0	0	N/A	0	N/A
Pipeline Total	**4,840**	**4.56**	**6.61**	**624.46**	**66.68**	**0.0253**	**1.26**	**0.14**
Pipeline in Pittsylvania, VA	1,629	1.53	2.25	226.62	24.19	0.0086	0.42	0.05
Pipeline in Rockingham, NC	1,594	1.51	2.15	240.54	25.67	0.0083	0.41	0.04
Pipeline in Alamance, NC	1,617	1.52	2.21	157.29	16.82	0.0085	0.42	0.05
2021 TOTAL:	**7,097**	**8.2**	**11.7**	**631.9**	**67.8**	**0.04**	**2.0**	**0.2**

N/A indicates that the specific pollutant emissions are not expected from that source.

Table 9.2-8

Operational and Fugitive Emissions from the Lambert Compressor Station Equipment

Pollutant	Equipment PTE (TPY)	Fugitive PTE (TPY)	Total PTE (TPY)
NO_2	55.58	0.0	55.58
PM_{10}	14.96	0.0	14.96
$PM_{2.5}$	14.96	0.0	14.96
CO	66.08	0.0	66.08
SO_2	5.25	0.0	5.25
VOC	7.89	1.18	9.07

9.2.6 Air Quality Mitigation Measures

Construction Emissions

The construction emissions associated with the Southgate Project are temporary in nature and are expected to have minimal impact on the air quality in the surrounding area. However, the Project will implement various mitigation measures to minimize construction emissions. These include:

- The Southgate Project will avoid unnecessary construction activities leading to increased emissions, where possible;

- The Southgate Project will utilize low sulfur diesel fuel with a maximum sulfur content of 15 ppm based upon the requirements of 40 CFR Part 80;
- The Southgate Project will, when practical, request that contractor(s) use newer model equipment that are equipped with the latest emission reduction technologies that are in compliance with EPA's mobile source emission standards;
- The Southgate Project will follow manufacturer's operating recommendations regarding good combustion practices to ensure that fuel efficiency is maximized, and engines are operated such that emissions are minimized;
- The Southgate Project will implement the fugitive dust control measures as described below; and
- The Southgate Project will avoid idling of the construction equipment to the extent possible.

The fugitive dust control measures will include the following specific steps to be taken during construction:

- Fugitive dust emissions from vegetation removal, clearing and grading, cutting and filling, topsoil removal, trenching, backfilling and stockpile storage will be controlled to a great extent by following the construction sequencing and disturbing limited areas at a time;
- Fugitive dust emissions generated by motorized equipment and miscellaneous vehicle traffic will be controlled by wet suppression as necessary;
- Fugitive dust emissions from paved roads will be controlled with a combination of water trucks, power washers, sweeping and/or vacuuming. If necessary, additional potential sources of water for dust control may include other municipal systems, groundwater supply wells, and/or approved surface waters;
- Track out of loose materials will be controlled using rock construction entrances on access roads that begin at a junction with paved roads; and
- When environmental conditions are dry, inspection of dust control measures will be conducted daily.

The Southgate Project performed a complete air dispersion modeling analysis, which is presented in Appendix 9-D, to ensure that the concentration levels from the emission sources at the compressor station will not exceed the NAAQS levels. Table 9.2-9 presents the list of the major existing and reasonably foreseeable future projects that may cumulatively or additively impact air quality along with an approximate distance from the nearest Project facility. Operation of the existing and reasonably foreseeable major air emissions sources listed in Table 9.2-9 will have air emissions associated with them; however, the other sources of air emissions from operation of these recent or planned projects are or will be controlled in accordance with state and federal air pollution laws and regulations. Additionally, Transcontinental Gas Pipe Line Company, LLC ("Transco") will need to obtain FERC authorization for the natural gas transmission projects associated with modifications at Transco Stations 165 and 166 prior to construction and operation; the review of those projects will include a detailed air quality assessment for construction and operation.

Table 9.2-9 Major Air Quality Facilities Within 20-miles of the Lambert Compressor Station		
County / State	**Facility**	**Approximate Distance to The Lambert Station (miles)**
Pittsylvania, VA	Transco - Station 165	<1
Pittsylvania, VA	Transco - Station 166	<1
Pittsylvania, VA	Arkema Inc.	5
Pittsylvania, VA	Owens-Brockway Glass Container Inc.	16
Pittsylvania, VA	Intertape Polymer Corporation	16
Pittsylvania, VA	Elkay Wood Product Company	17
Pittsylvania, VA	Dominion - Pittsylvania Power Station	19

The existing and proposed offsite major air emissions sources are or will be operated in compliance with all applicable state and federal air regulations; including, stack testing, recordkeeping, reporting, and monitoring requirements to establish compliance with federally enforceable emissions standards. Because operation of the Southgate Project, along with the other existing and proposed major Title V projects/facilities, will be regulated by the VADEQ and NCDEQ through the air permitting process, the cumulative effect of operation of the Project with other projects is not expected to result in adverse air quality impacts.

Climate Change and Greenhouse Gases

Construction activities will result in temporary increases in GHG emissions due to the use of non-stationary equipment powered by diesel fuel or gasoline engines and indirect emissions attributable to workers commuting to and from work sites during construction. These sources are not considered stationary sources, and their impacts will generally be temporary and localized. The Southgate Project will, to the extent practical, employ good management practices, as described above, to limit these emissions.

With respect to operational emissions, USEPA has not published formal white papers for different industries to discuss available GHG control technologies. In permitting guidance, USEPA agrees that energy efficiency improvements will satisfy the control requirements for GHGs in most cases. As such, operational GHG emissions would be expected to be limited to the use of energy efficient design and the minimization of GHG releases through standard work practices for the natural gas industry. The use of the combustion turbines represents one element of the Southgate Project's energy efficient design.

Fugitive GHG (and to a lesser extent, VOC) leaks will be minimized by adhering to good operating and maintenance practices and meeting the requirements of the federal NSPS OOOOa regulation. Mountain Valley designed the Southgate Project to reduce GHG emissions where technically and economically feasible. In addition, the Project reviewed USEPA's voluntary Natural Gas Star program for potential emission reduction measures, and Table 9.2-10 summarizes the feasibility of various measures for the Project. Total, site-wide VOC and GHG emissions from fugitive and blowdown sources are estimated to be low and well below major source permitting thresholds. Therefore, any additional emission reduction will not be cost effective due to the minimal emission reductions achieved.

Natural gas that will flow on the Southgate Project will be received at either the Mountain Valley Pipeline interconnection near Chatham, Virginia or from East Tennessee at the LN 3600 Interconnect near Eden, North Carolina. Accordingly, any GHGs attributable to this natural gas that could subsequently be attributed to a downstream use will either: (1) already have been considered as part of the Commission's upstream pipeline approval; or (2) is not an incremental increase in natural gas being transported but rather represents a different utilization of the upstream pipeline capacity. Therefore, it would be double counting if these GHG emissions were to be considered as part of the Southgate Project, and such downstream GHG emissions should not be attributed to the Project. Using good management practices and energy efficient design, the Project employed measures to minimize GHG emissions and any resulting impact on climate change.

Table 9.2-10

Summary of Natural Gas Star Program

Energy Star Project[3]	Feasibility Assessment
Replace Gas Starters with Air or Nitrogen	Feasible – Gas starters may be replaced with air.
Reduce Natural Gas Venting with Fewer Compressor Engine Startups and Improved Engine Ignition	Feasible – Turbines are intended to operate at all times other than preventative maintenance shutdowns. The Project's preventative maintenance program will reduce starts related to unanticipated shutdown/repairs.
Reducing Methane Emissions from Compressor Rod Packing Systems	Not feasible – This reduction strategy is applicable to older compressors with potentially worn packing. Compressors are equipped with newly installed packing by design. The Project will follow the manufacturer's recommended procedures for proper maintenance and inspection of compressor rod packing systems and comply with NSPS OOOOa.
Test and Repair Pressure Safety Valves	Feasible - Completed by the Project on periodic basis.
Eliminate Unnecessary Equipment and/or Systems	The Project will only be installing what is required for this application.
Install Automated Air/Fuel Ratio Controls	Feasible – Turbines will be equipped with state-of-the art AFR (air-to- fuel-ratio) controllers/SoLoNOx technology.
Install Electric Motor Starters	The turbines are intended to operate at all times therefore the number of starts is minimized and the potential methane reductions would be small. Nonetheless, current design includes electric motor starts.
Reducing Emissions When Taking Compressors Off-Line	Feasible - Blowdown gas may be injected into the fuel gas recovery system. However, the proposed facility is a gathering facility that is expected to operate at or near 100% capacity year-round. Shutdown events are expected to be very infrequent, and the current design of the station does not allow for recycling of turbine blowdowns.
Replace Compressor Cylinder Unloaders	Not Applicable.

[3] https://www.epa.gov/natural-gas-star-program/recommended-technologies-reduce-methane-emissions

Table 9.2-10 Summary of Natural Gas Star Program	
Energy Star Project[3]	**Feasibility Assessment**
Install Electric Compressors	Not Feasible - Electric compressors are cost prohibitive even if electric supply is available. As stated in the NG Star fact sheet "The capital costs and the electricity costs, however, are higher for an electric motor compared to those for a gas driven engine. The savings from maintenance costs relative to the cost of energy will not be justified unless the engine is at the end of its economic life."
Wet Seal Degassing Recovery System for Centrifugal Compressors	Turbine centrifugal compressors will be dry seal.

9.3 Noise

This section provides an overview of the noise generating equipment for the Project, the noise study approach for each compressor station, meter stations, locations of horizontal directional drill ("HDD") and railroad conventional bores, a description of noise associated with construction activities, and a discussion of typical noise mitigation methods for the type of equipment associated with each component of the Project. Environmental noise will be generated during construction and operation of the compressor station and meter stations associated with the Project. There will also be noise associated with the construction of the meter stations and the pipeline.

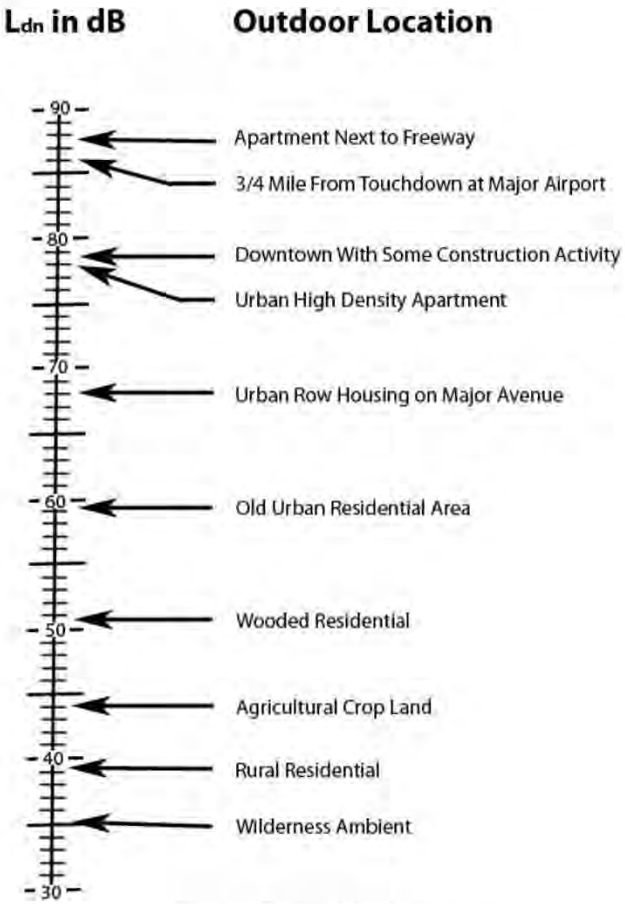
9.3.1 Background Information on Sound and Noise

A sound source is defined by a sound power level ("L_W"), which is the rate at which acoustical energy is radiated outward and is expressed in units of watts. A sound pressure level ("L_P") is a measure of fluctuation at a given receiver location and can be obtained through the use of a microphone or calculated from information associated with the source sound power level and surrounding environment. Sound power cannot be measured directly but can be calculated from measurements of sound intensity or sound pressure at a given distance from the source.

The perception of sound as "noise" is influenced by several technical factors such as intensity, sound quality, tonality, duration, and existing background levels. Sound levels are presented on a logarithmic scale to account for the large range of acoustic pressures that the human ear is exposed to and are expressed in units of decibels ("dB"). Broadband sound includes sound energy summed across the frequency spectrum. In addition to broadband sound pressure levels, analysis of the various frequency components of the sound spectrum is used to determine tonal characteristics. The unit of frequency is Hertz ("Hz") which is a measure of the cycles per second of the sound pressure waves. Typically, the frequency analysis examines 11 octave (or 33 1/3 octave) bands ranging from 16 Hz (low) to 16,000 Hz (high). One-third (1/3) octave bands have one third the width of full octave bands, which gives a higher resolution and a more detailed description of the frequency content of the sound. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter.

The A-weighted filter is applied to compensate for the frequency response of the human auditory system and sound exposure in acoustic assessments and is designated in A-weighted decibels ("dBA"). Environmental noise is commonly described in terms of equivalent sound level ("L_{eq}"). The L_{eq} value,

conventionally expressed in dBA, is the energy-averaged, A-weighted sound level for the complete time period represented as a steady, continuous sound level. Another common noise descriptor used when assessing environmental noise is the day-night sound level ("L_{dn}"), which is calculated by averaging the 24-hour hourly L_{eq} levels at a given location and adding 10 dB to noise emitted during the nighttime period (10:00 p.m. to 7:00 a.m.) to account for the increased sensitivity of people to hear noises that occur at night. The L_{max} is the maximum instantaneous sound level as measured during a specified time period. It can also be used to quantify the time-varying maximum instantaneous sound pressure level (as generated by equipment or an activity) or a manufacturer maximum source emission level. Estimates of common noise sources and outdoor acoustic environments, and the comparison of relative loudness are presented in Figure 9.3-1a.



(Adapted from USEPA, 1974)

Figure 9.3-1a. Environmental Sound Pressure Levels (L_{dn})

9.3.2 Applicable Noise Regulations

The Southgate Project pipeline is located in Virginia and North Carolina and crosses portions of three counties. The Project reviewed federal, state, county, and local noise regulations to identify regulations that may be applicable to construction and operation. A regulatory search found no state noise standards

applicable to the Project; however, there are several federal requirements and county noise regulations that are potentially applicable to the Project as described in Sections 9.3.2.1 and 9.3.2.2, respectively.

9.3.2.1 FERC Requirements

The FERC noise regulations, set forth in 18 CFR §380.12(k)(2), require an applicant to identify existing noise sensitive areas ("NSAs") within one mile of Project facilities (e.g., residences, schools, churches) and quantitatively describe existing sound levels at NSAs and at other areas covered by relevant state and local noise ordinances. The following stipulations are given:

- If new compressor station sites are proposed, measure or estimate the existing ambient sound environment based on current land uses and activities;
- For existing compressor stations (operated at full load), include the results of a sound level survey at the site property line and nearby NSAs;
- Include a plot plan that identifies the locations and duration of noise measurements; and
- All surveys must identify the time of day, weather conditions, wind speed and direction, engine load and other noise sources present during each measurement.

In addition, the FERC requirement for noise quality, in the absence of any applicable state or local noise regulation, is that the post-construction noise attributable to any new compressor station and associated pipeline facilities must not exceed an L_{dn} of 55 dBA at any pre-existing NSA such as schools, hospitals, or residences. This criterion limits the sound level contribution from the Project at any pre-existing NSA to 55 dBA (L_{dn}). An L_{dn} of 55 dBA is equivalent to a continuous noise level of 48.6 dBA L_{eq} for facilities that operate at a constant level of noise.

Regarding HDD construction sites, conditions set forth by the FERC typically require that the sound attributable to drilling operations should not exceed 55 dBA (L_{dn}) at any NSA during HDD operations. If this sound criterion/guideline is expected to exceed this level at any nearby NSA, it is generally necessary to describe noise mitigation measures/options which would be implemented during the drilling activity to reduce the noise impact of the drilling operations and achieve the sound criterion/guideline.

As per FERC's *Guidance Manual for Environmental Report Preparation* issued February 2017, "Construction activity that would or may occur during nighttime hours should be performed with the goal that the activity contribute noise levels below 55 dBA L_{dn} and 48.6 dBA L_{eq}, or no more than 10 dBA over background if ambient noise levels are above 55 dBA L_{dn}." at all surrounding NSAs. NSAs are typically residences, schools, churches, or hospitals.

In addition to the 55 dBA L_{dn} and 48.6 dBA L_{eq} nighttime sound level targets, for this Project, the nighttime construction noise has been compared to the existing nighttime ambient sound levels, to calculate the short-term increase in sound levels expected due to the construction activities.

9.3.2.2 County Limits

The three counties that the Project crosses have noise ordinances that may be applicable to the Project. Table 9.3-1 provides a summary of the noise limits identified within the ordinances. The Pittsylvania

County ordinance is the only one that provides quantitative limits. Both Rockingham County and Alamance County have ordinances that are primarily nuisance-based and provide no numerical limits.

The Pittsylvania County limits apply at the property boundary of the noise source or at any point within any other affected property, rather than at the NSA structure, so they cannot be directly compared to the FERC sound level requirements. The Pittsylvania County ordinance has an exemption for construction provided it takes place between 7:00 a.m. and 10:00 p.m. The Lambert Compressor Station is located in Pittsylvania County, Virginia. The sound levels from the station have been evaluated against both the FERC and the county sound level requirements.

Table 9.3-1

Noise Level Limits for Counties with Noise Ordinances Crossed by the MVP Southgate Project

County, State	Daytime (7 AM – 10 PM)	Nighttime (10 PM – 7 AM)
Pittsylvania, Virginia	Residential: 57 L_{eq} dBA Industrial: 77 L_{eq} dBA	Residential: 52 L_{eq} dBA Industrial: 77 L_{eq} dBA
Rockingham, North Carolina	Not Applicable (Nuisance based)	
Alamance, North Carolina	Not Applicable (Nuisance based)	

9.3.3 Existing Sound Environment

The existing sound environment surrounding each compressor station, meter station, HDD work area or railroad crossing was quantified during a baseline environmental sound level survey in the vicinity of each site. Sound levels were measured at accessible locations near the NSAs at each site. Observations of the primary existing environmental sound sources were documented.

Type 1 sound level instrumentation was used with field calibration conducted before and after each measurement. Windscreens were installed on all microphones. All instrumentation has current laboratory certification. Weather conditions during each survey were recorded, and the measurements were taken during weather periods appropriate for environmental sound level surveys.

Insect activity was the dominant source of ambient noise at most of the measurement locations. Because insect activity varies seasonally, insect noise may not be present during substantial portions of the year. Ambient data are therefore presented both as measured with the insect noise present, and with the insect noise filtered out by omitting sound energy in the whole octave bands above 1000 Hz in accordance with American National Standard method (ANSI/ASA, 2014). For the purposes of evaluating operational sound level impact, the insect-filtered data is used as the primary point of comparison to be conservative. However, if construction is going to be taking place in the spring or summer when insects will be present, it may be more appropriate to compare construction sound levels to the unfiltered ambient data.

9.3.3.1 Lambert Compressor Station

The Lambert Compressor Station site is located in Pittsylvania County, Virginia approximately 3.0 miles east of Chatham, Virginia. The area surrounding the station is mostly rural consisting of a mix of forest and open land, though there are several residences and Highway 57 within a one-mile radius of the station site. There is an existing Transco compressor station located just northeast of the site. The four closest

NSAs were identified, all residences. Figure 9.3-1 (Appendix 9-E) shows the NSAs in proximity of the Lambert Compressor Station and sound level measurement locations.

Table 9.3-2 shows the weather conditions at the start of the environmental sound level survey.

Table 9.3-2

Weather Conditions during the Lambert Compressor Station Sound Level Survey

Dates	July 18 – July 19, 2018
Temperature Range	81-86° F
Relative Humidity Range	48-64%
Wind Speed	1-4 mph
Wind From	S, W, SSW
Precipitation	none

Table 9.3-3 shows the measured daytime and nighttime sound levels (L_{eq}, dBA) as well as the equivalent day-night sound levels (L_{dn}, dBA). The measured sound level results at NSA 3 was higher than other locations due to traffic on Highway 57. Measurement locations are shown on Figure 9.3-1 (Appendix 9-E).

Table 9.3-3

Existing Sound Level Measurement Results – Lambert Compressor Station

Monitoring Location	Measurement Duration	All Octave Bands Included			Processed to Remove Insect Noise a/		
		Measured Day Average	Measured Night Average	Measured Day-Night Average	Measured Day Average	Measured Night Average	Measured Day-Night Average
	HH:MM	L_{eq} dBA	L_{eq} dBA	L_{dn} dBA	L_{eq} dBA	L_{eq} dBA	L_{dn} dBA
NSA 1	24:00	42.6	44.5	50.7	36.8	40.8	46.8
NSA 2	24:00						
NSA 3	24:00	61.8	56.3	64.0	60.4	55.1	62.8
NSA 4	24:00	56.4	46.5	56.4	38.6	38.4	44.8

a/ Insect noise was removed by omitting sound energy in the whole octave bands above 1000 Hz in accordance with American National Standard method (ANSI/ASA, 2014)

9.3.3.2 Meter Stations

There are currently four-meter (interconnect) stations planned as part of the Project.

Lambert Interconnect

The Lambert Interconnect will be located on the same site as the Lambert Compressor Station. The noise analysis for this interconnect has been included in the Lambert Compressor Station analysis. The NSAs for this site are therefore the same as for the Lambert Compressor Station. See Figure 9.3-1 (Appendix 9-E) for the meter station, compressor station, NSAs, and measurement locations for this site.

LN 3600 Interconnect

The LN 3600 Interconnect site is located in Rockingham County, North Carolina approximately 4 miles northeast of Meadow Summit, North Carolina. The closest NSA to the site is a residence. See Figure 9.3-2 (Appendix 9-E) for the NSA and measurement locations for this site. See Figure 9.3-2 (Appendix 9-E) for the meter station, compressor station, NSAs, and measurement locations for this site.

T-15 Dan River Interconnect

The T-15 Dan River Interconnect site is located in Rockingham County, North Carolina approximately 5.0 miles east of Eden, North Carolina. The closest NSA to the site is a residence. See Figure 9.3-3 (Appendix 9-E) for the NSA and measurement locations for this site.

T-21 Haw River Interconnect

The T-21 Haw River Interconnect is located in Alamance County, North Carolina approximately 2.0 miles southeast of Graham, North Carolina. The closest NSA to the site is a residence. See Figure 9.3-4 (Appendix 9-E) for the NSA and measurement locations for this site.

Ambient sound levels were measured for 24 hours from July 16 to July 17, 2018. Table 9.3-4 shows the weather conditions during the meter station sound level surveys.

Table 9.3-4

Weather Conditions during the Meter Station Sound Level Surveys

Station	LN 3600 Interconnect	T-15 Dan River Interconnect	T-21 Haw River Interconnect
Dates	July 16 – July 17, 2018	July 16 – July 17	July 16 – July 17
Temperature Range	84 - 92 °F	83 - 94° F	91 – 92° F
Relative Humidity Range	52 – 72	47 - 71%	51 – 62%
Wind Speed	2 - 3 mph	2 - 3 mph	1 mph
Wind From	West	NNW	NNW
Precipitation	none	none	none

Table 9.3-5 shows the measured daytime and nighttime sound levels (L_{eq}, dBA) as well as the equivalent day-night sound levels (L_{dn}, dBA) near the meter stations.

Table 9.3-5

Existing Sound Level Measurement Results – Meter Stations

Monitoring Location	Measurement Duration	All Octave Bands Included			Processed to Remove Insect Noise a/		
		Measured Day Average	Estimated Night Average	Estimated Day-Night Average	Measured Day Average	Estimated Night Average	Estimated Day-Night Average
	HH:MM	L_{eq} dBA	L_{eq} dBA	L_{dn} dBA	L_{eq} dBA	L_{eq} dBA	L_{dn} dBA
LN 3600 Interconnect	24:00	54.3	54.3	60.7	47.2	42.1	49.7
T-15 Dan River Interconnect	24:00	64.7	59.7	67.3	63.1	57.1	65.0
T-21 Haw River Interconnect	24:00	64.9	60.6	67.9	62.8	57.2	65.0

a/ Insect noise was removed by omitting sound energy in the whole octave bands above 1000 Hz in accordance with American National Standard method (ANSI/ASA, 2014)

9.3.3.3 Horizontal Directional Drilling and Railroad Crossing Sites

The HDD method will be used to cross the Dan River in Virginia and the Stony Creek Reservoir in North Carolina. In addition, there will be four railroad crossings that will be performed using the direct bore method and will likely require nighttime construction work. A noise evaluation has been performed for each HDD site and railroad crossing. An ambient noise survey at the potential HDD and railroad crossing sites was conducted to quantify the current ambient sound levels around each site and to document/identify existing NSAs. All NSAs are residences.

Table 9.3-6 shows the weather conditions during the HDD and railroad crossing sound level measurements.

Table 9.3-6

Weather Conditions during the HDD / Railroad Crossing Sound Level Surveys

Location	HDD: Stony Creek Reservoir	HDD: Dan River	Railroad Crossing 1	Railroad Crossing 2	Railroad Crossing 3	Railroad Crossing 4
Dates	July 18, 2018	July 16, 2018	July 16, 2018	July 16, 2018	July 17, 2018	July 18, 2018
Temperature	75° F	80° F	80° F	80° F	82° F	80° F
Relative Humidity	89%	70%	71%	74%	69%	53%
Wind Speed	0 mph	0 mph	1 mph	0 mph	0 mph	0 mph
Wind From	N/A	N/A	W	N/A	N/A	N/A
Precipitation	none	none	none	none	none	none

Figures 9.3-5 through 9.3-10 (Appendix 9-E) show the HDD and railroad crossing work areas along with the identified NSAs and sound level measurement locations. Table 9.3-7 shows the measured daytime and nighttime sound levels (L_{eq}, dBA) as well as the equivalent day-night sound levels (L_{dn}, dBA) near the HDD work areas and railroad crossings.

At all HDD and railroad crossing locations, short-duration nighttime measurements were taken near the closest NSA. Effort was made to exclude noise from passing vehicles from the measurements. Daytime levels were estimated by applying the average day-night sound level difference from a nearby 24-hour measurement location. The average day-night difference from the overnight measurement location closest to each HDD and railroad crossing location was applied to the short-duration data collected to estimate the nighttime level. The average day-night difference of 5 dB from the T-21 Haw River Interconnect measurement position was applied at the Stony Creek Reservoir HDD site and railroad crossing 4, and the average day-night difference of 5.5 dB from the T-15 Dan River Interconnect measurement location was applied to the other four locations.

Table 9.3-7

Existing Sound Level Measurement Results – HDD and Railroad Crossings

Monitoring Location and MP	Measurement Duration	All Octave Bands Included			Processed to Remove Insect Noise a/		
		Estimated Day Average	Measured Night Average	Estimated Day-Night Average	Estimated Day Average	Measured Night Average	Estimated Day-Night Average
	HH:MM	L_{eq} dBA	L_{eq} dBA	L_{dn} dBA	L_{eq} dBA	L_{eq} dBA	L_{dn} dBA
HDD: Stony Creek Reservoir, MP 63.6	00:10	52.8	47.8	55.4	37.1	32.1	39.7
HDD: Dan River, MP 30.2	00:10	61.6	56.1	63.9	40.5	35.0	42.8
Railroad Crossing 1, MP 5.4	00:10	60.4	54.9	62.7	56.6	51.1	58.9
Railroad Crossing 2, MP 25.1	00:10	63.0	57.5	65.3	38.8	33.3	41.1
Railroad Crossing 3, MP 39.8	00:10	54.9	49.4	57.2	43.2	37.7	45.5
Railroad Crossing 4, MP 69.3	00:10	58.3	53.3	60.9	46.3	41.3	48.9

a/ Insect noise was removed by omitting sound energy in the whole octave bands above 1000 Hz in accordance with American National Standard method (ANSI/ASA, 2014)

9.3.4 Project Construction Noise

9.3.4.1 Pipeline Construction Noise and Mitigation

Potential impacts from pipeline construction could include short-term increases in sound. Construction of the pipeline will generate noise from heavy machinery and equipment as construction moves in phases along the right-of-way (see Resource Report 1 for description of pipeline construction). Sound from pipeline construction will generally be temporary, sporadic, and short-term in any one location along the pipeline route. Because of the temporary and generally daytime nature of pipeline construction activities, no special noise mitigation or noise monitoring program will be implemented during the construction phase, except in locations where blasting or HDDs are required. These special cases are discussed below.

9.3.4.2 Compressor Station and Meter Station Construction Noise and Mitigation

Potential impacts at compressor and meter station locations could include short-term increases in sound levels during construction. Only standard construction equipment will be used in the construction of the stations, with no dynamic compaction or pile driving expected. Most construction will occur during daytime working hours of 7:00 a.m. until 7:00 p.m. Emergencies or other non-typical circumstances may necessitate limited nighttime work. The highest sound levels during construction are expected during the early earthmoving phase. Equipment that may be operating during this phase would include bulldozers, front end loaders, dump trucks, generators, etc.

Based on the equipment usage predictions, a sound level calculation was performed for compressor station and meter station construction using the Federal Highway Administration's Roadway Construction Noise Model version 1.1 (FHWA, 2008) The following equipment was included in the construction evaluation:

Daytime Civil Work – total sound power level of 123.9 dBA Lw

- Three (3) Excavators, Komatsu 228 or similar
- Three (3) Bulldozers, Cat D6 or similar
- Three (3) Dump trucks, 26-ton, articulated
- One (1) Generator
- Three (3) Drilling rigs
- Two (2) Pile augers
- One (1) Roller, smooth drum, 25 ton, Bomag or similar

Nighttime Civil Work – total sound power level of 120.2 dBA L_w

- Two (2) Excavators, Komatsu 228 or similar
- Two (2) Bulldozers, Cat D6 or similar
- Two (2) Dump trucks, 26 ton, articulated
- Three (3) Light plants
- One (1) Roller, smooth drum, 25 ton, Bomag or similar

Table 9.3-8 shows a summary of the predicted short-term, daytime construction sound levels at the NSAs for the compressor station and meter stations. The worst-case NSAs are not necessarily the closest NSAs due to terrain shielding between the compressor stations and the NSAs.

As shown in Table 9.3-8, the predicted construction sound levels are all below 55 dBA L_{dn} at the Lambert Compressor Station NSAs, low enough that no special noise mitigation or noise monitoring program will be implemented during daytime only construction. Some of the construction sound level contributions exceed 55 dBA L_{dn} at NSAs close to the T-15 Dan River and T-21 Haw River Interconnects. However, ambient sound levels at those locations are well above 55 dBA L_{dn} and the temporary sound level increase expected during construction is less than 6 decibels during the day and 3.1 decibels for the 24-hour L_{dn}. At all other NSAs, the expected construction sound levels are lower than 55 dBA L_{dn}.

Table 9.3-8

Predicted Temporary Sound Levels Due to Construction, Single 12-Hour Daytime Shift

Compressor / Meter Station	NSA	Existing Ambient Sound Levels, dBA a/			Predicted Sound Level –Single Daytime Shift, dBA		Construction Plus Ambient, dBA		Temporary Increase in Sound Level, dBA	
		Day	Night	L_{dn}	Day	L_{dn}	Day	L_{dn}	Day	L_{dn}
Lambert Compressor Station / Interconnect	1	36.8	40.8	46.8	48.7	46.6	49.0	49.7	12.2	2.9
	2				46.5	44.4	46.9	48.8	10.2	2.0
	3	60.4	55.1	62.8	43.8	41.7	60.5	62.8	0.1	0.0
	4	38.6	38.4	44.8	42.7	40.7	44.1	46.3	5.5	1.4
LN 3600 Interconnect	3	47.2	42.1	49.7	51.2	49.1	52.7	52.4	5.4	2.7
T-15 Dan River Interconnect	1	63.1	57.1	65.0	64.7	62.7	67.0	67.0	3.9	2.0
T-21 Haw River Interconnect	1	62.8	57.2	65.0	67.1	65.1	68.5	68.1	5.6	3.1

a/ To be conservative, ambient levels have been processed to remove insect noise.

Work will primarily be conducted between 6:00 a.m. and 7:00 p.m. or sunset, whichever is later. Nighttime work will be conducted for specific situations related to safety, permit compliance, or construction activities that cannot be stopped until completion (e.g. HDD, conventional bores, dry waterbody crossings). Low noise generating activities (e.g. x-ray, inspections, hydrostatic test, drying, etc.) may also occur during limited nighttime hours.

Table 9.3-9 shows the predicted temporary nighttime sound level impact for 24-hour construction activities. As shown in this table, nighttime construction sound levels are above 48.6 dBA and 55 dBA L_{dn} at certain NSAs. As shown in Table 9.3-9, the predicted construction sound levels are all below 55 dBA L_{dn} at the Lambert Compressor Station NSAs, just above 55 dBA L_{dn} at the LN 3600 Interconnect NSA, and less than 10 dB above the ambient at the T-15 Dan River and T-21 Haw River Interconnects. With the exception of the LN 3600 Interconnect, the predicted levels are low enough that no special noise mitigation or noise monitoring program should be required for 24-hour construction. However, due to the uncertainty of the equipment that might be operating during night construction, the Project will develop a nighttime construction noise management plan if nighttime construction is required at the compressor station or meter stations. This noise management plan will outline the specific equipment that will be

operating at night, the location of the equipment, and will predict the sound levels from the expected nighttime equipment. The management plan will include specific noise mitigation, such as noise barriers, quieter equipment, or partial equipment enclosures to ensure that sound levels at the NSAs do not exceed 48.6 dBA at night or 55 dBA L_{dn} overall or 10 dB over the ambient for the T-15 Dan River and T-21 Haw River Interconnects with ambient levels that exceed 55 dBA L_{dn}.

Table 9.3-9

Predicted Temporary Sound Levels Due to Construction, 24-Hour Construction Activities

Compressor / Meter Station	NSA	Existing Ambient Sound Levels, dBA a/			Predicted Sound Level –Single Daytime Shift, dBA		Construction Plus Ambient, dBA		Temporary Increase in Sound Level, dBA	
		Day	Night	L_{dn}	Night	L_{dn}	Night	L_{dn}	Night	L_{dn}
Lambert Compressor Station / Interconnect	1	36.8	40.8	46.8	45.9	53.1	47.1	54.0	6.3	7.2
	2				43.7	50.9	45.5	52.3	4.7	5.5
	3	60.4	55.1	62.8	41.0	48.2	55.3	63.0	0.2	0.1
	4	38.6	38.4	44.8	40.0	47.1	42.3	49.1	3.9	4.3
LN 3600 Interconnect	3	47.2	42.1	49.7	48.5	55.4	49.4	56.4	7.3	6.7
T-15 Dan River Interconnect	1	63.1	57.1	65.0	62.0	69.2	63.2	70.6	6.2	5.6
T-21 Haw River Interconnect	1	62.8	57.2	65.0	64.4	71.5	65.2	72.4	8.0	7.4

a/: To be conservative, ambient levels have been processed to remove insect noise.

9.3.4.3 Blasting

Blasting may be necessary for ditch excavation in locations where shallow bedrock is encountered. Most of the energy released during blasting goes towards rock breakage and movement, but a small portion passes outside the intended work zone in the form of ground or air vibrations. Air vibrations are pressure waves generated by the blast, referred to as "airblast" or "air overpressure". High frequency pressure waves (above about 20 Hz) may be heard as sound, while lower frequency pressure waves may be felt rather than heard, similar to a gust of wind. In general, surface detonations involving unconfined or poorly-confined blasts will cause audible noise; well-confined blasts, such as those used to excavate rock, generate lower frequency effects with airblast energy predominantly in the inaudible range. For this reason, and because noise from blasting is inherently short-term, there are often no audible noise limits for blasting projects. Blast emission criteria are specified on the basis of safe limits designed to minimize the risk of cosmetic damage such as surface cracks due to either vibration or airblast.

The Project has developed a Project Blasting Plan (see Resource Report 6 – Appendix 6-D). When the locations and extent of blasting is known, a noise and vibration assessment will be completed for residences and historical structures that could be affected by blasting. Noise and vibration due to blasting will be evaluated in accordance with the International Society of Explosives Engineers Blasters'

Handbook, which contains recommended ground vibration limits. If necessary, charge size per delay will be reduced to ensure these limits are not exceeded to prevent structural damage to nearby buildings.

9.3.4.4 Horizontal Directional Drilling and Railroad Crossing Construction Noise and Mitigation

The HDD method will be used to install the pipeline underneath the Dan River in Virginia and Stony Creek Reservoir in North Carolina. In addition, there will be four railroad crossings that will performed using the conventional bore method that will likely require nighttime construction work. A noise evaluation has been performed for each HDD site and railroad crossing.

Equipment Data

The HDD entry and exit sites will have several sound sources in operation during the temporary construction work. On the entry side, sound sources will include the drilling rig itself, mud pumps, generators, drilling mud mixers, shale shakers, light plants, and the driving engines associated with this equipment. Additional sound sources include mobile equipment such as cranes, front-end loaders, forklifts, and trucks. On the exit side, less equipment is required, typically including a backhoe or bulldozer, and possibly a generator and light plant. The actual equipment used, and the site layout and configuration, will depend on the drilling contractor(s) selected for the Project, the site conditions, and other factors. Typical sound power levels (L_w) for peak HDD construction operations based on measurements of previous HDD operations are shown in Table 9.3.10, below. These levels will be used in all HDD calculations in this study.

Table 9.3-10

Sound Power Levels of HDD and Railroad Crossing Equipment

Octave Band Center Frequency, Hz	Unweighted Sound Power Level at Octave Band Center Frequency									Total
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
HDD Entry Site	118	115	112	114	112	109	108	106	98	115
HDD Exit Site	110	108	105	102	100	98	95	92	88	103
Railroad crossing: Auger Boring Machine	116	117	124	107	95	100	97	99	79	110
Railroad crossing: Backhoe	114	115	122	106	93	98	95	97	77	108
Railroad crossing: Light Plant	88	93	93	98	93	88	83	78	73	94

For the conventional bore crossings of the railroads, an auger boring machine will be used similar to the Barbco HD48RCBM. That manufacturer reports that the auger produces sound level of 87 dBA at 20 feet. A standard diesel-powered engine spectrum was applied to the reported sound levels, and six light plants and two backhoes were included (or similar engine-driven earthmovers) at each railroad crossings.

Sound level data for the ancillary equipment were derived from the Federal Highway Administration's Roadway Construction Noise Model (FHWA 2008)[4]. The sources were used as inputs in a three-dimensional computer noise model developed using CadnaA acoustical modeling software.

These values represent conservative estimates without assumption of any additional noise control treatments. These levels do assume that all original equipment manufacturer noise control treatments are correctly installed and that all operating equipment is well-maintained and in good operating condition. These levels also assume some slight typical shielding and screening effects from the tanks and trailers that are used in typical construction operations.

Operations Schedule

The current drilling operation plan is to perform HDD activities whenever dictated by schedule or operations, 24-hours per day if necessary. As such, all calculations are based on the maximum HDD activity sound power levels shown in Table 9.3-10 without any adjustment for reduced activities during nighttime hours.

For the railroad crossings, 24-hour construction activities will be required for two to three days at each crossing. The duration could extend up to 14 days if problems are encountered during construction. The pipeline construction beyond the railroad crossing locations will take place during daytime unless otherwise specified.

Calculations

A noise model was developed for each HDD work area and railroad crossing using CadnaA version 2018 build 161.4801. The models were used to calculate the expected temporary sound level contributions due to the HDD and railroad crossing equipment. The ISO 9613-2 standard was used to calculate the divergence, atmospheric absorption, foliage, and ground absorption for the path from the HDD entry or exit site to the closest NSA.

Since the drilling direction has not been decided, two models were constructed for each HDD location, with each side modeled as both entry and exit. The models were used to identify both the worst-case NSA (i.e., the NSA likely to experience the highest noise) for either drilling direction and how many NSAs will potentially be affected. If the calculations indicated that the sound level at the worst-case NSA would exceed the sound level target, the required noise mitigation has been evaluated to meet the targets. A summary of the calculation results for all of the NSAs and railroad crossings is included in Table 9.3-11 below.

Predicted Temporary Sound Level Impact

The predicted HDD and railroad crossing equipment sound level contribution for each NSA was calculated using the noise model. The calculated sound level contribution was then combined with the

[4] FHWA (2008) Roadway Construction Noise Model, Federal Highway Administration, US Department of Transportation. Version 1.1, December 8, 2008.

measured ambient sound levels to determine the potential short-term sound level impact of the HDD or railroad crossing activities.

Noise Mitigation for HDD and Railroad Sites

For those HDD or railroad crossing sites where the predicted HDD or boring activity sound levels at the NSAs are predicted to be greater than 55 dBA L_{dn}, noise mitigation for the equipment or compensation/relocation will likely be necessary in order to achieve the noise goals. For noise mitigation on HDD or conventional bore equipment, engine exhaust and barrier treatments are typically used to reduce the sound level contribution to less than 55 dBA L_{dn}. Typically, all engines on power units, gensets, etc. would be fitted with residential-grade exhaust mufflers, and temporary barriers may be installed between the HDD / conventional bore site and the nearest NSAs. Secondary noise control treatments may be required, depending on the actual equipment and site layout used.

As an alternative to these primary and/or secondary noise control treatments, the Project may consider offering the residents compensation or temporary relocation as a means of reducing the temporary construction noise impact. If all impacted residents choose to accept temporary relocation compensation, then temporary barriers or other treatments will not be necessary.

Table 9.3-11 provides a summary of the Noise Quality Analysis for the planned HDD and railroad crossing sites at the closest NSA to the entry and exit side of the planned HDD and assumes that a "standard" drilling rig is employed (i.e., no additional noise mitigation measures included).

Table 9.3-11

Predicted Temporary Sound Levels Due to HDD / Railroad Crossing

HDD and Railroad Crossing	Distance and Direction of the Closest NSA to Site Center	Existing Ambient	Calculated Sound Level		Existing Ambient L_{dn} Plus L_{dn} of Operations	Temporary Change in the Ambient Sound Level
		L_{dn} dBA	L_{eq} dBA	L_{dn} dBA	L_{dn} dBA	L_{dn} dBA
Dan River HDD	1400 feet N	39.7	46.5	52.9	53.1	13.4
Stony Creek Reservoir HDD	300 feet NW	42.8	54.2	60.6	60.7	17.9
Railroad Crossing 1	3550 feet E	58.9	38.7	45.1	59.0	0.2
Railroad Crossing 2	3000 feet S	41.1	31.9	38.3	42.9	1.8
Railroad Crossing 3	250 feet NW	45.5	63.1	69.5	69.5	24.1
Railroad Crossing 4	700 feet N	48.9	50.3	56.7	57.4	8.5

Railroad Crossings 1 and 2 are located in Pittsylvania County and therefore are subject to the county noise ordinance. Construction noise is exempt from the Pittsylvania County noise ordinance if it occurs

between 7:00 a.m. and 10:00 p.m. However, if nighttime construction is necessary, the sound due to construction is expected to be less than 52 dBA at the nearest resident's property line for both locations.

The acoustical assessment indicates that the noise of HDD operations at the entry site for the planned HDD crossing at the Stony Creek Reservoir could exceed 55 dBA L_{dn} at the closest NSAs. Noise from the direct bore work at Railroad Crossings 3 and 4 will likely also exceed 55 dBA L_{dn} at the closest NSAs.

HDD activities can occur over the course of several weeks, so compensation or relocation are typically not practical for HDD work areas. Railroad crossings typically take one to three days, so compensation or relocation of affected residents of the most impacted NSAs is a practical noise mitigation option.

Noise mitigation for the Stony Creek Reservoir HDD site will likely take the form of a noise barrier, erected between the HDD site and the closest NSAs. Calculations indicate that an approximately 12 decibel reduction in the HDD site sound level contributions are possible through the implementation of a series of 12-14 foot tall noise barriers located approximately 20 feet from the primary noise generating equipment at the HDD site. Similar reductions would be expected for the direct bore equipment at the railroad crossings. Table 9.3-12 shows the predicted sound levels with a noise barrier in place for the Stony Creek Reservoir HDD site and at Railroad Crossings 3 and 4.

Even with noise barriers in place, it is likely that the sound levels due to the direct bore at Railroad Crossing 3 will exceed 55 dBA L_{dn} due to the close proximity of the NSA to the work area. Due to the short-term nature of the railroad crossing work, temporary compensation or relocation of the effected residents is likely the most efficient method.

Table 9.3-12

Predicted Temporary Sound Levels Due to HDD / Railroad Crossings with Noise Mitigation

HDD Crossing (Entry or Exit Site)	Distance and Direction of the Closest NSA to Site Center	Existing Ambient	Calculated L_{dn} of the Operations	Existing Ambient L_{dn} Plus L_{dn} of Operations	Temporary Change in the Ambient Sound Level
		L_{dn} dBA	L_{dn} dBA	L_{dn} dBA	L_{dn} dBA
Stony Creek Reservoir HDD	300 feet NW	42.8	48.7	49.7	6.9
Railroad Crossing 3	250 feet NW	45.5	57.5	57.8	12.3
Railroad Crossing 4	700 feet N	48.9	44.7	50.3	1.4

9.3.5 Project Operation Noise

9.3.5.1 Compressor and Meter Station Operational Noise and Mitigation

The Project has developed noise models for the Lambert Compressor Station using the most current station designs and manufacturer specifications.

The following equipment items were considered significant sound sources in the model:

- Noise from the turbine exhaust, including the exhaust outlet and noise radiated from the exhaust ductwork, expansion joints, and silencer shell;
- Noise from the turbine intake air system, including the inlet opening and noise radiated from the silencer/ductwork shell and any duct joints;
- Turbine/Compressor casing noise that penetrates the building and building ventilation openings;
- Noise from the lube oil/auxiliary cooler and gas aftercooler; and
- Noise radiated by aboveground station piping.

Noise Model Methodology

The noise model for each compressor station was developed using CadnaA, version 2018 build 161.4801, a commercial noise modeling package developed by DataKustik GmbH. The software takes into account spreading losses, ground and atmospheric effects, shielding from barriers and buildings, reflections from surfaces and other sound propagation properties. The software is based on published engineering standards. The ISO 9613 standard was used for air absorption and other noise propagation calculations. To be conservative, no foliage was included in the noise model. The model presents a worst-case prediction without any influence of trees or vegetation.

Noise Model Inputs

Sound power and sound pressure level data for the equipment in the noise models were taken from manufacturer data (if available) or from measurements of similar equipment at other compressor stations or interconnects. An exhaust system consistent with the planned turbine installations and current vendor proposals for the Project was modeled assuming an exhaust height of 45.5 feet above grade. The Lambert Compressor Station was modeled with one 10,915 hp Titan 130 turbine and one 15,900 hp Mars 100 turbine.

Table 9.3-13 shows the sound pressure levels and sound power levels used to model the Project compressor station and interconnect equipment along with the source of the information.

Table 9.3-13

Sound Pressure Levels (L_p) and Sound Power Levels (L_w) for Station Equipment

Source	Linear L_p or L_w at Octave Center Frequency									Total
	31.5	63	125	250	500	1k	2k	4k	8k	dBA
Lambert Compressor Station										
Solar Mars 100 Silenced Exhaust and Breakout, Sound Pressure Level at 200 ft., L_p a/	56	56	52	46	39	35	34	34	34	43
Solar Mars 100 Unsilenced Inlet, Sound Pressure Level at 50 ft., L_p b/	81	87	93	94	95	97	100	129	121	130
Solar Taurus 70 Exhaust, Sound Pressure Level with Silencer at 200 ft., L_p a/	67	65	50	45	36	33	34	31	34	44
Solar Taurus 70 Intake, Sound Pressure Level at 50 ft., L_p b/	81	86	96	98	98	101	106	139	122	140
Solar 90 dBA Lube Oil Cooler, Sound Pressure Level at 50 ft., L_p b/	64	71	68	61	56	53	49	45	39	60
Total Sound Power Level of Each Gas Aftercooler, L_w c/	95	95	94	91	86	84	78	72	66	89
Solar Mars 100 Inlet Breakout, Total L_w d/	89	77	75	80	70	68	70	77	63	80
Solar Taurus 70 Exhaust Breakout, Total L_w d/	96	98	95	95	89	87	96	95	84	100
Solar Taurus 70 Inlet Breakout, Total L_w d/	103	91	89	94	84	82	84	91	77	95
Sound Level in Compressor Building at Inner Wall Surface, L_p d/	83	83	94	97	96	95	97	105	95	107
Unlagged Suction Piping, Total L_w per unit d/	96	98	97	92	93	98	113	102	92	114
Unlagged Discharge Piping, Total L_w per unit d/	90	86	86	92	97	90	102	94	83	104
Fuel Gas Skid, L_w d/	-	-	-	85	85	66	72	67	66	84
Capstone C-1000 Generator, Sound Pressure Level at 10 meters L_p e/	71	71	69	61	62	58	54	58	57	65
54" Building Wall Panel Fan, L_w d/	101	101	98	94	93	90	86	83	82	95
Unit Venting f/	137	125	114	103	95	96	97	99	97	107
Interconnects										
Meter Station Piping d/	31	49	56	62	69	74	77	79	64	83
Flow Control Valves d/	72	77	73	73	74	76	78	80	67	84

a/ Manufacturer's quote provided by Mountain Valley.
b/ From Solar.
c/ From Moore Fan Datasheet
d/ Based on measurements of similar installed equipment.
e/ From Capstone
f/ As specified by Mountain Valley

Each compressor building will include wall exhaust fans and an acoustically baffled roof ridge vent. The sound levels due to intake ductwork, exhaust system ductwork, and suction and discharge piping were based on sound level measurements of similar equipment at existing compressor stations. The gas cooler sound power levels were taken from a manufacturer datasheet. The lube oil cooler sound power levels were supplied by Solar.

Noise Control Treatments

The noise models include certain noise control treatments as part of the compressor station design; however, there are many different combinations of noise control mitigation measures that would provide similar noise control. As the station design is finalized, noise mitigation treatments will also be finalized and will be modified as needed to ensure each station operates in compliance with FERC and local sound level requirements. Noise control treatments included in the noise model are shown in Table 9.3-14 and summarized below.

Table 9.3-14

Modeled Noise Control Treatments, Insertion Loss (IL) or Transmission Loss (TL)

Source	Treatment Description	Modeled Treatment Performance								
		31.5	63	125	250	500	1k	2k	4k	8k
Lambert Compressor Station										
Mars 100 Turbine Inlet	Stock Mars 100 Inlet Silencer, DIL	2	4	7	16	40	50	51	55	55
	Pulse Updraft Filter	2	4	8	9	13	26	27	27	33
	Combined Silencer and Filter Performance	4	8	15	25	53	76	78	82	88
Taurus 70 Turbine Inlet	Stock Taurus 70 Inlet Silencer, DIL	1	2	4	6	22	43	47	55	52
	Pulse Updraft Filter	2	4	8	9	13	26	27	27	33
	Combined Silencer and Filter Performance	3	6	12	15	35	69	74	82	85
Compressor Building	STC-40 Wall and Roof System, TL	10	15	22	34	49	54	55	56	58
Personnel Door	Insulated Personnel Door, TL	2	7	12	17	18	19	22	30	35
Equipment Door	Insulated Roll-up Door, TL	2	7	12	17	18	19	22	30	35
Building Ventilation	Three-foot silencers and lined hoods, DIL	0	2	7	16	25	32	32	21	14
Ridge Vent	Acoustic Baffle, TL	0	0	0	4	6	9	9	14	9
Comp. Suction and Discharge Piping	Lagging (ISO Type B2), DIL	0	0	0	0	6	15	24	33	42

Compressor Building Walls and Roof

The compressor buildings will include a minimum STC-40 wall and roof system. The compressor buildings will have no windows, skylights, or translucent panels. The building will be well sealed with no cracks or gaps, and all piping penetrations through the building walls will be flashed and caulked. The interior surfaces of the compressor building walls have been modeled as acoustically absorptive with an average Noise Reduction Coefficient of 0.8 or better.

Compressor Building Doors and Ventilation

The compressor buildings will have standard insulated overhead doors and industrial metal doors with good perimeter seals, all meeting defined acoustic transmission loss specifications. All building ventilation openings should include standard acoustical louvers or silencers to meet the Project requirements.

Turbine Exhaust Silencers and Breakout

The manufacturer warrants that the sound pressure level for the Mars 100 unit exhaust system at a distance of 200 feet from the exhaust will not exceed 45 dBA and the entire exhaust system for the Taurus 70 unit exhaust system will not exceed 45 dBA at a distance of 200 feet. The breakout noise generated by the exhaust system ductwork was included at this level.

Turbine Intake Silencers and Breakout

The sound pressure level of the intake system was warranted by the manufacturer to not exceed 73 dBA at 50 feet from the air inlet. This level includes the performance of the entire system, including any filter insertion losses and breakout noise.

Station Piping

Noise from centrifugal compressors can cause significant noise radiation from connected piping. To the extent practical, suction and discharge piping will be run underground. No acoustical lagging was included in the compressor station models, but aboveground main gas piping can be acoustically lagged as necessary.

Noise Modeling Results

The predicted sound levels from the acoustic modeling for the Lambert Compressor Station is shown in Figure 9.3-11, (Appendix 9-E) and the predicted sound levels due to meter station operations are shown in Figures 9.3-12 through 9.3-14 (Appendix 9-E). Predicted noise impacts on the nearest NSAs to each station are presented in Table 9.3-15. Site locations, layouts, and modeled equipment were determined from best available information and incorporated site-specific sound mitigation measures for these compressor and meter stations such as acoustical building enclosures, turbine intake and exhaust silencers.

Table 9.3-15

Predicted Sound Levels – Compressor and Meter Station

Compressor/ Meter Station	NSA	Distance from Compressor Station to NSA (feet)	Direction	Measured Existing Ambient (L_{dn} dBA)	Estimated Contribution of Station Equipment (L_{eq} dBA / L_{dn} dBA)		Combined, All Sources Including Ambient (L_{dn} dBA)	Increase Above Existing Condition (dB)
Lambert Compressor Station	1	3,480	WSW	46.8	41.6	48.0	50.5	3.7
	2	3,500	SW		35.2	41.6	47.9	1.1
	3	3,290	SE	62.8	34.3	40.7	62.8	0.0
	4	3,800	N	44.8	33.0	39.4	45.9	1.1
LN 3600 Interconnect	1	3,010	SE	49.7	41.6	48.0	50.5	3.7
T-15 Dan River Interconnect	1	750	S	65.0	40.4	46.8	65.1	0.1
T-21 Haw River Interconnect	1	550	N	65.0	35.4	41.8	65.0	0.0

As demonstrated by the noise model results, operation of the compressor and meter stations, with the noise mitigation included in the design, will contribute sound levels of less than 55 dBA L_{dn} at all NSAs. The predicted increase in the ambient sound levels ranges from 0.0 to 4.2 dB and is less than 10 decibels at all NSAs. The stations are predicted to operate in full compliance with FERC noise regulations.

Lambert Compressor Station is subject to the Pittsylvania County noise ordinance which limits sound levels at the station property line to 57 dBA during the day and 52 dBA at night for residential areas and to 77 dBA during both day and night for industrial areas. The parcels along the northeast property line are zoned industrial. The highest predicted sound level at the station property line is 65 dBA at the northeast property line adjacent to the Transco station. This is less than the 77 dBA limit for industrial areas. The highest predicted station sound level at a non-industrial property line is 51.9 dBA at the property line southeast of the station. This is just below than the nighttime limit of 52 dBA for agricultural property. The station is, therefore, predicted to comply with the Pittsylvania County noise ordinance.

9.3.5.2 Compressor Station Unit Venting Noise and Mitigation

Under certain circumstances, the pressure in the compressor casing and unit piping must be released in a controlled manner. These events are called unit venting and occur when a unit is shut down for an extended period. During venting, the high-pressure gas in the system is released in a controlled fashion through a silencer. Venting events may cause a temporary increase in sound level that usually lasts for approximately five minutes.

Compressor units will vent through silencers to limit the noise during venting. A compressor unit venting scenario was modeled for the Lambert station using a silencer designed to limit the maximum sound level due to venting to less than 85 dBA at 3 feet from each silencer.

Table 9.3-16 shows sound level predictions for the NSA at which the compressor station unit venting is predicted to be loudest. The worst-case NSA is not necessarily the closest NSA due to terrain shielding between the station and NSAs. The unit venting sound level is compared to the nighttime average level at the NSA to show the potential short-term sound level impact at the station. The predicted unit venting sound levels are low, with the highest predicted sound level of 36.5 dBA at NSA 1 of the Lambert Compressor Station.

Table 9.3-16

Lambert Compressor Station Unit Venting Sound Level Prediction

Worst Case NSA	Measured Existing Ambient, Night Average (L_{eq} dBA)	Estimated Contribution of Unit Venting (L_{eq} dBA)	Combined Venting and Ambient (L_{eq} dBA)	Short-term Sound Level Increase During Venting (dB)
1	44.5	36.5	45.1	0.6

9.3.5.3 Emergency Shutdown Noise and Mitigation

The compressor station has an emergency shutdown ("ESD") system that automatically halts operation of the station in the event of an irregularity. This results in full station venting during which the gas from all station piping is released in a controlled manner. These events are extremely rare and take place only in the event of an emergency or when the system is tested once every year. Residents will be notified in advance of the annual ESD system test.

The sound level due to an ESD event will be high enough to be audible within a one-mile radius and is intended to function as an alarm to notify nearby residents of a potential emergency.

9.3.5.4 Vibration

Large turbine exhausts, such as those present at the Lambert compressor station can be a source of low-frequency noise. Low-frequency noise can result in acoustically induced vibrations if the sound pressure level is above 65 dB in the 31.5 Hz octave band or above 75 dB in the 63 Hz octave band. The model predicts the station contribution will be 50 dB at 31.5 Hz and 50 dB at 63 Hz at the closest NSA to Lambert Compressor Station. Therefore, low-frequency noise induced vibration of structures should not be a concern.

9.3.6 Post Construction Sound Survey

As per FERC requirements, the Project will undertake post-construction sound level testing at the compressor station within 60 days of the station being placed into constant service. The testing will consist of sound level measurements at the closest NSAs with the station equipment in full-load operation. If full-load operation is not possible, then appropriate adjustments will be applied to the measured levels to estimate the sound levels under full-load conditions. The measured levels, along with the measurement methodology, measurement equipment used, station operating and weather conditions during the testing will be included in a report that will be submitted to the Commission. If the station sound level contributions are found to exceed the Commission's sound level limits, then the reports will

include the noise mitigation or equipment modifications that will be implemented to bring the station sound level contributions to below 55 dBA L_{dn}.

9.3.7 Cumulative Effect

Section 1.10 of Resource Report 1 discusses the reasonably foreseeable future actions that have been included in the cumulative impacts assessment for the Project, with the projects considered shown in Table 1.10-1. Generally, the cumulative impact assessment radius for noise is one mile. Of the projects listed in Table 1.10-1, only the Mountain Valley Pipeline and Stony Mill Road Construction are within one mile of the Southgate Project.

The Mountain Valley Pipeline Project is under construction and should be complete by the time that construction begins on the Southgate Project, so there is limited opportunity for cumulative construction noise impacts. In addition, there are no Mountain Valley Pipeline aboveground facilities (compressor stations or meter stations) within one mile of any of the Southgate Project aboveground facilities, so there are no cumulative operational noise impacts expected.

The Stony Mill Road construction project is a small road construction project at the intersection of Stony Mill Road and Tunstall High Road in Pittsylvania County, Virginia. There are no Southgate Project compressor stations, meter stations, HDDs, or railroad crossings within one mile of this project, so the only potential cumulative noise impact that could arise would be during pipeline construction. At the 0.5-mile distance from the pipeline corridor to the intersection, it is not expected that pipeline construction activities will be a significant noise source. No cumulative noise impacts are expected for the Stony Mill Road construction.

9.4 References

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MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 9

Appendix 9-A

Construction Emissions Calculations

Table 9-A1

MVP Southgate Project
Construction Period Emissions Summary

		2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
County	Activity	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
Pittsylvania, VA	Non-Road and On-Road Construction Vehicles and Worker Commutes	39,222.0	59.5	93.7	6.2	5.7	0.2	12.4	1.1	3,885.8	5.2	7.3	0.6	0.5	0.0	1.2	0.1
	Fugitive Dust	0.0	0.0	0.0	402.3	42.8	0.0	0.0	0.0	0.0	0.0	0.0	233.5	24.8	0.0	0.0	0.0
	Open Burning	3,293.1	145.0	4.1	17.6	17.6	0.0	24.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	**42,515.0**	**204.4**	**97.9**	**426.1**	**66.1**	**0.2**	**37.3**	**1.1**	**3,885.8**	**5.2**	**7.3**	**234.1**	**25.3**	**0.0**	**1.2**	**0.1**
Rockingham, NC	Non-Road and On-Road Construction Vehicles and Worker Commutes	33,527.6	43.4	78.8	5.0	4.6	0.2	10.1	0.9	1,594.3	1.5	2.1	0.1	0.1	0.0	0.4	0.0
	Fugitive Dust	0.0	0.0	0.0	414.9	44.1	0.0000	0.0	0.0	0.0	0.0	0.0	240.4	25.6	0.0	0.0	0.0
	Open Burning	3,255.1	143.3	4.1	17.4	17.4	0.0	24.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	**36,782.7**	**186.7**	**82.9**	**437.2**	**66.1**	**0.2**	**34.7**	**0.9**	**1,594.3**	**1.5**	**2.1**	**240.5**	**25.7**	**0.0**	**0.4**	**0.0**
Alamance, NC	Non-Road and On-Road Construction Vehicles and Worker Commutes	31,438.9	39.0	73.1	4.5	4.2	0.2	9.4	0.9	1,616.8	1.5	2.2	0.1	0.1	0.0	0.4	0.0
	Fugitive Dust	0.0	0.0	0.0	270.5	28.8	0.0	0.0	0.0	0.0	0.0	0.0	157.2	16.7	0.0	0.0	0.0
	Open Burning	2,325.7	102.4	2.9	12.4	12.4	0.0	17.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	**33,764.6**	**141.4**	**76.0**	**287.5**	**45.4**	**0.2**	**27.0**	**0.9**	**1,616.8**	**1.5**	**2.2**	**157.3**	**16.8**	**0.0**	**0.4**	**0.0**
PROJECT TOTAL		**113,062.3**	**532.5**	**256.8**	**1,150.8**	**177.5**	**0.6**	**98.9**	**2.9**	**7,097.0**	**8.2**	**11.7**	**631.9**	**67.8**	**0.04**	**2.0**	**0.2**

Table 9-A2

MVP Southgate Project
Construction Period Work Activity Emissions Summary

Summary of Non-Road Emissions

Activity	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
H-605 and H-650 Pipeline - Pittsylvania County, VA	27,862	23.98	65.53	3.74	3.74	0.1460	8.25	0.64	1,472	0.74	1.98	0.11	0.11	0.0074	0.38	0.03
H-650 Pipeline - Rockingham County, NC	27,862	23.98	65.53	3.74	3.74	0.1460	8.25	0.64	1,472	0.74	1.98	0.11	0.11	0.0074	0.38	0.03
H-650 Pipeline - Alamance County, NC	27,862	23.98	65.53	3.74	3.74	0.1460	8.25	0.64	1,472	0.74	1.98	0.11	0.11	0.0074	0.38	0.03
Lambert Compressor Station/ Interconnect	7,664	15.26	22.16	1.64	1.64	0.0413	3.13	0.18	1,929	2.14	4.46	0.34	0.34	0.0101	0.69	0.04
LN 3600 Interconnect	1,470	2.54	4.35	0.30	0.30	0.0079	0.57	0.03	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
T-15 Dan River Interconnect	1,470	2.54	4.35	0.30	0.30	0.0079	0.57	0.03	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
T-21 Haw River Interconnect	1,470	2.54	4.35	0.30	0.30	0.0079	0.57	0.03	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
TOTAL	**95,660**	**94.81**	**231.81**	**13.77**	**13.77**	**0.5030**	**29.60**	**2.20**	**6,346**	**4.35**	**10.38**	**0.65**	**0.65**	**0.0322**	**1.83**	**0.14**

Summary of On-Road Construction Vehicle Emissions induding Material Deliveries/Removals and Worker Commutes

Activity	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
H-605 and H-650 Pipeline - Pittsylvania County, VA	972	8.52	0.77	0.17	0.04	0.0066	0.26	0.11	113	0.60	0.19	0.03	0.01	0.0009	0.03	0.01
H-650 Pipeline - Rockingham County, NC	900	8.30	0.61	0.15	0.03	0.0060	0.24	0.10	78	0.57	0.09	0.02	0.00	0.0006	0.02	0.01
H-650 Pipeline - Alamance County, NC	950	8.42	0.73	0.17	0.04	0.0064	0.25	0.11	101	0.59	0.15	0.02	0.01	0.0008	0.03	0.01
Lambert Compressor Station/ Interconnect	470	3.77	0.46	0.09	0.02	0.0033	0.13	0.05	95	0.65	0.12	0.02	0.01	0.0007	0.03	0.01
LN 3600 Interconnect	50	0.42	0.04	0.01	0.00	0.0003	0.01	0.01	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
T-15 Dan River Interconnect	50	0.42	0.04	0.01	0.00	0.0003	0.01	0.01	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
T-21 Haw River Interconnect	50	0.42	0.04	0.01	0.00	0.0003	0.01	0.01	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
TOTAL	**3,442**	**30.27**	**2.69**	**0.61**	**0.13**	**0.0233**	**0.91**	**0.39**	**386**	**2.40**	**0.56**	**0.08**	**0.03**	**0.0029**	**0.11**	**0.03**

Summary of Off-Road Vehicle Travel

Activity	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
H-605 and H-650 Pipeline - Pittsylvania County, VA	488	2.17	0.92	0.12	0.05	0.0038	0.14	0.04	44	0.20	0.08	0.01	0.00	0.0003	0.01	0.00
H-650 Pipeline - Rockingham County, NC	488	2.17	0.92	0.12	0.05	0.0038	0.14	0.04	44	0.20	0.08	0.01	0.00	0.0003	0.01	0.00
H-650 Pipeline - Alamance County, NC	488	2.17	0.92	0.12	0.05	0.0038	0.14	0.04	44	0.20	0.08	0.01	0.00	0.0003	0.01	0.00
Lambert Compressor Station/ Interconnect	1,766	5.78	3.87	0.46	0.20	0.0144	0.50	0.11	233	0.84	0.49	0.06	0.03	0.0019	0.07	0.02
LN 3600 Interconnect	618	1.51	1.49	0.17	0.08	0.0052	0.18	0.04	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
T-15 Dan River Interconnect	618	1.51	1.49	0.17	0.08	0.0052	0.18	0.04	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
T-21 Haw River Interconnect	618	1.51	1.49	0.17	0.08	0.0052	0.18	0.04	0	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
TOTAL	**5,086**	**16.80**	**11.09**	**1.32**	**0.59**	**0.0413**	**1.44**	**0.33**	**364**	**1.43**	**0.74**	**0.09**	**0.04**	**0.0029**	**0.10**	**0.03**

Summary of Open Burning Emissions

Activity	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS	CO_2	CO	NOx	PM_{10}	PM_{25}	SO_2	VOC	HAPS
H-605 and H-650 Pipeline - Pittsylvania County, VA	3,228	142.10	4.06	17.26	17.26	0.0	24.4	NA	0	0	0	0	0	0	0	NA
H-650 Pipeline - Rockingham County, NC	3,251	143.13	4.09	17.38	17.38	0.0	24.5	NA	0	0	0	0	0	0	0	NA
H-650 Pipeline - Alamance County, NC	2,326	102.39	2.93	12.43	12.43	0.0	17.6	NA	0	0	0	0	0	0	0	NA
Lambert Compressor Station/ Interconnect	65	2.88	0.08	0.35	0.35	0.0	0.5	NA	0	0	0	0	0	0	0	NA
LN 3600 Interconnect	2	0.09	0.002	0.01	0.01	0.0	0.01	NA	0	0	0	0	0	0	0	NA
T-15 Dan River Interconnect	2	0.09	0.002	0.01	0.01	0.0	0.01	NA	0	0	0	0	0	0	0	NA
T-21 Haw River Interconnect	0	0.00	0.00	0.00	0.00	0.0	0.0	NA	0	0	0	0	0	0	0	NA
TOTAL	**8,874**	**390.67**	**11.16**	**47.44**	**47.44**	**0.0**	**66.97**	**0.00**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**

Summary of Fugitive Dust Emissions

Activity	2020 Emission Totals (Tons)		2021 Emission Totals (Tons)	
	PM_{10}	PM_{25}	PM_{10}	PM_{25}
H-605 and H-650 Pipeline - Pittsylvania County, VA	388	41.27	226.48	24.07
H-650 Pipeline - Rockingham County, NC	412	43.81	240.41	25.55
H-650 Pipeline - Alamance County, NC	269	28.64	157.15	16.70
Lambert Compressor Station/ Interconnect	14	1.49	7.02	0.75
LN 3600 Interconnect	1	0.12	0.00	0.00
T-15 Dan River Interconnect	2	0.17	0.00	0.00
T-21 Haw River Interconnect	1	0.12	0.00	0.00
TOTAL	1,088	115.61	631.07	67.08

Table 9-A3
MVP Southgate Project
Fugitive Dust Emissions During Construction

Facility	County	Disturbed Acreage	Construction Duration (months)	Exposed Soils (acre-months)	Total PM Emissions (tons)				Earth Moving - Total PM Emissions (tons)				Wind Erosion - Total PM Emissions (tons)			
					2020		2021		2020		2021		2020		2021	
					PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Pipeline	Pittsylvania, VA	514.2	19	9,770	388.25	41.27	226.48	24.07	339.40	33.94	197.98	19.80	48.85	7.33	28.50	4.27
	Rockingham, NC	545.9	19	10,372	412.14	43.81	240.41	25.55	360.28	36.03	210.16	21.02	51.86	7.78	30.25	4.54
	Alamance, NC	356.8	19	6,780	269.40	28.64	157.15	16.70	235.51	23.55	137.38	13.74	33.90	5.08	19.77	2.97
Lambert Compressor Station/ Interconnect	Pittsylvania, VA	18.6	18	335	14.05	1.49	7.02	0.75	12.28	1.23	6.14	0.61	1.77	0.27	0.88	0.13
LN 3600 Interconnect	Rockingham, NC	3.5	5	18	1.10	0.12	0.00	0.00	0.97	0.10	0.00	0.00	0.14	0.02	0.00	0.00
T-15 Dan River Interconnect	Rockingham, NC	5.2	5	26	1.62	0.17	0.00	0.00	1.42	0.14	0.00	0.00	0.20	0.03	0.00	0.00
T-21 Haw River Interconnect	Alamance, NC	3.6	5	18	1.12	0.12	0.00	0.00	0.98	0.10	0.00	0.00	0.14	0.02	0.00	0.00
			Total	**27,318**	**1087.68**	**115.61**	**631.07**	**67.08**	**950.82**	**95.08**	**551.66**	**55.17**	**136.86**	**20.53**	**79.41**	**11.91**

Fugitive Dust Emission Factors (Construction)

PM_{10}[2]	5.50E-02 ton/acre-month
$PM_{2.5}$[1,2]	5.50E-03 ton/acre-month

[1]WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1.
[2]WRAP Fugitive Dust Handbook, Table 3-2, level 1, average conditions

Fugitive Dust Emission Factors (Wind Erosion)

PM_{10}[3]	7.92E-03 ton/acre-month
$PM_{2.5}$[3,4]	1.19E-03 ton/acre-month

[3]Wind erosion of exposed areas (seeded land, stripped or graded overburden) = 0.38 ton TSP/acre/yr (WRAP Fugitive Dust Handbook, Table 11-6)

[4]PM_{10}/TSP = 0.5, $PM_{2.5}$/PM_{10} = 0.15, (**WRAP Fugitive Dust Handbook**, Section 7-2)

[5]Water and other approved dust suppressants would be used at construction sites (50% minumum control applied per WRAP Fugitive Dust Handbook).

Table 9-A4
H-605 and H-650 Pipeline Construction Equipment Air Emissions - Pittsylvania County

MVP Southgate Project
H-605 and H-650 Pipeline, Pittsylvania, VA

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Light plants	15	X		2	4	2270002027	2,149	277	588.92	2.36	4.48	0.35	0.35	0.0040	0.45	0.01	0.43	9.00	0.04	0.07	0.005	0.005	0.0001	0.007	0.000	1.16	0.00	0.01	0.001	0.001	0.0000	0.001	0.000
Bore rigs	250	X		6	10	2270002033	2,080	0	530.27	0.68	2.86	0.15	0.15	0.0031	0.24	0.01	0.43	130.70	0.17	0.70	0.036	0.036	0.0008	0.060	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
HDD Reaming/Pullback Rig	875	X		6	10	2270002033	2,080	0	530.03	1.09	4.71	0.18	0.18	0.0031	0.32	0.01	0.43	457.24	0.94	4.06	0.157	0.157	0.0027	0.272	0.011	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
HDD Assist Reaming/Pilot Hole Rig	440	X		6	10	2270002033	2,080	0	530.35	0.88	3.08	0.14	0.14	0.0031	0.22	0.01	0.43	230.06	0.38	1.33	0.060	0.060	0.0014	0.094	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	71,240	3,640	536.38	0.38	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	8076.65	5.70	15.00	0.819	0.819	0.0417	2.101	0.185	412.68	0.29	0.77	0.042	0.042	0.0021	0.107	0.009
Excavators (JD 350G LC)	271	X		6	10	2270002036	8,060	0	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	761.97	0.24	0.75	0.030	0.030	0.0037	0.191	0.017	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 320DL)	148	X		6	10	2270002036	71,240	3,900	536.39	0.23	0.56	0.04	0.04	0.0027	0.14	0.01	0.59	3678.05	1.56	3.83	0.244	0.244	0.0182	0.935	0.084	201.35	0.09	0.21	0.013	0.013	0.0010	0.051	0.005
Off-highway trucks -1-2.5 ton trucks (CAT 725)	309	X		6	8	2270002051	6,656	1,456	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	717.48	0.26	0.70	0.028	0.028	0.0035	0.179	0.016	156.95	0.06	0.15	0.006	0.006	0.0008	0.039	0.004
Water Truck	175	X		6	10	2270002051	4,160	1,560	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	253.97	0.06	0.15	0.005	0.005	0.0012	0.063	0.006	95.24	0.02	0.06	0.002	0.002	0.0005	0.023	0.002
Utility Truck	100	X		6	10	2270002051	10,140	2,080	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	363.74	0.10	0.22	0.008	0.008	0.0017	0.087	0.008	72.56	0.02	0.04	0.002	0.002	0.0004	0.018	0.002
Tractors, loaders, and backhoes (CAT 450F)	144	X		6	6	2270002066	1,560	0	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	32.51	0.09	0.14	0.018	0.018	0.0002	0.023	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Dozers (CAT D6K)	125	X		6	10	2270002069	49,920	4,160	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	2176.73	1.15	2.92	0.207	0.207	0.0109	0.571	0.050	181.39	0.10	0.24	0.017	0.017	0.0009	0.048	0.004
Dozers (CAT D7E)	235	X		6	10	2270002069	49,400	3,900	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	4049.71	1.54	5.08	0.220	0.220	0.0201	1.039	0.093	319.71	0.12	0.40	0.017	0.017	0.0016	0.082	0.007
Off- highway tractors (John Deere 6116D)	115	X		6	6	2270002051	1,404	468	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	56.33	0.02	0.03	0.001	0.001	0.0003	0.014	0.001	18.78	0.01	0.01	0.000	0.000	0.0001	0.005	0.000
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	3,120	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	269.88	0.23	0.67	0.043	0.043	0.0014	0.081	0.006	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Feller Buncher (CAT 553C)	173	X		6	10	2270002081	260	0	536.28	0.61	1.44	0.14	0.14	0.0029	0.17	0.01	0.59	15.69	0.02	0.04	0.004	0.004	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	780	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	49.51	0.04	0.12	0.008	0.008	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	780	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	68.01	0.06	0.17	0.011	0.011	0.0004	0.020	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Sideboom (CAT 583T Pipelayer)	347	X		6	10	2270002081	37,700	0	536.26	0.95	2.24	0.14	0.14	0.0031	0.18	0.01	0.59	4562.39	8.12	19.09	1.169	1.169	0.0261	1.524	0.105	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Bending Machine	175	X		6	10	2270002081	3,900	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	238.05	0.20	0.59	0.038	0.038	0.0013	0.071	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	1,560	0	595.69	0.38	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	16.32	0.01	0.09	0.001	0.001	0.0001	0.004	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10	X		6	10	2270002081	7,540	0	594.37	4.49	4.32	0.35	0.35	0.0040	0.56	0.01	0.59	29.15	0.22	0.21	0.017	0.017	0.0002	0.027	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Bobcat with sweeper attachment	70	X		6	2	2270003040	572	364	589.79	1.16	3.25	0.14	0.14	0.0033	0.18	0.01	0.43	11.19	0.02	0.06	0.003	0.003	0.0001	0.003	0.000	7.12	0.01	0.04	0.002	0.002	0.0000	0.002	0.000
Bobcat with brush hog attachement	70	X		6	2	2270003040	312	0	589.79	1.16	3.25	0.14	0.14	0.0033	0.18	0.01	0.43	6.11	0.01	0.03	0.001	0.001	0.0000	0.002	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Commercial Equipment																																
Pumps	15	X		6	6	2270006010	13,416	1,092	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	56.16	0.23	0.44	0.034	0.034	0.0004	0.046	0.001	4.57	0.02	0.04	0.003	0.003	0.0000	0.004	0.000
Air compressors	275	X		6	10	2270006015	18,200	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	1257.68	2.09	7.29	0.463	0.463	0.0075	0.659	0.029	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Welders	55	X		6	9	2270006025	19,422	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	268.43	0.45	1.56	0.099	0.099	0.0016	0.141	0.006	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Pressure washers	5	X		6	4	2270006030	2,392	728	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	3.01	0.00	0.02	0.001	0.001	0.0000	0.002	0.000	0.91	0.00	0.01	0.000	0.000	0.0000	0.000	0.000
Hydro power units	200	X		6	10	2270006035	520	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	26.13	0.04	0.15	0.010	0.010	0.0002	0.014	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																							
Light duty gasoline vehicles (< 6,000 lb GVW)	150		X	6	2		46,800	1,560	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		22.55	0.21	0.02	0.004	0.001	0.0002	0.006	0.003	0.75	0.01	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty gasoline vehicles (>6,000 lb GVW)	300		X	6	2		393,120	39,000	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		189.43	1.75	0.13	0.032	0.006	0.0013	0.050	0.022	18.79	0.17	0.01	0.003	0.001	0.0001	0.005	0.002
Light duty diesel vehicles (< 6,000 lb GVW)	150	X		6	2		82,680	10,920	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		182.97	0.14	0.52	0.055	0.028	0.0016	0.053	0.008	24.17	0.02	0.07	0.007	0.004	0.0002	0.007	0.001
Heavy duty diesel vehicles (>6,000 lb GVW) Gang Bus	300	X		6	2		42,120	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		93.21	0.07	0.26	0.028	0.014	0.0008	0.027	0.004	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)	Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
				2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
On-road delivery vehicles																													
Heavy duty diesel vehicles (>6,000 lb GVW) Pipe / Materials Truck	11	21.5	70	74,620	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	35.96	0.33	0.02	0.006	0.001	0.0002	0.009	0.004	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road material removal vehicles																													
Heavy duty diesel vehicles (>6,000 lb GVW)	11	21.5	70	23,660	23,660	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08	52.36	0.04	0.15	0.016	0.008	0.0005	0.015	0.002	52.36	0.04	0.15	0.016	0.008	0.0005	0.015	0.002

Construction Areas	Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Potential Open Burning of Forested Area	226	0	14.31	0.63	0.02	0.08	0.08	0.00	0.11	NA	3,227.75	142.10	4.06	17.26	17.26	0.00	24.36	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers	Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Worker Commutes	1,833,171	125,306	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	883.34	8.15	0.59	0.151	0.028	0.0059	0.233	0.102	60.38	0.56	0.04	0.010	0.002	0.0004	0.016	0.007

Table 9-A5
H-650 Pipeline Construction Equipment Air Emissions - Rockingham County

MVP Southgate Project
H-650 Pipeline, Rockingham, NC

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Light plants	15	X		2	4	2270002027	2,149	277	588.92	2.36	4.48	0.35	0.35	0.0040	0.45	0.01	0.43	9.00	0.04	0.07	0.005	0.005	0.0001	0.007	0.000	1.16	0.00	0.01	0.001	0.001	0.0000	0.001	0.000
Bore rigs	250	X		6	10	2270002033	2,080	0	530.27	0.88	2.86	0.15	0.15	0.0031	0.24	0.01	0.43	130.70	0.17	0.70	0.036	0.036	0.0008	0.060	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
HDD Reaming/Pullback Rig	875	X		6	10	2270002033	2,080	0	530.03	1.09	4.71	0.18	0.18	0.0031	0.32	0.01	0.43	457.24	0.94	4.06	0.157	0.157	0.0027	0.272	0.011	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
HDD Assist Reaming/Pilot Hole Rig	440	X		6	10	2270002033	2,080	0	530.35	0.88	3.08	0.14	0.14	0.0031	0.22	0.01	0.43	230.08	0.38	1.33	0.060	0.060	0.0014	0.094	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	71,240	3,640	536.38	0.38	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	8076.65	5.70	15.00	0.819	0.819	0.0417	2.101	0.185	412.68	0.29	0.77	0.042	0.042	0.0021	0.107	0.009
Excavators (JD 360G LC)	271	X		6	10	2270002036	8,060	0	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	781.97	0.24	0.75	0.030	0.030	0.0037	0.191	0.017	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 320DL)	148	X		6	10	2270002036	71,240	3,900	536.39	0.23	0.56	0.04	0.04	0.0027	0.14	0.01	0.59	3678.05	1.56	3.83	0.244	0.244	0.0182	0.935	0.084	201.35	0.09	0.21	0.013	0.013	0.0010	0.051	0.005
Off-highway trucks -1-2.5 ton trucks (CAT 725)	309	X		6	8	2270002051	6,656	1,456	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	717.48	0.26	0.70	0.028	0.028	0.0035	0.179	0.016	156.95	0.06	0.15	0.006	0.006	0.0008	0.039	0.004
Water Truck	175	X		6	10	2270002051	4,160	1,560	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	253.97	0.06	0.15	0.005	0.005	0.0012	0.063	0.006	95.24	0.02	0.06	0.002	0.002	0.0005	0.023	0.002
Utility Truck	100	X		6	10	2270002051	10,140	2,080	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	353.74	0.10	0.22	0.008	0.008	0.0017	0.087	0.008	72.56	0.02	0.04	0.002	0.002	0.0004	0.018	0.002
Tractors, loaders, and backhoes (CAT 450F)	144	X		6	6	2270002066	1,560	0	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	32.51	0.09	0.14	0.018	0.018	0.0002	0.023	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Dozers (CAT D6K)	125	X		6	10	2270002069	49,920	4,160	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	2176.73	1.15	2.92	0.207	0.207	0.0109	0.571	0.050	181.39	0.10	0.24	0.017	0.017	0.0009	0.048	0.004
Dozers (CAT D7E)	235	X		6	10	2270002069	48,400	3,900	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	4049.71	1.54	5.08	0.220	0.220	0.0201	1.039	0.093	318.71	0.12	0.40	0.017	0.017	0.0018	0.082	0.007
Off- highway tractors (John Deere 6115D)	115	X		6	6	2270002051	1,404	468	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	56.33	0.02	0.03	0.001	0.001	0.0003	0.014	0.001	18.78	0.01	0.01	0.000	0.000	0.0001	0.005	0.000
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	3,120	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	269.88	0.23	0.67	0.043	0.043	0.0014	0.081	0.008	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Feller Buncher (CAT 553C)	173	X		6	10	2270002081	260	0	536.28	0.61	1.44	0.14	0.14	0.0029	0.17	0.01	0.59	15.89	0.02	0.04	0.004	0.004	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	780	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	49.51	0.04	0.12	0.008	0.008	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	780	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	68.01	0.06	0.17	0.011	0.011	0.0004	0.020	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Sideboom (CAT 583T Pipelayer)	347	X		6	10	2270002081	37,700	0	536.26	0.95	2.24	0.14	0.14	0.0031	0.18	0.01	0.59	4582.39	8.12	19.09	1.169	1.169	0.0261	1.524	0.105	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Bending Machine	175	X		6	10	2270002081	3,900	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	238.05	0.20	0.59	0.038	0.038	0.0013	0.071	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	1,560	0	595.69	0.38	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	16.32	0.01	0.09	0.001	0.001	0.0001	0.004	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10	X		6	10	2270002081	7,540	0	594.37	4.49	4.32	0.35	0.35	0.0040	0.56	0.01	0.59	29.15	0.22	0.21	0.017	0.017	0.0002	0.027	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Bobcat with sweeper attachment	70	X		6	2	2270003040	572	364	589.79	1.16	3.25	0.14	0.14	0.0033	0.18	0.01	0.43	11.19	0.02	0.06	0.003	0.003	0.0001	0.003	0.000	7.12	0.01	0.04	0.002	0.002	0.0000	0.002	0.000
Bobcat with brush hog attachement	70	X		6	2	2270003040	312	0	589.79	1.16	3.25	0.14	0.14	0.0033	0.18	0.01	0.43	6.11	0.01	0.03	0.001	0.001	0.0000	0.002	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Commercial Equipment																																
Pumps	15	X		6	6	2270006010	13,416	1,092	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	56.16	0.23	0.44	0.034	0.034	0.0004	0.046	0.001	4.57	0.02	0.04	0.003	0.003	0.0000	0.004	0.000
Air compressors	275	X		6	10	2270006015	18,200	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	1257.68	2.09	7.29	0.463	0.463	0.0075	0.659	0.029	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Welders	55	X		6	9	2270006025	19,422	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	268.43	0.45	1.56	0.099	0.099	0.0016	0.141	0.006	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Pressure washers	5	X		6	4	2270006030	2,392	728	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	3.01	0.00	0.02	0.001	0.001	0.0000	0.002	0.000	0.91	0.00	0.01	0.000	0.000	0.0000	0.000	0.000
Hydro power units	200	X		6	10	2270006035	520	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	26.13	0.04	0.15	0.010	0.010	0.0002	0.014	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																					
Light duty gasoline vehicles (< 8,000 lb GVW)	150		X	6	2		46,800	1,560	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		22.55	0.21	0.02	0.004	0.001	0.0002	0.006	0.003	0.75	0.01	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty gasoline vehicles (>8,000 lb GVW)	300		X	6	2		393,120	39,000	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		189.43	1.75	0.13	0.032	0.006	0.0013	0.050	0.022	18.79	0.17	0.01	0.003	0.001	0.0001	0.005	0.002
Light duty diesel vehicles (< 8,000 lb GVW)	150	X		6	2		82,680	10,920	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		182.97	0.14	0.52	0.055	0.028	0.0018	0.053	0.008	24.17	0.02	0.07	0.007	0.004	0.0002	0.007	0.001
Heavy duty diesel vehicles (>8,000 lb GVW) Gang Bus	300	X		6	2		42,120	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		93.21	0.07	0.26	0.028	0.014	0.0008	0.027	0.004	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)	Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
				2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
On-road delivery vehicles																													
Heavy duty diesel vehicles (>6,000 lb GVW) Pipe / Materials Truck	11	21.5	70	35,350	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	17.03	0.18	0.01	0.003	0.001	0.0001	0.004	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road material removal vehicles																													
Heavy duty diesel vehicles (>6,000 lb GVW)	11	21.5	70	0	8,050	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000	17.81	0.01	0.05	0.005	0.003	0.0002	0.005	0.001

Construction Areas	Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Potential Open Burning of Forested Area	227	0	14.31	0.83	0.02	0.08	0.08	0.00	0.11	NA	3,251.16	143.13	4.09	17.38	17.38	0.00	24.54	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers	Number of Vehicle Miles		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Worker Commutes	1,833,171	125,306	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	883.34	8.15	0.59	0.151	0.028	0.0059	0.233	0.102	60.38	0.56	0.04	0.010	0.002	0.0004	0.016	0.007

Table 9-A6
H-650 Pipeline Construction Equipment Air Emissions - Alamance County

MVP Southgate Project
H-650 Pipeline, Alamance, NC

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Light plants	15	X		2	4	2270002027	2,149	277	588.92	2.36	4.48	0.35	0.35	0.0040	0.45	0.01	0.43	9.00	0.04	0.07	0.005	0.005	0.0001	0.007	0.000	1.16	0.00	0.01	0.001	0.001	0.0000	0.001	0.000
Bore rigs	250	X		6	10	2270002033	2,080	0	530.27	0.88	2.86	0.15	0.15	0.0031	0.24	0.01	0.43	130.70	0.17	0.70	0.036	0.038	0.0008	0.060	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
HDD Reaming/Pullback Rig	875	X		6	10	2270002033	2,080	0	530.03	1.09	4.71	0.18	0.18	0.0031	0.32	0.01	0.43	457.24	0.94	4.06	0.157	0.157	0.0027	0.272	0.011	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
HDD Assist Reaming/Pilot Hole Rig	440	X		6	10	2270002033	2,080	0	530.35	0.88	3.09	0.14	0.14	0.0031	0.22	0.01	0.43	230.06	0.38	1.33	0.060	0.060	0.0014	0.094	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	71,240	3,640	536.38	0.38	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	8076.65	5.70	15.00	0.819	0.819	0.0417	2.101	0.185	412.68	0.29	0.77	0.042	0.042	0.0021	0.107	0.009
Excavators (JD 350G LC)	271	X		6	10	2270002036	8,060	0	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	761.97	0.24	0.75	0.030	0.030	0.0037	0.191	0.017	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 320DL)	148	X		6	10	2270002036	71,240	3,900	536.39	0.23	0.56	0.04	0.04	0.0027	0.14	0.01	0.59	3678.05	1.56	3.83	0.244	0.244	0.0182	0.935	0.084	201.35	0.09	0.21	0.013	0.013	0.0010	0.051	0.005
Off-highway trucks -1-2.5 ton trucks (CAT 725)	308	X		6	8	2270002051	6,656	1,456	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	717.48	0.26	0.70	0.028	0.028	0.0035	0.178	0.016	156.95	0.06	0.15	0.006	0.006	0.0008	0.039	0.004
Water Truck	175	X		6	10	2270002051	4,160	1,560	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	253.97	0.06	0.15	0.005	0.005	0.0012	0.063	0.006	95.24	0.02	0.06	0.002	0.002	0.0005	0.023	0.002
Utility Truck	100	X		6	10	2270002051	10,140	2,080	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	353.74	0.10	0.22	0.008	0.008	0.0017	0.097	0.008	72.56	0.02	0.04	0.002	0.002	0.0004	0.018	0.002
Tractors, loaders, and backhoes (CAT 450F)	144	X		6	8	2270002066	1,560	0	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	32.51	0.09	0.14	0.018	0.018	0.0002	0.023	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Dozers (CAT D8K)	125	X		6	10	2270002069	49,920	4,160	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	2176.73	1.15	2.92	0.207	0.207	0.0109	0.571	0.050	181.39	0.10	0.24	0.017	0.017	0.0009	0.048	0.004
Dozers (CAT D7E)	235	X		6	10	2270002069	49,400	3,900	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	4049.71	1.54	5.08	0.220	0.220	0.0201	1.039	0.083	319.71	0.12	0.40	0.017	0.017	0.0018	0.082	0.007
Off- highway tractors (John Deere 6115D)	115	X		6	8	2270002051	1,404	468	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	56.33	0.02	0.03	0.001	0.001	0.0003	0.014	0.001	18.78	0.01	0.01	0.000	0.000	0.0001	0.005	0.000
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	3,120	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	269.88	0.23	0.67	0.043	0.043	0.0014	0.081	0.006	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Feller Buncher (CAT 553C)	173	X		6	10	2270002081	260	0	536.28	0.81	1.44	0.14	0.14	0.0029	0.17	0.01	0.59	15.69	0.02	0.04	0.004	0.004	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	780	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	49.51	0.04	0.12	0.008	0.008	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	780	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	88.01	0.06	0.17	0.011	0.011	0.0004	0.020	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Sideboom (CAT 583T Pipelayer)	347	X		6	10	2270002081	37,700	0	536.26	0.95	2.24	0.14	0.14	0.0031	0.18	0.01	0.59	4562.39	8.12	18.09	1.169	1.169	0.0261	1.524	0.105	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Bending Machine	175	X		6	10	2270002081	3,900	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	238.05	0.20	0.59	0.038	0.038	0.0013	0.071	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	1,560	0	595.69	0.38	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	16.32	0.01	0.09	0.001	0.001	0.0001	0.004	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10	X		6	10	2270002081	7,540	0	594.37	4.48	4.32	0.35	0.35	0.0040	0.56	0.01	0.59	29.15	0.22	0.21	0.017	0.017	0.0002	0.027	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Bobcat with sweeper attachment	70	X		6	2	2270003040	572	364	589.79	1.16	3.25	0.14	0.14	0.0033	0.18	0.01	0.43	11.19	0.02	0.06	0.003	0.003	0.0001	0.003	0.000	7.12	0.01	0.04	0.002	0.002	0.0000	0.002	0.000
Bobcat with brush hog attachement	70	X		6	2	2270003040	312	0	589.79	1.16	3.25	0.14	0.14	0.0033	0.18	0.01	0.43	6.11	0.01	0.03	0.001	0.001	0.0000	0.002	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Commercial Equipment																																
Pumps	15	X		6	8	2270006010	13,416	1,092	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	58.16	0.23	0.44	0.034	0.034	0.0004	0.046	0.001	4.57	0.02	0.04	0.003	0.003	0.0000	0.004	0.000
Air compressors	275	X		6	10	2270006015	18,200	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	1267.88	2.09	7.29	0.483	0.483	0.0075	0.859	0.029	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Welders	55	X		6	9	2270006025	19,422	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	268.43	0.45	1.56	0.099	0.099	0.0016	0.141	0.006	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Pressure washers	5	X		6	4	2270006030	2,392	728	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	3.01	0.00	0.02	0.001	0.001	0.0000	0.002	0.000	0.91	0.00	0.01	0.000	0.000	0.0000	0.000	0.000
Hydro power units	200	X		6	10	2270006035	520	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	26.13	0.04	0.15	0.010	0.010	0.0002	0.014	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																							
Light duty gasoline vehicles (< 6,000 lb GVW)	150		X	6	2		46,800	1,560	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		22.55	0.21	0.02	0.004	0.001	0.0002	0.006	0.003	0.75	0.01	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty gasoline vehicles (>6,000 lb GVW)	300		X	6	2		393,120	39,000	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		189.43	1.75	0.13	0.032	0.006	0.0013	0.050	0.022	18.79	0.17	0.01	0.003	0.001	0.0001	0.005	0.002
Light duty diesel vehicles (< 6,000 lb GVW)	150	X		6	2		82,680	10,920	2007.81	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		182.97	0.14	0.52	0.055	0.028	0.0016	0.053	0.008	24.17	0.02	0.07	0.007	0.004	0.0002	0.007	0.001
Heavy duty diesel vehicles (>6,000 lb GVW) Gang Bus	300	X		6	2		42,120	0	2007.81	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		93.21	0.07	0.26	0.028	0.014	0.0008	0.027	0.004	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)	Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
				2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
On-road delivery vehicles																													
Heavy duty diesel vehicles (>6,000 lb GVW) Pipe / Materials Truck	11	21.5	70	55,300	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	26.65	0.25	0.02	0.005	0.001	0.0002	0.007	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road material removal vehicles																													
Heavy duty diesel vehicles (>6,000 lb GVW)	11	21.5	70	18,200	18,200	2007.81	1.54	5.67	0.60	0.30	0.0176	0.59	0.08	40.28	0.03	0.11	0.012	0.006	0.0004	0.012	0.002	40.28	0.03	0.11	0.012	0.006	0.0004	0.012	0.002

Construction Areas	Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Potential Open Burning of Forested Area	163	0	14.31	0.63	0.02	0.08	0.08	0.00	0.11	NA	2,325.68	102.39	2.93	12.43	12.43	0.00	17.55	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers	Number of Vehicle Miles		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Worker Commutes	1,833,171	125,308	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	883.34	8.15	0.59	0.151	0.028	0.0059	0.233	0.102	60.38	0.56	0.04	0.010	0.002	0.0004	0.016	0.007

Table 9-A7
Lambert Compressor Station Construction Equipment Air Emissions - Pittsylvania County

MVP Southgate Project
Lambert Compressor Station, Pittsylvania County, VA

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Pavers (CAT AP655D Track Asphalt Paver)	174	X		6	10	2270002003	1,040	260	536.36	0.38	0.91	0.08	0.08	0.0028	0.15	0.01	0.59	63.12	0.04	0.11	0.009	0.009	0.0003	0.017	0.001	15.78	0.01	0.03	0.002	0.002	0.0001	0.004	0.000
Small handheld, walk-behind, or single person sized tampers or rammers (BoMag 8500 compactor)	19	X		6	10	2270002006	9,360	3,120	588.51	4.46	4.45	0.38	0.38	0.0040	0.58	0.01	0.43	49.61	0.38	0.38	0.032	0.032	0.0003	0.049	0.001	16.54	0.13	0.13	0.011	0.011	0.0001	0.016	0.000
Light plants	15	X		6	10	2270002027	14,560	3,120	588.92	2.36	4.48	0.35	0.35	0.0040	0.45	0.01	0.43	60.96	0.24	0.46	0.036	0.036	0.0004	0.047	0.001	13.06	0.05	0.10	0.008	0.008	0.0001	0.010	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	7,280	2,860	536.38	0.38	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	825.35	0.58	1.53	0.084	0.084	0.0043	0.215	0.019	324.24	0.23	0.60	0.033	0.033	0.0017	0.084	0.007
Excavators (JD 350G LC)	271	X		6	10	2270002036	3,900	1,560	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	368.70	0.12	0.36	0.014	0.014	0.0018	0.093	0.008	147.48	0.05	0.15	0.006	0.006	0.0007	0.037	0.003
Excavators (CAT 320DL)	148	X		6	10	2270002036	2,860	1,560	536.39	0.23	0.56	0.04	0.04	0.0027	0.14	0.01	0.59	147.86	0.06	0.15	0.010	0.010	0.0007	0.038	0.003	80.54	0.03	0.08	0.005	0.005	0.0004	0.020	0.002
Concrete or stone industrial saws	10	X		6	10	2270002039	4,680	520	594.37	4.50	4.32	0.36	0.36	0.0040	0.56	0.01	0.59	18.09	0.14	0.13	0.011	0.011	0.0001	0.017	0.000	2.01	0.02	0.01	0.001	0.001	0.0000	0.002	0.000
Off-highway trucks - 1-2.5 ton trucks (CAT 725)	309	X		6	10	2270002051	7,800	3,640	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	840.80	0.31	0.82	0.033	0.033	0.0041	0.210	0.019	392.37	0.14	0.38	0.015	0.015	0.0019	0.098	0.009
Water Truck	175	X		6	10	2270002051	3,640	1,560	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	222.22	0.05	0.13	0.004	0.004	0.0011	0.055	0.005	95.24	0.02	0.06	0.002	0.002	0.0005	0.023	0.002
Utility Truck	100	X		6	6	2270002051	3,432	1,248	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	119.73	0.03	0.07	0.003	0.003	0.0006	0.030	0.003	43.54	0.01	0.03	0.001	0.001	0.0002	0.011	0.001
Rough terrain forklifts (CASE 588H)	78	X		6	10	2270002057	6,760	1,560	595.59	1.46	1.48	0.18	0.18	0.0032	0.18	0.01	0.59	204.24	0.50	0.51	0.063	0.063	0.0011	0.061	0.004	47.13	0.12	0.12	0.015	0.015	0.0003	0.014	0.001
Rubber tire front loaders (CAT 972K)	288	X		6	6	2270002060	1,716	936	536.36	0.30	0.95	0.05	0.05	0.0027	0.15	0.01	0.59	172.39	0.10	0.30	0.018	0.016	0.0009	0.047	0.004	94.03	0.05	0.17	0.009	0.009	0.0005	0.026	0.002
Tractors, loaders, and backhoes (CAT 450F)	144	X		6	8	2270002066	2,288	1,248	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	47.68	0.13	0.21	0.026	0.026	0.0003	0.034	0.001	26.01	0.07	0.11	0.014	0.014	0.0002	0.016	0.001
Dozers (CAT D6K)	125	X		6	10	2270002069	5,720	3,120	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	249.42	0.13	0.33	0.024	0.024	0.0013	0.065	0.006	136.05	0.07	0.18	0.013	0.013	0.0007	0.036	0.003
Dozers (CAT D7E)	235	X		6	6	2270002069	312	0	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	25.58	0.01	0.03	0.001	0.001	0.0001	0.007	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Loaders (Tracked - CAT 953D)	148	X		6	6	2270002072	5,928	1,872	624.59	2.33	3.58	0.44	0.44	0.0037	0.61	0.01	0.21	126.85	0.47	0.73	0.089	0.089	0.0008	0.124	0.002	40.06	0.15	0.23	0.028	0.028	0.0002	0.039	0.001
Off- highway tractors (John Deere 6115D)	115	X		6	10	2270002051	1,560	1,560	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	62.58	0.02	0.04	0.001	0.001	0.0003	0.015	0.001	62.58	0.02	0.04	0.001	0.001	0.0003	0.015	0.001
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	1,560	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	134.94	0.11	0.34	0.022	0.022	0.0007	0.040	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	1,560	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	99.03	0.08	0.25	0.016	0.016	0.0005	0.030	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	1,560	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	136.03	0.11	0.34	0.022	0.022	0.0007	0.041	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	1,560	0	595.69	0.38	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	16.32	0.01	0.09	0.001	0.001	0.0001	0.004	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10		X	6	10	2285002081	3,120	0	1046.89	278.54	1.97	0.11	0.11	0.0191	4.90	0.23	0.48	17.28	4.60	0.03	0.002	0.002	0.0003	0.081	0.004	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Aerial Lifts	49	X		6	10	2270003010	24,960	2,600	692.66	4.22	4.79	0.63	0.63	0.0042	1.05	0.01	0.21	196.10	1.19	1.36	0.179	0.179	0.0012	0.296	0.003	20.43	0.12	0.14	0.019	0.019	0.0001	0.031	0.000
Self-propelled sweeping and scrubbing vehicles	70	X		6	5	2270003030	1,560	650	589.99	0.74	3.08	0.08	0.08	0.0031	0.15	0.01	0.43	30.53	0.04	0.16	0.004	0.004	0.0002	0.008	0.001	12.72	0.02	0.07	0.002	0.002	0.0001	0.003	0.000
Hydraulic Crane	288	X		6	10	2270002045	5,200	260	530.57	0.22	1.02	0.04	0.04	0.0027	0.15	0.01	0.43	350.47	0.14	0.67	0.027	0.027	0.0018	0.097	0.008	17.52	0.01	0.03	0.001	0.001	0.0001	0.005	0.000
Manitoka	250	X		6	6	2270002069	2,496	312	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	217.68	0.08	0.27	0.012	0.012	0.0011	0.056	0.005	27.21	0.01	0.03	0.001	0.001	0.0001	0.007	0.001
Nonroad Commercial Equipment																																
Generator set (specify kW)	94	X		6	10	2270006005	17,160	7,800	589.21	1.80	3.24	0.31	0.31	0.0035	0.36	0.01	0.43	450.48	1.38	2.48	0.238	0.238	0.0027	0.278	0.009	204.77	0.63	1.13	0.108	0.108	0.0012	0.126	0.004
Pumps	15	X		6	5	2270006010	8,620	780	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	40.27	0.17	0.31	0.025	0.025	0.0003	0.033	0.001	3.27	0.01	0.03	0.002	0.002	0.0000	0.003	0.000
Air compressors	275	X		6	10	2270006015	7,280	520	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	503.07	0.84	2.92	0.185	0.185	0.0030	0.264	0.012	35.93	0.06	0.21	0.013	0.013	0.0002	0.019	0.001
Welders	55	X		6	10	2270006025	17,160	3,120	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	237.16	0.39	1.37	0.087	0.087	0.0014	0.124	0.006	43.12	0.07	0.25	0.016	0.016	0.0003	0.023	0.001
Pressure washers	5	X		6	5	2270006030	2,340	1,040	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	2.94	0.00	0.02	0.001	0.001	0.0000	0.002	0.000	1.31	0.00	0.01	0.000	0.000	0.0000	0.001	0.000
Hydro power units	200	X		6	10	2270006035	3,120	520	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	156.80	0.26	0.91	0.058	0.058	0.0009	0.082	0.004	26.13	0.04	0.15	0.010	0.010	0.0002	0.014	0.001
On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																							
Light duty gasoline vehicles (< 6,000 lb GVW)	150		X	6	2		101,400	35,100	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		48.86	0.45	0.03	0.008	0.002	0.0003	0.013	0.006	16.91	0.16	0.01	0.003	0.001	0.0001	0.004	0.002
Heavy duty gasoline vehicles (>6,000 lb GVW)	300		X	6	5		731,250	126,750	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		352.36	3.25	0.24	0.060	0.011	0.0023	0.093	0.041	61.08	0.56	0.04	0.010	0.002	0.0004	0.016	0.007
Light duty diesel vehicles (< 6,000 lb GVW)	150	X		6	5		271,050	46,800	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		599.83	0.46	1.70	0.179	0.091	0.0053	0.175	0.025	103.57	0.08	0.29	0.031	0.016	0.0009	0.030	0.004
Heavy duty diesel vehicles (>6,000 lb GVW)	300	X		6	5		66,300	23,400	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		146.72	0.11	0.41	0.044	0.022	0.0013	0.043	0.006	51.78	0.04	0.15	0.015	0.008	0.0005	0.015	0.002

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)	Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
				2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
On-road delivery vehicles																														
Heavy duty diesel vehicles (>6,000 lb GVW)	11	50	200	127,000	48,000	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		61.20	0.56	0.04	0.010	0.002	0.0004	0.016	0.007	23.13	0.21	0.02	0.004	0.001	0.0002	0.006	0.003
On-road material removal vehicles																														
Heavy duty diesel vehicles (>6,000 lb GVW)	11	21	200	28,000	12,000	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		61.96	0.05	0.18	0.018	0.009	0.0005	0.018	0.003	26.56	0.02	0.08	0.008	0.004	0.0002	0.008	0.001

Construction Areas	Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Potential Open Burning of Forested Area	5	0	14.31	0.63	0.02	0.08	0.08	0.00	0.11	NA	85.33	2.88	0.08	0.35	0.35	0.00	0.49	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers	Number of Vehicle Miles		MOVES Emission Factors (g/VMT)								2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Worker Commutes	615,729	93,088	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05	296.70	2.74	0.20	0.051	0.009	0.0020	0.078	0.034	44.85	0.41	0.03	0.008	0.001	0.0003	0.012	0.005

Table 9-A8
Lambert Interconnect Construction Equipment Air Emissions - Pittsylvania County

MVP Southgate Project
Lambert Interconnect, Pittsylvania County, VA

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Small handheld, walk-behind, or single person sized tampers or rammers (BoMag 8500 compactor)	19	X		6	10	2270002006	2,080	0	588.51	4.46	4.45	0.38	0.38	0.0040	0.56	0.01	0.43	11.02	0.08	0.08	0.007	0.007	0.0001	0.011	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Light plants	15	X		6	10	2270002027	3,640	0	588.92	2.36	4.48	0.35	0.35	0.0040	0.45	0.01	0.43	15.24	0.06	0.12	0.009	0.009	0.0001	0.012	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	2,080	0	536.38	0.38	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	235.81	0.17	0.44	0.024	0.024	0.0012	0.061	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (JD 350G LC)	271	X		6	10	2270002036	1,040	0	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	98.32	0.03	0.10	0.004	0.004	0.0005	0.025	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 320DL)	148	X		6	10	2270002036	260	0	536.39	0.23	0.66	0.04	0.04	0.0027	0.14	0.01	0.59	13.42	0.01	0.01	0.001	0.001	0.0001	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Concrete or stone industrial saws	10	X		6	10	2270002039	780	0	594.37	4.50	4.32	0.36	0.36	0.0040	0.56	0.01	0.59	3.02	0.02	0.02	0.002	0.002	0.0000	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Off-highway trucks -1-2.5 ton trucks (CAT 725)	309	X		6	10	2270002051	1,040	0	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	112.11	0.04	0.11	0.004	0.004	0.0005	0.026	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Water Truck	175	X		6	10	2270002051	1,300	0	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	79.36	0.02	0.05	0.002	0.002	0.0004	0.020	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Utility Truck	100	X		6	6	2270002051	1,560	0	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	54.42	0.02	0.03	0.001	0.001	0.0003	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rough terrain forklifts (CASE 588H)	78	X		6	10	2270002057	1,300	0	595.59	1.46	1.48	0.18	0.18	0.0032	0.18	0.01	0.59	39.28	0.10	0.10	0.012	0.012	0.0002	0.012	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rubber tire front -loaders (CAT 972K)	288	X		6	8	2270002060	468	0	536.36	0.30	0.95	0.05	0.05	0.0027	0.15	0.01	0.59	47.02	0.03	0.08	0.004	0.004	0.0002	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Tractors, loaders, and backhoes (CAT 450F)	144	X		6	8	2270002066	1,040	0	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	21.67	0.06	0.10	0.012	0.012	0.0001	0.015	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Dozers (CAT D6K)	125	X		6	10	2270002069	1,300	0	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	56.89	0.03	0.08	0.005	0.005	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Loaders (Tracked - CAT 953D)	148	X		6	6	2270002072	780	0	624.59	2.33	3.58	0.44	0.44	0.0037	0.61	0.01	0.21	16.69	0.06	0.10	0.012	0.012	0.0001	0.016	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Off- highway tractors (John Deere 6115D)	115	X		6	10	2270002051	520	0	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	20.86	0.01	0.01	0.000	0.000	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	520	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	44.98	0.04	0.11	0.007	0.007	0.0002	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	260	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	16.50	0.01	0.04	0.003	0.003	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	260	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	22.67	0.02	0.06	0.004	0.004	0.0001	0.007	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	260	0	595.69	0.36	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	2.72	0.00	0.01	0.000	0.000	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10		X	6	10	2285002081	520	0	1046.69	278.54	1.97	0.11	0.11	0.0191	4.80	0.23	0.48	2.88	0.77	0.01	0.000	0.000	0.0001	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Aerial Lifts	49	X		6	10	2270003010	1,300	0	692.66	4.22	4.79	0.63	0.63	0.0042	1.05	0.01	0.21	10.21	0.06	0.07	0.009	0.009	0.0001	0.015	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Self-propelled sweeping and scrubbing vehicles	70	X		6	5	2270003030	650	0	589.89	0.74	3.09	0.08	0.08	0.0031	0.15	0.01	0.43	12.72	0.02	0.07	0.002	0.002	0.0001	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Hydraulic Crane	288	X		6	10	2270002045	780	0	530.57	0.22	1.02	0.04	0.04	0.0027	0.15	0.01	0.43	52.57	0.02	0.10	0.004	0.004	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Marooka	250	X		6	8	2270002069	780	0	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	68.02	0.03	0.09	0.004	0.004	0.0003	0.017	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Commercial Equipment																																
Pumps	15	X		6	5	2270006010	2,080	0	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	8.71	0.04	0.07	0.005	0.005	0.0001	0.007	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Air compressors	275	X		6	10	2270006015	3,120	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	215.60	0.36	1.25	0.079	0.079	0.0013	0.113	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Welders	55	X		6	10	2270006025	2,340	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	32.34	0.05	0.19	0.012	0.012	0.0002	0.017	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Pressure washers	5	X		6	5	2270006030	520	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	0.65	0.00	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Hydro power units	200	X		6	10	2270006035	1,040	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	52.27	0.09	0.30	0.019	0.019	0.0003	0.027	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																							
							2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Light duty gasoline vehicles (< 6,000 lb GVW)	150		X	6	10		156,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		75.17	0.69	0.05	0.013	0.002	0.0005	0.020	0.009	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty gasoline vehicles (>6,000 lb GVW)	300		X	6	5		97,500	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		46.98	0.43	0.03	0.008	0.001	0.0003	0.012	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Light duty diesel vehicles (< 6,000 lb GVW)	150	X		6	10		175,500	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		388.38	0.30	1.10	0.116	0.059	0.0034	0.114	0.016	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty diesel vehicles (>6,000 lb GVW)	300	X		6	5		48,750	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		107.88	0.08	0.30	0.032	0.016	0.0009	0.032	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)		Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
					2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
On-road delivery vehicles																																
Heavy duty gasoline vehicles (>6,000 lb GVW)			50		1,250	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		0.60	0.01	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty diesel vehicles (>6,000 lb GVW)			50		2,250	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		1.08	0.01	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road material removal vehicles																																
Heavy duty diesel vehicles (>6,000 lb GVW)			50		2,250	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		4.98	0.00	0.01	0.001	0.001	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Construction Areas					Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
					2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Potential Open Burning of Forested Area					0	0	14.31	0.83	0.02	0.08	0.08	0.00	0.11	NA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers					Number of Vehicle Miles		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
					2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Worker Commutes					90,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		43.37	0.40	0.03	0.007	0.001	0.0003	0.011	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Table 9-A9
LN 3600 and T-15 Dan River Interconnect Construction Equipment Air Emissions - Rockingham County

MVP Southgate Project
LN 3600 and T-15 Dan River Interconnects, Rockingham County, NC

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Small handheld, walk-behind, or single person sized tampers or rammers (BoMag 8500 compactor)	19	X		6	10	2270002006	4,160	0	588.51	4.46	4.45	0.38	0.38	0.0040	0.58	0.01	0.43	22.05	0.17	0.17	0.014	0.014	0.0001	0.022	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Light plants	15	X		6	10	2270002027	7,280	0	588.82	2.36	4.48	0.35	0.36	0.0040	0.45	0.01	0.43	30.49	0.12	0.23	0.018	0.018	0.0002	0.023	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	4,160	0	536.38	0.39	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	471.63	0.33	0.88	0.049	0.048	0.0024	0.123	0.011	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (JD 350G LC)	271	X		6	10	2270002036	2,080	0	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	196.64	0.06	0.19	0.008	0.008	0.0010	0.049	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 320DL)	148	X		6	10	2270002036	520	0	536.39	0.23	0.56	0.04	0.04	0.0027	0.14	0.01	0.59	26.85	0.01	0.03	0.002	0.002	0.0001	0.007	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Concrete or stone industrial saws	10	X		6	10	2270002039	1,560	0	584.37	4.50	4.32	0.36	0.36	0.0040	0.56	0.01	0.59	6.03	0.05	0.04	0.004	0.004	0.0000	0.008	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Off-highway trucks -1-2.5 ton trucks (CAT 725)	309	X		6	10	2270002051	2,080	0	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	224.21	0.08	0.22	0.009	0.009	0.0011	0.058	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Water Truck	175	X		6	10	2270002051	2,600	0	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	158.73	0.04	0.10	0.003	0.003	0.0008	0.039	0.004	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Utility Truck	100	X		6	6	2270002051	3,120	0	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	108.84	0.03	0.07	0.002	0.002	0.0005	0.027	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rough terrain forklifts (CASE 588H)	78	X		6	10	2270002057	2,600	0	595.59	1.46	1.48	0.18	0.18	0.0032	0.18	0.01	0.59	78.55	0.18	0.19	0.024	0.024	0.0004	0.023	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rubber tire front -loaders (CAT 972K)	286	X		6	6	2270002080	936	0	536.36	0.30	0.95	0.05	0.05	0.0027	0.15	0.01	0.59	94.03	0.05	0.17	0.009	0.009	0.0005	0.026	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Tractors, loaders, and backhoes (CAT 460F)	144	X		6	8	2270002066	2,080	0	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	43.34	0.11	0.19	0.024	0.024	0.0003	0.031	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Dozers (CAT D6K)	125	X		6	10	2270002069	2,600	0	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	113.37	0.06	0.15	0.011	0.011	0.0006	0.030	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Loaders (Tracked - CAT 953D)	148	X		6	6	2270002072	1,560	0	624.59	2.33	3.58	0.44	0.44	0.0037	0.61	0.01	0.21	33.38	0.12	0.19	0.024	0.024	0.0002	0.033	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Off- highway tractors (John Deere 6115D)	115	X		6	10	2270002051	1,040	0	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	41.72	0.01	0.03	0.001	0.001	0.0002	0.010	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	1,040	0	538.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	89.96	0.08	0.22	0.014	0.014	0.0005	0.027	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	520	0	538.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	33.01	0.03	0.08	0.005	0.005	0.0002	0.010	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	520	0	538.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	45.34	0.04	0.11	0.007	0.007	0.0002	0.014	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	520	0	595.69	0.38	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	5.44	0.00	0.03	0.000	0.000	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10		X	6	10	2265002081	1,040	0	1046.69	278.54	1.97	0.11	0.11	0.0181	4.90	0.23	0.48	5.76	1.53	0.01	0.001	0.001	0.0001	0.027	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Aerial Lifts	49	X		6	10	2270003010	2,600	0	692.66	4.22	4.79	0.63	0.63	0.0042	1.05	0.01	0.21	20.43	0.12	0.14	0.019	0.019	0.0001	0.031	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Self-propelled sweeping and scrubbing vehicles	70	X		6	5	2270003030	1,300	0	589.89	0.74	3.08	0.08	0.08	0.0031	0.15	0.01	0.43	25.44	0.03	0.13	0.003	0.003	0.0001	0.006	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Hydraulic Crane	268	X		6	10	2270002045	1,560	0	530.57	0.22	1.02	0.04	0.04	0.0027	0.15	0.01	0.43	105.14	0.04	0.20	0.008	0.008	0.0005	0.029	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Manooka	250	X		6	6	2270002068	1,560	0	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	136.05	0.05	0.17	0.007	0.007	0.0007	0.035	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Commercial Equipment																																
Pumps	15	X		6	5	2270006010	4,160	0	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	17.42	0.07	0.14	0.011	0.011	0.0001	0.014	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Air compressors	275	X		6	10	2270006015	6,240	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	431.21	0.72	2.50	0.159	0.159	0.0026	0.226	0.010	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Welders	55	X		6	10	2270006025	4,680	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	64.68	0.11	0.37	0.024	0.024	0.0004	0.034	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Pressure washers	5	X		6	5	2270006030	1,040	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	1.31	0.00	0.01	0.000	0.000	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Hydro power units	200	X		6	10	2270006035	2,080	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	104.53	0.17	0.61	0.038	0.038	0.0006	0.055	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																					
Light duty gasoline vehicles (< 6,000 lb GVW)	150		X	6	10		312,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		150.34	1.39	0.10	0.026	0.005	0.0010	0.040	0.017	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty gasoline vehicles (>6,000 lb GVW)	300		X	6	5		195,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		93.96	0.87	0.06	0.016	0.003	0.0006	0.025	0.011	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Light duty diesel vehicles (< 6,000 lb GVW)	150	X		6	10		351,000	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		776.75	0.60	2.20	0.232	0.117	0.0068	0.227	0.033	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty diesel vehicles (>6,000 lb GVW)	300	X		6	5		97,500	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		215.77	0.17	0.61	0.064	0.033	0.0019	0.063	0.009	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)	Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
				2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
On-road delivery vehicles																														
Heavy duty gasoline vehicles (>6,000 lb GVW)			50	2,500	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		1.20	0.01	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty diesel vehicles (>6,000 lb GVW)			50	4,500	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		2.17	0.02	0.00	0.000	0.000	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road material removal vehicles																														
Heavy duty diesel vehicles (>6,000 lb GVW)			50	4,500	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		9.96	0.01	0.03	0.003	0.002	0.0001	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Construction Areas	Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Potential Open Burning of Forested Area	0.3	0	14.31	0.63	0.02	0.08	0.08	0.00	0.11	NA		3.92	0.17	0.00	0.02	0.02	0.00	0.03	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers	Number of Vehicle Miles		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
	2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Worker Commutes	180,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		86.74	0.80	0.06	0.015	0.003	0.0006	0.023	0.010	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Table 9-A10
T-21 Haw River Interconnect Construction Equipment Air Emissions - Alamance County

MVP Southgate Project
T-21 Haw River Interconnect, Alamance County, NC

On-site Road and Nonroad Construction Equipment	Equipment Engine HP	Fuel		Schedule		SCC	Number of Operating Hours		NONROAD2008a Emission Factor (g/hp-hr)								Engine Load Factor	2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
		Diesel	Gasoline	days/week	hours/day		2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Nonroad construction equipment																																
Small handheld, walk-behind, or single person sized tampers or rammers (BoMag 8500 compactor)	19	X		6	10	2270002006	2,080	0	588.51	4.46	4.45	0.38	0.38	0.0040	0.58	0.01	0.43	11.02	0.08	0.08	0.007	0.007	0.0001	0.011	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Light plants	15	X		6	10	2270002027	3,640	0	588.92	2.36	4.48	0.35	0.35	0.0040	0.45	0.01	0.43	15.24	0.06	0.12	0.009	0.009	0.0001	0.012	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 345C)	325	X		6	10	2270002036	2,080	0	536.38	0.38	1.00	0.05	0.05	0.0028	0.14	0.01	0.59	235.81	0.17	0.44	0.024	0.024	0.0012	0.061	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (JD 350G LC)	271	X		6	10	2270002036	1,040	0	536.40	0.17	0.53	0.02	0.02	0.0026	0.13	0.01	0.59	98.32	0.03	0.10	0.004	0.004	0.0005	0.025	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Excavators (CAT 320DL)	148	X		6	10	2270002036	260	0	536.39	0.23	0.66	0.04	0.04	0.0027	0.14	0.01	0.59	13.42	0.01	0.01	0.001	0.001	0.0001	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Concrete or stone industrial saws	10	X		6	10	2270002039	780	0	594.37	4.50	4.32	0.36	0.36	0.0040	0.56	0.01	0.59	3.02	0.02	0.02	0.002	0.002	0.0000	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Off-highway trucks -1-2.5 ton trucks (CAT 725)	309	X		6	10	2270002051	1,040	0	536.40	0.20	0.52	0.02	0.02	0.0026	0.13	0.01	0.59	112.11	0.04	0.11	0.004	0.004	0.0005	0.026	0.003	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Water Truck	175	X		6	10	2270002051	1,300	0	536.41	0.12	0.32	0.01	0.01	0.0026	0.13	0.01	0.59	79.36	0.02	0.05	0.002	0.002	0.0004	0.020	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Utility Truck	100	X		6	6	2270002051	1,560	0	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	54.42	0.02	0.03	0.001	0.001	0.0003	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rough terrain forklifts (CASE 588H)	78	X		6	10	2270002057	1,300	0	595.59	1.46	1.48	0.18	0.18	0.0032	0.18	0.01	0.59	39.28	0.10	0.10	0.012	0.012	0.0002	0.012	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rubber tire front -loaders (CAT 972K)	288	X		6	8	2270002060	468	0	536.36	0.30	0.95	0.05	0.05	0.0027	0.15	0.01	0.59	47.02	0.03	0.08	0.004	0.004	0.0002	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Tractors, loaders, and backhoes (CAT 450F)	144	X		6	8	2270002066	1,040	0	625.13	1.65	2.76	0.34	0.34	0.0036	0.44	0.01	0.21	21.67	0.06	0.10	0.012	0.012	0.0001	0.015	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Dozers (CAT D6K)	125	X		6	10	2270002069	1,300	0	536.38	0.28	0.72	0.05	0.05	0.0027	0.14	0.01	0.59	56.89	0.03	0.08	0.005	0.005	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Loaders (Tracked - CAT 953D)	148	X		6	6	2270002072	780	0	624.59	2.33	3.58	0.44	0.44	0.0037	0.61	0.01	0.21	16.69	0.06	0.10	0.012	0.012	0.0001	0.016	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Off- highway tractors (John Deere 6115D)	115	X		6	10	2270002051	520	0	536.41	0.15	0.33	0.01	0.01	0.0026	0.13	0.01	0.59	20.86	0.01	0.01	0.000	0.000	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Rock Drill Machine (JOHN HENRY drill on CAT320DL)	248	X		6	10	2270002081	520	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	44.98	0.04	0.11	0.007	0.007	0.0002	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Logging Skidder (CAT 525C)	182	X		6	10	2270002081	260	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	16.50	0.01	0.04	0.003	0.003	0.0001	0.005	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chipper (Bandit 1850)	250	X		6	10	2270002081	260	0	536.32	0.45	1.33	0.09	0.09	0.0029	0.16	0.01	0.59	22.87	0.02	0.06	0.004	0.004	0.0001	0.007	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Stump Grinder (Vermeer SC252)	27	X		6	10	2270002081	260	0	595.69	0.38	3.16	0.04	0.04	0.0030	0.15	0.01	0.59	2.72	0.00	0.01	0.000	0.000	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Chain Saw	10		X	6	10	2285002081	520	0	1046.69	276.54	1.97	0.11	0.11	0.0191	4.80	0.23	0.48	2.88	0.77	0.01	0.000	0.000	0.0001	0.013	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Industrial Equipment																																
Aerial Lifts	49	X		6	10	2270003010	1,300	0	692.66	4.22	4.79	0.63	0.63	0.0042	1.05	0.01	0.21	10.21	0.06	0.07	0.009	0.009	0.0001	0.015	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Self-propelled sweeping and scrubbing vehicles	70	X		6	5	2270003030	650	0	589.89	0.74	3.09	0.08	0.08	0.0031	0.15	0.01	0.43	12.72	0.02	0.07	0.002	0.002	0.0001	0.003	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Hydraulic Crane	288	X		6	10	2270002045	780	0	530.57	0.22	1.02	0.04	0.04	0.0027	0.15	0.01	0.43	52.57	0.02	0.10	0.004	0.004	0.0003	0.015	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Marooka	250	X		6	8	2270002069	780	0	536.39	0.20	0.67	0.03	0.03	0.0027	0.14	0.01	0.59	68.02	0.03	0.09	0.004	0.004	0.0003	0.017	0.002	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Nonroad Commercial Equipment																																
Pumps	15	X		6	5	2270006010	2,080	0	588.81	2.43	4.59	0.36	0.36	0.0040	0.49	0.01	0.43	8.71	0.04	0.07	0.005	0.005	0.0001	0.007	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Air compressors	275	X		6	10	2270006015	3,120	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	215.60	0.36	1.25	0.079	0.079	0.0013	0.113	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Welders	55	X		6	10	2270006025	2,340	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	32.34	0.05	0.19	0.012	0.012	0.0002	0.017	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Pressure washers	5	X		6	5	2270006030	520	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	0.65	0.00	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Hydro power units	200	X		6	10	2270006035	1,040	0	530.15	0.88	3.07	0.20	0.20	0.0031	0.28	0.01	0.43	52.27	0.09	0.30	0.019	0.019	0.0003	0.027	0.001	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

On-road construction vehicles							Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)																							
							2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAPs
Light duty gasoline vehicles (< 6,000 lb GVW)	150		X	6	10		156,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		75.17	0.69	0.05	0.013	0.002	0.0005	0.020	0.009	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty gasoline vehicles (>6,000 lb GVW)	300		X	6	5		97,500	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		46.98	0.43	0.03	0.008	0.001	0.0003	0.012	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Light duty diesel vehicles (< 6,000 lb GVW)	150	X		6	10		175,500	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		388.38	0.30	1.10	0.116	0.059	0.0034	0.114	0.016	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty diesel vehicles (>6,000 lb GVW)	300	X		6	5		48,750	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		107.88	0.08	0.30	0.032	0.016	0.0009	0.032	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Deliveries / Removals	Empty Vehicle Weight (tons)	Full Vehicle Weight (tons)	Round Trip Distance (miles)		Number of Vehicle Miles Traveled		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
					2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
On-road delivery vehicles																																
Heavy duty gasoline vehicles (>6,000 lb GVW)			50		1,250	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		0.60	0.01	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
Heavy duty diesel vehicles (>6,000 lb GVW)			50		2,250	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		1.08	0.01	0.00	0.000	0.000	0.0000	0.000	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000
On-road material removal vehicles																																
Heavy duty diesel vehicles (>6,000 lb GVW)			50		2,250	0	2007.61	1.54	5.67	0.60	0.30	0.0176	0.59	0.08		4.98	0.00	0.01	0.001	0.001	0.0000	0.001	0.000	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

Construction Areas					Potential Open Burning Area (acres)		AP-42 Section 13 Southern Region Emission Factors (tons/acre) 2014 Climate Registry Default Emission Factors for CO_2									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
					2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Potential Open Burning of Forested Area					0	0	14.31	0.63	0.02	0.08	0.08	0.00	0.11	NA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA

Construction Workers					Number of Vehicle Miles		MOVES Emission Factors (g/VMT)									2020 Emission Totals (Tons)								2021 Emission Totals (Tons)							
					2020	2021	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP		CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP	CO2	CO	NOx	PM10	PM25	SO2	VOC	HAP
Worker Commutes					90,000	0	437.15	4.03	0.29	0.07	0.01	0.0029	0.12	0.05		43.37	0.40	0.03	0.007	0.001	0.0003	0.011	0.005	0.00	0.00	0.00	0.000	0.000	0.0000	0.000	0.000

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 9

Appendix 9-B

Operational Emissions Calculations

MVP Southgate Project
Lambert Compressor Station

Table B-1. Total Facility Potential Emissions Summary

Proposed Sources	NOx	CO	VOC	SO2	PM/PM-10/ PM-2.5	CO2	Total HAPS	CH4	N2O	CO2e
Solar Taurus 70	21.81	25.85	3.16	2.07	5.96	46,418	1.26	0.88	0.09	46,466
Solar Mars 100	31.66	35.18	3.85	3.00	8.65	67,393	1.90	1.27	0.13	67,463
Capstone C200 Microturbines (5 Units)	1.81	4.79	0.44	0.17	0.33	5,841.0	0.21	0.11	0.011	5,847
Fuel Gas Heater	0.31	0.26	0.02	0.018	0.02	394.5	0.01	0.01	0.001	395
Produced Fluids Tanks	-	-	0.43	-	-	-	-	-	-	4.2
Blowdowns	-	-	0.46	-	-	0.23	0.02	44.35	-	1,109
Station Fugitives	-	-	0.72	-	-	0.36	0.03	69.59	-	1,740
Totals (ton/year)	**55.58**	**66.08**	**9.07**	**5.25**	**14.96**	**120,047**	**3.43**	**116.20**	**0.23**	**123,024**

MVP Southgate Project
Lambert Compressor Station

Table B-2. Solar Taurus 70 Specifications

Fuel	Natural Gas																				
Load	50	50	50	50	50	50	50	75	75	75	75	75	75	75	100	100	100	100	100	100	100
Hp Output (Net)	5,896	5,896	5,791	5,678	9,657	8,832	8,474	8,844	8,844	8,686	8,518	7,876	10,056	9,603	11,792	11,792	11,581	11,358	10,502	11,189	10,796
Ambient Temperature (F)	below 0	0	20	40	60	80	100	below 0	0	20	40	60	80	100	below 0	0	20	40	60	80	100
% RH	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Elevation ft	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660
Fuel LHV (Btu/scf)	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20
Heat Input LHV (MMBtu/hr)	60.78	60.78	58.84	56.89	53.59	50.22	46.71	73.56	73.56	71.10	68.60	64.39	60.11	55.59	83.62	83.62	82.54	81.49	76.98	72.04	66.64
Heat Input HHV (MMBtu/hr) (=LHV*1.1125)	67.62	67.62	65.46	63.29	59.62	55.87	51.96	81.84	81.84	79.10	76.32	71.63	66.87	61.84	93.03	93.03	91.83	90.66	85.64	80.14	74.14
Exhaust lb/hr	193,726	193,726	184,513	175,520	164,699	154,855	144,524	218,893	218,893	209,712	200,406	187,412	174,269	159,827	231,761	231,761	225,326	218,819	207,302	194,517	179,098
Exhaust ACFM	111,151	111,151	107,948	104,557	100,113	95,916	91,765	124,004	124,004	120,454	116,562	111,039	105,408	99,557	130,010	130,010	129,423	128,765	124,151	118,653	112,486
Stack Height (ft)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Stack Height (m)	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24
Stack Equiv Diameter (ft)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Stack Exhaust Velocity (m/s)	28.76	28.76	27.93	27.05	25.90	24.82	23.74	32.08	32.08	31.16	30.16	28.73	27.27	25.76	33.64	33.64	33.48	33.31	32.12	30.70	29.10
Exhaust Temperature (F)	886	886	912	937	964	989	1016	869	869	887	904	928	955	988	856	856	887	920	943	967	1000
Exhaust Temperature (K)	747.6	747.6	762.0	775.9	790.9	804.8	819.8	738.2	738.2	748.2	757.6	770.9	785.9	804.3	730.9	730.9	748.2	766.5	779.3	792.6	810.9
NOx ppm@ 15% O_2	120	15	15	15	15	15	15	120	15	15	15	15	15	15	120	15	15	15	15	15	15
NOx lb/hr	29.120	3.640	3.520	3.400	3.190	2.970	2.730	35.280	4.410	4.260	4.100	3.840	3.560	3.250	40.160	5.020	4.950	4.880	4.590	4.270	3.900
NOx g/s	3.669	0.459	0.444	0.428	0.402	0.374	0.344	4.445	0.556	0.537	0.517	0.484	0.449	0.410	5.060	0.633	0.624	0.615	0.578	0.538	0.491
CO ppm@ 15% O_2	150	25	25	25	25	25	25	150	25	25	25	25	25	25	150	25	25	25	25	25	25
CO lb/hr	22.200	3.700	3.580	3.450	3.240	3.020	2.770	26.880	4.480	4.320	4.160	3.890	3.610	3.300	30.540	5.090	5.020	4.950	4.660	4.330	3.960
CO g/s	2.797	0.466	0.451	0.435	0.408	0.381	0.349	3.387	0.564	0.544	0.524	0.490	0.455	0.416	3.848	0.641	0.633	0.624	0.587	0.546	0.499
UHC ppm@ 15% O_2	50	25	25	25	25	25	25	50	25	25	25	25	25	25	50	25	25	25	25	25	25
UHC lb/hr	4.240	2.120	2.050	1.980	1.860	1.730	1.590	5.120	2.560	2.480	2.380	2.230	2.070	1.890	5.840	2.920	2.880	2.840	2.670	2.480	2.270
VOC ppm@ 15% O_2 (20% of UHC)	10	5	5	5	5	5	5	10	5	5	5	5	5	5	10	5	5	5	5	5	5
VOC lb/hr	0.848	0.424	0.410	0.396	0.372	0.346	0.318	1.024	0.512	0.496	0.476	0.446	0.414	0.378	1.168	0.584	0.576	0.568	0.534	0.496	0.454
sulfur gr/100 scf	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SO2 lb/hr	0.352	0.352	0.341	0.329	0.310	0.291	0.270	0.426	0.426	0.412	0.397	0.373	0.348	0.322	0.484	0.484	0.478	0.472	0.446	0.417	0.386
SO2 g/s	0.044	0.044	0.043	0.042	0.039	0.037	0.034	0.054	0.054	0.052	0.050	0.047	0.044	0.041	0.061	0.061	0.060	0.059	0.056	0.053	0.049
Particulates lb/MMBtu	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
$PM_{10/2.5}$ lb/hr	1.01	1.01	0.98	0.95	0.89	0.84	0.78	1.23	1.23	1.19	1.14	1.07	1.00	0.93	1.40	1.40	1.38	1.36	1.28	1.20	1.11
$PM_{10/2.5}$ g/s	0.128	0.128	0.124	0.120	0.113	0.106	0.098	0.155	0.155	0.149	0.144	0.135	0.126	0.117	0.176	0.176	0.174	0.171	0.162	0.151	0.140
CO2 lb/mmBtu	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
CO_2 lb/hr	7,904	7,904	7,651	7,398	6,969	6,531	6,074	9,566	9,566	9,246	8,921	8,373	7,817	7,229	10,874	10,874	10,733	10,597	10,010	9,368	8,666
CH_4 lb/mmBtu	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022
CH_4 lb/hr	0.1491	0.1491	0.1443	0.1395	0.1314	0.1232	0.1146	0.1804	0.1804	0.1744	0.1683	0.1579	0.1474	0.1363	0.2051	0.2051	0.2024	0.1999	0.1888	0.1767	0.1634
N_2O lb/mmBtu	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
N_2O lb/hr	0.0149	0.0149	0.0144	0.0140	0.0131	0.0123	0.0115	0.0180	0.0180	0.0174	0.0168	0.0158	0.0147	0.0136	0.0205	0.0205	0.0202	0.0200	0.0189	0.0177	0.0163
CO_2e lb/mmBtu	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0
CO_2e lb/hr	7,912	7,912	7,659	7,406	6,976	6,537	6,080	9,576	9,576	9,255	8,930	8,382	7,825	7,236	10,885	10,885	10,745	10,608	10,021	9,378	8,675

Notes

1. Data provided by Solar for 100%, 75%, and 50% load cases: net output power, fuel flow (MMBtu/hr, LHV), exhaust flow (lb/hr), exhaust temperature, NOx/CO/UHC concentrations and lb/hr.
2. Below zero and low load operation uses 0°F for operating parameters and uses concentrations from Solar PIL 167. Data for Particulate Matter based upon Solar PIL 171.
3. Greenhouse gases are calculated using emission factors from Part 98, Tables C-1 and C-2 and global warming potentials from Table A-1 (CO_2 = 1, CH_4 = 25, N_2O = 298).
4. VOC as 20% of UHC based on Solar PIL 168 for natural gas.

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Table B-3. Solar Taurus 70 Potential to Emit

Operations	**Normal Ambient Temperatures (>0 degrees F)**		**Startup**		**Shutdown**		**Potential to Emit Including Startup/Shutdown during Normal Temperature Operation**	**Low Ambient Temperatures (<0 degrees F)**		**Maximum Yearly Potential to Emit (Includes Startup, Shutdown, and Low Temperature Operation)**
Maximum Annual Combined Event Frequency	8,760 hrs/yr		52 Events/Yr (10 Minute Event Duration)		52 Events/Year (10 Minute Event Duration)		8,760 hrs/yr	24 hrs/yr		8,760 hrs/yr
Pollutant	Hourly (lb/hr)	Maximum Annual (tpy)	Event (lb/event)	Maximum Annual (tpy)	Event (lb/event)	Maximum Annual (tpy)	Maximum Annual (tpy)	Hourly (lb/hr)	Maximum Annual (tpy)	Maximum Annual (tpy)
NO_X	4.88	21.37	1.00	0.03	1.00	0.03	21.38	40.16	0.48	21.81
CO	4.95	21.68	88.00	2.29	62.00	1.61	25.54	30.54	0.37	25.85
SO2	0.47	2.07	0	0	0	0	2.07	0.48	0.01	2.07
PM10/2.5	1.36	5.96	0	0	0	0	5.96	1.40	0.02	5.96
CO2e	10,608	46,462	0	0	0	0	46,462	10,885	131	46,466
CO2	10,597	46,414	0	0	0	0	46,414	10,874	130	46,418
N2O	0.02	0.09	0	0	0	0	0.09	0.02	0.000	0.09
TOC (Total)	2.84	12.44	88.00	2.29	40.00	1.04	15.74	5.84	0.07	15.78
CH4	0.20	0.88	0	0	0	0	0.88	0.21	0.00	0.88
VOC (Total)	0.57	2.49	17.60	0.46	8.00	0.21	3.15	1.17	0.01	3.16

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Table B-4. Solar Mars 100 Specifications

Fuel	Natural Gas																				
Load	50	50	50	50	50	50	50	75	75	75	75	75	75	75	100	100	100	100	100	100	100
Hp Output (Net)	8,562	8,562	8,300	7,959	7,521	6,986	6,393	12,842	12,842	12,450	11,939	11,282	10,480	9,589	17,123	17,123	16,600	15,918	15,042	13,973	12,786
Ambient Temperature (F)	below 0	0	20	40	60	80	100	below 0	0	20	40	60	80	100	below 0	0	20	40	60	80	100
% RH	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Elevation ft	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660
Fuel LHV (Btu/scf)	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20	989.20
Heat Inpu LHV (MMBtu/hr) by volume	71.43	71.43	90.64	86.81	82.93	78.41	74.07	112.88	112.88	108.69	104.25	99.18	93.60	87.86	126.60	126.60	122.73	118.30	113.23	107.44	101.48
Heat Input HHV (MMBtu/hr) (=LHV*1.1125)	79.47	79.47	100.84	96.58	92.26	87.23	82.40	125.58	125.58	120.92	115.98	110.34	104.13	97.74	140.84	140.84	136.54	131.61	125.97	119.53	112.90
Exhaust lb/hr	291,037	291,037	297,633	282,272	267,923	251,220	234,805	346,736	346,736	333,007	318,188	301,449	283,287	264,650	358,083	358,083	349,335	338,647	325,252	309,604	291,077
Exhaust ACFM	137,829	137,829	171,716	166,278	161,598	155,290	148,483	196,724	196,724	190,989	184,855	177,567	169,887	162,347	202,398	202,398	199,459	195,584	190,475	184,076	176,179
Stack Height (ft)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Stack Height (m)	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24	15.24
Stack Equiv Diameter (ft)	7.00		7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Stack Exhaust Velocity (m/s)	18.19	#VALUE!	22.67	21.95	21.33	20.50	19.60	25.97	25.97	25.21	24.40	23.44	22.43	21.43	26.72	26.72	26.33	25.82	25.14	24.30	23.26
Exhaust Temperature (F)	651	651	893	920	951	981	1010	871	871	885	901	918	938	966	866	866	879	893	910	926	947
Exhaust Temperature (K)	617.0	617.0	751.5	766.5	783.7	800.4	816.5	739.3	739.3	747.0	755.9	765.4	776.5	792.0	736.5	736.5	743.7	751.5	760.9	769.8	781.5
NOx ppm@ 15% O_2	120	15	15	15	15	15	15	120	15	15	15	15	15	15	120	15	15	15	15	15	15
NOx lb/hr	34.160	4.270	5.430	5.190	4.940	4.640	4.330	54.160	6.770	6.510	6.240	5.910	5.540	5.140	60.800	7.600	7.360	7.080	6.750	6.370	5.940
NOx g/s	4.304	0.538	0.684	0.654	0.622	0.585	0.546	6.824	0.853	0.820	0.786	0.745	0.698	0.648	7.661	0.958	0.927	0.892	0.851	0.803	0.748
CO ppm@ 15% O_2	150	25	25	25	25	25	25	150	25	25	25	25	25	25	150	25	25	25	25	25	25
CO lb/hr	25.980	4.330	5.510	5.270	5.010	4.710	4.400	41.220	6.870	6.610	6.330	6.000	5.620	5.220	46.260	7.710	7.470	7.180	6.850	6.460	6.030
CO g/s	3.273	0.546	0.694	0.664	0.631	0.593	0.554	5.194	0.866	0.833	0.798	0.756	0.708	0.658	5.829	0.971	0.941	0.905	0.863	0.814	0.760
UHC ppm@ 15% O_2	50	25	25	25	25	25	25	50	25	25	25	25	25	25	50	25	25	25	25	25	25
UHC lb/hr	4.960	2.480	3.150	3.020	2.870	2.700	2.520	7.860	3.930	3.790	3.620	3.440	3.220	2.990	8.840	4.420	4.280	4.120	3.920	3.700	3.450
VOC ppm@ 15% O_2 (20% of UHC)	10	5	5	5	5	5	5	10	5	5	5	5	5	5	10	5	5	5	5	5	5
VOC lb/hr	0.992	0.496	0.630	0.604	0.574	0.540	0.504	1.572	0.786	0.758	0.724	0.688	0.644	0.598	1.768	0.884	0.856	0.824	0.784	0.740	0.690
sulfur gr/100 scf	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SO2 lb/hr	0.414	0.414	0.525	0.503	0.480	0.454	0.429	0.654	0.654	0.629	0.604	0.574	0.542	0.509	0.733	0.733	0.711	0.685	0.656	0.622	0.588
SO2 g/s	0.052	0.052	0.066	0.063	0.060	0.057	0.054	0.082	0.082	0.079	0.076	0.072	0.068	0.064	0.092	0.092	0.090	0.086	0.083	0.078	0.074
Particulates lb/MMBtu	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
$PM_{10/2.5}$ lb/hr	1.19	1.19	1.51	1.45	1.38	1.31	1.24	1.88	1.88	1.81	1.74	1.66	1.56	1.47	2.11	2.11	2.05	1.97	1.89	1.79	1.69
$PM_{10/2.5}$ g/s	0.150	0.150	0.191	0.183	0.174	0.165	0.156	0.237	0.237	0.229	0.219	0.209	0.197	0.185	0.266	0.266	0.258	0.249	0.238	0.226	0.213
CO2 lb/mmBtu	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
CO_2 lb/hr	9,289	9,289	11,787	11,289	10,784	10,196	9,632	14,679	14,679	14,134	13,557	12,897	12,172	11,425	16,463	16,463	15,960	15,384	14,724	13,971	13,196
CH_4 lb/mmBtu	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022
CH_4 lb/hr	0.1752	0.1752	0.2223	0.2129	0.2034	0.1923	0.1817	0.2769	0.2769	0.2666	0.2557	0.2433	0.2296	0.2155	0.3105	0.3105	0.3010	0.2901	0.2777	0.2635	0.2489
N_2O lb/mmBtu	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
N_2O lb/hr	0.0175	0.0175	0.0222	0.0213	0.0203	0.0192	0.0182	0.0277	0.0277	0.0267	0.0256	0.0243	0.0230	0.0215	0.0311	0.0311	0.0301	0.0290	0.0278	0.0264	0.0249
CO_2e lb/mmBtu	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0
CO_2e lb/hr	9,298	9,298	11,799	11,300	10,795	10,207	9,642	14,694	14,694	14,149	13,571	12,911	12,184	11,437	16,480	16,480	15,976	15,400	14,740	13,986	13,210

Notes

1. Data provided by Solar for 100%, 75%, and 50% load cases: net output power, fuel flow (MMBtu/hr, LHV), exhaust flow (lb/hr), exhaust temperature, NOx/CO/UHC concentrations and lb/hr.
2. Below zero and low load operation uses 0°F for operating parameters and uses concentrations from Solar PIL 167. Data for Particulate Matter based upon Solar PIL 171.
3. Greenhouse gases are calculated using emission factors from Part 98, Tables C-1 and C-2 and global warming potentials from Table A-1 (CO_2 = 1, CH_4 = 25, N_2O = 298).
4. VOC as 20% of UHC based on Solar PIL 168 for natural gas.

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Table B-5. Solar Mars 100 Potential to Emit

Operations	**Normal Ambient Temperatures (>0 degrees F)**		**Startup**		**Shutdown**		**Potential to Emit Including Startup/Shutdown during Normal Temperature Operation**	**Low Ambient Temperatures (<0 degrees F)**		**Maximum Yearly Potential to Emit (Includes Startup, Shutdown, and Low Temperature Operation)**
Maximum Annual Combined Event Frequency	8,760 hrs/yr		52 Events/Yr (10 Minute Event Duration)		52 Events/Year (10 Minute Event Duration)		8,760 hrs/yr	24 hrs/yr		8,760 hrs/yr
Pollutant	Hourly (lb/hr)	Maximum Annual (tpy)	Event (lb/event)	Maximum Annual (tpy)	Event (lb/event)	Maximum Annual (tpy)	Maximum Annual (tpy)	Hourly (lb/hr)	Maximum Annual (tpy)	Maximum Annual (tpy)
NO_X	7.08	31.01	1.00	0.03	1.00	0.03	31.01	60.80	0.73	31.66
CO	7.18	31.45	46.00	1.20	82.00	2.13	34.71	46.26	0.56	35.18
SO2	0.68	3.00	0	0	0	0	3.00	0.73	0.01	3.00
PM10/2.5	1.97	8.65	0	0	0	0	8.65	2.11	0.03	8.65
CO2e	15,400	67,450	0	0	0	0	67,450	16,480	198	67,463
CO_2	15,384	67,380	0	0	0	0	67,380	16,463	198	67,393
N2O	0.03	0.13	0	0	0	0	0.13	0.03	0.000	0.13
TOC (Total)	4.12	18.05	20.00	0.52	26.00	0.68	19.21	8.84	0.11	19.26
CH_4	0.29	1.27	0	0	0	0	1.27	0.31	0.00	1.27
VOC (Total)	0.82	3.61	4.00	0.10	5.20	0.14	3.84	1.77	0.02	3.85

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Table B-6. Capstone Microturbine Potential Emissions Summary (C200)

Engine parameters

Power output base load	268.2	hp
Power output base load	200	kW
Heat Input Capacity (HHV)	2.28	MMBtu/hr
Maximum Annual Operation	8760	hr/yr
Number of Units	5	Units

	Potential Emissions			
Pollutant	**g/bhp-hr[1]**	**lb/MMBtu[2]**	**lb/hr**	**Total Annual (ton/yr)[3]**
NO_x	0.14		0.08	1.81
CO	0.37		0.22	4.79
VOC	0.03		0.02	0.44
PM10/2.5		0.0066	0.02	0.330
SO2		0.0034	0.008	0.1698
CO2e		117.10	266.990	5847.07
CO2		116.9800	266.714	5841.05
CH4		0.0022	0.005	0.11
N2O		0.0002	0.001	0.011

Notes:

[1] NOx, CO, VOC based on vendor data.

[2] Emissions for PM10/PM2.5 and SO2 calculated using AP-42 emission factors (Table 3.1-2a). Emission for GHGs based upon 40 CFR Part 98, Subpart C.

[3] Represents 5 x Capstone C200 Microturbines, each limited to 8,760 hours / year.

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Table B-7. Gas-Fired Heater Potential Emissions Summary

Heater parameters

Heat Input Capacity (HHV)	0.77	MMBtu/hr
Fuel Firing Rate	700	SCF/hr
Maximum Annual Operation	8,760	hr/yr

	Potential Emissions		
Pollutant	**lb/mmscf**	**lb/hr**	**Total Annual (ton/yr)**
NO_x	100	0.07	0.31
CO	84	0.06	0.26
VOC	5.5	0.004	0.017
PM/PM-10/PM-2.5	7.6	0.005	0.023
SO_2 [2]	5.71	0.0040	0.018
CO2e	128,868	90.17	394.93
CO2	128,735	90.07	394.53
CH4	2.42	0.0017	0.01
N2O	0.24	0.00017	0.0007

[1] NO_x, CO, VOC and PM emissions are based upon AP-42 Emission Factors

[2] Emissions of SO_2 from based on mass balance of sulfur in fuel:

Sulfur Content	2.0	grains/100 SCF
Higher Heating Value	1,100	Btu/SCF
Molecular Weight of S =	32	lb/lbmol
Molecular Weight of SO_2 =	64	lb/lbmol

[3] GHG Emissions are based upon 40 CFR Part 98, Subpart C

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Table B-8. Fugitive Blowdowns Potential Emissions Summary

Natural Gas Specifications

Constituent	Mol Percent	Molecular Weight	Lb/Lb-Mol NG	Mass Percent	VOC
CO_2	0.165	44.01	0.073	0.41%	No
Nitrogen	0.396	28.01	0.111	0.62%	No
Methane	87.823	16.04	14.089	79.08%	No
Ethane	11.303	30.07	3.399	19.08%	No
Propane	0.28	44.10	0.123	0.69%	Yes
i-Butane	0.009	58.12	0.005	0.03%	Yes
i-Pentane	0.003	72.15	0.002	0.01%	Yes
N-Pentane	0.003	72.15	0.002	0.01%	Yes
N-Hexane	0.008	86.18	0.007	0.04%	Yes
N-Butane	0.01	58.12	0.006	0.03%	Yes

Notes: Based upon representative gas analyses for Project.

Natural Gas Properties	
Molecular Weight	17.817
Specific Gravity	0.615
lb/Scf	0.047
Scf/lb	21.26

Parameter	Blowdown Events							
	Taurus 70 Shutdown	Mars 100 Shutdown	Pig Receiver	Pig Launcher	Suction Filter	Station Discharge	Miscellaneous Filters	Emergency Station Shutdown (ESD)[1]
Gas Blowdown (scf/event)	42,000	64,000	6,500	13,000	19,000	67,000	3,500	218,000
Blowdowns per Year	12	12	2	2	12	12	12	1
VOC Emissions (lb/event)	16.2	24.6	2.5	5.0	7.3	25.8	1.3	83.9
CO_2 Emissions (lb/event)	8.1	12.3	1.25	2.49	3.6	12.8	0.7	41.8
CH_4 Emissions (lb/event)	1,562.0	2,380.2	241.7	483.5	706.6	2,491.8	130.2	8,107.5
CO_2e Emissions (lb/event)	39,058.1	59,517.1	6,044.7	12,089.4	17,669.1	62,306.9	3,254.8	202,730.0
HAP Emissions (lb/event)	0.8	1.2	0.1	0.2	0.3	1.2	0.1	4.0
VOC Emissions (tpy)	0.0969	0.1477	0.0025	0.0050	0.0439	0.1546	0.0081	0.0419
CO_2 Emissions (tpy)	0.0483	0.0736	0.0012	0.0025	0.0219	0.0771	0.0040	0.0209
CH_4 Emissions (tpy)	9.4	14.3	0.24	0.48	4.2	15.0	0.8	4.1
CO_2e Emissions (tpy)	234.3	357.1	6.0	12.1	106.0	373.8	19.5	101.4
HAP Emissions (tpy)	0.005	0.007	0.00012	0.00024	0.002	0.007	0.0004	0.002

Note: Facility-wide blowdown events may occur for unplanned reasons (e.g. when an unsafe operating condition is detected). To prepare for such events, Mountain Valley Pipeline, LLC must perform ESD testing once every 5 years to ensure proper operation of the ESD system. A full station blowdown will only occur during emegency conditions. Emergency events are expected to be very infrequent and cannot be predicted. Accordingly, emergency station shutdown events are provided for informational purposes only.

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Table B-9. Produced Fluids Tank Potential Emissions Summary

Storage Tank Design Data

Capacity (gal)	10,080
Liquids Input Rate (gal/yr)	126,000
Daily Input Rate (bbl/day)	8
Percent Condensate (%)	1
Condensate Throughput (bbl/day)	0.1
Number of Tanks	2
Max. Hours of Operation	8760

Pollutant	Single Tank Total Emissions (Working + Breathing + Flashing)		
	lbs/hr	lbs/year	tons/year
VOC (Total)	0.049	429.2	0.21
CO2e	0.475	4161.0	2.08

Notes: Source - E&P Tanks 2.0

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Table B-10. Potential Fugitive Emissions Summary

Component	CH_4 Emission Factor[1,2]	CO_2 Emission Factor[1,2]	Units
Compressor Station Fugitives	135,260.0	7,813.1	lb/station-yr
Centrifugal Compressor Fugitives	467,660.0	27,013.7	lb/compressor-yr

[1]Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage, Volume 1 - GHG Emission Estimation Methodologies and Procedures, Interstate Natural Gas Association of America (INGAA), September 28, 2005. See Table 4.4.

[2]Based on 93.4 vol% CH_4 and 2 vol% CO_2 in natural gas, per INGAA Guideline

Natural Gas Specifications

Constituent	Mol Percent	Molecular Weight	Lb/Lb-Mol NG	Mass Percent	VOC
CO2	0.165	44.01	0.073	0.41%	No
Nitrogen	0.396	28.01	0.111	0.62%	No
Methane	87.823	16.04	14.089	79.08%	No
Ethane	11.303	30.07	3.399	19.08%	No
Propane	0.28	44.10	0.123	0.69%	Yes
i-Butane	0.009	58.12	0.005	0.03%	Yes
i-Pentane	0.003	72.15	0.002	0.01%	Yes
N-Pentane	0.003	72.15	0.002	0.01%	Yes
N-Hexane	0.008	86.18	0.007	0.04%	Yes
N-Butane	0.01	58.12	0.006	0.03%	Yes

Natural Gas Properties	
Molecular Weight	17.817
Specific Gravity	0.615
lb/Scf	0.047
Scf/lb	21.26

Fugitive Componont Leak Emissions

Component Type	Estimated Component Count	Gas Leak Emission Factor		Hourly Average Gas Leak Rate	Annual Gas Leak Rate		Potential VOC Emissions	Potential HAP Emissions	CO_2 Emissions	CH_4 Emissions	CO_2e Emissions
		(scf/hr/component)	Factor Source	(scf/hr)	(scf/year)	lb/year	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
Connectors	1000	0.003	40 CFR 98, Table W-1A	3.00	26,280	1,236	0.01	0.0002	0.003	0.49	12.22
Flanges	500	0.003	40 CFR 98, Table W-1A	1.50	13,140	618	0.00	0.0001	0.001	0.24	6.11
Open-Ended	0	0.061	40 CFR 98, Table W-1A	0	0	0	0	0	0	0	0
Pump Seals	0	13.300	40 CFR 98, Table W-1A	0	0	0	0	0	0	0	0
Valves	100	0.027	40 CFR 98, Table W-1A	2.70	23,652	1,112	0.00	0.0002	0.002	0.44	11.00
Other	0	0.040	40 CFR 98, Table W-1A	0	0	0	0	0	0	0	0

Notes:
1. "Other" equipment types include compressor seals, relief valves, diaphragms, drains, meters, etc
2. The component count is a preliminary estimate based on the proposed design of the station
3. VOC, HAP, CO_2, and CH_4 emissions are based on fractions of these pollutants in the site-specific gas analysis
4. CO_2e calculated using global warming potentials from Part 98, Table A-1 (CO_2 = 1, CH_4 = 25)

Dry Seal Emissions

Number of Compressors	Leak Rate (scf/hr/compressor)	Annual Natural Gas Released (scf/yr)	Annual Natural Gas Released (lb/yr)	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)	CO_2 Emissions (tpy)	CH_4 Emissions (tpy)	CO_2e Emissions (tpy)
2	210	3,679,200	173,037	0.71	0.03	0.35	68.4	1,710.7

Notes:
1. Leak rate and seal information from EPA Natural Gas Star Program (https://www.epa.gov/sites/production/files/2016-06/documents/ll_wetseals.pdf)
2. VOC, HAP, CO_2, and CH_4 emissions are based on fractions of these pollutants in the site-specific gas analysis
3. CO_2e calculated using global warming potentials from Part 98, Table A-1 (CO_2 = 1, CH_4 = 25)

Fugitive Emissions Summary

Segment	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)	CO_2 Emissions (tpy)	CH_4 Emissions (tpy)	CO_2e Emissions (tpy)
Compressor Station Fugitives	0.01	0.001	0.01	1.2	29.3
Dry Seal Emissions	0.71	0.03	0.35	68.4	1,710.7
Total	0.72	0.03	0.36	69.6	1,740.1

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Lambert Compressor Station

Table B-11. Proposed Project Potential HAP Emissions Summary

	Solar Taurus 70			Solar Mars 100			Fuel Gas Heater			Capstone Microturbines			
Hazardous Air Pollutants (HAPs)	**Emission Factor Basis[1] lb/MMBtu**	**Max Hourly lb/hr**	**Annual Potential tons/year**	**Emission Factor Basis[1] lb/MMBtu**	**Max Hourly lb/hr**	**Annual Potential tons/year**	**Emission Factor Basis[2] lb/MMBtu**	**Max Hourly lb/hr**	**Annual Potential tons/year**	**EF Basis[3] lb/MMBtu**	**Max Hourly lb/hr**	**Annual Potential tons/year**	**Facility PTE tons/yr**
VOC-HAP													
Acetaldehyde	1.20E-04	1.12E-02	4.89E-02	1.20E-04	1.69E-02	7.40E-02				1.68E-04	3.82E-04	8.37E-03	1.31E-01
Acrolein	1.92E-05	1.79E-03	7.82E-03	1.92E-05	2.70E-03	1.18E-02				2.68E-05	6.11E-05	1.34E-03	2.10E-02
Benzene	3.60E-05	3.35E-03	1.47E-02	3.60E-05	5.07E-03	2.22E-02	2.06E-06	1.59E-06	6.94E-06	5.03E-05	1.15E-04	2.51E-03	3.94E-02
1,3-Butadiene	1.29E-06	1.20E-04	5.26E-04	1.29E-06	1.82E-04	7.96E-04				1.80E-06	4.11E-06	9.00E-05	1.41E-03
Dichlorobenzene							1.18E-06	9.06E-07	3.97E-06				3.97E-06
Ethylbenzene	9.60E-05	8.93E-03	3.91E-02	9.60E-05	1.35E-02	5.92E-02				1.34E-04	3.06E-04	6.70E-03	1.05E-01
Formaldehyde	2.13E-03	1.98E-01	8.68E-01	2.13E-03	3.00E-01	1.31E+00	7.35E-05	5.66E-05	2.48E-04	2.98E-03	6.78E-03	1.49E-01	2.33E+00
Hexane							1.76E-03	1.36E-03	5.95E-03				5.95E-03
Naphthalene	3.90E-06	3.63E-04	1.59E-03	3.90E-06	5.49E-04	2.41E-03	5.98E-07	4.60E-07	2.02E-06	5.45E-06	1.24E-05	2.72E-04	4.27E-03
PAH	6.60E-06	6.14E-04	2.69E-03	6.60E-06	9.30E-04	4.07E-03				9.22E-06	2.10E-05	4.60E-04	7.22E-03
Propylene Oxide	8.70E-05	8.09E-03	3.54E-02	8.70E-05	1.23E-02	5.37E-02				1.22E-04	2.77E-04	6.07E-03	9.52E-02
Toluene	3.90E-04	3.63E-02	1.59E-01	3.90E-04	5.49E-02	2.41E-01	3.33E-06	2.57E-06	1.12E-05	5.45E-04	1.24E-03	2.72E-02	4.27E-01
Xylenes	1.92E-04	1.79E-02	7.82E-02	1.92E-04	2.70E-02	1.18E-01				2.68E-04	6.11E-04	1.34E-02	2.10E-01
Polycyclic Organic Compounds (POM)													
Acenaphthene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Acenaphthylene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Anthracene	2.35E-09	2.19E-07	9.59E-07	2.35E-09	3.31E-07	1.45E-06	2.35E-09	1.81E-09	7.94E-09	2.35E-09	5.36E-09	1.17E-07	2.54E-06
Benz(a)anthracene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Benzo(a)pyrene	1.18E-09	1.09E-07	4.79E-07	1.18E-09	1.66E-07	7.26E-07	1.18E-09	9.06E-10	3.97E-09	1.18E-09	2.68E-09	5.87E-08	1.27E-06
Benzo(b)fluoranthene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Benzo(g,h,i)perylene	1.18E-09	1.09E-07	4.79E-07	1.18E-09	1.66E-07	7.26E-07	1.18E-09	9.06E-10	3.97E-09	1.18E-09	2.68E-09	5.87E-08	1.27E-06
Benzo(k)fluoranthene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Chrysene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Dibenzo(a,h)anthracene	1.18E-09	1.09E-07	4.79E-07	1.18E-09	1.66E-07	7.26E-07	1.18E-09	9.06E-10	3.97E-09	1.18E-09	2.68E-09	5.87E-08	1.27E-06
7,12-Dimethylbenz(a)anthracene	1.57E-08	1.46E-06	6.39E-06	1.57E-08	2.21E-06	9.68E-06	1.57E-08	1.21E-08	5.29E-08	1.57E-08	3.58E-08	7.83E-07	1.69E-05
Fluoranthene	2.94E-09	2.74E-07	1.20E-06	2.94E-09	4.14E-07	1.81E-06	2.94E-09	2.26E-09	9.92E-09	2.94E-09	6.71E-09	1.47E-07	3.17E-06
Fluorene	2.75E-09	2.55E-07	1.12E-06	2.75E-09	3.87E-07	1.69E-06	2.75E-09	2.11E-09	9.26E-09	2.75E-09	6.26E-09	1.37E-07	2.96E-06
3-Methylchloranthrene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
2-Methylnaphthalene	2.35E-08	2.19E-06	9.59E-06	2.35E-08	3.31E-06	1.45E-05	2.35E-08	1.81E-08	7.94E-08	2.35E-08	5.36E-08	1.17E-06	2.54E-05
Indeno(1,2,3-cd)pyrene	1.76E-09	1.64E-07	7.19E-07	1.76E-09	2.49E-07	1.09E-06	1.76E-09	1.36E-09	5.95E-09	1.76E-09	4.02E-09	8.81E-08	1.90E-06
Phenanthrene	1.67E-08	1.55E-06	6.79E-06	1.67E-08	2.35E-06	1.03E-05	1.67E-08	1.28E-08	5.62E-08	1.67E-08	3.80E-08	8.32E-07	1.80E-05
Pyrene	4.90E-09	4.56E-07	2.00E-06	4.90E-09	6.90E-07	3.02E-06	4.90E-09	3.77E-09	1.65E-08	4.90E-09	1.12E-08	2.45E-07	5.28E-06
Total POM	8.65E-08	8.04E-06	3.52E-05	8.65E-08	1.22E-05	5.33E-05	8.65E-08	6.66E-08	2.92E-07	8.65E-08	1.97E-07	4.32E-06	9.32E-05
Total HAPs													
												Maximum Individual HAP:	**2.3**
												Total Project HAPs:	**3.4**

[1] Emissions based on AP-42 5th Edition, Section 3.1. Emissions based on scaling of AP-42 values using Vendor Guarantee for TOC.

[2] Emissions based on AP-42 5th Edition, Section 1.4.

[3] Emissions based on AP-42 5th Edition, Section 3.1.

MVP Southgate Project
Table B-12: Maintenance Blowdown and Fugitive Emissions - Operational Emissions

			Ongoing Operation				
Component	**County**	**Length (miles)**	**Total VOC[1] (lbs)**	**Total VOC (tons)**	**Total CO2 (tons)**	**Methane (tons)**	**Total CO2e (tons)**
Pipeline[3]							
	Pittsylvania, VA	26.5	1,226	0.61	0.122	24.5	611.9
	Rockingham, NC	26.5	1,224	0.61	0.121	24.4	611.0
Mainline	Alamance, NC	20.5	947	0.47	0.094	18.9	472.7
M&R Stations[4]							
Lambert Interconnect	Pittsylvania, VA	NA	1,329	0.665	0.123	26.52	663.2
LN 3600 Interconnect	Rockingham, NC	NA	1,329	0.665	0.123	26.52	663.2
T-15 Dan River Interconnect	Rockingham, NC	NA	1,329	0.665	0.123	26.52	663.2
T-21 Haw River Interconnect	Alamance, NC	NA	1,329	0.665	0.123	26.52	663.2

Notes:
1. Based upon VOC, CO2, and methane contents of 0.82%, 0.165%, and 98.15%, respectively, based upon the expected natural gas composition.
2. The global warming potential of CO2 and Methane is 1 and 25, respectively
3. Based upon the API Compendum Methodology provided below.
4. Estimates based on emission calculation techniques provided in AP-42, 40 CFR Part 98, U.S. EPA's Protocol for Equipment Leak Emissions Estimates (EPA 453/R-95-017) and design data for similar sites.

Summary by County

	Ongoing Operation	
County	**Total VOC**	**Total CO2e**
Pittsylvania, VA	1.28	1,275.1
Rockingham, NC	1.94	1,937.4
Alamance, NC	1.14	1,135.9

Basis - American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, August 2009 ("API Compendium")

	Fugitive	Blowdown
M&R	Table 6-6	Table 5-26 - Miscellaneous
Pipeline	Table 6-6	Table 5-26 - Pipeline

Fugitive

Table 6-6 Fugitive Emission factors for NG Transmission and Storage Equipment — EF- ton/mile-hr

Transmission Pipeline	1.32E-06	ton CH4/mile-hr	1.39E-06
Transmission Pipeline - CO2 from Oxidation	4.33E-07	ton CO2/mile-hr	3.57E-08
Transmission Pipeline - CO2 from Leaks	8.69E-08	ton CO2/mile-hr	7.17E-09
		tonVOC/mile-hr	3.48E-08
M&R Stations	1.44E-04	ton CH4/Station-hr	1.52E-04
		ton CO2/Station-hr	7.02E-07
		ton VOC/Station-hr	3.80E-06

Blowdown

Table 5-26 Transmission Segment CH4 Emission Factors for Non-Routine Activities — ton CH4/Station-yr

Miscellaneous Blowdown (M&R, Pigging, and etc)	23.9752425	ton CH4/Station-yr	25.194
		ton CO2/Station-yr	0.116
		ton VOC/Station-yr	0.631
Transmission Pipeline Venting/Blowdown	0.865864505	ton CH4/mile-yr	0.910
		ton CO2/mile-yr	0.004
		ton VOC/mile-yr	0.023

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 9

Appendix 9-C

Virginia State Air Permit Application

[To be provided in a supplemental filing.]

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 9

Appendix 9-D

Lambert Compressor Station Air Quality Modeling Report

Mountain Valley Pipeline, LLC
Lambert Compressor Station
Southgate Project
Air Quality Modeling Report

Prepared for:

Mountain Valley Pipeline, LLC

Prepared by:

TRC Environmental Corporation
1200 Wall Street West, 5th Floor
Lyndhurst, New Jersey 07071

November 2018

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1.0 INTRODUCTION

1.1 Project Overview

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity ("Certificate") from the Federal Energy Regulatory Commission ("FERC") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Project"). The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina. Mountain Valley proposes to construct approximately a 0.4-mile-long 24-inch-diameter pipeline (H-605) and 73 miles of 24- and 16-inch-diameter natural gas pipeline (H-650) to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States ("U.S."), including for the Project's anchor shipper, a local distribution company serving customers in North Carolina.

In addition to the proposed pipeline, Mountain Valley proposes to construct and operate a new compressor station (Lambert Compressor Station) near the beginning of the pipeline. As part of the Southgate Project and in order to boost pressures on Mountain Valley's transmission pipeline system, Mountain Valley is proposing to construct and operate one Solar Taurus 70 compressor turbine (11,792 hp) and one Solar Mars 100 compressor turbine (17,123 hp) at the Lambert Compressor Station. The Lambert Compressor Station (CS) will be a new natural gas transmission facility covered by Standard Industrial Classification (SIC) 4922. Ancillary project emission sources include five (5) Capstone microturbines rated at 200 kW each, one (1) 0.77 MMBtu/hr natural gas fired heater, and two (2) 10,000 gallon produced fluids tanks.

At the federal level, because the emission increases from the Lambert Compressor Station equipment are less than applicable major source thresholds, the Project will not trigger federal NSR requirements for any regulated air pollutant under either PSD or NNSR permitting programs. At the state level, the Project triggers air permitting through the VADEQ as a minor source of air emissions. If the agency considers that any project triggering minor NSR permitting could threaten attainment with the National Ambient Air Quality Standards (NAAQSs), VADEQ can require air dispersion modeling for the Project. A site wide modeling analysis for criteria pollutants has been performed to demonstrate that the Project will comply with the NAAQS. This report details the NAAQS and toxic air pollutant modeling assessments for the proposed Lambert Compressor Station.

2.0 PROJECT DESCRIPTION

2.1 Site Location and Surroundings

The proposed Lambert Compressor Station, as shown in Figure 2-1, is proposed to be located on an undeveloped parcel of land in a rural area near to Chatham, Virginia. The Lambert Compressor Station will be constructed at the beginning of the pipeline at milepost 0.0 in Pittsylvania County, Virginia on a parcel of land owned by Mountain Valley.

The approximate Universal Transverse Mercator (UTM) coordinates of the facility are: 647,900 meters east and 4,076,900 meters north in Zone 17 (North American Datum of 1983(NAD83)). A detailed plot plan of the proposed facility is shown in Figure 2-2.

2.2 Facility Conceptual Design

As a part of the Southgate Project, Mountain Valley is proposing to install the following equipment at the proposed Lambert Compressor Station:

- One Solar Taurus 70, 11,792 hp natural gas fired turbine-driven compressor unit;
- One Solar Mars 100, 17,123 hp natural gas fired turbine-driven compressor unit;
- Five (5) Capstone Microturbines each rated at 200 kW;
- One 0.77 MMBtu/hr heater; and
- Two 10,000 gallon produced fluids storage tanks.

Potential Project emissions include trivial station blowdowns consisting of two types of gas blowdown events that could occur at the Station: (1) a type of maintenance gas blowdown that could occur when a compressor is stopped and gas between the suction/discharge valves and compressors is vented to the atmosphere via a blowdown vent, and (2) an emergency full station shutdown (ESD) that would only occur infrequently at required U.S. Department of Transportation (DOT) test intervals or in an emergency situation.

The installation of the above equipment will include a number of piping components at the station which could result in additional fugitive emissions due to equipment leaks.

2.2.1 Compressor Turbines

The proposed Solar Taurus 70 and Mars 100 natural gas-fired turbines to be installed at the Lambert Compressor Station will be equipped with Solar's SoLoNOx dry low NOx

combustor technology for NOx control. Potential emissions for the Solar Turbines conservatively assume that the units will operate up to 8,760 hours per year and up to 100% rated output. The vendor provided emission rates for normal operating conditions are as follows (all emissions rates are in terms of parts per million dry volume (ppmvd) @ 15% O2):

- 15 ppmvd NOx;
- 25 ppmvd CO;
- 25 ppmvd unburned hydrocarbons (UHC); and
- 5 ppmvd VOC.

Depending upon demand, the turbines may operate at loads ranging from 50% to 100% of full capacity. Because of the different emission rates and exhaust characteristics that occur at different loads and ambient temperatures, a matrix of operating modes is presented. Emission parameters for three turbine loads (50%, 75%, and 100%) and six ambient temperatures (0°F, 20°F, 40°F, 60°F, 80 °F, and 100°F) are accounted for in this air modeling analysis to cover the range of steady-state turbine operations.

At very low load and cold temperature extremes, the turbine system must be controlled differently in order to assure stable operation. The required adjustments to the turbine controls at these conditions cause emissions of NOx, CO and VOC to increase (emission rates of other pollutants are unchanged). Low-load operation (non-normal SoLoNOx operation) of the turbines is expected to occur only during periods of startup and shutdown and for maintenance or unforeseen emergency events.

Similarly, Solar has provided emission estimates for low temperature operation (inlet combustion air temperature less than 0° F and greater than -20° F) in Solar PIL 167 (SoLoNOx Products: Emissions in Non-SoLoNOx Modes). Solar PIL 167 provides estimated pre-control emissions from the turbines at low temperature conditions.

- 120 ppmvd NOx;
- 150 ppmvd CO;
- 50 ppmvd unburned hydrocarbons (UHC); and
- 10 ppmvd VOC.

Mountain Valley reviewed historic meteorological data from the previous five years for the region to estimate the worst-case number of hours per year under sub-zero (less than 0° F) conditions. The annual hours of operation during sub-zero conditions was assumed to be not more than 24 hours per year.

2.2.2 Ancillary Equipment

Mountain Valley is proposing to install five (5) new natural gas fired Capstone C200 (200 kW) microturbines to provide electrical power to the Station. Emissions of NOx, CO, and VOC are based on vendor data. Emission rates for SO_2, particulates, and hazardous air pollutants (HAPs) are based on USEPA AP-42 emission factors (Table 3.1-2a). The emission rates are based on the microturbines operating at peak load.

2.3 Proposed Project Emission Potential

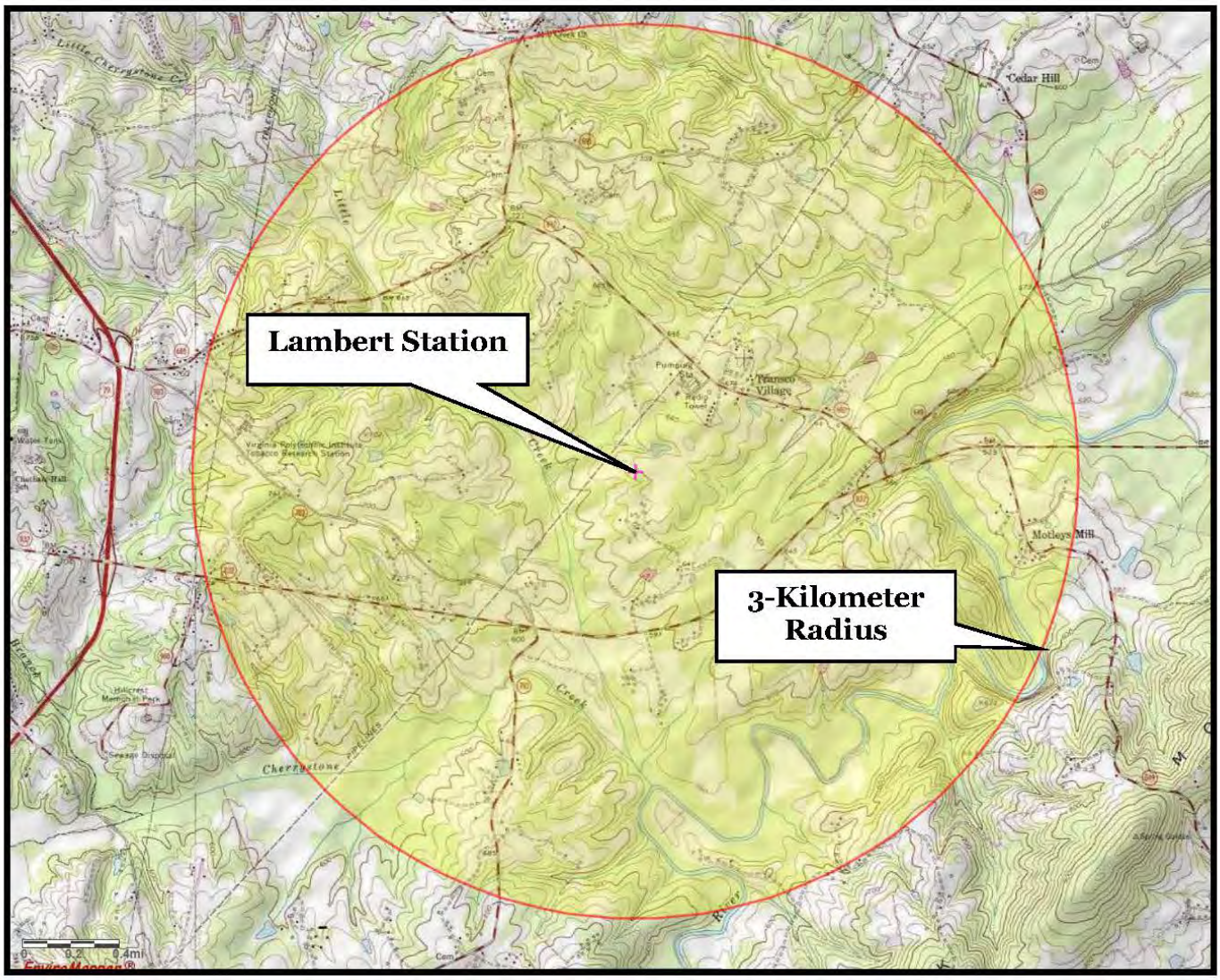
Table 2-1 presents project emission potentials from the new units to be installed as a part of the proposed Lambert Compressor Station.

Table 2-1: Proposed Facility Emissions (tons/year)

Pollutant	Solar Taurus 70 Turbine	Solar Mars 100 Turbine	Capstone Microturbines	Heater	Produced Fluids Tanks	Station Blowdowns	Station Fugitives	Proposed Project Total
NOx	21.81	31.66	1.81	0.31	-	-	-	55.58
VOC	3.16	3.85	0.44	0.02	0.43	0.46	0.72	9.07
CO	25.85	35.18	4.79	0.26	-	-	-	66.08
SO_2	2.07	3.00	0.17	0.018	-	-	-	5.25
$PM_{10}/PM_{2.5}$	5.96	8.65	0.33	0.02	-	-	-	14.96
CO_2e(1)	46,466	67,463	5,847	395	4.2	2,449	1,740	124,364
HAPs	1.26	1.90	0.21	0.01	-	0.05	0.03	3.46
Maximum Individual HAP(2)	0.87	1.31	0.15	0.00025	-	-	-	2.33

(1) Greenhouse gases calculated as CO_2e.

(2) The individual HAP with the highest total annual emission rate is formaldehyde.

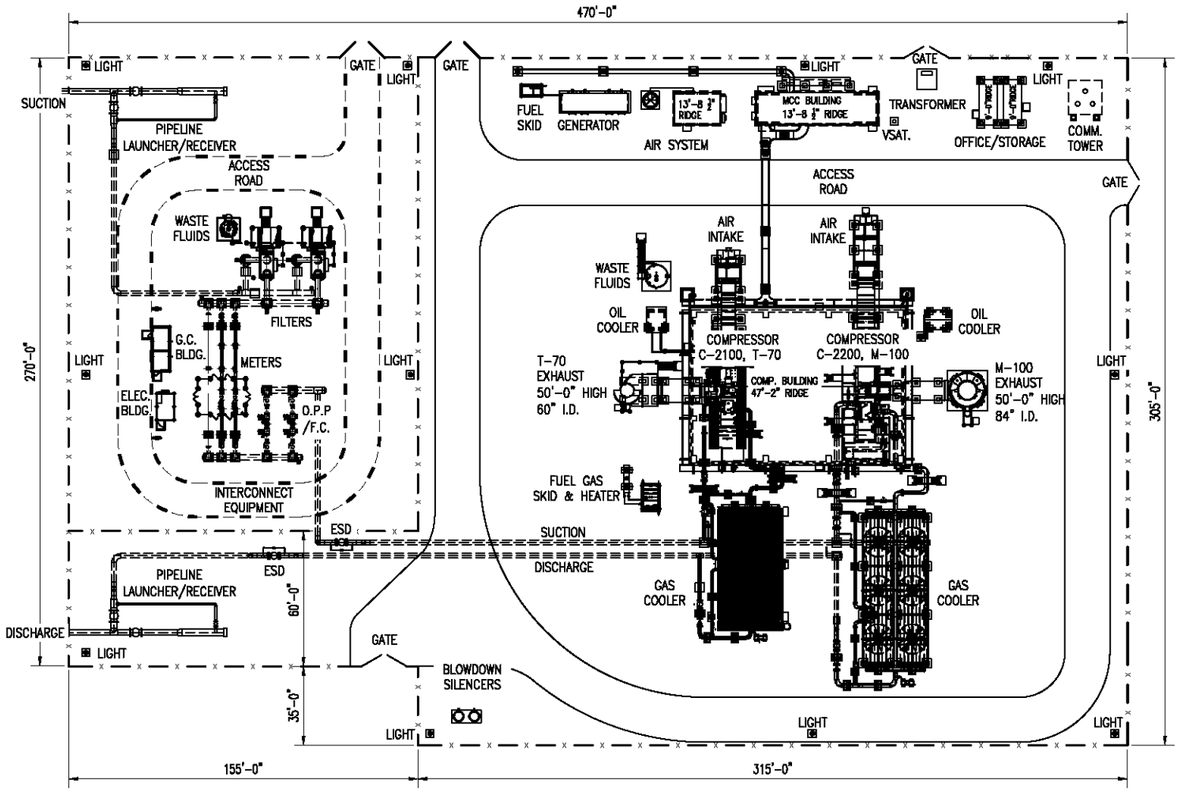


Mountain Valley Pipeline, LLC
Lambert Compressor Station
Pittsylvania County, Virginia

Figure 2-1. Site Location Map

Source: USGS, USEPA EJSCREEN

Figure 2-2: Facility Plot Plan



REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE	P	8-14-2018	PRELIMINARY	#	#	#	#	#	#	#	#	#
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TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

DOUG MACE — MECHANICAL DESIGN ENGINEER — 8-14-2018 — DATE

— ELECTRICAL DESIGN ENGINEER — # — DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

Mountain Valley PIPELINE, LLC

PROJECT ID: ######

DRAWING SCALE: 1/32" = 1'-0"

DRAWING TITLE:
LAMBERT COMPRESSOR STATION
MECHANICAL
PIPING
PLOT PLAN

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
C	V	LAM	1100	01	P

Plotted by: Mace, Doug on: October 10, 2018 - 2:49 PM

File Path: C:\Working\PROJECTS\SOUTHGATE\PLOT PLAN\Lambert CS 10-10-2018 DKM.DWG

3.0 AIR QUALITY MODELING ANALYSIS

3.1 Background Ambient Air Quality

Background ambient air quality data was obtained from various existing monitoring locations. Based on a review of the locations of Virginia and North Carolina ambient air quality monitoring sites, the closest representative monitoring sites were used to represent the current background air quality in the site area.

The monitoring data for the most recent three years (2015 – 2017) are presented and compared to the NAAQS in Table 3-1. The maximum measured concentrations for each of these pollutants during the last three years are all below applicable standards and are used as representative background values for comparison of facility concentrations to the NAAQS.

3.2 Modeling Methodology

An air quality modeling analysis was performed consistent with the procedures found in the following documents: Virginia Modeling Guideline for Air Quality Permits (VADEQ, 2015), Guideline on Air Quality Models (Revised) (USEPA, 2017), and New Source Review Workshop Manual (USEPA, 1990).

3.2.1 Model Selection

The USEPA has compiled a set of preferred and alternative computer models for the calculation of pollutant impacts. The selection of a model depends on the characteristics of the source, as well as the nature of the surrounding study area. Of the four classes of models available, the Gaussian type model is the most widely used technique for estimating the impacts of nonreactive pollutants.

The AERMOD model was designed for assessing pollutant concentrations from a wide variety of sources (point, area, and volume). AERMOD is currently recommended by the USEPA for modeling studies in rural or urban areas, flat or complex terrain, and transport distances less than 50 kilometers, with one hour to annual averaging times.

Table 3-1: Maximum Measured Ambient Air Quality Concentrations

Pollutant	Averaging Period	Monitoring Station	AQS Site ID	County	State	Approx. Distance from Facility (km)	Background Concentration	Primary NAAQS	Units a/
CO	1-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	1.1	35	ppm
CO	8-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	0.7	9	ppm
NO_2	1-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	33.3	100	ppb
NO_2	Annual	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	5.7	53	ppb
PM_{10}	24-hour	Mendenhall School	37-081-0013	Guilford	NC	90	35	150	ug/m^3
$PM_{2.5}$	24-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	15.7	35	ug/m^3
$PM_{2.5}$	Annual	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	7.0	12	ug/m^3
SO_2	1-hour	East Vinton Elementary School	51-161-1004	Roanoke	VA	69	4.0	75	ppb

a/ ppm = parts per million by volume. ppb = parts per billion by volume. µg/m3 = micrograms per cubic meter.

The latest version of USEPA's AERMOD model (Version 18081) was used in the analysis. AERMOD was applied with the regulatory default options and 5-years (2013-2017) of hourly meteorological data consisting of surface data observed at the Danville Regional Airport meteorological station (WBAN #13728) and upper air data collected from Greensboro, North Carolina upper air sounding station (WBAN #13723).

3.2.2 Urban/Rural Area Analysis

A land cover classification analysis was performed to determine whether the URBAN option in the AERMOD model should be used in quantifying ground-level concentrations. The methodology utilized to determine whether the project is located in an urban or rural area is described below.

The following classifications relate the colors on a United States Geological Survey (USGS) topographic quadrangle map to the land use type that they represent:

- Blue – water (rural);
- Green – wooded areas (rural);
- White – parks, unwooded, non-densely packed structures (rural);
- Purple – industrial; identified by large buildings, tanks, sewage disposal or filtration plants, rail yards, roadways, and, intersections (urban);
- Pink – densely packed structures (urban); and,
- Red – roadways and intersections (urban)

The USGS map covering the area within a 3-kilometer radius of the facility (Figure 2-1) was reviewed and indicated that the clear majority of the surrounding area is denoted as green or white, which represent wooded areas, parks, and non-densely packed structures (all designated as rural land uses). Although a small percent of the surrounding area is designated as urban land use, the "AERMOD Implementation Guide" published on August 3, 2015 cautions users against applying the Land Use Procedure on a source-by-source basis and instead to consider the potential for urban heat island influences across the full modeling domain. This approach is consistent with the fact that the urban heat island is not a localized effect, but is more regional in character.

Because the urban heat island is more of a regional effect, the Urban Source option in AERMOD was not utilized since the area within 3 kilometers of the facility as well as the full modeling domain (20 kilometers by 20 kilometers) is predominantly rural.

3.2.3 Good Engineering Practice Stack Height

Section 123 of the Clean Air Act (CAA) required the USEPA to promulgate regulations to assure that the degree of emission limitation for the control of any air pollutant under an applicable State Implementation Plan (SIP) was not affected by (1) stack heights that exceed Good Engineering Practice (GEP) or (2) any other dispersion technique. The USEPA provides specific guidance for determining GEP stack height and for determining whether building downwash will occur in the Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations), (USEPA, 1985). GEP is defined as "...the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes that may be created by the source itself, or nearby structures, or nearby terrain "obstacles"."

The GEP definition is based on the observed phenomenon of atmospheric flow in the immediate vicinity of a structure. It identifies the minimum stack height at which significant adverse aerodynamics (downwash) are avoided. The USEPA GEP stack height regulations (40 CFR 51.100) specify that the GEP stack height (H_{GEP}) be calculated in the following manner:

$$H_{GEP} = H_B + 1.5L$$

Where: H_B = the height of adjacent or nearby structures, and
L = the lesser dimension (height or projected width of the adjacent or nearby structures).

A detailed plot plan of the proposed facility is shown in Figure 2-2. A GEP stack height analysis was conducted using the USEPA approved Building Profile Input Program with PRIME (BPIPPRM, version 04274). The maximum calculated GEP stack height for the new emission sources is 117.9 feet; the controlling structure is the proposed compressor building (peak height of 47.17 feet). As such, all of the exhaust stacks are subject to downwash and the downwash parameters from the BPIP program were included in the AERMOD analysis.

While the proposed exhaust stacks are lower than the calculated GEP height, the modeling analysis demonstrates that the proposed exhaust stack heights will result in potential air quality impacts that are lower than the NAAQS and VADEQ's Significant Ambient Air Concentrations for toxic air pollutants.

3.2.4 Meteorological Data

If at least one year of hourly on-site meteorological data is not available, the application of the AERMOD dispersion model requires five years of hourly meteorological data that are representative of the project site. In addition to being representative, the data must meet quality and completeness requirements per USEPA guidelines. The closest source of representative hourly surface meteorological data is Danville Regional Airport located in Danville, VA, approximately 18 miles to the south of the Lambert Compressor Station.

The meteorological data at the Danville Regional Airport is recorded by an Automated Surface Observing System (ASOS) that records 1-minute measurements of wind direction and wind speed along with hourly surface observations necessary. The USEPA AERMINUTE program was used by the VADEQ to process 1-minute ASOS wind data (2013 – 2017) from the Danville Regional Airport surface station in order to generate hourly averaged wind speed and wind direction data to supplement the standard hourly ASOS observations. The hourly averaged wind speed and direction data generated by AERMINUTE was merged with the aforementioned hourly surface data.

The AERMOD assessment utilized five (5) years (2013–2017) of concurrent meteorological data collected from a meteorological tower at the Danville Regional Airport and from radiosondes launched from Greensboro, North Carolina. Both the surface and upper air sounding data were processed by the VADEQ using AERMOD's meteorological processor, AERMET (version 18081). The output from AERMET was used as the meteorological database for the modeling analysis and consists of a surface data file and a vertical profile data file. This data, which were prepared and processed to AERMOD format by the VADEQ, was provided for use in the modeling analyses for the proposed facility.

3.3 Receptor Grid

3.3.1 Basic Grid

The AERMOD model requires receptor data consisting of location coordinates and ground-level elevations. The receptor generating program, AERMAP (Version 18081), was used to develop a complete receptor grid to a distance of 10 kilometers from the proposed facility. AERMAP uses digital elevation model (DEM) or the National Elevation Dataset (NED) data obtained from the USGS. The preferred elevation dataset based on NED data was used in AERMAP to process the receptor grid. This is currently the preferred data to be used with AERMAP as indicated in the USEPA AERMOD

Implementation Guide published August 3, 2015. AERMAP was run to determine the representative elevation for each receptor using 1/3 arc second NED files that were obtained for an area covering at least 10 kilometers in all directions from the proposed facility. The NED data was obtained through the USGS Seamless Data Server (http://seamless.usgs.gov/index.php).

The following rectangular (i.e. Cartesian) receptors were used to assess the air quality impact of the proposed facility:

- Fine grid receptors (100 meter spacing) for a 20 km (east-west) x 20 km (north-south) grid centered on the proposed facility site.
- Fine grid receptors (50 meter spacing) for a 2 km (east-west) x 2 km (north-south) grid centered on the proposed facility site.

3.3.2 Property Line Receptors

The facility will have a fenced property line that precludes public access to the site. Ambient air is therefore defined as the area at and beyond the fence. The modeling receptor grid includes receptors spaced at 25-meter intervals along the entire fence line. Any Cartesian receptors located within the fence line were removed.

3.4 Selection of Sources for Modeling

The emission sources responsible for most of the potential emissions from the Lambert Compressor Station are the two Solar combustion turbines. These units were included in and are the main focus of the modeling analyses. The modeling includes consideration of operation over a range of turbine loads, ambient temperatures, and operating scenarios.

Ancillary sources (Capstone microturbines) were also included in the modeling for appropriate pollutants and averaging periods.

3.4.1 Emission Rates and Exhaust Parameters

The dispersion modeling analysis was conducted with emission rates and flue gas exhaust characteristics (flow rate and temperature) that are expected to represent the range of possible operation parameters for the proposed natural gas fired turbines. Because emission rates and flue gas characteristics for a given turbine load vary as a function of ambient temperature and fuel use, data were derived for a number of ambient temperature cases for natural gas fuel at 100%, 75% and 50% operating loads. The temperatures were:

- 0°F, 20°F, 40°F, 60°F, 80°F and 100°F.

To be conservative and limit the number of cases to be modeled, the modeling analyses were conducted using the lowest stack exhaust temperature and exit velocity coupled with the maximum emission rate over all ambient temperature cases for each operating load. Tables 3-2 and 3-3 summarize the stack parameters and emission rates that were used in the modeling for the two compressor turbines.

Table 3-2: Stack Parameters and Emission Rates – Proposed Solar Taurus 70 Compressor Turbine

Parameter		Values		
Load		50%	75	100%
Stack Height (m)		15.24	15.24	15.24
Stack Diameter (m)		1.52	1.52	1.52
Exhaust Velocity (m/s)		23.74	25.76	29.10
Exhaust Temperature (K)		747.6	738.2	730.9
Pollutant Emissions (g/s)	NOx	0.459	0.556	0.633
	CO	0.466	0.564	0.641
	SO_2	0.044	0.054	0.061
	PM10/PM2.5	0.128	0.155	0.176
	Formaldehyde	0.018	0.022	0.025

Table 3-3: Stack Parameters and Emission Rates – Proposed Solar Mars 100 Compressor Turbine

Parameter		Values		
Load		50%	75	100%
Stack Height (m)		15.24	15.24	15.24
Stack Diameter (m)		2.13	2.13	2.13
Exhaust Velocity (m/s)		18.19	21.43	23.26
Exhaust Temperature (K)		617.0	739.3	736.5
Pollutant Emissions (g/s)	NOx	0.684	0.853	0.958
	CO	0.694	0.866	0.971
	SO_2	0.066	0.082	0.092
	PM10/PM2.5	0.191	0.237	0.266
	Formaldehyde	0.027	0.034	0.038

Table 3-4 provide the stack parameters and emission rates for the Capstone microturbines.

Table 3-4: Stack Parameters and Emission Rates – Proposed Mircoturbines

Parameter		Values
Stack Height (m)		3.89
Stack Diameter (m)		0.30
Exhaust Velocity (m/s)		32.18
Exhaust Temperature (K)		552.6
Pollutant Emissions (g/sec)	NOx	0.010
	CO	0.0276
	SO_2	0.001
	PM10/PM2.5	0.0019
	Formaldehyde	0.00085

3.5 Maximum Modeled Facility Concentrations

Table 3-5 presents the maximum modeled air quality concentrations of the proposed facility calculated by AERMOD. As shown in this table, the maximum modeled concentrations when combined with a representative background concentration as provided in Table 3-5, are less than the applicable NAAQS for all pollutants.

Table 3-5: Facility Maxi mum Modeled Concentrations Compared to NAAQS

Pollutant	Averaging Period	NAAQS (µg/m³)	Maximum Modeled Concentration (µg/m³)	Background Concentration (µg/m³)	Total Concentration (µg/m³)
CO	1-Hour	40,000	59.1	1,265	1,324.1
	8-Hour	10,000	54.0	805	859.0
SO_2	1-Hour	196	4.1	10.5	14.6
	3-Hour	1,300	3.7	10.5	14.2
PM10	24-Hour	150	7.4	35	42.4
PM2.5	24-Hour	35	3.3[a]	15.7	19.0
	Annual	12	0.2	7	7.2
NO_2	1-Hour	188	31.5[b]	62.6	94.1
	Annual	100	0.9[b]	10.7	11.6

[a]Conservatively based upon maximum 98% percentile daily maximum modeled concentrations.

[b]Based upon USEPA Ambient Ratio Method 2 (ARM2) modeling guidance.

3.6 Toxic Air Pollutant Analysis

New and modified sources that emit toxic pollutants must meet the standards in 9 VAC 5-60-300. Virginia defines a toxic pollutant in 9 VAC 5-60-310 as "any air pollutant listed in §112(b) of the federal Clean Air Act, as revised by 40 CFR §63.60, or any other air pollutant that the board determines, through adoption of regulation, to present a significant risk to public health." As HAPs are emitted from the proposed sources at the Lambert Compressor Station, Mountain Valley completed a dispersion modeling evaluation to confirm the Project complies with toxic air pollutant requirements in Virginia.

The Project emissions of toxic air pollutants were compared to the exemption thresholds contained in 9VAC5-60-300C. The only toxic air pollutant that is potentially emitted above the exemption thresholds is formaldehyde. Thus, an air quality dispersion modeling analysis is required by VADEQ to demonstrate that the emissions of formaldehyde will not cause, or contribute to, any significant ambient air concentration that may cause, or contribute to, the endangerment of human health.

An air toxics modeling analysis was conducted for formaldehyde by comparing the modeled 1-hour and annual formaldehyde impacts to the VADEQ's Significant Ambient Air Concentrations (SAAC) for formaldehyde. The SAAC is the concentration of a toxic pollutant in the ambient air that, if exceeded, may have an adverse effect to human health.

As shown in Table 3-6, the maximum modeled impacts are well below the SAACs and thus, the Project complies with the VADEQ toxic pollutant requirements.

Table 3-6: Toxic Air Pollutant Impact Analysis

Pollutant	Averaging Period	VADEQ Screening Level(µg/m3)	Maximum Modeled Concentration (µg/m3)
Formaldehyde	1-Hour	62.5	2.1
	Annual	2.4	0.1

3.7 References

USEPA, 2015. AERMOD Implementation Guide. AERMOD Implementation Workgroup, Office of Air Quality Planning and Standards, Air Quality Assessment Division, Research Triangle Park, North Carolina. August 3, 2015.

USEPA, 2014. Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard. USEPA. September 30, 2014.

USEPA, 2011. Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 NAAQS. USEPA. March 1, 2011.

USEPA, 2017. Guideline on Air Quality Models (Revised). Appendix W to Title 40 U.S. Code of Federal Regulations (CFR) Parts 51 and 52, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. Research Triangle Park, North Carolina. January 7, 2017.

USEPA, 1992. "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised". EPA Document 454/R-92-019, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

USEPA, 1990. "New Source Review Workshop Manual, Draft". Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. Research Triangle Park, North Carolina.

USEPA, 1985. Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations-Revised). EPA-450/4-80-023R. U.S. Environmental Protection Agency.

VADEQ, 2015. "Virginia Modeling Guideline for Air Quality Permits". Office of Air Quality Assessments, Virginia Department of Environmental Quality. March 2015.

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 9

Appendix 9-E

Noise Sensitive/Measurements and Predicted Sound Level Figures

Project:
Southgate Project

Description:
Lambert CS:
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-1 10.12.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- Compressor Station Building

Scale

SLR

6001 Savoy Drive, Suite 215
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
LN 3600 Interconnect (IC):
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-2 10.15.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- Interconnect Location

Scale

SLR

6001 Savoy Drive, Suite 215
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
T-15 Dan River Interconnect (IC): Noise Sensitive Areas and Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-3 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- Interconnect Location

Scale

SLR

6001 Savoy Drive, Suite 215
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
T-21 Haw River Interconnect (IC): Noise Sensitive Areas and Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-4 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- HDD Location

Scale

SLR

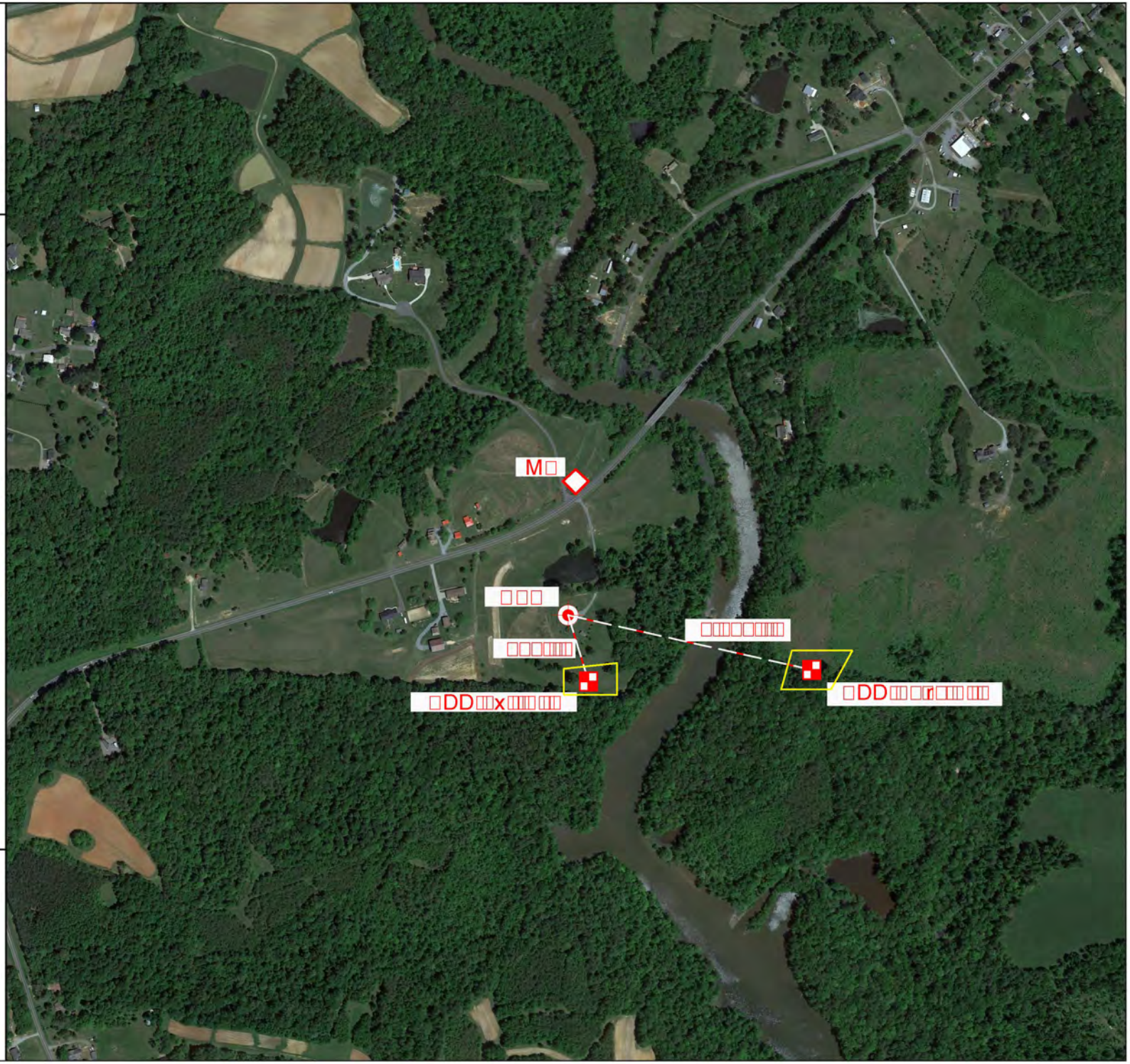
6001 Savoy Drive, Suite 215
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
Stony Creek Reservoir HDD: Noise Sensitive Areas and Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-5 08.03.2018



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Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
Dan River HDD:
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-6 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- HDD Location

Scale

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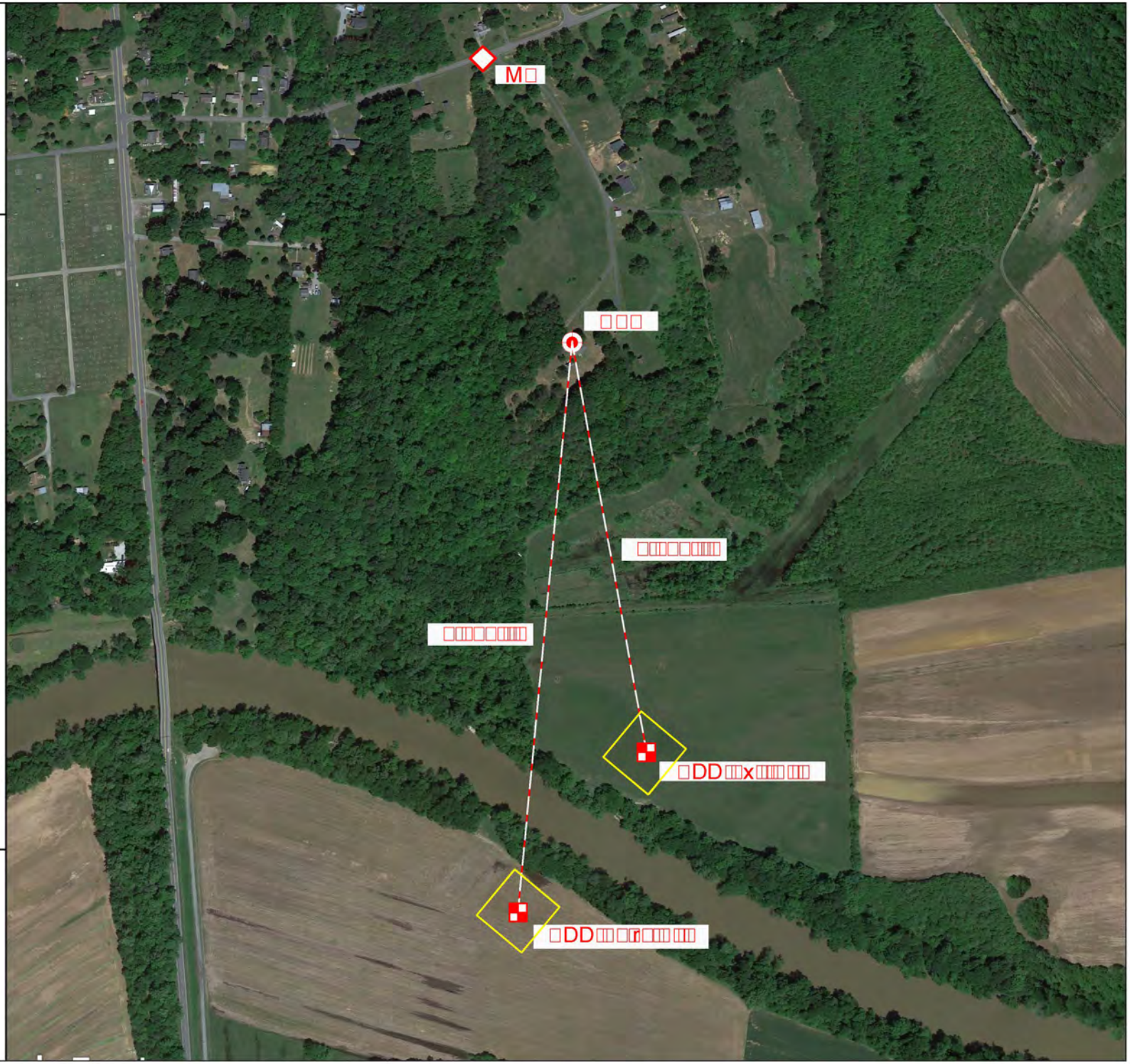
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax



Project:
Southgate Project

Description:
Railroad Crossing #1:
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-7 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- RR Crossing

Scale

SLR

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Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
Railroad Crossing #2:
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-8 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- RR Crossing

Scale

SLR

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Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
Railroad Crossing #3:
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

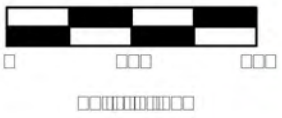
FIGURE 9.3-9 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- RR Crossing

Scale



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Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
Railroad Crossing #4:
Noise Sensitive Areas and
Measurement Locations

Prepared By:
SLR International Corporation

FIGURE 9.3-10 08.03.2018

N

Legend

- Noise Sensitive Area (NSA)
- Measurement Location (ML)
- RR Crossing

Scale

SLR

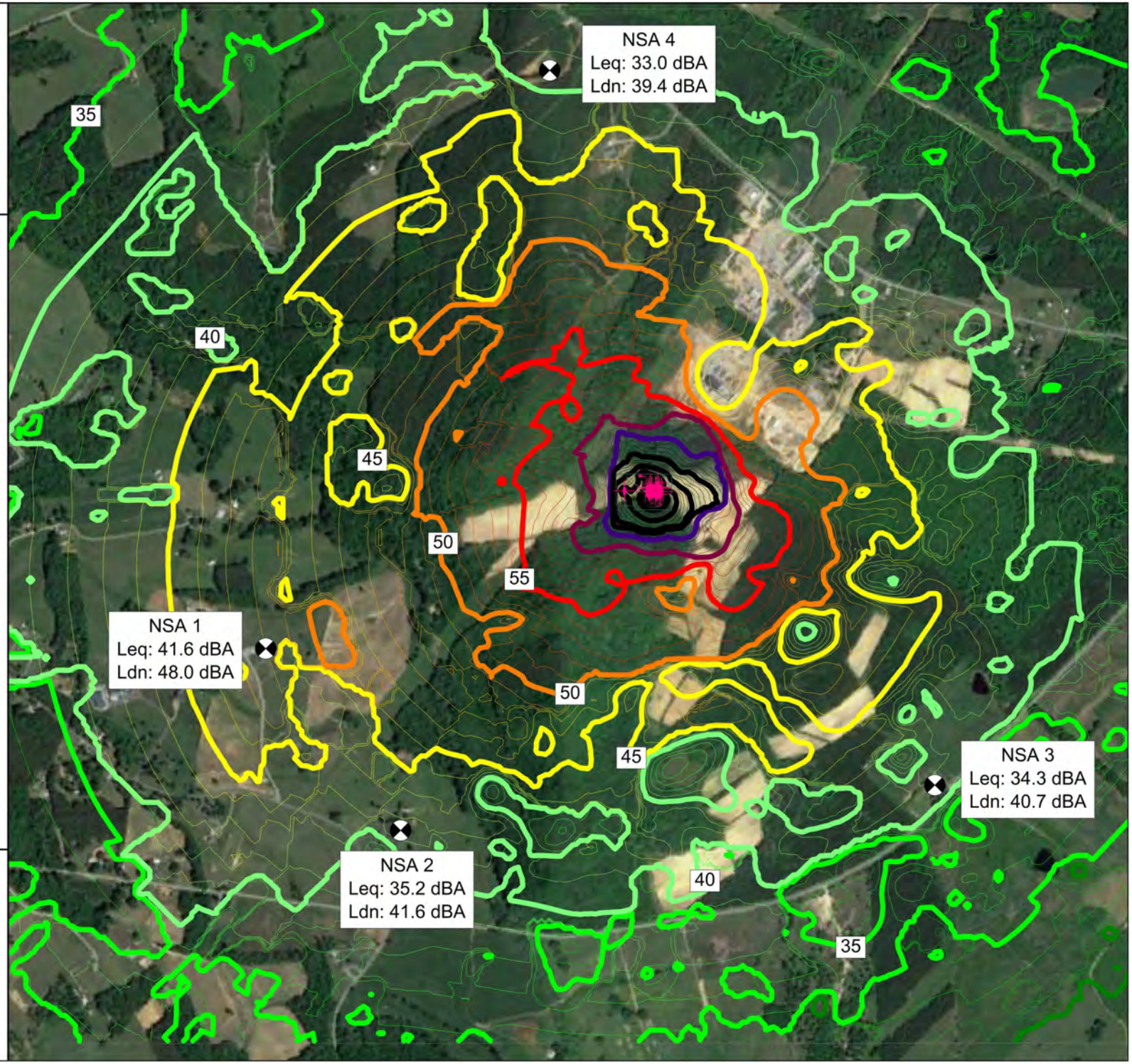
6001 Savoy Drive, Suite 215
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
Lambert Compressor Station (CS):
Noise Contour, dBA Ldn

Prepared By:
SLR International Corporation

FIGURE 9.3-11 10.15.2018



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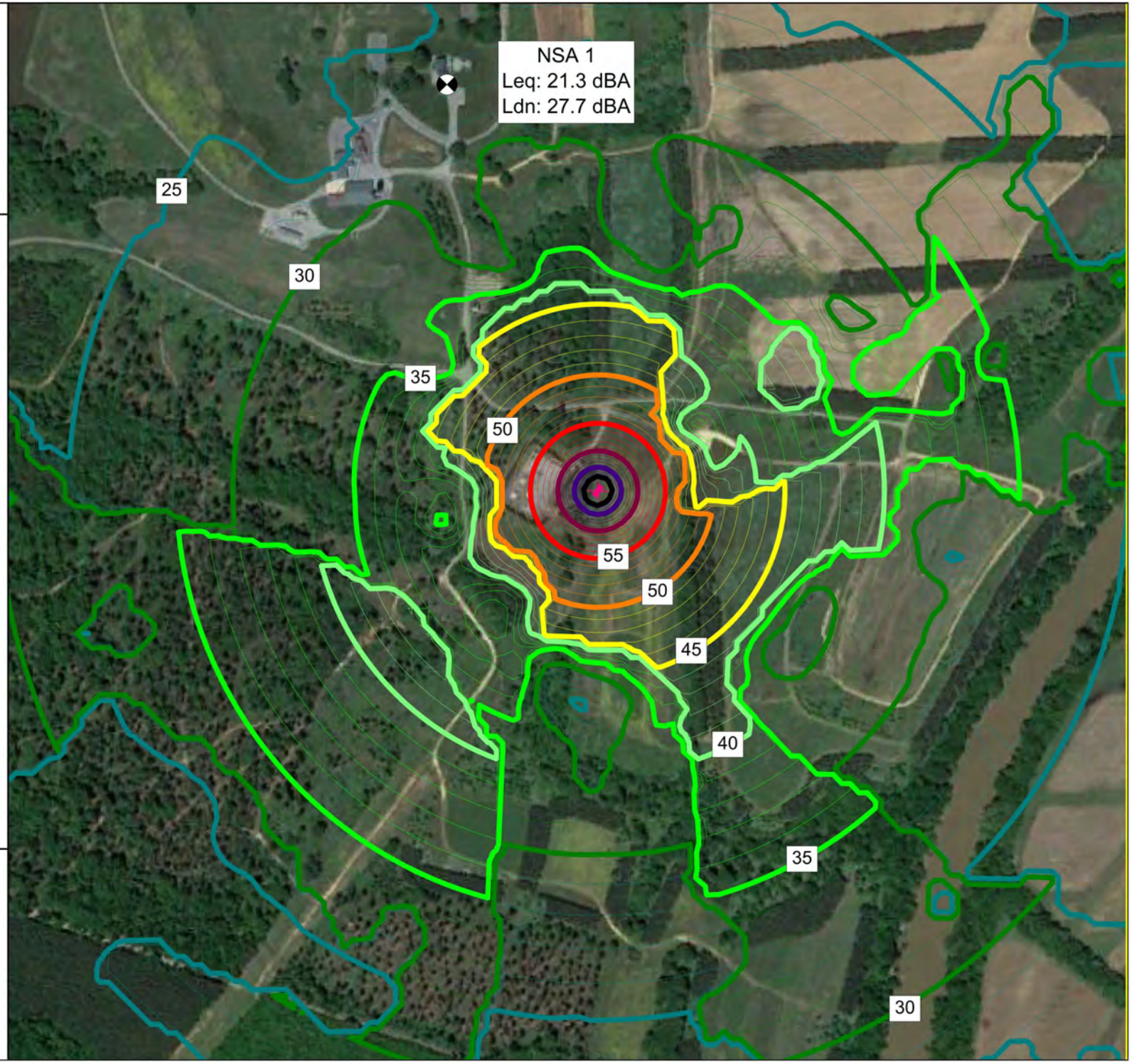
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
LN 3600 (IC):
Noise Contour, dBA Ldn

Prepared By:
SLR International Corporation

FIGURE 9.3-12 10.15.2018



SLR

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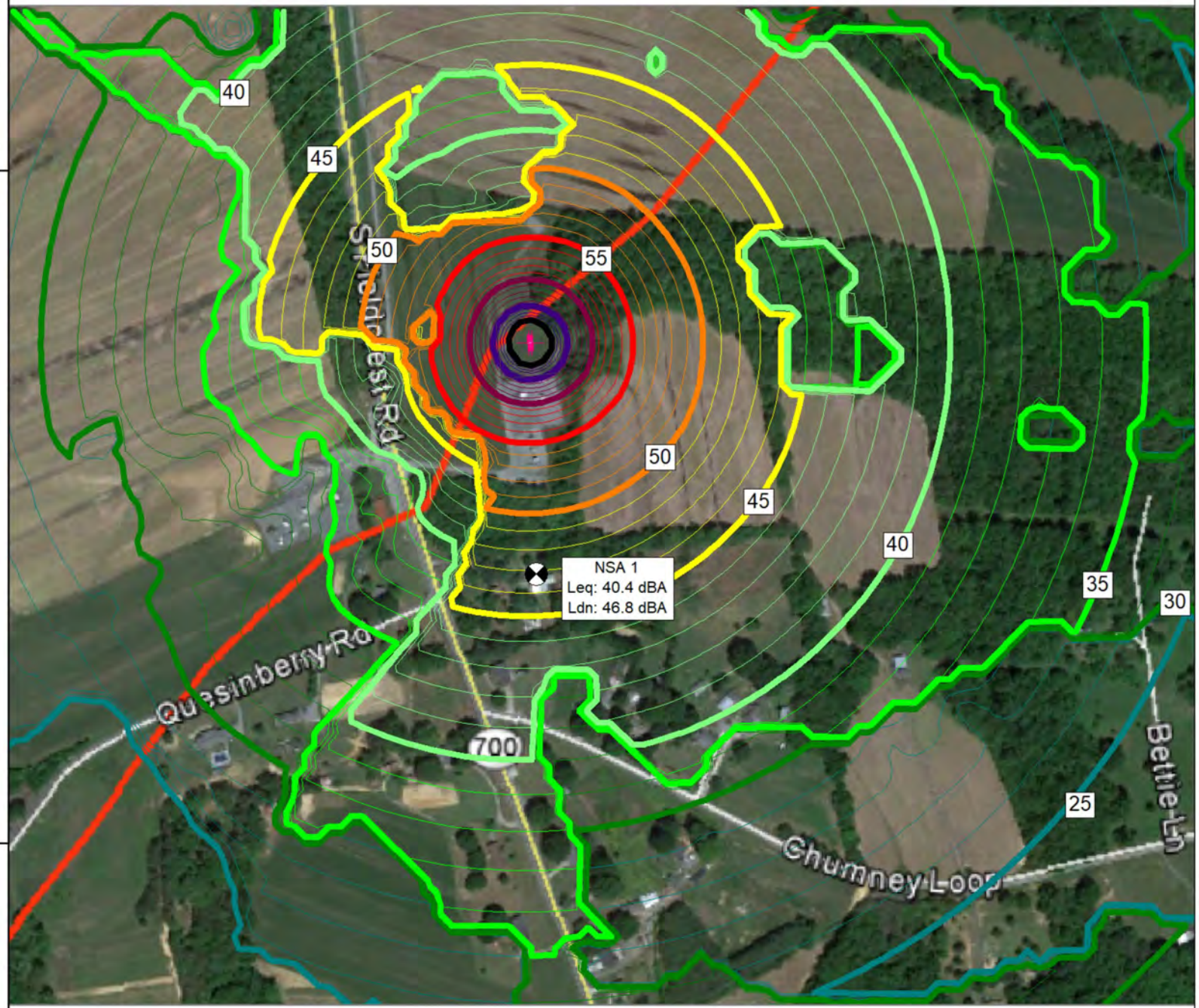
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
T-15 Dan River Interconnect (IC): Noise Contour, dBA Ldn

Prepared By:
SLR International Corporation

FIGURE 9.3-13 08.03.2018



Legend

Noise Sensitive Area (NSA)

SLR

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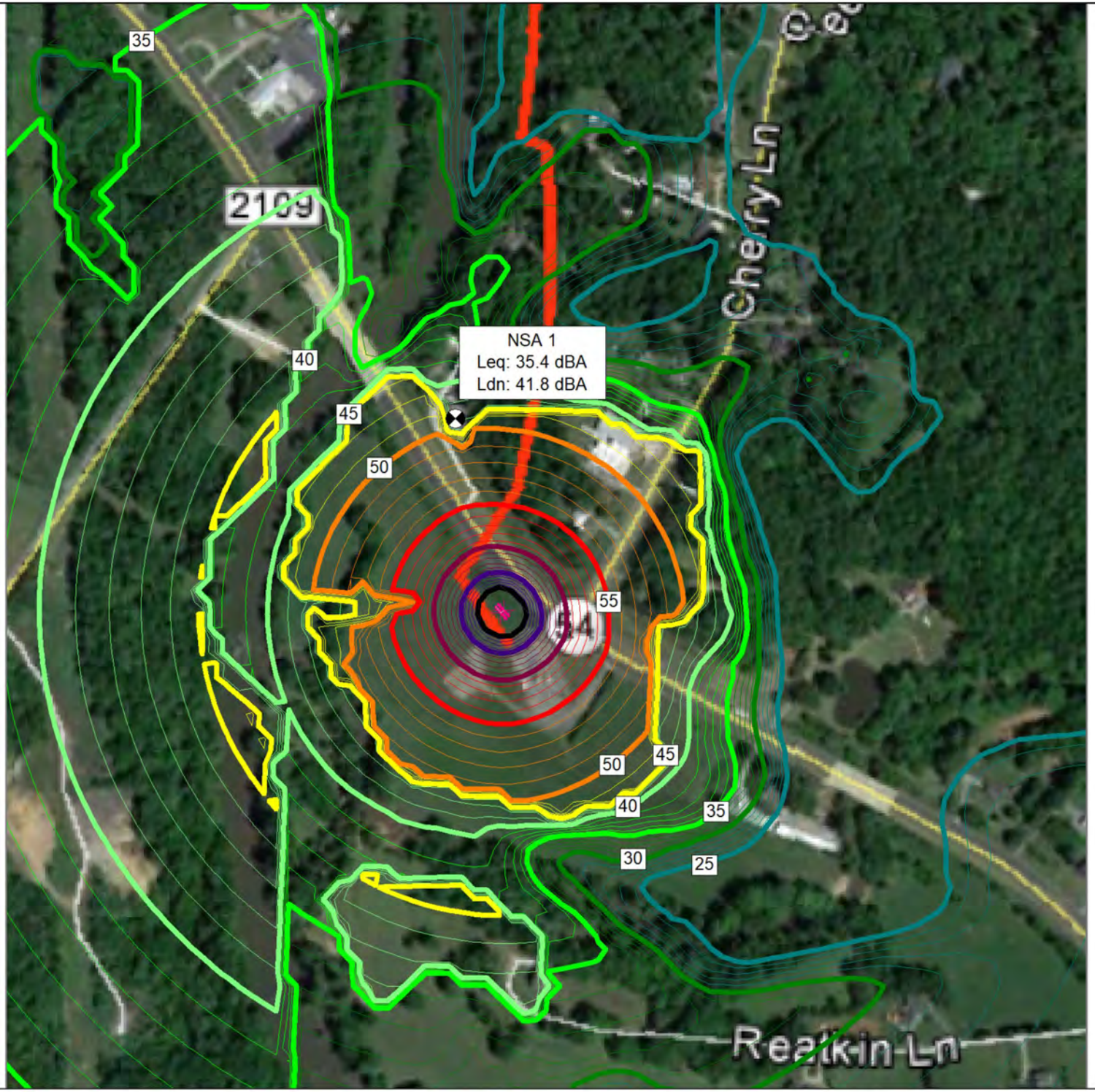
Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Project:
Southgate Project

Description:
T-21 Haw River Interconnect (IC): Noise Contour, dBA Ldn

Prepared By:
SLR International Corporation

FIGURE 9.3-14 08.03.2018



Legend

Noise Sensitive Area (NSA)

SLR

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Houston, Texas 77036-3322
713-789-9400 Tel
713-789-5493 Fax

Appendix O

MVP Southgate Project

Traffic and Transportation Management Plan, Revision 2

(May 2020)

MVP Southgate Project

Traffic and Transportation Management Plan

Revision 2

May 2020

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC ("Company") has developed this Traffic and Transportation Management Plan to describe the measures the MVP Southgate ("Project") and their Contractors ("Contractor") will take to minimize potential impacts on state and local roadways during the construction of the Project. This plan outlines traffic impact minimization measures, noxious weed control measures, and dust control methods that will be used on the Project to reduce impacts during construction.

Operations and maintenance activities will be conducted with light vehicles at very few occasions that should have no impact to roadways and traffic once the Project is in-service.

1.1 Traffic Impacts

Prior to construction, the Company will obtain applicable Federal, State/Commonwealth, and local road use and crossing permits, as required. The Company and Contractor personnel will comply with all permit requirements and conditions to provide for public safety and minimize impacts on public roads. Copies of this *Traffic and Transportation Management Plan* and applicable road use and crossing permits will be provided to the appropriate personnel and maintained at each Contractors' field office.

Increased temporary traffic from Project-related activities will include transportation for construction workers in light and heavy-duty trucks, construction equipment (e.g. tractor trailers hauling machinery and materials), and truck deliveries. Prior to construction, the Company and Contractor will work together to determine the number of workers' cars, equipment, and trucks that would use local roads and commuting periods. The Company will establish routes to and from the Project work areas to ensure that traffic impacts are minimized. These established routes will be provided to the Contractors' and utilized during construction. The contractor will develop an appropriate work zone plan to ensure the safe and efficient travel of vehicles during the construction phase. The Company shall coordinate with the following transportation districts to obtain the required permits or agreements for any operations within a state right-of-way:

- Virginia Department of Transportation (VDOT) Lynchburg District (VDOT Land Use permit for any operations within the VDOT Right-of-way).
- North Carolina Department of Transportation (NCDOT) District 1 (Rockingham County) and District 3 (Alamance County) (encroachment agreement for construction or utility installation within the limits of the NCDOT right-of-way).

The Company will consult with State and local agencies regarding detour routes, speed/load limits, and other use limitations, conditions, or restrictions on the roads that will be utilized during construction. Before the start of construction, the Company will work with these agencies to obtain the most up-to-date traffic information for the roadways in the Project area as well as ongoing road reconstruction or improvement projects in the vicinity of the pipeline route and facilities area. At this time, no conflict is anticipated. Currently no active Six-Year Improvement Projects (SYIP) overlaps or falls adjacent to the proposed Project. The Contractor shall monitor the VDOT paving

schedule website map for any updates during construction of the Project and update the Company weekly.(https://vdot.maps.arcgis.com/apps/webappviewer/index.html?id=fbf 86e85fdcb43e482432f41ddbb51c7). The Pavement Status Map Application is updated to indicate new paving projects annually. The contractor shall also monitor the NCDOT State Improvement Program,(STIP),(https://www.ncdot.gov/initiatives-policies/Transportation/stip/development/Pages/default.aspx).

Where local, private roadways will be affected, the Company will coordinate with landowners and lessees of properties to mitigate potential impacts on those roads. Similarly, where roads on public lands will be affected, the Company will coordinate with the appropriate managing agency to mitigate potential impacts on roads or implement required traffic and transportation procedures. As discussed further in the following sections, the Contractor will place and maintain traffic control measures, such as flag persons, warning signs, lights, and/or barriers, as appropriate, to ensure the safety of construction workers and the public and to minimize traffic congestion. The Contractor will maintain traffic flow and emergency vehicle access on roadways with traffic control personnel or detour signs, where necessary. Please refer to Drawing Number MVPPL-VAR-200 for traffic control guidelines in Virginia and Drawing Number MVPPL-NCR-200B for traffic control guidelines in North Carolina. The Company will ensure coordination with local law enforcement, fire departments, and emergency medical services to coordinate access for effective emergency response during construction. Contractors will be directed to comply with local weight limitations and restrictions on area roadways.

The Company strives to mitigate the increase in construction-related truck traffic on local roads shared with community and school buses in suburban and more densely populated rural areas. Key components to a successful community partnership include:

- Central point of command for construction traffic route plan. The Company will have a Coordinator responsible for maintaining traffic related plans, procedures, records, and documents.

- School bus curfews. Often times construction vehicles can pose concern when school buses are traveling their established routes. The community expects that their children will have safe and timely travel to and from school. The Company will ensure coordination with the governing School Districts or the School Transportation Department in the Project area to identify the bus routes and times. To the extent practicable, construction traffic will be limited or refrained during the bus route times with a published school bus route curfew time period.

- Speed enforcement. In more rural areas, law enforcement is often not staffed to handle a sudden increase in traffic. Company will ensure monitoring of the speed of the route. This not only keeps contractor and the public safe but lends accountability to the Project. Inevitably, contractors will end up off of approved routes. The Traffic Coordinator will be able to actively monitor these issues and reduce unapproved travel that can become costly

if damage occurs. The Coordinator can also be useful in diffusing potential hostile situations with neighbors and landowners.

All impacts shall be within the guidelines of all applicable agencies, as well as approval from landowners. A list of state and county contacts is provided in the table below. Once construction is complete, the Company will ensure all roads are restored back to their original level of service or better, unless the Company is directed otherwise in writing by the landowner or regulatory agency. Pre-construction video will be used to document the roadway condition prior to Project usage.

Virginia County, State Requirements			
	Phone	**Website**	**Contact Name/Position**
State Agency			
Virginia Department of Transportation (VDOT)	(540) 381-7194	http://www.virginiadot.org/	Paul Brown, Area Land Use Engineer
Virginia County			
Pittsylvania	(434) 432-7974	http://pittsylvaniacountyva.gov/	Greg Sides, Assistant County Administrator

North Carolina County, State Requirements			
	Phone	**Website**	**Contact Name/Position**
State Agency			
North Carolina Department of Transportation (NCDOT)	(919) 707-2500 (336) 487-0000	https://www.ncdot.gov/Pages/default.aspx	Chief Engineer, Tim M. Little, PE. Mike Mills, PE, Division 7 Engineer
North Carolina County			
Rockingham	(336) 342-8101	https://www.co.rockingham.nc.us/	Lance L. Metzler, County Manager
Alamance	(336) 228-1312	https://www.alamance-nc.com/	Bryan Hagood, County Manager

2.0 PIPELINE ROAD CROSSINGS

The Company will ensure construction of road and highway crossings are in accordance with the permit requirements and the construction drawings for the crossing. No work on any such crossing shall be started before obtaining all applicable permits from the regulatory agencies. The Contractor will strive to maintain single lane traffic on all roads and shall provide flagmen, road signs and all other signaling required by the governing authority to supervise the flow of traffic. In the event a roadway needs to be closed and traffic detoured, the Company will ensure coordination with all applicable agencies and expediting of all work to mitigate inconveniences to the public. The Contractor will provide barricades, warning signs, flares, lanterns, flagmen and such other protective measures required to maintain traffic and to safeguard the public at all times.

Any damage to paved or blacktop roads shall be repaired per specifications provided by the regulatory agencies. Road surfaces other than hard surface roads (e.g., paved, blacktop, or concrete) shall be backfilled in well-tamped 6-inch layers and shall be finished with a well-tamped surface matching the existing road. If flowable fill is used, it will be in accordance with the appropriate mix per agency specifications. For all types of crossings, additional or other limitations may be provided by the governing municipality and must prevail.

At the end of each workday, the Contractor will make passable any open-cut driveways for ingress and egress. This may be accomplished by using steel plates. Any and all steel plates used for such purposes shall be properly pinned (i.e., secured in place) and ramped on each end to allow traffic flow. The backfilling road crossings shall be performed immediately after the pipe is installed and in accordance with requirements established by the applicable permit.

3.0 CONSTRUCTION TRAFFIC AND BUSSING PLAN

An increase in traffic to local and state roads will be expected throughout the day between the hours of 6:00 a.m. and 7:00 p.m. or sunset, whichever is later. Emergencies or other designated construction activities may necessitate nighttime work. The temporary traffic will include transportation for construction workers in light and heavy-duty trucks, as well as tractor trailers hauling machinery and materials. Prior to construction, the Contractor will determine locations of commuting workers collection points (it is anticipated the majority of the worker collection points will be the permitted Contractor Yards), and bus routes and associated traffic impacts. Large work crews will meet at the identified collection points and take a bus to the construction right-of-way. Smaller crews will use vans or will car pool with the foreman or straw boss. Impacts are expected to be minor and short term because construction spreads and personnel will be geographically dispersed, and personnel will commute to and from work areas in early morning and late evening during nonpeak traffic hours. Traffic will be entering and leaving off-site locations such as laydown yards, right-of-way and additional temporary workspace for the purpose of pipeline construction, hauling material and roadway maintenance. Once the material and heavy equipment are placed on the right-of-way, construction equipment will move in a linear manner along the right-of-way as work progresses, minimizing traffic on local roads. The amount of equipment moved by hauling from site to site will be reduced due to the accessibility created by the construction right-of-way.

The Company may arrange to have road improvements performed at areas that are not conducive to heavy hauling and large traffic volume, in addition to having all approved roads maintained during construction, and finally returning the roads back to their original or better level of service, meaning their original width and length, unless the Company is directed otherwise in writing by the landowner or state agency.

4.0 NOXIOUS WEEDS

To prevent noxious weeds from transporting along roadways, the Company developed the following measures:

- The prompt seeding and revegetation of areas of disturbed soils with certified weed-free seed.
- Encourage the cleaning of equipment and vehicles prior to entering or leaving each management area. (Pressure wash in a designated area only.)
- Minimize soil disturbance, where possible.
- Use certified weed-free mulch/straw for erosion control.

5.0 FUGITIVE DUST CONTROL

Dirt and gravel during construction periods in dry weather can create an inhospitable environment for neighbors and workers. The Company developed the following fugitive dust control measures to address this issue.

- Implementation of construction and restoration best management practices and operational controls will be used to mitigate fugitive dust emissions.
- The Project's earth disturbance permit will outline specific practices that control fugitive dust, including a construction sequence; use of rock construction entrances; and temporary soil stabilization methods.
- Operational controls are also implemented, including the use of a reduced speed limit on unpaved access roads as well as sweeping/vacuuming paved roadways when Project-related soils are tracked out onto paved surfaces.
- Wet suppression, using water, is the predominate method of suppressing fugitive dust on unpaved roads and gravel pads as it causes finer materials to adhere into larger particles.
    - Increasing the moisture content of the finer materials may be accomplished either naturally or mechanically.
    - Moisture content of unpaved road surfaces can be naturally increased through rainfall.
    - Moisture content can also be increased mechanically through the application of water.

- The amount of water required to sufficiently control fugitive dust emissions is dependent on the characteristics of materials (e.g., surface moisture content), ambient conditions (e.g., rainfall, humidity, temperature), and activities occurring in the area (e.g., vehicle traffic, vehicle weight, speeds).

The following measures will be taken to reduce fugitive dust from operations:

- Fugitive dust emissions from vegetation removal, clearing and grading, cutting and filling, topsoil removal, trenching, backfilling and stockpile storage will be controlled to a great extent by following the construction sequencing and disturbing limited areas at a time;
- Fugitive dust emissions generated by motorized equipment and miscellaneous vehicle traffic will be controlled by wet suppression as necessary;
- Fugitive dust emissions from paved roads will be controlled with a combination of water trucks, power washers, sweeping and/or vacuuming. If necessary, additional potential sources of water for dust control may include other municipal systems, groundwater supply wells, and/or approved surface waters;
- Track out of loose materials will be controlled using rock construction entrances on access roads that begin at a junction with paved roads; and
- When environmental conditions are dry, inspection of dust control measures will be conducted daily.

6.0 INSPECTION, MONITORING, AND RECORD KEEPING

The Contractor will implement the dust control measures specified in this plan. All construction personnel will be informed of the measures in this plan. Company will have primary responsibility for monitoring and enforcing the implementation of dust control measures by the Contractor. The Company will also be responsible for ensuring that these measures are effective and proper documentation is maintained. When environmental conditions are dry, inspection of dust control measures will be conducted daily, and the Company will be responsible for recording the following information on a daily basis:

- weather conditions, including temperature, wind speed and wind direction;
- number of water trucks in use;
- incidents where dust concentration is such that special abatement measures must be implemented;
- condition of soils (e.g., damp, crusted, unstable) on the right-of-way and other construction sites;
- condition of soils (e.g., damp, crusted, unstable) on access roads;
- condition of track-out pads;

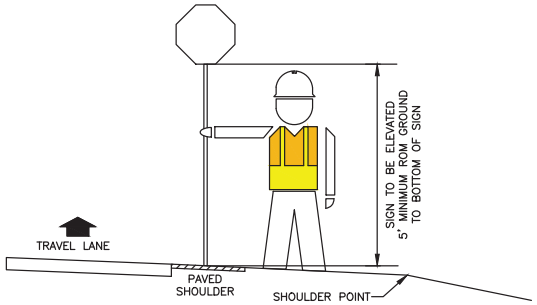
- overall status of dust control compliance.

This information will be incorporated into Company documentation, and significant instances of non-compliance with the plan will be reported to the Company as soon as they are discovered.

Attachment A Virginia Traffic Control Plan (MVPPL-VAR-200)

Attachment B North Carolina Traffic Control Plan (MVPPL-NCR-200B)

FLAGGERS



08-30-2019

FLAGGERS SHALL PERFORM THEIR DUTIES IN THE FOLLOWING MANNER:

1. ENSURE ALL SIGNS ARE INSTALLED PRIOR TO PERFORMING FLAGGING OPERATIONS.
2. BE ALERT AND ATTENTIVE AT ALL TIMES.
3. THE FLAGGER SHALL STAND ALONE, NEVER PERMITTING A GROUP OF WORKERS TO CONGREGATE AROUND THE FLAGGER STATION OR ALLOW WORK VEHICLES NEAR THE FLAGGER STATION.
4. ALWAYS STAND WHILE WAITING FOR TRAFFIC.
5. HAVE AN AVENUE OF ESCAPE IF APPROACHED BY AN ERRANT VEHICLE.
6. USE PROPER HAND SIGNALS WITH THE STOP/SLOW PADDLE.
7. MAKE EYE CONTACT WITH MOTORISTS.
8. DO NOT LEAVE YOUR POST UNTIL YOU ARE PROPERLY RELIEVED.
9. COORDINATE WITH OTHER FLAGGERS.
10. HAVE YOUR CERTIFICATION CARD IN YOUR POSSESSION WHILE PERFORMING FLAGGING DUTIES.

FLAGGERS SHALL ADHERE TO THE FOLLOWING DRESS CODE:

1. HARD HAT.
2. RETROREFLECTIVE HIGHLY-VISIBILITY SAFETY APPAREL MEETING ANSI/ISEA 107-2010 CLASS 3 RISK EXPOSURE FOR DAYTIME AND NIGHTTIME ANSI/ISEA 107-2010 CLASS 3 RISK EXPOSURE SHALL INCLUDE TYPE E TROUSERS.
3. PROTECTIVE FOOTWARE MUST COMPLY WITH ANSI Z41-1999, ASTM F-2412-2005, ASTM F-2413-2005 (OR MORE CURRENT ASTM).
4. SHIRT WITH SLEEVES AND LONG PANTS (REMOVAL OF SHIRT IS PROHIBITED).

METHODS OF FLAGGING TRAFFIC:

WHERE TO STAND

1. STAND WHERE YOU CAN SEE AND BE SEEN BY APPROACHING TRAFFIC. CLEAR SIGHT DISTANCE FROM THE GRAPHIC FLAGGER SIGN TO THE FLAGGER STATION SHOULD BE 350' TO 500' WHERE THE POSTED SPEED LIMIT IS 45 MPH OR 500' TO 800' WHERE THE POSTED SPEED LIMIT IS GREATER THAN 45 MPH.
2. STAND FACING TRAFFIC EITHER ON THE EDGE OF THE SHOULDER OF THE ROAD OR NEAR THE EDGE OF PAVEMENT.
3. FLAGGER STATIONS SHOULD BE LOCATED SUCH THAT AN ERRANT VEHICLE HAS ADDITIONAL SPACE TO STOP WITHOUT ENTERING THE WORK AREA. THE DISTANCE FROM THE FLAGGER STATION TO THE WORK AREA SHOULD BE AS SHOWN IN THE TABLE BELOW:

POSTED SPEED	25	30	35	40	45	50	55	60
DISTANCE (FT)	155-165	200-210	250-260	305-320	360-380	425-445	500-520	570-600

HOW TO STOP TRAFFIC

1. STAND ON THE SHOULDER OF THE ROADWAY FACING TRAFFIC.
2. HOLD THE STOP SIGN PADDLE IN A STATIONARY POSITION. LOOK DIRECTLY AT THE APPROACHING TRAFFIC. RAISE YOUR FREE HAND WITH PALM EXPOSED TO APPROACHING DRIVER AND MAKE EYE CONTACT WITH THE DRIVER.
3. IF TIME PERMITS, DRIVERS MAY BE INFORMED CONCERNING THE REASON FOR THE DELAY. SPEAKING IN ENGLISH BE COURTEOUS AND BRIEF.

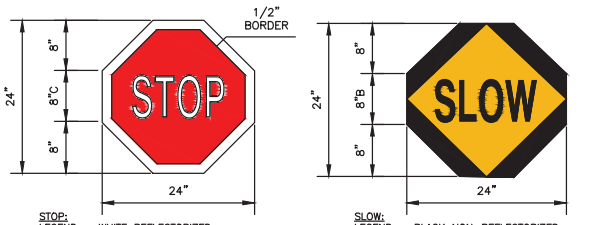
HOW TO RELEASE TRAFFIC

1. BEFORE RELEASING TRAFFIC THE FLAGGER WILL RETURN TO THE NORMAL FLAGGING LOCATION. KEEP YOUR PADDLE ON STOP UNTIL YOU ARE SAFELY ON THE SHOULDER OF THE ROADWAY.
2. STAND FACING TRAFFIC. HOLD THE SLOW SIGN PADDLE IN A STATIONARY POSITION WITH THE PADDLE FACING THE ROAD USER. WITH YOUR FREE ARM SIGNAL THE DRIVERS TO PROCEED INTO THE OPEN LANE.
3. WHERE TRAFFIC IS STOPPED TEMPORARILY IN ONE LANE, RELEASE TRAFFIC BY TURNING THE PADDLE A QUARTER TURN SO THAT THE WORD "STOP" FACES YOU AND IS PARALLEL TO THE ROADWAY. WITH YOUR FREE ARM SIGNAL THE DRIVERS TO PROCEED INTO THE OPEN LANE.

HOW TO ALERT AND SLOW TRAFFIC BUT NOT STOP IT

1. STAND FACING TRAFFIC.
2. HOLD THE SLOW SIGN PADDLE IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. FOR ADDED EMPHASIS, THE FLAGGER MAY RAISE AND LOWER THE FREE HAND WITH THE PALM DOWN.

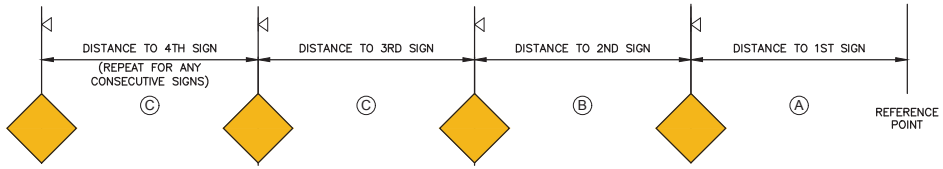
STOP / SLOW PADDLE



STOP / SLOW PADDLE NOTE:

1. FOR OPERATIONS THAT ARE RESTRICTED TO DAYLIGHT HOURS ONLY, USE NON-REFLECTORIZED LEGENDS, BORDERS AND BACKGROUNDS.
2. FOR OPERATIONS THAT EXTEND INTO NIGHTTIME, RETROREFLECTIVE AND/OR ILLUMINATE DEVICES SHALL BE USED.

SPACING FOR TEMPORARY SIGNS IN SERIES (STATIONARY OR PORTABLE SIGNS)



RECOMMENDED SPACING OF ADVANCE WARNING SIGNS	
ROAD TYPE	SPACING (FEET±) AT (A), (B) OR (C)
URBAN STREET, ≤25MPH POSTED SPEED	100-200
URBAN STREET, 30-40MPH POSTED SPEED	250-350
URBAN STREET, >40MPH POSTED SPEED	350-500
OTHER ROADWAYS, ≤45MPH POSTED SPEED	350-500
OTHER ROADWAYS, >45PH POST SPEED	500-800
LIMITED ACCESS HIGHWAYS	1300-1500

SPACING OF TEMPORARY SIGNS NOTE:

1. APPLY THE ADVANCE WARNING SIGNS SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS ADDITIONAL REACTION TIME FOR A CONDITION, LIMITED SIGHT DISTANCE, ETC.

TEMPORARY TRAFFIC CONTROL ZONE SIGN NOTES:

1. FLAGGING STATIONS SHALL BE PRECEDED BY PROPER ADVANCE WARNING SIGNS. SIGNS SHALL BE REMOVED WHEN THE FLAGGER IS NO LONGER AT THEIR STATION.
2. SIGNS MUST BE RETROREFLECTIVE AND MADE FROM VDOT APPROVED MATERIALS. MESH SIGNS ARE NOT ALLOWED.
3. SIGNS SHALL BE LOCATED ON THE RIGHT SIDE OF THE ROADWAY.
4. ALL SIGNS MAY BE PORTABLE MOUNTED.
5. USE PROPER BALLAST SUCH AS SAND BAGS ON PORTABLE SIGN STAND LEGS TO PREVENT OVERTURNING OR USE STATIONARY MOUNTED SIGNS IN HIGH WIND AREAS.
6. SIGNS SHOULD BE POSITIONED SO THE SIGN FACE IS TURNED SLIGHTLY AWAY FROM THE TRAVEL LANE TO REDUCE SUN AND HEADLIGHT GLARE.
7. SIGNS SHOULD USE MESSAGES THAT ARE CLEARLY UNDERSTANDABLE BY THE MOTORIST, CLEAN AND LEGIBLE FROM AT LEAST THE DISTANCE REQUIRED IN THE ADVANCE WARNING SIGN SPACING CHART SHOWN ABOVE.

MISCELLANEOUS NOTE:

1. TRAFFIC CONTROL MEASURES SHALL BE IN ACCORDANCE WITH PREVAILING FEDERAL, STATE, LOCAL, AND VDOT POLICIES, STANDARDS AND PROCEDURES. THESE POLICIES, STANDARDS, AND PROCEDURES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: (1) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), (2) VIRGINIA WORK AREA PROTECTION MANUAL, AND (3) VIRGINIA ROAD AND BRIDGE SPECIFICATIONS.

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VIRGINIA
LAND USE PERMIT

LAST REVISED: 07-15-2019

PREPARED BY:
ENGineering
28100 TORCH PARKWAY
WARRENVILLE, IL. 60555
TEL. 630-353-4000
FAX 630-353-7777
WWW.ENENGINEERING.COM

PREPARED FOR:
Mountain Valley PIPELINE

TRACT NUMBER:
N/A

va811.com Dig With CARE

MVP SOUTHGATE

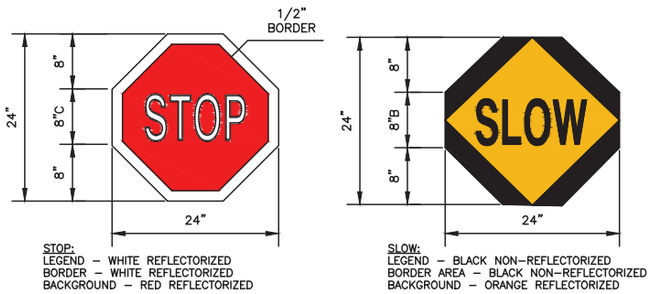
TEMPORARY TRAFFIC CONTROL PLAN
TYPICAL
24" H-650 MVP SOUTHGATE PIPELINE

PITTSYLVANIA COUNTY — VIRGINIA

DATE:	SCALE:	DRAWN BY	APPR.	DRAWING NUMBER:	SHEET NO.	REV:
05-08-19	N/A	TCB	DP	MVPPL-VAR-200	25	A

FILE NAME: I:\PROJECTS\ENCOMPASS\1954800.01\6 - WORKING DRAWINGS\MECHANICAL DRAWINGS\PIPELINE\TRAFFIC CONTROL & DETAIL DRAWINGS\VA-TTCP-TYP.DWG

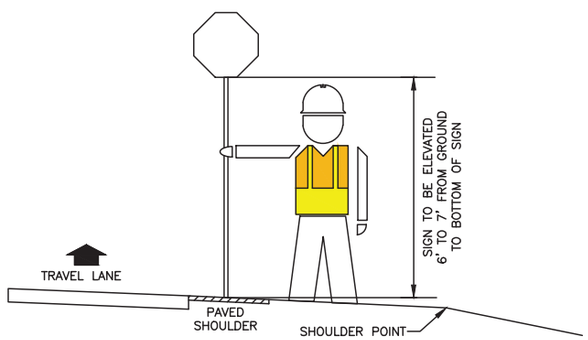
STOP / SLOW PADDLE



STOP / SLOW PADDLE NOTE:

1. FOR OPERATIONS THAT ARE RESTRICTED TO DAYLIGHT HOURS ONLY, USE NON–REFLECTORIZED LEGENDS, BORDERS AND BACKGROUNDS.

FLAGGERS

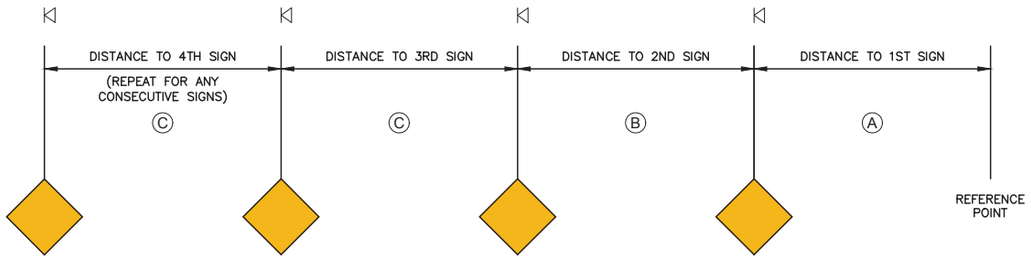


FLAGGER NOTES:

1. FLAGGERS ARE REQUIRED TO BE QUALIFIED THRU AN NCDOT APPROVED FLAGGER TRAINING COURSE.
2. ALWAYS SELECT A LEAD FLAGGER TO COORDINATE THE FLAGGING OPERATION.
3. LOCATION OF THE FLAGGER– ALWAYS START ON GRASS SIDE OF WHITE EDGE LINE.
4. HAND SIGNALS– STOP (PALM OUT AT 90 DEGREES PERPENDICULAR), PROCEED (USE HAND FINGERS AND ARM TO SWEEP ACROSS BODY TOWARD OPEN LANE FOR TRAVEL), SLOW ("PAT THE DOG" WITH PALM DOWN AND MOVE PALM UP AND DOWN).
5. FACE TRAFFIC. NEVER TURN YOUR BACK ON MOVING TRAFFIC. NEVER STOP TRAFFIC FROM IN THE ROADWAY. NEVER RELEASE TRAFFIC FROM IN THE ROADWAY.
6. RADIO COMMUNICATION BETWEEN FLAGGERS IS RECOMMENDED.
7. ALWAYS HAVE AN ESCAPE ROUTE PLANNED.
8. NEVER USE CONES OR OTHER DEVICES AS A "FLAGGER STATION".
9. AT A MINIMUM, WEAR ANSI CLASS II SAFETY VEST. RECOMMEND WEARING ORANGE HARD HAT OR ORANGE HARD HAT COVER DURING FLAGGING OPERATIONS.
10. PREPARE FOR EMERGENCIES BY CARRYING "STOP AND SLOW" PADDLES WITH TELESCOPING OR SECTIONED STAFFS THAT REACH 7 FEET AND LIGHTS TO ILLUMINATE THE FLAGGER AT NIGHT.
11. WHEN WORKERS STOP TRAFFIC TO ALLOW WORK VEHICLES TO DELIVER MATERIALS OR UNLOAD EQUIPMENT THEY MUST USE ADVANCE WARNING SIGNS AND "STOP AND SLOW" PADDLES.
12. ROTATE FLAGGERS EVERY 2 TO 3 HOURS TO GIVE THEM BREAKS TO KEEP THEM FRESH AND ALERT.
13. ALTERNATE TRAFFIC FLOW EVERY 2 TO 3 MINUTES UNDER HEAVY TRAFFIC CONDITIONS.
14. LOCATE FLAGGER POSITION TO PROVIDE STOPPING SIGHT DISTANCE AS A MINIMUM VIEWING DISTANCE FROM MOTORIST TO FLAGGER (SEE ADVANCE WARNING SIGN SPACING CHART).
15. ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.

10-28-2019

SPACING FOR TEMPORARY SIGNS IN SERIES (STATIONARY OR PORTABLE SIGNS)



ADVANCE WARNING SIGN SPACING CHART			
POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET ±)		
	Ⓐ	Ⓑ	Ⓒ
≤35	200	200	200
40–50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROAD ≥55	1000	1500	2700

SPACING OF TEMPORARY SIGNS NOTE:

1. APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

TEMPORARY TRAFFIC CONTROL ZONE SIGN NOTES:

1. SIGNS MUST BE RETROREFLECTIVE AND MADE FROM NCDOT APPROVED MATERIALS. MESH SIGNS ARE NOT ALLOWED.
2. ROAD WORK AHEAD OR BEGIN WORK ZONE SIGNS ARE REQUIRED IF THE WORK AREA IS NOT INSIDE A LARGER LONG TERM STATIONARY WORK ZONE THAT HAS THESE SIGNS ALREADY IN PLACE, AND THAT WILL REMAIN IN EFFECT OVERNIGHT.
3. ALL SIGNS MAY BE PORTABLE MOUNTED.
4. SIGNS SHOULD USE MESSAGES THAT ARE CLEARLY UNDERSTANDABLE BY THE MOTORIST, CLEAN AND LEGIBLE FROM AT LEAST THE DISTANCE REQUIRED IN THE ADVANCE WARNING SIGN SPACING CHART SHOWN ABOVE.
5. SIGNS SHOULD BE POSITIONED SO THE SIGN FACE IS TURNED SLIGHTLY AWAY FROM THE TRAVEL LANE TO REDUCE SUN AND HEADLIGHT GLARE.
6. USE PROPER BALLAST SUCH AS SAND BAGS ON PORTABLE SIGN STAND LEGS TO PREVENT OVERTURNING OR USE STATIONARY MOUNTED SIGNS IN HIGH WIND AREAS.
7. DURING PERIODS OF CONSTRUCTION INACTIVITY (LONGER THAN 30 MINUTES) SIGNS SHOULD BE REMOVED AND TURNED AWAY FROM THE MOTORIST'S VIEW (OR LAID DOWN TO REMOVE THE SIGN FROM THE MOTORIST'S VIEW).

MISCELLANEOUS NOTE:

1. TRAFFIC CONTROL MEASURES SHALL BE IN ACCORDANCE WITH PREVAILING FEDERAL, STATE, LOCAL, AND NCODT POLICIES, STANDARDS AND PROCEDURES. THESE POLICIES, STANDARDS, AND PROCEDURES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: (1) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), (2) NCDOT MAINTENANCE/UTILITY TRAFFIC CONTROL GUIDELINES, AND (3) NCDOT ROADWAY STANDARD DRAWINGS.

ISSUED FOR NORTH CAROLINA UTILITY ENCROACHMENT AGREEMENT

LAST REVISED: 08-29-2019

PREPARED BY:
ENspecialty services
4944 PARKWAY PLAZA, SUITE 470
CHARLOTTE, NC 28217
TEL 630-353-4000
FAX 630-353-7777
WWW.ENENGINEERING.COM

PREPARED FOR:
Mountain Valley PIPELINE, LLC

TRACT NUMBER:
N/A

NORTH CAROLINA 811
North Carolina One-Call Center

MVP SOUTHGATE

TEMPORARY TRAFFIC CONTROL PLAN
TYPICAL
16" H-650 MVP SOUTHGATE PIPELINE

ROCKINGHAM COUNTY — NORTH CAROLINA

DATE:	SCALE:	DRAWN BY:	APPR.:	DRAWING NUMBER:	SHEET NO:	REV:
08-21-19	N/A	NCK	DP	MVPPL-NCR-200B	12	A

FILE NAME: I:\PROJECTS\ENCOMPASS\1954800.00\6 – WORKING DRAWINGS\MECHANICAL DRAWINGS\PIPELINE\TRAFFIC CONTROL & DETAIL DRAWINGS\MVPPL–NCR–200B.DWG

Environmental Compliance and Mitigation Plans – Summary Sheets

COMPANY/ PROJECT NAME:	FERC Docket No.:
MVP Southgate Project	**CP 19-14-000**

Plan Title / Date:
Traffic and Transportation Management Plan, Revision 2, May 2020

PLAN OWNER	FIELD REPRESENTATIVE
	Spread Chief

APPLICABLE CONSTRUCTION PHASE:

☒ Pre-construction ☒ During construction ☐ Post-construction

APPLICABLE CONSTRUCTION SEQUENCE:

☐ Survey ☒ Clearing, Grading, Fencing ☒ Aboveground Facility Construction ☒ Trenching ☒ Pipe installation
☒ Padding and Backfilling ☒ Hydrostatic Testing and Tie-in ☐ Clean up and restoration ☐ Post-construction monitoring

ENVIRONMENTAL RESOURCES:

☒ Cultural ☒ Wetlands ☒ Waterbodies ☒ Agricultural
☒ Rare, Threatened, and Endangered Species ☒ Drinking Water

SPECIFIC IFC STATION LOCATIONS (If Applicable):	GENERAL LOCATION INFORMATION:
Not Applicable	Project wide

STATE SPECIFIC ITEMS (If Applicable):

Includes state-specific DOT agency contacts, state-specific road project websites to monitor, and state specific drawings for traffic control plans (Attachment A and Attachment B).

PLAN SUMMARY

This Plan describes the measures MVP and their Contractors will take to minimize potential impacts on state and local roadways during the construction of the Project.

Prior to Construction, MVP will:

- Appoint a Traffic Coordinator reporting to the Safety Program Manager or Construction Manager responsible for maintaining traffic related plans, procedures, records, and documents.
- Determine the number of workers' cars, equipment, and trucks that would use local roads and commuting periods.
  - Large work crews will meet at the identified collection points and take a bus to the construction right-of-way.
  - Smaller crews will use vans or will car pool with the foreman or straw boss.
- Establish routes to and from the Project work areas to ensure that traffic impacts are minimized.
- Coordinate with the VDOT AND NCDOT to obtain the required permits or agreements for any operations within a state right-of-way (see Plan for a list of state agency contacts, agencies).

During Construction:

- MVP will coordinate with landowners and lessees of properties to mitigate potential impacts on where local, private roadways will be affected.
- MVP will coordinate with the appropriate managing agency to mitigate potential impacts on roads or implement required traffic and transportation procedures on roads where public lands will be affected.
- MVP will maintain traffic flow and emergency vehicle access on roadways with traffic control personnel or detour signs, where necessary.
- MVP's Traffic Coordinator will work with local law enforcement, fire departments, and emergency medical services to coordinate access for effective emergency response during construction.
- MVP will work with the governing School Districts or the School Transportation Department in the project area to identify the bus routes and times.
- Contractor will develop an appropriate work zone plan to ensure the safe and efficient travel of vehicles during the construction phase and will comply with local weight limitations and restrictions on area roadways.
- Noxious weeds will be prevented from transporting along roadways by cleaning equipment and vehicles prior to entering or leaving each management area. Pressure wash in a designated area only.
- Certified week-free mulch/straw for erosion control will be used.
- Fugitive dust control measures such as wet suppression, using water, will be implemented to mitigate fugitive dust emissions from a variety of construction-related operations. EIs will monitor and enforce implementation of dust control measures by the construction contractor.

Appendix P

TRC Engineers, Inc.,

Lambert Compressor Site Traffic Impacts and Mitigation

(September 14, 2020)

September 14, 2020

Douglas K. Iles, PE
TRC, Inc.
781 Science Boulevard, Suite 200
Gahanna, Ohio 43230

Mountain Valley Pipeline, LLC
2200 Energy Drive
Canonsburg, PA 15317
Attn: Mr. James Sabol

Re: Lambert Compressor Station Traffic Impacts and Mitigation

Dear Mr. Sabol,

Mountain Valley Pipeline, LLC is proposing a natural gas pumping station, the Lambert Compressor Station (Station) is required for the safe and reliable operation of the MVP Southgate project. The Station will be located in Pittsylvania County, Virginia. These findings concur with the conclusion in the FERC's Final Environmental Impact Statement (February 2020) that construction activities associated with the MVP Southgate project will not have a significant impact to traffic along Transco Road.

The proposed Station will have a single driveway located along Transco Road (CR 692), north of Halifax Road (SR 57) and south of Chalk Level Road (CR 685). Transco Road is a rural road with (2) two 10-foot lanes, no shoulders. The latest traffic count data available from the Virginia Department of Transportation (VDOT) show an average daily traffic (ADT) on Transco Road of 330 trips.

Traffic in the project vicinity is predicted to increase temporarily during the construction phase of the project. This includes daily morning and evening peaks for construction laborers entering and exiting the station site and periodic delivery of construction materials and equipment. The on-site staff trips are expected to occur between 6:00-8:00 am and 4:00-6:00 pm, deliveries will mostly occur outside the peak travel periods. The use of rail delivery is not anticipated for construction of this project.

During construction the station is expected to employ 110 on-site construction staff. There will also be infrequent delivery of materials and supplies. Under ideal conditions a two-lane roadway can accommodate 2000 or more trips per hour. Transco Road currently has an ADT of 330 trips per day. Therefore, even if all staff drive separately, an additional 110 peak hour trips can be easily accommodated by Transco Road. Most likely the entering and exiting trips will be split, with some coming to and from Chalk Level Road and others coming to and from Halifax Road; therefore, not all 110 trips will occur on the full length of Transco Road.

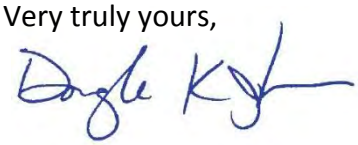
Appropriate signage and traffic directing will occur as necessary to increase driver safety and reduce risk of collisions for approaching traffic. There are no anticipated damages to the existing roadway infrastructure.

Land disturbing activities associated with the proposed project may temporarily contribute to airborne materials. To reduce wind erosion of recently disturbed areas, appropriate revegetation measures, application of water, mulching or covering of spoil piles may occur. The size of the project site, distance to nearby structures and roadways, combined with vegetated buffers along the property boundaries and fencerows will aid in managing off-site dust impacts. Internal roads will be compacted gravel, which may result in an increase in airborne dust particles during dry conditions and when internal road traffic is heavy. During construction activities water may be applied to the internal road system to reduce dust generation.

Upon completion of the project, Station operation and maintenance tasks are only expected to require 1-2 on site employees.

If you have any questions, please feel free to contact me.

Very truly yours,



TRC Engineers, Inc.

Douglas Iles, PE
Project Manager/Senior Traffic Engineer
diles@trccompanies.com
cc: file

DOUGLAS K. ILES, PE

EDUCATION

M.B.A., University of Central Florida, 2003

B.S., Civil Engineering, Ohio State University, 1998

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Professional Engineer, Ohio, (#69097)

AREAS OF EXPERTISE

Mr. Douglas K. Iles, PE, has project management and technical experience in the following general areas:

- Transportation Planning
- Local and Regional Long-Range Transportation Plans
- Traffic Impact Studies
- Safety Studies
- Speed Zone Studies
- Parking & Circulation Studies
- IMS/IJS
- ITS Plans
- Traffic Signal Plans
- Signing and Marking Plans
- Traffic Signal Timing & Coordination

REPRESENTATIVE EXPERIENCE

Mr. Iles has nearly 25 years of experience in both the public and private sector. His experience includes corridor studies, signal coordination studies using Synchro/SimTraffic software, parking studies, facility and event traffic planning, traffic impact studies, planning, construction plans, traffic calming studies, safety and speed studies, and detailed assessments of traffic operations and traffic controls. Working for the Franklin County Engineer's office, he analyzed all the county-maintained signals; implementing and fine-tuning the new timings. Mr. Iles was the lead engineer for a traffic signal retiming project for the City of Fort Lauderdale that included seven key corridors and over 30 signals throughout the City. In addition to modeling existing and recommended timing patterns, he worked with City staff to input the optimized timings and fine-tune the system. Mr. Iles also worked for the Florida DOT doing traffic analysis. In this position, he forecast and modeled traffic for projects in the planning stages. Eventually Mr. Iles became the District 5 Bituminous Engineer, managing approximately 15 staff members including professional engineers, roadway project inspectors and laboratory staff. As the Bituminous Engineer he was responsible not only for construction projects but also responding to roadway closures resulting from crash damage to pavement. Mr. Iles has been responsible for training and oversight of junior staff and QA/QC of many construction plans and studies. Additionally, he prepares contracts scope and fee documents.

Traffic Studies

Franklin County Engineer's Office, Corridor Evaluation & Coordination – Columbus, OH (Project Manager: 2017)

The Franklin County Engineers Office (FCEO) wanted to reevaluate traffic signals installed along the corridor serving the Hollywood Casino. Mr. Iles supervised an evaluation of inventory the signal equipment, evaluate crashes, capacity to determine if changes to timing, cycle length or phasing could improve traffic flow and safety.

RGLP Group, Campus Gateway – Columbus, OH (Project Manager/Engineer: 2017)

This TIS was for five buildings totaling over 2.3SKF, including the Amazon warehouse. Mr. Iles study included 10 intersections (six site driveways).

Minelli Builders, Heritage Preserve TIS – Hilliard, OH (Project Manager/Engineer: 2015)

This TIS was for a residential development that included single family units and apartments. Mr. Iles recommended a mix of roundabouts and stop control intersections to calm traffic and maintain safe residential streets.

Minelli Builders, Diersing Yarnell Vinmar TIS – Delaware, OH (Project Manager/Engineer: 2015)

This TIS involved traffic flow for an expanding subdivision. Mr. Iles analysis showed link volumes expected for various site layout plans.

Minelli Builders, Shamrock TIS – Delaware, OH (Project Manager/Engineer: 2014)

Mr. Iles was the design engineer for the Traffic Impact Study for a 162-unit residential development at the Shamrock Golf Club in Delaware County.

Minelli Builders, Crownover TIS – Delaware, OH (Project Manager/Engineer: 2013)

Mr. Iles was the design engineer for the Traffic Impact Study for a 106-unit residential development in Delaware County.

Traffic Operations

Texas DOT, Frontage Road Signal Timing – Dallas, TX (Project Engineer: 2013)

Mr. Iles designed signal timing plans for use at ramp locations, the timings were used to allow traffic to be diverted from the interstate onto frontage roads during emergencies.

Illinois DOT, I55 Managed Lane – Chicago, IL (Project Manager: 2015)

IDOT prepared plans to add a managed lane to I64. Mr. Iles managed the traffic, signing and ITS components of the project. The planned lane used dynamic pricing to create LOS C or better in the toll lane by increasing the toll as demand increased. He also coordinated the study to identify entry/exit points to the managed lanes.

ODOT, Eastern Corridor Safety Study – Newtown, OH (Project Engineer: 2010)

Mr. Iles summarized crash data and identified improvements based on the crash type, facility characteristic and input from the maintaining agency.