MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2 – Water Use and Quality

November 2018

MVP Southgate Project
Resource Report 2 – Water Use and Quality

Resource Report 2 – Filing Requirements	
Information	**Location in Resource Report**
Minimum Filing Requirements	
1. Identify all perennial surface waterbodies crossed by the proposed project and their water quality classification. (§ 380.12(d)(1)) • Identify by milepost • Indicate if potable water intakes are within 3 miles downstream of the crossing.	Section 2.3.1.3, 2.3.2.2, 2.3.2.7, Appendix 2-A
2. Identify all waterbody crossings that may have contaminated waters or sediments. (§ 380.12(d)(1)) • Identify by milepost • Include offshore sediments.	Section 2.3.2.5
3. Identify watershed areas, designated surface water protection areas, and sensitive waterbodies crossed by the proposed project. (§ 380.12(d)(1)) • Identify by milepost	Section 2.3.1.1, 2.3.2, and 2.3.2.4
4. Provide a table (based on NWI maps if delineations have not been done) identifying all wetlands, by milepost and length, crossed by the proposed project, and the total acreage and acreage of each wetland type that would be affected by construction. (§ 380.12(d)(l&4))	Section 2.4, Appendix 2-B
5. Discuss construction and restoration methods proposed for crossing wetlands, and compare them to staff's Wetland and Waterbody Construction and Mitigation Procedures. (§ 380.12(d)(2))	Section 2.4.3 and 2.4.4
6. Describe the proposed waterbody construction, impact mitigation, and restoration methods to be used to cross surface waters and compare to the staff's Wetland and Waterbody Construction and Mitigation Procedures. (§ 380.12(d)(2)) • Although the Procedures do not apply offshore, the first part of this requirement does apply. Be sure to include effects of sedimentation, etc. This information is needed on a mile-by-mile basis and will require completion of geophysical and other surveys before filing. (See also Resource Report 3.)	Section 2.3.1.4 and 2.3.6
7. Provide original National Wetlands Inventory (NWI) maps or the appropriate state wetland maps, if NWI maps are not available, that show all proposed facilities and include milepost locations for proposed pipeline routes. (§ 380.12(d)(4))	Appendix 2-J
8. Identify all U.S. Environmental Protection Agency (EPA) - or state-designated aquifers crossed. (§ 380.12(d)(9)) • Identify the location of known public and private groundwater supply wells or springs within 150 feet of construction.	Sections 2.2.1, 2.2.3.1, 2.2.3.2 and 2.2.3.3
Additional Information Often Missing and Resulting in Data Requests	
9. Identify proposed mitigation for impacts on groundwater resources.	Section 2.2.4
10. Discuss the potential for blasting to affect water wells, springs, and wetlands, and associated mitigation.	Section 2.2.4.2

Resource Report 2 – Filing Requirements		
	Information	**Location in Resource Report**
11.	Identify all sources of water required for construction (e.g. hydrostatic testing, dust suppression, horizontal directional drills [HDD]), the quantity of water required, and methods for withdrawal. Identify the treatment of discharge, discharge volumes, rates, and locations, and any waste products generated.	Section 2.3.3, 2.3.4, 2.3.5
12.	Identify operating water requirements for proposed liquefied natural gas facilities, including the water use, source(s), and volumes.	Not Applicable (no liquefied natural gas facilities)
13.	If underground storage of natural gas is proposed, identify how water produced from the storage field will be disposed.	Not Applicable (no underground storage)
14.	If salt caverns are proposed for storage of natural gas, identify the source locations, the quantity required, the method and rate of water withdrawal, and disposal methods.	Not Applicable (no salt cavern storage)
15.	Provide a site-specific construction plan for each proposed HDD crossing in accordance with section V.B.6.d of the Federal Energy Regulatory Commission's *Wetland and Waterbody Construction and Mitigation Procedures*.	Appendix 1-C1 of Resource Report 1
16.	Provide a site-specific construction plan for crossing each waterbody greater than 100 feet wide. Include a discussion on the feasibility of a trenchless crossing method.	Appendix 1-C1 of Resource Report 1
17.	Identify mitigation measures to avoid impacts on springs; especially those used for drinking water or livestock.	Section 2.2.4.1
18.	Identify mitigation measures to ensure that public or private water supplies are returned to their former capacity or replaced in the event of damage resulting from construction.	Section 2.2.4.1
19.	In addition to identifying perennial surface waterbodies crossed or affected by the project, also identify intermittent and ephemeral waterbodies.	Sections 2.3.1.3 and Appendix 2-A
20.	Show the locations of wetlands and waterbodies relative to the construction and permanent rights-of-way and additional temporary workspaces on mile posted alignment sheets or aerial photography.	Appendix 1-A of Resource Report 1
21.	If wetlands would be filled or permanently lost, describe proposed measures to compensate for permanent wetland losses. Include copies of any compensatory mitigation plans and discuss the status of agency consultations/approvals.	Section 2.4.4
22.	Describe measures to avoid or minimize impacts on forested wetlands. If impacts are unavoidable, describe proposed measures to restore forested wetlands following construction	Section 2.4.4
23.	Describe techniques to be used to minimize turbidity and sedimentation impacts associated with offshore trenching, if applicable.	Not Applicable (no offshore trenching)

RESOURCE REPORT 2
WATER USE AND QUALITY

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LIST OF ACRONYMS AND ABBREVIATIONS

ATWS	additional temporary workspace
BMPs	best management practices
CFR	Code of Federal Regulations
E. coli	Escherichia coli
EDR	Environmental Data Resources Inc.
E&SCP	Erosion and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FERC or Commission	Federal Energy Regulatory Commission
GPM	gallons per minute
HDD	horizontal directional drilling
HUC	hydrologic unit code
MGD	million gallons per day
MP	milepost
Mountain Valley	Mountain Valley Pipeline, LLC
NCDEQ	North Carolina Division of Environmental Quality
NCDWR	North Carolina Division of Water Resources
NHD	National Hydrography Database
NRI	National Rivers Inventory
PCB	polychlorinated biphenyl
PEM	palustrine emergent
PFO	palustrine forested
Plan	FERC Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
Project or Southgate Project	MVP Southgate Project
PSS	palustrine scrub/shrub
riparian buffer	Jordan Lake riparian buffer
SDWA	Safe Drinking Water Act
SPCC Plan	Spill Prevention, Control and Countermeasure Plan
TMDL	Total Maximum Daily Load
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Society
VADEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH-ODW	Virginia Department of Health – Office of Drinking Water

RESOURCE REPORT 2
WATER USE AND QUALITY

2.1 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.

2.1.1 Environmental Resource Report Organization

Resource Report 2 is prepared and organized according to the FERC *Guidance Manual for Environmental Report Preparation* (February 2017). This report is organized into three major sections and a separate section listing the sources used to prepare this report. Section 2.2 describes groundwater resources, Section 2.3 describes surface water resources, and Section 2.4 describes wetlands. A list of waterbodies and wetlands crossed by the Southgate Project is provide in Appendix 2-A and 2-B, respectively.

2.2 GROUNDWATER RESOURCES

2.2.1 Aquifers – Geology, Hydrology, Quality, and Uses

Information on major aquifers discussed in this section is based on the Ground Water Atlas of the United States ("U.S.") (USGS, 2000), Water Resources Investigations Report (USGS, 1996), and Aquifer Susceptibility in Virginia (USGS, 2003). Aquifer systems have generally been characterized based on physiographic provinces in both Virginia and North Carolina. Groundwater aquifers used for public and private water sources can be located in unconsolidated depositional units or lithified bedrock units, depending on their location. Unconsolidated surficial deposits, such as alluvium, alluvial fans, and colluvium, are found in all the aquifer system areas. These surficial aquifers are discontinuous both in extent and in terms of their aquifer characteristics and are not commonly used as potable water sources in the Southgate Project area (areas impacted by construction). As a result, surficial aquifers have not been mapped by state agencies or otherwise documented in the area of the Project. Bedrock aquifers are the primary source of groundwater in the Project area. Aquifer systems in the Project area are summarized by county in Table 2.2-1 and shown on Figure 2-C-1 in Appendix 2-C.

Table 2.2-1

Aquifers Crossed by the MVP Southgate Project Pipeline

Facility / State / County	Approximate Mileposts	Aquifer System Name	Dominant Lithology
Virginia			
H-605 Pipeline			
Pittsylvania	0.0 – 0.4	Early Mesozoic basin aquifers	Sandstone aquifers
H-650 Pipeline			
Pittsylvania	0.0 - 4.3	Early Mesozoic basin aquifers	Sandstone aquifers
	4.3 - 4.6	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
	4.6 - 26.1	Early Mesozoic basin aquifers	Sandstone aquifers
North Carolina			
Rockingham	26.1 - 32.5	Early Mesozoic basin aquifers	Sandstone aquifers
	32.5 - 52.6	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
Alamance	52.6 - 73.1	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
Source: USGS, 2000			

In Virginia, Pittsylvania County is part of the Piedmont physiographic province. The Virginia State Water Resources Plan (VADEQ, 2015) notes that the structural complexity of the groundwater/surface water system in areas of fractured rock and karst terrain creates some practical limitations regarding characterization of such resources. The geologic units that underlie several meters of saprolite regolith in Pittsylvania County are fractured and highly deformed crystalline bedrock that are not designated as individual aquifers. Aquifer characterization in the Southgate Project area is highly dependent on well data in the immediate vicinity of the Project, and generalized information regarding aquifer depths and yields are highly variable across entire aquifer extents. Based on information provided through consultation with the Virginia Department of Environmental Quality ("VADEQ"), wells in Pittsylvania County are varied both in depth and yield. Depth of wells in Pittsylvania County can range from 80 feet to 1,000 feet. Well yields are also extremely varied in Pittsylvania County, ranging from three gallons per minute ("GPM") upwards of 600 GPM (VADEQ, 2018a).

In North Carolina, the Southgate Project is located in Rockingham and Alamance counties that are within the Piedmont regional aquifer system. In Rockingham County, the amount of groundwater available is estimated to average 0.32 million gallons per day ("MGD") per square mile. Continuously pumped wells spaced about 2,500 feet apart may be expected to yield 0.08 MGD in the northwestern part of the county and 0.05 MGD in the southeastern part of the county. The City of Eden, located west of the Project, is underlain by sedimentary rock (sandstone, shale, mudstone, and conglomerate) of the Triassic Period. Groundwater wells drilled in Triassic range from 70 to 150 feet and are reported to yield as much as 50 GPM. The City of Reidsville, located southwest of the Project, is underlain by metamorphic rocks, which

are weathered to a depth of 50 feet. Groundwater wells in this area are typically drilled to depths of 75 to 250 feet, and can yield as much as 30 GPM (Jackson, 1972).

In Alamance County, the predominant rock types are mafic volcanic rocks, felsic volcanic rocks, granite, and diorite. The majority of the Southgate Project in Alamance County is underlain by mafic volcanic rocks and may have small bodies of diorite, which are found throughout the county. In general, due to the fractures and bedding characteristics and amply overlying soils cover, the rocks in Alamance County form some of the best aquifers in the Piedmont, producing average to above-average well yields. Above-average well yields are found where soil cover is thickest and in low, flat areas. Average well depths exceed 100 feet and average well yields can range from an average of 7 GPM (diorite rock) to 21 GPM (mafic volcanic rock). It is estimated that 0.1 MGD per square mile can be withdrawn from aquifers in most of the county. In areas underlain by granite, this figure can generally be doubled. The probable yield of continuously pumped wells spaced about one-half mile apart is in the order of 0.05 MGD in the areas underlain by granite and 0.03 MGD in the remainder of the county. The City of Burlington is predominantly underlain by granite and greenstone schist that has weathered as deep as 80 feet. Well yields in Burlington can range from 0 to 200 GPM but average 20 to 30 GPM (Jackson, 1972).

2.2.1.1 Major Aquifers – Geology and Hydrology

Piedmont Regional Aquifer System

The Southgate Project is located solely within the Piedmont regional aquifer system. The Piedmont physiographic province is underlain by crystalline-rock and undifferentiated sedimentary-rock aquifers in the Project area. Hard, crystalline igneous and metamorphic formations dominate this region with some areas of sedimentary rocks and weathered bedrock deposits overlying the bedrock. The size and number of fractures and faults in the bedrock that store and transmit groundwater decrease with depth; therefore, most significant water supplies are found within a few hundred feet of the surface. Most of the rocks that compose the crystalline-rock and undifferentiated sedimentary-rock aquifers are crystalline metamorphic and igneous rocks of many types. Within the Piedmont physiographic province, the Project is specifically located within crystalline-rock aquifers and aquifers within early Mesozoic basins. The main types of crystalline rocks are coarse-grained gneisses and schists of various mineral compositions; however, fine-grained rocks, such as phyllite and metamorphosed volcanic rocks, are common in places. Wells in crystalline rocks yield from less than 1 GPM to more than 100 GPM and range in depth from 60 to 500 feet. In general, recharge is highly variable in the Piedmont province because it is determined by local precipitation and runoff which are highly variable and influenced by topographic relief and the capacity of the land surface to accept infiltrating water. The location of the Project within the western part of the Piedmont province receives less precipitation because it is in the rain shadow of the Blue Ridge Mountains. The majority of recharge in the Piedmont provinces takes place in interstream areas. Almost all groundwater recharge is from precipitation that enters the aquifers through the porous regolith.

Crystalline-Rock Aquifers

Crystalline-Rock Aquifers are among the most common and widespread aquifers in the Piedmont Province. In general, in crystalline-rock areas, the regolith and fractures in the bedrock serve as the primary places for the transmission of water. The porosity of the regolith ranges from 20 to 30 percent. Most of the fractures in crystalline rocks are steeply inclined, intersecting openings that are more numerous at shallow depths. Groundwater movement is general along short flow paths from interstream recharge areas to the nearest stream.

Aquifers in Early Mesozoic Basins

Unlike crystalline-rock aquifers, aquifers in Early Mesozoic Basins compose a small percent of the total area in the Piedmont province. Within the early Mesozoic basin, the Southgate Project is located within the Dan River Danville Basin, which contains sedimentary rocks consisting of sandstone, siltstone, mudstone, shale and local conglomerate.

In general, the rocks of the early Mesozoic basins originally had considerable effective porosity between the grains. Due to compaction and cementation, the pores in most of the strata are now reduced in size and poorly interconnected causing only a small part of the groundwater to move between pores. The groundwater in the Mesozoic rocks moves primarily along joints, fractures and bedding planes. Since some sedimentary rocks contain more interconnected openings than others, the ground-water system in the early Mesozoic basins consists of a series of aquifers of tabular form that alternate with confining units that are tens of feet thick. Aquifers in the early Mesozoic basins north of North Carolina generally yield more water than other noncarbonated aquifers in the Piedmont province likely due to the original, intergranular pore space in the Mesozoic rocks being insufficient to store and transmit appreciable quantities of water.

2.2.1.2 Water Quality

The quality of water from aquifers in the different rock types of the Piedmont province is generally suitable for drinking and other uses; however locally high concentrations of iron, manganese, and sulfate can affect this suitability. Large iron concentrations can be caused by corrosion or the action of iron-fixing bacteria on iron and steel casings and well fittings. Some crystalline rocks and some sedimentary rocks in early Mesozoic basins contain minerals that when weathered can contribute iron and manganese to groundwater. The potential for contamination in crystalline rock is high because of rapid movement of water in fractures, joints, and bedding planes.

In Rockingham County, North Carolina, the chemical quality of the groundwater in Eden is suitable for most domestic use and some industrial processes, but the water may locally be very hard and contain high iron concentrations. In Reidsville, a partial analysis from one well indicated that the chemical quality of groundwater is acceptable for most uses, but hardness may be a localized problem (Jackson, 1972).

In Alamance County, North Carolina, the chemical quality of the groundwater in all parts of the County is acceptable for most domestic and industrial uses. However, in some locations the concentrations of iron and hardness-causing constituents are higher than desirable. For public water supply, the groundwater is of acceptable quality and no problems that conventional treatment procedures would not correct, except where pollution may be a factor, have been reported (Jackson, 1972).

The Project proposes the use of a 100-foot-wide construction right-of-way, and the pipeline trench would be excavated to a depth of about 6 to 10 feet in most locations. For these areas, the Southgate Project is not anticipated to have any impacts to groundwater resources or require additional mitigation measures. This is due to the surficial nature of the disturbance, the relatively short-term nature of the disturbance, and because the aquifers are typically much deeper than any proposed disturbance area. The use of other construction techniques and their potential effect on groundwater are discussed in Section 2.2.6.

2.2.1.3 Water Use

According to the U.S. Geological Society ("USGS") Estimated Water Use in the United States Report (2015), 81 percent of Virginians used domestic water sources provided by public suppliers (USGS, 2015).

An estimated 48 percent of North Carolina's population receives its drinking water supplies from the ground (NCDEQ, 2018a). Approximately 125 million gallons of groundwater per day was withdrawn to supply the 19 percent of all Virginians who rely on self-supplied groundwater (private wells) for domestic supplies, and approximately 169 million gallons of groundwater per day was withdrawn to supply 35 percent of all North Carolinians who rely on self-supplied groundwater for domestic supplies (USGS, 2015, NCDEQ, 2018a). While both Virginia and North Carolina's groundwater is generally of good quality, both the quality and quantity can vary. Reliance on groundwater is also highly variable across both states, depending on a variety of geographic, geologic, and socioeconomic factors.

Water use data is available from Virginia's Water Use Plan (VADEQ, 2015) by hydrologic unit code ("HUC") watershed. The Southgate Project is located entirely within the Roanoke River Basin in Virginia. Groundwater wells provide source water for most of the community water systems in Roanoke River Basin in Virginia. An estimated 16,136 people used private groundwater wells for residential water supply during 2015. The estimated 2015 groundwater use in Pittsylvania County was 1.417 MGD by community water systems, 3.096 MGD by small private users, 0.079 MGD by large private users, and 8.488 MGD for agricultural use.

According to most recently available data from USGS South Atlantic Water Science Center's 2010 North Carolina Water Use Report (USGS, 2010), in Alamance County, a total of approximately 3.76 MGD of groundwater was withdrawn. In Rockingham County, a total of approximately 7.89 MGD of groundwater was withdrawn in 2010. In general, groundwater withdrawn is used for public supply, domestic, irrigation and small amounts for industrial, mining, livestock and agriculture.

2.2.1.4 Groundwater in Karst Terrain

Surface water in karst terrain generally flows from higher elevations to sinks when it reaches limestone and dolostone rock formations. These soluble rock formations form the sinkholes, insurgencies, and caves that form the basis for the karst hydrology that includes sinking streams, springs, and complex underground flow conditions.

The Southgate Project contracted qualified geologists to evaluate the Project alignment and assess the limited karst terrain present. The Project evaluated karst topography areas and determined that there is negligible potential for karst hazards to be present within 0.25-mile of the Project pipelines. The Project Karst Hazards Assessment is provided in Resource Report 6, Appendix 6-E.

2.2.2 Sole-Source Aquifers

The U.S. Environmental Protection Agency ("USEPA") defines a sole- or principal-source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer (USEPA, 2015). USEPA guidelines also stipulate that these areas can have no alternative drinking water sources that could physically, legally, or economically supply all those who depend upon the aquifer for drinking water (USEPA, 2015).

No sole-source aquifers have been designated in the Southgate Project area according to USEPA Regions 3 and 4 (USEPA, 2015). There is one designated sole-source aquifer in Virginia (SSA32, Prospect Hill Aquifer) located approximately 175 miles north of the Project in the northern part of the state in Clark County, which will not be impacted by the Project. North Carolina has no designated sole-source aquifers within the state.

2.2.3 Water Supply Resources

2.2.3.1 Public Water Supply Wells and Springs

Initial information on public wells and springs located within one-mile of the Southgate Project alignment was obtained from USEPA's Safe Drinking Water Information System (USEPA, 2016a), and digital location information for public supplies was obtained from the VADEQ (VADEQ, 2018b), and the North Carolina Division of Environmental Quality ("NCDEQ") (NCDEQ, 2018b).

The VADEQ and NCDEQ confirmed that no public water supply wells or springs are located within 150 feet of the Southgate Project construction work area (NCDEQ, 2018d, VADEQ, 2018a).

If any public water supply well or spring is identified within 150 feet of the Southgate Project workspace areas during construction, mitigation measures will be utilized to minimize potential impact as a result of the Project. Mitigation measures for protection of public water supplies are further described in Section 2.2.6.

2.2.3.2 Private Water Resources (Wells)

Private water wells in the area of the Southgate Project are primarily completed in bedrock aquifers. As outlined in Section 2.2.1, wells in this area can range in depth from 60 to 500 feet. In general, bedrock aquifers are not expected to be impacted by the Project with the implementation of mitigation measures and procedures described in Section 2.2.6. Potential impacts to bedrock aquifers include impacts from blasting and trenching during construction. See Resource Report 6 for areas of karst terrain conditions and Sections 2.2.1.4 and 2.2.4.

The Project is in the process of conducting landowner and civil surveys where access is granted, which includes efforts to identify private water resources within 150 feet of the alignment work area. Table 2.2-2 lists the private wells identified by civil surveys where access has been granted. The Project will update Table 2.2.2 in a supplemental filing expected to be filed in early 2019.

Table 2.2-2

Private Wells within 150 feet of the MVP Southgate Project Construction Workspace a/

State, County, Milepost	Line List Number	Status (active, inactive, plugged, etc.)	Use (irrigation, monitoring, domestic, etc.)	Distance from Project Construction Workspace (Feet) b/
Virginia				
Pittsylvania				
H-605 Pipeline				
No private wells located within 150 feet of workspace areas				
H-650 Pipeline				
4.3	VA-PI-030.000	TBD	TBD	0
6.2	VA-PI-036.000	TBD	TBD	0
6.2	VA-PI-036.000	TBD	TBD	0
6.2	VA-PI-036.000	TBD	TBD	0
6.2	VA-PI-036.000	TBD	TBD	0
6.2	VA-PI-036.000	TBD	TBD	0

Table 2.2-2

Private Wells within 150 feet of the MVP Southgate Project Construction Workspace a/

State, County, Milepost	Line List Number	Status (active, inactive, plugged, etc.)	Use (irrigation, monitoring, domestic, etc.)	Distance from Project Construction Workspace (Feet) b/
6.2	VA-PI-036.000	TBD	TBD	0
6.3	VA-PI-037.000	TBD	TBD	22
6.3	VA-PI-037.000	TBD	TBD	127
6.3	VA-PI-037.000	TBD	TBD	0
6.3	VA-PI-037.000	TBD	TBD	0
6.5	VA-PI-037.000	TBD	TBD	86
6.5	VA-PI-037.000	TBD	TBD	0
6.5	VA-PI-037.000	TBD	TBD	96
21.9	VA-PI-167.000	TBD	TBD	99
North Carolina				
Rockingham				
43.9	NC-RO-133.100.AR	TBD	TBD	31
45.0	NC-RO-139.000	TBD	TBD	69
Alamance				
52.9	NC-AL-000.035	TBD	TBD	25
52.9	NC-AL-000.030	TBD	TBD	65
56.7	NC-AL-028.000	TBD	TBD	0
69.1	NC-AL-150.000	TBD	TBD	4

Note: The Southgate Project is currently working with landowners to identify the status and use of wells within 150 feet. TBD = To Be Determined.
a/ Private wells identified by civil survey where access has been granted
b/ Wells with a distance of 0 feet from Southgate Project Construction Workspace are located within the current construction workspace.

Through implementation of the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan") (2013) and FERC's *Wetland and Waterbody Construction and Mitigation Procedures* ("Procedures") (2013), the Project does not anticipate private wells to be impacted as a result of Southgate Project construction or operations.

2.2.3.3 Springs and Swallets

Springs of Virginia (Virginia Division of Water Resources and Power, 1930) provides information on springs based on largely anecdotal information, and the exact location of the springs listed in the publication is not available. VADEQ is in the process of locating, characterizing and publishing a database of springs throughout Virginia; however, that information is not available at this time. Based on an online map of the "Spring Database 2016," no springs have been recorded within Pittsylvania County (VADEQ, 2016a).

Similar to Virginia, there are no published data on springs in North Carolina. The Project has attempted to augment published data and nomenclature on wells and springs with information obtained from landowners where survey access has been obtained. As additional survey access is obtained, the Project will continue to conduct surveys to identify springs within 150 feet of the Southgate Project workspace areas.

The Southgate Project will survey affected landowners to request the locations of known springs to help minimize or avoid potential impacts to private springs that are used for potable water supply purposes. If springs are identified that could be affected by construction activities, the Project will consult with the appropriate regulatory agencies and with individual landowners to minimize impacts. Springs, if used for domestic, livestock, or agriculture, purposes may be tested and evaluated, and repaired or replaced, as outlined in Section 2.2.6.

2.2.3.4 Wellhead or Source Water Protection Areas

Under a 1986 amendment to the Safe Drinking Water Act ("SDWA"), each state is required to develop and implement a wellhead protection program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The SDWA was later updated in 1996 to require the development of a broader-based source water assessment program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach.

In 1999, the Virginia Department of Health – Office of Drinking Water ("VDH-ODW") developed a Source Water Assessment Program, as a result of the 1996 Amendments to the SDWA, Section 1453. By 2003, all existing drinking water sources were assessed. The objective of the Source Water Assessment Program is to facilitate and promote the implementation of source water protection measures for both groundwater and surface water sources. To achieve this, VDH-ODW delineates a generalized assessment area for each drinking water source and creates an inventory of potential sources of contamination. Through consultation with VDH-ODW, it was explained that assessment areas are not designated protection areas. The assessment area information is provided to local municipalities and used to make a susceptibility determination of the drinking water source in relation to the potential source of contaminants found in the assessment area (VDH-ODW, 2018a). As detailed in VDH-ODW consultation (VDH-ODW, 2018b), the program is voluntary at the local level and there are no requirements for reporting; therefore, an accurate database for the program does not exist.

According to the NCDEQ's Source Water Assessment Program Plan (NCDENR, 1999), wellhead protection can be broadly defined as a program that reduces the threat to the quality of groundwater used for drinking water by identifying and managing recharge areas to specific wells or wellfields. Wellhead protection is accomplished in part by defining a wellhead protection area. A wellhead protection area is defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are likely to move toward and reach such water well or wellfield". The NCDEQ believes that the most appropriate level for Wellhead Protection Program implementation is at the County level. There are five steps taken in North Carolina to implement the Wellhead Protection Program; setting up a local planning team, delineating wellhead protection area, inventory of potential contamination sources, managing the wellhead protection area and administration of the Wellhead Protection Program. As documented through consultation with the NCDEQ Division of Water Resources, there are no wellhead protection areas in Rockingham or Alamance counties (NCDEQ, 2018c).

2.2.3.5 Potential Contaminated Groundwater

USEPA's Facility Registry Service database (USEPA, 2018) was used to identify documented contaminated sites located within 0.5 miles of the Southgate Project. The database includes information on regulated sites for hazardous waste handling, releases to air, and federal cleanup sites. As outlined in Resource Report 8, Environmental Data Resources, Inc ("EDR") conducted a search to identify potential

and actual sources of contamination to nearby groundwater resources along the Project facilities. Information from EDR is a compilation of a variety of available federal, state, and local government databases within information on known locations of current and historic contamination. Additional sites identified from the EDR review within 0.25-mile of the Southgate Project are provided in Appendix 2-D.

Additionally, the Eden North Carolina Coal Ash Spill was identified more than 0.25 mile from the Southgate Project in Eden, North Carolina (EDR, 2018). On February 2, 2014, an estimated 39,000 tons of coal ash spilled from Duke Energy's Dan River Steam Station into the Dan River in Eden, North Carolina. The Dan River Steam Station is located approximately 2.3 river miles upstream from the Project's Dan River crossing at MP 30.1 in Rockland County, North Carolina. On May 22, 2014, the USEPA and Duke Energy entered into an Administrative Order on Consent. Under the requirements of the Administrative Order on Consent, Duke Energy removed coal ash that had accumulated at the Schoolfield Dam, Town Creek Sand Bar, and at both the Danville and South Boston water treatment facilities (located downstream of the Project's Dan River crossing). The removal action was completed in July 2014, and an estimated 4,000 cubic yards of coal ash were removed. USEPA's January 27, 2015 information update on long term monitoring for the ash spill stated that, "following extensive surface water and sediment sampling, no further ash removal is planned. There have been no exceedances of human health screening thresholds, or any recent exceedances of ecological screening thresholds, for contaminants associated with ash" (USEPA, 2017). Based on the USEPA's January 27, 2015 status of the of the spill cleanup, and the Project's HDD for the Dan River, which will avoid in-stream disturbance of stream bottom sediments, no impact on Project-related construction or operation activities associated with the coal ash spill are anticipated.

USEPA documented sites with potentially contaminated groundwater within 0.5 mile of the Southgate Project are listed in Table 2.2-3.

Table 2.2-3

Documented Potential Contaminated Groundwater Sites within 0.50 mile of the Construction Right-of-Way

Milepost	Facility	Relation to Route	Distance from Construction right-of-way (feet)	Distance from Construction right-of-way (miles)
0.0	Transco Gas Pipeline Corp Station 165	NNE	324	0.1
4.6	Sartomer USA LLC	W	2,201	0.4
13.4	Elkay Wood Products Co.	SE	420	0.1
13.4	Owens-Brockway Glass Container	SE	1,873	0.4
30.7	Millercoors LLC – Eden Brewery	NW	811	0.2
30.8	Loparex Incorporated	NW	334	0.1
44.1	Keystone Foods	W	1,019	0.2
44.1	Ball Metal Beverage Container Corporation	W	1,597	0.3
69.3	City of Burlington – East Burlington Waste Water Treatment Plant	SW	1,117	0.2
69.7	Texfi Industries Incorporated Haw River Dyeing	W	146	0.0
69.9	Cone Mills Corporation	W	959	0.2
71.5	Stericycle Incorporated	E	2,553	0.5

Source: USEPA, 2018

The closest USEPA documented contaminated site to the Southgate Project is VerTex Sportswear, Inc. (Texfi Industries Incorporated Haw River Dyeing), located near MP 69.7, approximately 146 feet east of the Project in Haw River, North Carolina. The last update to information pertaining to this registered facility was in April 2015 and it appears the facility is no longer functioning (USEPA, 2018). If contaminated soil or groundwater is encountered during construction, the Project will notify the affected landowner and will coordinate with the appropriate federal and state agencies in accordance with applicable notification requirements. See Resource Report 1, Appendix 1-G for the Project's Unanticipated Discovery of Contamination Plan. The purpose of the Unanticipated Discovery of Contamination Plan is to provide procedures for work, investigation and reporting for responding to the unanticipated discovery of contamination in soil, groundwater, or sediment during excavation, construction, or maintenance activities associated with construction of the Project.

The Southgate Project does not anticipate any potential concerns associated with hazardous materials during construction and operation of the Project. If any hazardous materials are encountered during pipeline construction, the Project will dispose of and / or implement mitigation measures for the hazardous materials in accordance with applicable regulations.

2.2.4 Construction Impacts and Mitigation

Construction, operation, and maintenance of the Southgate Project facilities are not anticipated to have significant or long-term impacts on groundwater resources. Impacts will be minimized or avoided by implementation of the construction practices outlined in the FERC Plan and Procedures and as described in the mitigation measures detailed below.

Although no impacts to groundwater supply or quality are expected due to the limited depth of excavation and the short duration of open trench and typical depths to the groundwater table, the Southgate Project will employ accepted measures and procedures to minimize potential impacts. Construction activities associated with the Project that have the potential to impact groundwater include shallow excavations, blasting for trench excavation, hydrostatic test discharges, HDD and potential spills or leaks of contaminants from the refueling of construction vehicles or storage of fuel, oil, and other fluids. The Project proposes to implement construction practices designed to avoid impacts on groundwater during construction. These practices will include the FERC Plan and Procedures and a Project-specific Spill Prevention, Control, and Countermeasures Plan ("SPCC") Plan. During construction, the construction contractors will adhere to these general practices related to groundwater protection including:

- Enforcing restrictions on refueling locations and storage of contaminants; and
- Installation of permanent trench plugs, where needed, to maintain existing groundwater flow patterns.

Additional information on groundwater impacts and mitigation associated with construction is provided in the following sections.

2.2.4.1 Aquifers and Groundwater Sources

In areas of shallow groundwater, construction activities may temporarily affect shallow, near-surface aquifers. Grading and clearing, trenching and blasting, trench dewatering and hydrostatic test discharge activities could temporarily alter overland water flow and groundwater recharge, or could result in minor

fluctuations in groundwater levels. Overland construction could potentially increase turbidity through erosion and sedimentation. Dewatering of the pipeline trench may require the temporary pumping of groundwater in areas where there is near-surface water table. Construction activities may affect shallow aquifers and could cause minor temporary fluctuations in groundwater levels and/or increased turbidity. Impacts will be minimized or avoided by implementation of the construction practices outlined in the FERC Plan and Procedures and in this section.

As outlined in Section 2.2.1, surficial aquifers are discontinuous both in extent and in terms of their aquifer characteristics and are not commonly used as potable water sources in the Southgate Project area. Although bedrock aquifers are most common in the Project area, construction activities such as trenching, blasting, dewatering, and backfilling may encounter shallow alluvial aquifers and could cause minor, localized fluctuations in groundwater levels and/or increased turbidity. Ground disturbance associated with typical pipeline construction is generally within 6 to 10 feet of the existing ground surface. A depth of 10 feet is above most surficial aquifers utilized as a potable water source, and most existing wells that might be drilled in a shallow aquifer will be cased to at least 20 feet. Most alluvial aquifers exhibit rapid recharge and groundwater movement; therefore, it is likely that such aquifers would quickly re-establish equilibrium and turbidity levels would rapidly subside.

Surficial aquifers could experience minor disturbances from changes in overland water flow and recharge caused by clearing and grading of the right-of-way. The ability of soil to absorb water can be altered through near-surface compaction by heavy construction vehicles. This minor impact would be temporary and is not expected to significantly affect groundwater resources or quality. The majority of groundwater use along the Southgate Project alignment uses deeper bedrock aquifers. Impacts to bedrock aquifers are not expected since construction activities are not likely to occur at a depth that would impact the bedrock aquifers in the Project area. As outlined in the Project's HDD Contingency Plan (Appendix 2-H), should there be any impact to a private drinking water supply due to the use of HDDs, the Project will provide temporary drinking water supply in accordance with the Project's Water Resources Identification and Testing Plan (Appendix 2-E).

Potential impacts would be greatest in areas of shallow aquifers, including shallow karst areas. In these areas, potential impacts would be avoided by implementing the FERC Procedures and BMPs.

Trench Dewatering

Groundwater depth varies based on a number of factors including site elevation and setting, weather, seasonality, and surficial geology. Accordingly, the depth to groundwater varies along the Southgate Project route based on these conditions. Shallow groundwater along the Project alignment would generally coincide with wetland areas (see Section 2.4) and locations near springs (see Section 2.2.3.3) and karst geological conditions (see Section 2.2.1.4). The excavated trench for pipeline installation would be most likely to intercept shallow groundwater in these locations. Typical trench depth is anticipated to be approximately 6-10 feet below existing grade. As described in Section 2.2.1, bedrock aquifers are predominant along the entire extent of the Project. Typical depths to groundwater in bedrock aquifers in higher elevation settings are 60 to 500 feet as described in Section 2.2.1. Therefore, in most upland portions of the route, groundwater will not be encountered during trench excavation. However, the trench will intersect the water table in some wetland and floodplain areas that are crossed. Accordingly, temporary trench dewatering is anticipated to be required in wetland areas.

Dewatering of the pipeline trench, the only activity requiring pumping of groundwater, may be necessary in areas where there is a high water table. However, pipeline construction activities within a particular location are typically completed within several days, and any lowering of localized groundwater is expected to be temporary. The Southgate Project will dewater into well-vegetated upland areas, or into filtration structures if vegetation is insufficient.

Private Wells and Springs

For private wells and spring identified within 150 feet of the construction works area, the Southgate Project will clearly mark the wellhead or spring and surround it with silt fence and/or safety fence (if landowner access is provided) as a precaution for construction equipment and activities. To further mitigate the potential for land disturbance associated with the pipeline to impact a water resource, the Project will implement the FERC's Plan and Procedures for stormwater-runoff control and control of petroleum and hazardous materials. In the event that the water resource is affected or a significant potential for impact arises, the Project will be responsible for notifying the owner/operator of the well / spring.

The potential for impact to a water supply well from ground disturbance associated with Southgate Project construction would be indicated by negative effects on water quality well before, and in a more demonstrable manner than water yields. The Project will conduct pre-construction testing of all private wells located within 150 feet of the construction workspace. The Project will conduct post-construction tests if requested by a landowner who had a pre-construction test. The Project will evaluate landowner complaints or damage associated with construction. In the unlikely event that a private well is impacted by Project construction, the Project will negotiate a settlement with the landowner that will include a temporary water supply to affected homeowners while their well is repaired or replaced. If an impact occurs to a livestock well or an irrigation well, the Project will provide a temporary water source to sustain livestock while a new permanent water supply well is constructed. The Project will not provide temporary water sources for crops but would compensate landowners for any losses in crops resulting from irrigation system damage.

Water supply identification, characterization and pre-construction sampling are addressed in further detail in the Water Resources Identification and Testing Plan (Appendix 2-E).

Karst Areas

As described in Resource Report 6, karst terrain is a landscape formed by the dissolution of soluble bedrock. The Southgate Project contracted qualified geologists to evaluate the Project alignment and assess the limited karst terrain present. The Project evaluated karst topography areas and determined that there is negligible potential for karst hazards to be present within 0.25-mile of the Project pipelines. The Project Karst Hazards Assessment is provided in Resource Report 6, Appendix 6-E. Construction erosion and sediment control measures will be strictly followed to prevent overland flow of water and sediment toward or into a stream, spring or wellhead. Where blasting is required to advance pipeline construction, additional monitoring and safeguards for structures and water supplies will be specified in the General Blasting Plan in Resource Report 6, Appendix 6-D.

Public Water Supplies and Source Water Protection

There are no public water supplies or wellhead protection areas within the Southgate Project area. Construction erosion and sediment control measures, as outlined in the Project-specific Erosion and Sediment Control Plan ("E&SCP") and in accordance with the FERC Procedures and applicable state

requirements, will be strictly followed throughout the Project area to prevent overland flow and sediment runoff.

2.2.4.2 Blasting Impacts on Water Supply Wells and Mitigation Measures

Although mechanical methods of removing bedrock are preferred, blasting will be conducted to excavate the pipeline trench in areas of shallow bedrock. Where blasting is required in an area near water supply wells, blasting could cause temporary changes in water quality and/or yield. The Southgate Project will implement the following measures to avoid, minimize, and mitigate potential impacts to water supply wells from blasting:

- Blasting will be conducted in a manner to minimize possible impacts on nearby water supply wells. Use of controlled blasting techniques should avoid the impacts of blasting and limit rock fracture to the immediate vicinity of detonation along the trench line and contain impact to within the construction right-of-way. Blasting will be conducted by highly trained contractors;
- Where blasting is conducted within 150 feet of an active water well, the Southgate Project will conduct a pre-construction evaluation of the well with landowner permission at the expense of the Project. The well will be sampled for water quality and quantity parameters. Post construction tests will be conducted at the request of the landowner. The post-construction test will sample water quality and quantity parameters. Templates for the "Pre-Blast Report" and "Post-Blast Report" are located in the General Blasting Plan (see Resource Report 6, Appendix 6-D). Landowners will be contacted by a Project representative and a qualified independent contractor will conduct the testing; and
- The Southgate Project will evaluate, on a timely basis, landowner complaints regarding potential damage resulting from blasting to wells, homes, or outbuildings. If the damage is substantiated, the Project will negotiate a settlement with the landowner that may include repair or replacement.

2.2.4.3 Contaminated Groundwater Impacts and Mitigation Measures

Although the probability of encountering contaminated groundwater resources during construction is expected to be low, should existing contaminated groundwater be encountered, it could pose health and safety concerns to construction workers and potentially elevate overall environmental risk through increased exposure. The Project's Environmental Inspectors will be trained to detect direct and indirect evidence of soil and/or groundwater contamination. If contaminated soil or groundwater is encountered during construction, the Southgate Project will notify the affected landowner and will coordinate with the appropriate federal and state agencies in accordance with applicable notification requirements.

The Southgate Project will operate and maintain the Project and aboveground facilities in compliance with U.S. Department of Transportation ("USDOT") regulations provided at 49 Code of Federal Regulations ("CFR") Part 192, the FERC's regulations at 18 CFR Part 380.15, and maintenance provisions of the FERC Plan and Procedures. The permanent easement will predominantly be maintained with mechanized clearing equipment. Herbicide treatment will only be used to control invasive species present within upland areas in the permanent easement, as necessary.

2.3 SURFACE WATER RESOURCES

Surface water resources identified in the vicinity of the Southgate Project include rivers, streams, associated tributaries, ponds, lakes, and catchment basins. This section describes the surface water resources crossed by the Project and the proposed measures to mitigate potential adverse effects on those resources. To determine the surface water resources crossed by the Project, this report relied on watershed data from USGS, delineated stream data up to and including September 20, 2018, the National Hydrography Database ("NHD") maintained by USGS (USGS, 2018a), and the 303(d)/305(b) reports submitted by the states to the USEPA. Field delineations were conducted in 2018 within a 300 to 400–foot-wide survey corridor associated with the pipeline, access roads, additional temporary workspace ("ATWS"), contractor yards, and aboveground facility sites where land access was granted. The Project has completed field delineation of waterbodies along approximately 77 percent of the pipeline alignment where survey access was available.

2.3.1 Waterbody Crossings

2.3.1.1 Surface Water Basins

The United States is divided and sub-divided into successively smaller hydrologic units that are classified into four levels and HUCs: regions (HUC 2), sub-regions (HUC 4), basins (HUC 6), and sub-basins (HUC 8). Sub-basins are further divided into watersheds (HUC 10). The Southgate Project is located within the USGS designated 03-South Atlantic-Gulf Region (USGS, 2018b). In Virginia, the Project will cross the Roanoke and Yadkin Rivers Basin, two sub basins and three watersheds (VADEQ, 2018c). In North Carolina, the Project will cross the Roanoke River Basin and the Cape Fear River Basin, three sub basins and four watersheds (NCDEQ, 2018d). Table 2.3-1 identifies these major regions and their respective sub-basins by 8-digit HUC and watershed by 10-digit HUC. Watersheds are shown on Figure 2-C-2 in Appendix 2-C.

Table 2.3-1

Watersheds Crossed by the Pipeline of the MVP Southgate Project

Major Region (2-digit HUC)	County/State	Sub-basin (8-digit HUC)	Watershed (10-digit HUC)
03- South Atlantic-Gulf Region	Pittsylvania/ Virginia	Banister River (03010105)	Cherrystone Creek-Banister River (0301010501)
	Pittsylvania/ Virginia	Upper Dan (03010103)	Wolf Island Creek-Dan River (0301010310)
	Pittsylvania/ Virginia Rockingham/ North Carolina	Upper Dan (03010103)	Cascade Creek-Dan River (0301010309)
	Rockingham/ North Carolina	Lower Dan (03010104)	Hogans Creek-Dan River (0301010401)
	Rockingham, Alamance/ North Carolina	Haw River (03030002)	Headwaters Haw River (0303000202)
	Alamance/ North Carolina	Haw River (03030002)	Back Creek-Haw River (0303000204)

Source: VADEQ, 2018c and NCDEQ, 2018d

2.3.1.2 Flood Zones

The Southgate Project has reviewed Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Mapping for areas crossed by the Project and recorded the location of 100-year flood zones (FEMA, 2018). A summary of 100-year flood zones crossed by the Project is listed in Table 2.3-2 and shown on Figure 2-C-3 in Appendix 2-C.

Table 2.3-2

FEMA 100-year Flood Zones crossed by the MVP Southgate Project

State/County	Flood Zone a/	Entry Mile Post	Exit Mile Post	Length Crossed (feet)
Virginia				
H-605 Pipeline				
Pittsylvania	No Flood Zones Crossed			
H-650 Pipeline				
Pittsylvania	A	0.3	0.4	556
	A	8.5	8.6	266
	A	9.9	9.9	220
	A	15.7	15.7	172
	A	23.2	23.2	57
	AE	1.4	2.2	4357
	AE	4.8	5.1	1260
	AE	5.1	5.2	771
	AE	6.6	6.6	174
	AE	12.7	12.8	210
	AE	13.4	13.5	318
	AE	17.7	17.8	258
North Carolina				
Rockingham	AE	27.1	27.8	3665
	AE	27.8	27.8	32
	AE	27.9	28.0	668
	AE	28.0	28.1	97
	AE	28.3	28.4	204
	AE	29.6	29.6	22
	AE	29.6	30.5	4741
	AE	30.5	30.6	315
	AE	30.7	30.7	150
	AE	30.7	30.9	941
	AE	32.1	32.2	37
	AE	32.2	32.2	196
	AE	32.2	32.2	10
	AE	32.6	32.7	526
	AE	33.0	33.1	470
	AE	33.1	33.1	32
	AE	38.6	38.8	886
	AE	41.1	41.2	320

Table 2.3-2

FEMA 100-year Flood Zones crossed by the MVP Southgate Project

State/County	Flood Zone a/	Entry Mile Post	Exit Mile Post	Length Crossed (feet)
	AE	43.2	43.3	551
	AE	46.4	46.5	88
	AE	46.9	47.0	341
	AE	48.6	48.7	353
	AE	50.8	50.8	95
Alamance	AE	53.6	53.7	198
	AE	54.6	54.6	125
	AE	56.4	56.4	26
	AE	56.6	56.6	281
	AE	57.0	57.0	304
	AE	57.9	57.9	8
	AE	58.6	58.7	322
	AE	60.7	60.7	76
	AE	60.7	60.8	47
	AE	63.6	63.6	350
	AE	63.6	63.6	4
	AE	63.8	63.9	100
	AE	64.0	64.0	377
	AE	65.6	65.6	115
	AE	67.6	67.6	153
	AE	69.1	69.1	222
	AE	69.1	69.3	894
	AE	70.2	70.3	320
	AE	70.7	70.8	254
	AE	70.9	70.9	253
	AE	70.9	71.0	115
	AE	71.3	71.3	328
	AE	71.3	71.8	2,536
	AE	72.5	72.7	1,279
	AE	72.9	73.1	832

a/ Flood Zone A – Areas subject to inundation by the 1-percent annual chance flood event determined using approximate methodologies.

Flood Zone AE – Areas subject to inundation by the 1-percent annual chance flood event determined by detailed methods.

There are four permanent access roads and two interconnects located within the FEMA 100-year flood zone in North Carolina. The permanent access roads will displace a total of approximately 0.7 acre of floodplain, and the meter stations will displace a total of approximately 1.0 acre. The permanent impacts within the 100-year flood zone is provided in Table 2.3-3.

Table 2.3-3

Permanent Impacts within the 100-year Flood Zone

Facility	Impact (acre)
T-15 Dan River Interconnect/ MLV 4	0.8
T-21 Haw River Interconnect/ MLV 8	0.2
PA-AL181A	0.3
PA-AL-194	0.2
PA-AL-194A	0.1
PA-RO-082	0.1
Total	**1.7**

Temporary access roads located within floodplains may have a temporary effect on flood storage but will be restored after construction unless requested to be maintained by the landowner or agency.

2.3.1.3 Pipeline Crossings

In North Carolina, waterbodies were delineated in accordance with the Division of Water Quality's *Identification Methods for the Origins of Intermittent and Perennial Stream* version 4.11 effective September 1, 2010. As outlined in the VADEQ's *Perennial Stream Field Identification Protocol* effective May 2013, waterbody delineations conducted in Virginia adopted the North Carolina guidance noted above. The following waterbody information is based on the NHD dataset and field data collected where survey access has been obtained through September 20, 2018. In areas where survey access has not been granted, a detailed desktop analysis taking into account several components (aerial imagery, NHD data, and hydrological conditions from nearby delineated resources) was conducted to determine approximate resource boundaries. Appendix 2-A lists waterbodies crossed or affected by the Southgate Project. Appendix 2-G provides a list of areas that have not been surveyed as of this filing. Appendix 1-A in Resource Report 1 depicts waterbodies crossed by the Project on the detailed alignment sheets. Table 2.3-4 is a summary of waterbodies crossed by pipeline of the Project.

Table 2.3-4

Summary of Waterbodies Crossed by the Pipeline of the MVP Southgate Project a/

Facility, State	Flow Type	Number of Waterbodies Crossed
H-605 Pipeline		
Virginia	Ephemeral	0
	Intermittent	1
	Perennial	0
	H-605 Pipeline Virginia Total	**1**
H-650 Pipeline		
Virginia	Ephemeral	3
	Intermittent	22
	Perennial	35
	H-650 Pipeline Virginia Total	**60**
North Carolina	Ephemeral	18
	Intermittent	52

Table 2.3-4

Summary of Waterbodies Crossed by the Pipeline of the MVP Southgate Project a/

Facility, State	Flow Type	Number of Waterbodies Crossed
	Perennial	84
	Pond	1
H-650 Pipeline North Carolina Total		**155**
Project Total		**216**

a/ Based on data from field delineation as of September 20, 2018 where access has been obtained to the pipeline corridor, approximated and NHD data elsewhere. Table only includes waterbodies that cross the centerline of the Southgate Project.

The Southgate Project will implement its Project-specific E&SCP that will outline BMPs to minimize impacts on various resources, including waterbodies. Table 2.3-5 is a summary of the number of FERC classification of waterbodies crossed by the pipeline of the Project. The Project will cross two major waterbodies, both located in North Carolina: Dan River (247 feet wide at MP 30.1) in Rockingham County and Stony Creek Reservoir (304 feet wide at MP 63.6) in Alamance County. The Project will cross the Dan River and Stony Creek Reservoir using HDDs. Site specific HDD and waterbody plans for these waterbodies are located in Resource Report 1, Appendix 1-C3.

Table 2.3-5

Summary of FERC Classification of Waterbody Crossings by the Pipeline of the MVP Southgate Project a/

State	Minor b/	Intermediate c/	Major d/	Total
Virginia	38	23	0	**59**
North Carolina	119	34	2	**155**
Total	**157**	**57**	**2**	**216**

a/ Based on data from field delineation as of September 20, 2018 where access has been obtained to the pipeline corridor, approximated and NHD data elsewhere. Table only includes waterbodies that cross the centerline of the Southgate Project.

b/ FERC classified Minor Waterbodies – waterbodies less than or equal to 10 feet wide at the water's edge

c/ FERC classified Intermediate Waterbodies – waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge

d/ FERC classified Major Waterbodies – waterbodies greater than 100 feet wide at the water's edge

2.3.1.4 Waterbody Crossing Methods

For all crossings, the Southgate Project will follow the FERC Procedures and the Project-specific E&SCP, as well as BMPs to limit water quality and aquatic resource impacts during and following construction across all waterbodies. Federal and State permitting erosion and sediment control requirements will be followed.

Construction methods at waterbody crossings will vary based on the characteristics of the waterbody at the time of crossing and will be performed consistent with applicable regulatory approvals. The Southgate Project will follow FERC's Procedures and its Project-specific E&SCP to limit water quality and aquatic resource impacts during and following construction. The crossing method planned for each waterbody is

listed in Appendix 2-A. The crossing methods are designed to maintain water flow and minimize changes in waterbody flow characteristics. All in-stream work will be conducted during low-flow periods to the extent practicable. Detailed descriptions and typical details of the various waterbody crossings are provided in Resource Report 1.

A summary of the types of waterbody crossing methods, as well as cleanup and restoration, is described in Resource Report 1.

2.3.2 Sensitive Waterbodies

Sensitive surface waters generally include the following:

- Outstanding or exceptional quality waterbodies;
- Waterbodies that contain threatened or endangered species, or critical habitat;
- Waterbodies located in sensitive and protected watershed areas;
- Waterbodies that are crossed less than 3 miles upstream of potable water intake structures;
- Waters that do not meet the water quality standards associated with their designated beneficial uses;
- Rivers on or designated to be added to the Nationwide Rivers Inventory ("NRI") or a State River Inventory;
- Waters that have been designated for intensified water quality management and improvement; and
- Waters that support fisheries of special concern (including trout streams).

Several waterbodies crossed by the Southgate Project possess one or more of the above characteristics of sensitive surface waters. The following sections discuss these sensitive waterbodies.

Measures to minimize impacts on sensitive waterbodies are discussed in more detail in Resource Report 3 due to their importance to fishery resources. Where impact on sensitive waterbodies cannot be avoided due to the linear nature of the pipeline, and if measures beyond those required by the FERC Procedures are required as a result of state permitting, the Southgate Project will develop additional mitigation measures during state permitting.

2.3.2.1 National or State Wild and Scenic Rivers

The Southgate Project reviewed rivers that are included on the NRI and those that may be designated as wild and scenic. The sources viewed include the NRI (NPS, 2017), the National Wild and Scenic River System (National Wild and Scenic Rivers System, 2018), and The Wild and Scenic Rivers Act (16 USC 1271-1287).

The NRI is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values considered to be of more than local or regional significance (NPS, 2017). The National Park Service maintains the NRI as a list of river segments that potentially qualify as national wild, scenic, or recreational river areas. All federal agencies must seek to avoid or mitigate actions that would adversely affect any NRI segments. The segment of the Dan River crossed by the Southgate Project in North Carolina possess outstandingly remarkable values of cultural, fish, geologic, historic, recreational, scenic and wildlife (NPS, 2017). This segment of the Dan River in North Carolina crossed by the Project is described as "Popular recreational stream with diversified

scenic and physiographic features; significant archaeological and geologic values; 200-foot bluffs and 1000 foot deep gorge area" (NPS, 2017). The Project is proposing to HDD the Dan River to minimize any potential impacts to the river. The Project consulted with NPS regarding this segment of the Dan River. NPS indicated that the use of HDD to cross the Dan River will reduce potential impacts, and that BMPs should be utilized to further minimize potential impacts. The Project will implement applicable BMPs outlined in the Project-specific E&SCP (NPS, 2018).

The National Wild and Scenic River System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural and recreational values in a free-flowing condition. Rivers are designated as wild, scenic or recreational. The Southgate Project does not cross federally designated wild and scenic rivers (National Wild and Scenic Rivers System, 2018).

Virginia Department of Conservation and Recreation administers the Virginia Scenic River program to identify, designate and help protect rivers and streams that possess outstanding scenic, recreational, historic and natural characteristics of statewide significance for future generations. In addition to existing designated state scenic rivers, other river segments have been deemed qualified or worthy of further study. Although no designated segments are crossed by the Southgate Project, the Virginia Department of Conservation and Recreation lists one waterbody crossed by the Project, the Sandy River, as qualified for potential designation (VDCR, 2013). The Project has initiated consultation with the Virginia Department of Conservation and Recreation. Consultations are ongoing as the Project continues to coordinate with the Department of Conservation and Recreation.

North Carolina Division of Parks and Recreation administers river designations intended to protect certain free flowing rivers or segments with outstanding natural, scenic, educational, recreational, geologic, fish and wildlife, historic, scientific or other cultural values. There are three river classifications, Natural, Scenic, and Recreational, designated by the NC DPR. According to the DPR, there are only 5 rivers that qualify as natural, scenic and/or recreational in North Carolina, and the Southgate Project does not cross any of the 5 rivers (NCDPR, 2016).

2.3.2.2 State-Designated Use and Exceptional Waters

Virginia and North Carolina classify surface waters to evaluate water quality. Each system includes a "designation use" that describes the potential or realized capacity of a waterbody to provide defined ecological benefits and recreational values for residents and visitors. A summary of the use designation system for each state is provided below. State water classifications for waterbodies crossed by the Southgate Project route are detailed in Appendix 2-A.

In Virginia, the VADEQ assigns six primary classifications for surface waters; aquatic life, fish consumption, public water supplies, recreation, shellfishing, and wildlife. The primary classifications of waterbodies crossed by the Southgate Project are defined as follows;

- *Aquatic life use*: supports the propagation, growth, and protection of a balances indigenous population of aquatic life which may be expected to inhabit a waterbody;
- *Fish consumption use*: supports game and marketable fish species that are safe for human health;
- *Public water supply use*: supports safe drinking water;
- *Recreation use*: supports swimming, boating, and other recreational activities;

- *Wildlife use*: supports the propagation, growth, and protection of associated wildlife.

Additional subcategories have been designated for aquatic life classifications, but those additional subcategories do not apply to any waterbodies within the Southgate Project area. The majority of the streams crossed by the Project have not been assessed by the state and, therefore, default to the minimal four designated uses for all stream in Virginia (Aquatic Life, Recreation, Fish Consumption, and Wildlife). Waterbodies that have been assessed by the state, and are crossed by the Project, have one or multiple of the following designations: aquatic life, public water supply, wildlife, fish consumption, and recreation (see Appendix 2A).

The Virginia Department of Game and Inland Fisheries ("VDGIF") has established a classification system for trout waters based on aesthetics, productivity, resident fish population and stream structure. In general, these include natural trout waters with wild trout habitat, and stockable trout waters with cold-water habitat not suitable for wild trout but adequate for year-round hold-over of stocked trout (9 VAC 260-370). Remaining streams are considered unsuitable for trout due to one or more of the following conditions: summer temperatures; a significant population of warm-water gamefish; insufficient flow; and intolerable water quality. The Southgate Project does not cross any VDGIF designated trout waters (VDGIF, 2018).

The Commonwealth of Virginia further designates all surface waters in Virginia into one of three levels, or tiers, of antidegradation protection as set forth by the Antidegradation Policy found in the state code, 9VAC25-260-30. The crossing of Tier I waters requires satisfying the adopted water quality standards. The crossing of Tier II waters permits negative effects on water quality only in limited circumstances. Tier III waters are considered to be of exceptional quality and, as such, the Antidegradation Policy prohibits any increased pollutant discharge. However, activities causing temporary sources of pollution may be allowed where they are demonstrated to be temporary and affected waters are returned to equal or better conditions within a minimal timeframe. Tier III waters are designated by name within the code.

According to the VADEQ Exceptional State Waters Program, there are no Tier III waterbodies located within the Southgate Project area nor within Pittsylvania County (VADEQ, 2018d).

In North Carolina, surface water classifications are designations applied to surface waterbodies, such as streams, rivers, and lakes, that define the best uses to be protected within these waters (for example swimming, fishing, drinking water supply) and carry with them an associated set of water quality standards to protect those uses. Surface water classifications are one tool that state and federal agencies use to manage and protect all streams, rivers, lakes, and other surface waters in North Carolina. Classifications and their associated protection rules may be designed to protect water quality, fish and wildlife, or other special characteristics. Each classification has associated standards that are used to determine if the designated uses are being protected. Many waterbodies in North Carolina can have multiple overlapping designations to protect different uses or special characteristics of the waterbody.

The North Carolina Division of Water Resources ("NCDWR") assigns primary classifications to all surface waters in North Carolina. All waters must at least meet the standards for Class C (fishable / swimmable) waters. The other primary classifications provide additional levels of protection for primary water contact recreation (Class B) and drinking water (Water Supply Classes I through V). Supplemental classifications are sometimes added by NCDWR to the primary classifications to provide additional protection to waters with special uses or values (NCDEQ, 2018e).

In North Carolina, the pipeline will cross multiple streams with one or multiple of the following designations; Class C, Water Supply II ("WS-II"), Water Supply IV ("WS-IV"), Water Supply V ("WS-V"), Nutrient Sensitive Waters ("NSW"), and High Quality Waters ("HQW").

- *Class C* is a primary classification and is described as "Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner."

- *Water Supply II* is a primary classification and is described as "Waters used as sources of water supply for drinking, culinary, or food processing purposes where a WS-I classification is not feasible. These waters are also protected for Class C uses. WS-II waters are generally in predominantly undeveloped watersheds. All WS-II waters are HQW by supplemental classification."

- *Water Supply IV* is a primary classification and is described as "Waters used as sources of water supply for drinking, culinary, or food processing purposes where a WS-I, II or III classification is not feasible. These waters are also protected for Class C uses. WS-IV waters are generally in moderately to highly developed watersheds or Protected Areas."

- *Water Supply V* is a primary classification and is described as "Waters protected as water supplies which are generally upstream and draining to Class WS-IV waters or waters used by industry to supply their employees with drinking water or as waters formerly used as water supply. These waters are also protected for Class C uses."

- Nutrient Sensitive Waters is a supplemental classification and is described as "Supplemental classification intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation."

- High Quality Waters is a supplemental classification and is described as "Supplemental classification intended to protect waters which are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission. The following waters are HQW by definition: WS-I, WS-II, SA, ORW, and PNA."

The NCDEQ has a supplemental classification ("TS") intended to protect freshwaters that have conditions that shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis. The NC Wildlife Resources Commission also designates qualified streams as trout waters. According to publicly available data, the Southgate Project does not cross any NCDEQ or NC Wildlife Resources Commission designated trout streams (NCDEQ 2018e, NCWRC, 2018).

The FERC Procedures require a construction window from June 1 through September 30 for all crossings of coldwater fisheries and a construction window from June 1 through November 30 for other fisheries (warmwater and warmwater/coolwater). All waterbody crossings for the Southgate Project are designated as warmwater fisheries. The FERC Procedures state these construction windows may be modified by state

agencies. The allowable construction windows for fisheries of special concern crossed by the Project are included in Resource Report 3.

2.3.2.3 Waters Containing Federally or State-listed Threatened or Endangered Species or Critical Habitat

Resource Report 3 provides details and species descriptions of threatened and endangered species identified as potentially occurring along the Southgate Project, including aquatic species and the waterbodies where these species potentially occur. The pipeline does not cross waterbodies containing critical habitats for federally or state-listed species (USFWS, 2018). Additional information for threatened and endangered species, including suitable habitat within the Project area is presented in Section 3.5 of Resource Report 3.

2.3.2.4 Surface Water Protection Areas and Public Surface Water Supplies

As outlined in the Water Supply Watershed Protection Program, the NCDWR has a cooperative program of water supply watershed management and protection administered by local governments consistent with statewide management requirements. The water supply watershed protection program establishes minimum statewide water supply watershed protection requirements applicable to each classification to protect surface water supplies by (i) controlling development density, (ii) providing for performance-based alternatives to development density controls that are based on sound engineering principles, or (iii) a combination of both (i) and (ii). The Southgate Project crosses designated protected and critical watersheds. A "critical" designation is applied to the area adjacent to a water supply intake or reservoir where risk associated with pollution is greater than from the remaining portions of the watershed. The critical area is defined as extending half mile from the normal pool elevation of the reservoir in which the intake is located or to the ridge line of the watershed (whichever comes first); or half mile upstream from and draining to the intake located directly in the stream or river, or to the ridge line of the watershed (whichever comes first). A "protected" designation is applied to areas adjoining and upstream of the critical area in a WS-IV water supply in which protection measures are required. The boundary of protected areas are defined as within five miles of the normal pool elevation of the reservoir and draining to water supply reservoirs or to the ridge line of the watershed (whichever comes first); or 10 miles upstream and draining to the intake located directly in the stream or river, or to the ridge line of the watershed (whichever comes first). (NCDEQ, 1998)

The Southgate Project crosses two protected watersheds and one critical watershed in North Carolina. The two protected watersheds crossed are associated with Stony Creek (WS-II) and Haw River (WS-IV). The critical watershed is associated with Stony Creek. The Project crosses a total of approximately 7.1 miles of protected watersheds throughout Rockingham and Alamance counties and 1.5 miles of critical watershed between MP 63 and MP 64.5 in Alamance County.

As outlined in Section 2.2.3.4, the VDH-ODW, maintains the Source Water Assessment Program in Virginia for both groundwater and surface water. Consistent with the groundwater program, the surface water program is voluntary and there are no requirements for reporting; therefore, an accurate database for the program does not exist. According to publicly available data, there are no public surface water supplies within 0.5 mile of the Southgate Project workspace in Virginia or North Carolina.

There is typically downstream movement of existing sediments within the streams during large storm events. Additionally, the streams in this area receive significant sediment input from industry, accidental erosion, and other non-point sources. Public surface water intake facilities are designed to filter out large

debris and to remove sediment from the raw water intakes depending on the water quality and adjust the treatment processes as necessary (USEPA, 2004a). Mitigation measures specified in the FERC Plan and Procedures and the Southgate Project-specific E&SCP to address potential impacts to public water supplies from the construction right-of-way in Section 2.3.6.

2.3.2.5 Contaminated Sediments and Impaired Waters

The Project reviewed the National Sediment Quality Survey for information regarding contaminated sediments at all waterbody crossings. None of the watersheds in the Southgate Project area are listed as containing areas of probable concern for sediment contamination (USEPA, 2004b). Sampling locations for sites with Tier 1, 2, and 3 contaminated sediments were viewed in the National Sediment Inventory Database (NOAA, 2007).

As part of state water quality assessments, Section 303(d) of the federal Clean Water Act mandates that states must prepare a list of all waters that do not meet the water quality criteria for their designated uses and develop for each criterion a Total Maximum Daily Load ("TMDL"), which establishes the maximum allowable discharge into a waterbody to better control pollutant levels. To determine whether impaired waterbodies will be affected by the Southgate Project, the Project reviewed the 303(d) lists for states crossed by the Project that are included in USEPA Categories 4 and 5. Category 4 lists waterbodies where TMDLs have been completed or cannot be completed due to the nature of the contamination, and Category 5 lists waterbodies where TMDLs need to be developed by the state (USEPA, 2016b).

The Virginia DEQ released the final 2016 305(b)/303(d) Water Quality Assessment Integrated Report (Integrated Report) on April 2, 2018. This report is a summary of the water quality conditions in Virginia from January 1, 2009 through December 31, 2014 (VADEQ, 2016b). This report satisfies the requirements of the U.S. Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information and Restoration Act. The goals of Virginia's water quality assessment program are to determine whether waters meet water quality standards, and to establish a schedule to restore waters with impaired water quality. As outlined in Section 2.3.2.2, there are six surface water designated uses in Virginia; aquatic life, fish consumption, public water supplies, recreation, shellfishing, and wildlife.

The majority of the waterbodies crossed by the Southgate Project in Virginia either have not been assessed for impairment, or the data collected resulted in a "Category 3a Indeterminate" designation. Three waterbodies crossed by the Project in Virginia are designated as "Category 4a Impaired" (Little Cherrystone Creek, White Oak Creek (crossed twice by the Project) and Sandy Creek) due to a pollutant caused impairment for the streams' recreational state surface water designation.

In Virginia, there are no waterbodies crossed by the Southgate Project that are impaired due to polychlorinated biphenyl ("PCB") as determined by levels in fish tissues. Although not crossed by the Project in Virginia, the Dan River is PCB impaired. The VADEQ commented that hydroseeding could be a contributing factor to PCB concentrations in the pigment; therefore, the Project will avoid hydroseeding within 100 feet of direct tributaries to the Dan River.

Cherrystone Creek "has an observed effect on Hg [mercury] in one species of fish" (VADEQ, 2018e). By using BMP's intended to minimize sedimentation, including the implementation of dry crossing methods, the FERC Procedures, and the Southgate Project-specific E&SCP, the Project will not increase the concentration of mercury currently occurring within Cherrystone Creek.

Three watersheds crossed by the Southgate Project in Virginia are listed as impaired for Escherichia coli ("E. coli") (Dan River watershed, Sandy Creek watershed, and Banister River watershed). Due to the impaired status of the identified watersheds, BMPs (such as livestock exclusion fencing and vegetated buffer zones along stream banks) have been implemented in an effort to improve the overall quality of the watersheds. Through the implementation of the FERC Procedures and the Project-specific E&SCP, there will be no increase in pollutants to the three impaired watersheds as a result of the Project. The NCDEQ released the final 2016 305(b)/303(d) Integrated Report on April 11, 2018, this report is a summary of water conditions in North Carolina between 2010 and 2014 (NCDEQ, 2016). The water quality assessment process is a framework used by North Carolina Division of Water Resources to interpret data and information to determine whether a waterbody is meeting water quality standards. As outlined in Section 2.3.2.2, all waters in North Carolina must at least meet the standards for fishable/swimmable waters (Class C), and additional primary designations include water contact recreation (Class B) and drinking water (Water Supply Classes I through V), along with several other supplemental classifications.

Similar to Virginia, the majority of the waterbodies crossed by the Southgate Project in North Carolina have not been assessed for impairment, or the data collected resulted in a "Category 3a – Inconclusive Data" designation. In North Carolina, the 303(d) list consists of only Category 5 designations. According to the 2016 NCDEQ data, there are no designated impaired waterbodies crossed by the Project in North Carolina.

Table 2.3-6 provides a summary of impaired waterbodies crossed by the Southgate Project route. The Project will cross all streams in Virginia and North Carolina in accordance with the FERC Plan and Procedures and the Project-specific E&SCP.

Table 2.3-6

Impaired Waterbodies Crossed by the MVP Southgate Project

State/County	MP	Waterbody Name	Crossing Method	Causes of Impairment
Virginia				
Pittsylvania	0.4	S-F18-65 / Little Cherrystone Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment – E. coli
	5.0	S-D18-2 / White Oak Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment – E. coli
	5.1	S-D18-2 / White Oak Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment – E. coli
	12.8	S-D18-21 / Sandy Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment– E. coli
Source: VADEQ 2016				

The Southgate Project will construct all of its pipeline crossings using a dry construction technique (e.g., dam and pump and / or flume) if there is flowing water at the time of construction. The Dan River and Stony Creek Reservoir will be crossed using the HDD construction method. Best management practices will be implemented during construction to control soil erosion and sedimentation down gradient of areas as described in Section 2.3.6. With the implementation of these measures, no additional impairment to designated waterbodies in the Southgate Project area is anticipated.

The Project conducted a federal and state database search report from EDR for the area within 0.25 mile of the Southgate Project facilities and the results are provided in Appendix 2-D.

2.3.2.6 North Carolina Jordan Lake Riparian Buffer Area

In North Carolina, the Jordan Lake impoundment was created in 1983 by damming the Haw River near its confluence with the Deep River. Jordan Lake spans several county boundaries and supplies drinking water to approximately 500,000 people and offers recreational opportunities (swimming, boating, fishing) to residents (TCH, 2018, USACE, 2018). In December of 1963, the U.S. Army Corps of Engineers ("USACE") Wilmington District took stewardship of Jordan Lake, proposing an earthen dam with a multi-level intake tower in the interest of flood control, water supply, water quality control, recreation and other purposes (USACE, 2018). In a joint effort to improve the low water quality of Jordan Lake, the Wilmington District and NCDWR have enacted the Jordan Lake Nutrient Strategy, consisting of the Jordan Lake Rules that are a nutrient management strategy designed to restore the water quality in the lake by reducing the amount of pollution entering upstream. Specific issues addressed by the rules include reducing pollution from wastewater discharges, stormwater runoff from new and existing development, agricultural and fertilizer application (NCDWR, 2018). In an effort to further define the Jordan Lake Nutrient Strategy program, a riparian buffer zone watershed upstream of Jordan Lake was developed which outlines the stormwater and buffer permit program for the watershed. The Jordan Lake watershed is divided into three Jordan subsheds, the Lower New Hope, Upper New Hope and the Haw subshed (NCDWR, 2018).

Although Jordan Lake is located approximately 25 miles southeast of the southern extent of the Southgate Project, the Project crosses the Jordan Lake riparian buffer zone watershed, specifically the Haw subshed, for a total of approximately 24 miles in Rockingham (4 miles) and Alamance (20 miles) counties. See Section 2.3.6 below for additional information regarding Jordan Lake riparian buffer zone watershed.

2.3.2.7 Public Water Supply Intakes within 3 Miles Downstream of the Southgate Project

The Southgate Project identified one public water supply intake (Stony Creek Reservoir) located within three miles downstream of the Southgate Project (VDH, 2018, NCDEQ, 2015). The Stony Creek Reservoir is located approximately 1.3 miles south of the Project in the City of Burlington, North Carolina. The Project will cross Stony Creek Reservoir using HDD. The Project is consulting with the owners/managers of this intake and will provide notification before the waterbody crossing takes place.

Implementation of the FERC Plan and Procedures and the Project-specific E&SCP will minimize short- and long-term impacts on the waterbodies crossed by the Southgate Project route, therefore the Project does not anticipate any impact to the Stony Creek Reservoir as a result of construction.

2.3.3 Hydrostatic Test Water

The pipeline will be hydrostatically tested to ensure that it is capable of safely operating at the design pressure. Test segments of the pipeline will be capped and filled with water. Test water is anticipated to be drawn from two municipal sources identified in Table 2.3-7. If necessary, additional potential sources for hydrostatic test water may include groundwater supply wells, and/or approved surface waters.

The water in the pipe will be pressurized and held for a minimum of 8 hours in accordance with the USDOT Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety requirements identified in 49 CFR Part 192 prior to being placed in service. Any loss of pressure that cannot be attributed to other

factors, such as temperature changes, will be investigated. Leaks detected will be repaired and the segment will be retested.

Upon completion of the test, the water may be pumped to the next segment for testing, or the water may be discharged. The test water will be discharged through an energy-dissipating device in compliance with National Pollutant Discharge Elimination System permit conditions. If applicable, the Project will apply for agency approval for the discharge of hydrostatic test water. To the extent practicable, the Project will discharge within the same watershed from that water was withdrawn and will to an upland well vegetated area, directed through containment structures such as hay bale structures and filter bags. The discharge rate will be regulated using valves and energy dissipation devices to prevent erosion.

The total volume of water used for hydrostatic testing is proposed to be approximately 8,500,000 gallons (see Table 2.3-7). Each of the construction spreads will likely be broken down into smaller test sections. The hydrostatic test has been designed such that the water should only need to be drawn from the identified source once. From there, it will be transferred into the next test section, which has been chosen to be smaller than the first. By this method, no additional water will be needed within a construction spread, since the large volume initially drawn will be transferred to increasing smaller sections that require less volume. Hydrostatic tests are anticipated to take place in 2020.

Test water will contact only new pipe, and no chemicals will be added to the test water unless otherwise approved by FERC and applicable federal and/or state regulatory agencies. An exception would be that if a municipal water source with chlorinated water is used for testing, addition of a dechlorinating agent may be required prior to discharge depending on the discharge location.

Once a segment of pipe has been successfully tested and dried, the test cap and manifold will be removed, and the pipe will be connected to the remainder of the pipeline. No desiccant or chemical additives will be used to dry the pipe. The Project will implement Section VII of the FERC Procedures regarding hydrostatic testing, as well as any specifications pertaining directly to hydrostatic testwater discharge in applicable regulatory approvals.

Table 2.3-7

Proposed Hydrostatic Test Water Use Summary

Anticipate Year of Construction	Construction Spread	Segment Name	Beginning MP	Ending MP	Length of Section (feet)	Required Water (gal)	Proposed Water Source			Proposed Test Water Discharge Location		
							MP	Water Source	Watershed	MP	Watershed	Volume
2020	1	1	0.0	30.4	160,512	3,600,000	0	Municipal	NA	0	Roanoke River Basin	3,600,000
2020	2	2	30.4	73.1	225,456	4,900,000	30.4	Municipal	NA	30.4	Cape Fear River Basin	4,900,000
Hydrostatic Test Water Total						**8,500,000**						

2.3.4 HDD Water

The HDD method utilizes a drilling fluid comprised of a water and bentonite clay mixture (typically a 97:3 mixture), often referred to as a bentonite slurry, to facilitate the drilling process. Bentonite clay is classified as a non-toxic/non-hazardous substance. Due to the unique characteristics of bentonite, the slurry is capable of absorbing 10 times its own weight in water and swells up to 19 times its dry volume. The combined bentonite and water mixture serves the following purposes: lubricate and cool the drill head; seal and fill the porous space on the circumference of the drilled hole; form a cake-like substance to help prevent the walls of the drill hole from collapsing inward; and suspend the cuttings for removal through the drilling process. Water for HDDs is anticipated to be obtained from municipal sources. If necessary, additional potential sources of water for HDDs may include other municipal systems, groundwater supply wells, and/or approved surface waters. Water usage associated with each of the HDDs proposed for the Southgate Project is presented in Table 2.3-8. There are several additives that are typically included in the bentonite slurry, and some may be used for the HDDs associated with the Project. The Project will use additives for HDDs that are certified for conformance with NSF/ANSI Standard 60, which provides assurances that the product is safe for use in drinking water (NSF International, 2018). These fluids will comply with state and federal requirements. HDD fluid will be disposed of per the HDD Contingency Plan (Appendix 2-H). Water containing mud, silt, drilling fluid, or other materials from equipment washing or other activities, will not be allowed to enter wetlands and waterbodies. The bentonite used in the drilling process will be either disposed of at an approved disposal facility or recycled in an approved manner.

Table 2.3-8

Estimated Water Usage for the MVP Southgate Project HDDs

State, HDD Name	MP (Ending) of the HDD	Maximum Estimated Volume (gallons)		Water Source
		Hydrostatic Test Water	HDD Operations	
North Carolina				
Dan River HDD	30.4	105,000	105,000	Municipal
Stony Creek Reservoir HDD	63.8	105,000	105,000	Municipal

2.3.5 Dust Control

Water will be required for dust suppression during construction. Watering trucks would spray only enough water to control the dust or to reach the optimum soil moisture content to create a surface crust. Runoff should not be generated during this procedure. Water for dust control will be obtained from municipal sources. If necessary, additional potential sources of water for dust control may include other municipal systems, groundwater supply wells, and/or approved surface waters. If surface waters are used for dust control, the Project will utilize appropriate intake rates and will screen the intake hose to prevent entrainment of aquatic species (see Resource Report 3, Section 3.2.4). The locations and amount of disbursement of water will be decided by the spread lead environmental inspector. All applicable permits/approvals would be obtained prior to withdrawal. During construction, the Project will implement fugitive dust control measures as described in Section 9.2.6 of Resource Report 9.

2.3.6 Construction and Operation Impacts and Mitigation

The construction method utilized at each waterbody crossing will vary with the characteristics of the specific waterbody and will be performed consistent with permit conditions outlined in the regulatory permit approvals. The preferred crossing method of minor and intermediate waterbodies at the time of crossing will be open-cut or dry ditch crossing methods as described in the FERC Procedures and summarized in Resource Report 1. In additional to reducing the construction workspace to 75 feet through waterbody crossings, implementation of the FERC Plan and Procedures and the Project's Project-specific E&SCP, specifically with respect to construction time windows, erosion and sedimentation control, bank stabilization, and bank revegetation, will minimize short- and long-term impacts on the waterbodies crossed by the Southgate Project route. The Project will continue to consult with state agencies during the permitting process to identify additional site-specific impact avoidance and mitigation measures.

The Southgate Project will restore pipeline facility temporary workspaces, including the areas within FEMA flood zones, as closely as practicable to pre-construction contours. Restoration of pre-construction contours will preserve the existing flood storage capacity of the FEMA flood zones in temporary construction workspace. Approximately 1.7 acres of 100-year flood zone in North Carolina will be permanently altered as a result of the Project. The Project will obtain the necessary state and/or local permits required in Virginia and North Carolina, specifically working with the Rockingham County and Alamance County Planning Departments.

The Southgate Project will abide by state requirements / permit conditions for the Jordan Lake riparian buffer ("riparian buffer') zone watershed. The riparian buffer applies to intermittent streams, perennial streams, lakes, ponds, estuaries and modified natural streams within natural drainageways that are depicted on the most recent published version of the soil survey map prepared by the Natural Resources Conservation Service or the 1:24,000 scale quadrangle topographic map prepared by the USGS. As outlined in the *Jordan Watershed Riparian Buffer Protection Ordinance*, the Zone One buffer zone consists of a vegetated area initiating at the bank of a waterbody and extending 30 feet horizontally. Generally, Zone One is maintained as vegetated buffer zone and there is no disturbance allowed in Zone One. The Zone Two buffer zone extends from the outer limit of Zone One buffer zone and measures 20 feet horizontally, which comprises the outer portion of the 50-foot buffer zone for waterbodies that qualify for the riparian buffer within the Southgate Project area. Generally, grading is allowed in Zone Two provided that the health of the vegetation in Zone One is not compromised. The Southgate Project's temporary impacts within the riparian buffer zone are classified as "Allowable" or "Allowable with mitigation" uses for non-electric, utility line projects (NCDEQ, 2010a). The Southgate Project will continue consultation with NCDEQ to determine appropriate measures required to adequately mitigate for Zone One temporary impacts associated with the Project. Implementation of the FERC Plan and Procedures, the Project-specific E&SCP and the applicable state permit conditions will minimize any potential impacts to surface waterbodies within the Jordan Lake riparian buffer watershed.

ATWS will generally be located at least 50 feet away from waterbodies, unless otherwise approved by FERC through a site-specific exception to the FERC Procedures. The Project will limit the amount of vegetation cleared between the waterbody and the ATWS. ATWS within 50 feet of a waterbody and justification for each are listed in Appendix 2-F.

Crossings will be aligned as close to perpendicular to the axis of the waterbody channel as engineering and site-specific conditions allow. If the pipeline route parallels a waterbody, the Project will attempt to

maintain at least 15 feet of undisturbed vegetation between the waterbody (and adjacent wetland, if present) and the construction workspace. There are 20 locations along the Southgate Project where maintaining 15 feet of undisturbed vegetation is not feasible. These locations and justifications are listed in Table 2.3-9 and shown in Appendix 2-K.

Table 2.3-9

Construction Workspace Parallels Waterbody (or associated Wetland) within 15 feet

Resource ID	MP	Length of Route within 15' Feet of Resource (feet)	Justification
S-F18-17	9.9	60	Crossing location avoids sensitive resource site. Minimizes impact to wetlands. Constructability to avoid side slope construction.
S-D18-37	15.7	52, 44	Collocation and constructability to avoid side slope construction.
S-A18-36	28.4	53	Collocation and constructability to avoid side slope construction.
S-A18-143	31.9	28	Collocation and constructability to avoid side slope construction.
S-A18-150	32.5	40	Collocation and constructability to avoid side slope construction.
S-A18-151	32.7	90	Constructability to avoid side slope construction.
S-A18-154	33	38	Constructability to avoid side slope construction.
S-A18-94 / W-A18-95	37	40 / 61	Constructability to avoid side slope construction.
S-A18-4	38.5	180	Collocation.
AS-B18-71 / S-B18-71	45.7	35, 37	Collocation and constructability to avoid side slope construction.
W-A18-184	49.8	122	Collocation and constructability to avoid side slope construction.
S-A18-87	53.7	43	Collocation.
S-B18-59 / W-B18-60	55.3	102 / 63	Constructability, to avoid residences
S-A18-125 / W-A18-119	56.5	241 / 60	Collocation.
S-A18-125 / W-A18-127	56.6	105 / 153	Collocation.
S-A18-70	62.4	50	Constructability to avoid side slope construction.
S-B18-14	63.2	51	Collocation and constructability to avoid side slope construction.
S-B18-9	68.8	50	Constructability to avoid side slope construction.
S-B18-135	70.2	110	Constructability to avoid side slope construction.
S-C18-82	70.4	93	Constructability to avoid side slope construction.

2.3.6.1 Impacts to Waterbodies from Crossings and Mitigation Measures

Construction of the pipeline could result in minor, short-term impacts to waterbodies. These impacts could occur because of in-stream construction activities, use of access roads, or construction on slopes and riparian areas adjacent to stream channels. Clearing and grading of stream banks, removal of riparian vegetation, in stream trenching, trench dewatering, and backfilling could result in stream bank modification, increased sedimentation, turbidity, increase in temperature, and decreased dissolved oxygen concentrations. An increase in soil compaction and vegetation clearing could potentially increase runoff and subsequent stream flow or peak flows. In the unlikely event of a leak or breach in the pipeline, the natural gas will rise

to the ground surface and dissipate in the air. There are no liquids in the pipeline that would be released to groundwater or surface water in the unlikely event of a leak.

The following is a description of potential impacts due to the different waterbody crossing methods. Descriptions of waterbody crossing methods are summarized in Section 2.3.1.4 above, and described in more detail in Resource Report 1.

Open-cut: As described in Section 1.4.1.1 of Resource Report 1, the Southgate Project will cross waterbodies with no discernable flow at the time of construction using the conventional crossing methods, unless otherwise required. Waterbodies with no perceptible flow will be crossed using standard upland construction techniques in accordance with the FERC Plan, provided that the Environmental Inspector verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event that perceptible flow occurs, the Southgate Project will cease the standard construction technique and implement a dry crossing method as described below. Stream beds will be recontoured as closely as possible to pre-construction conditions. The Project will implement the FERC Plan and Procedures such that restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, revegetation is successful, and proper drainage has been restored.

Dry crossing methods (Dam and Pump / Flume): Temporary construction-related impacts would be limited primarily to short periods of increased turbidity during the installation of temporary upstream and downstream dams prior to pipeline installation and following installation of the pipeline when the dams are removed, and flow across the restored work area is re-established. Streambed and bank stabilization will be completed before returning flow to the waterbody channel.

Specific measures to minimize or avoid impacts to waterbodies for the different waterbody crossing methods proposed include:

<u>Dam and Pump</u>

- Sufficient pumps, including on-site backup pumps, will be used to maintain downstream flows;
- Pumps will be placed in secondary containment and properly aligned to prevent streambed scour at pump discharge;
- Dams will be constructed with materials that prevent sediment and other pollutants from entering the waterbody;
- Pump intakes will be screened to minimize entrainment of fish; and
- Dams and pumps will be continuously monitored to ensure proper operation throughout the waterbody crossing.

<u>Flume</u>

- Sand bags, sand bag and plastic sheeting diversion structures, or the equivalent will be used to develop an effective seal and to divert stream flow through the flume pipe;
- Flume pipes will be installed after blasting (if necessary), but before trenching;
- Flume pipes will remain in place until trenching, pipe laying, backfilling, and initial streambed restoration efforts are complete;
- Flume pipes will be properly aligned to prevent bank erosion and streambed scour; and
- All flume pipes and dams that are not part of the equipment bridge will be removed as soon as final cleanup of the streambed and bank is complete.

Based on evaluation of location and topography, the Project is currently proposing to utilize conventional or guided bore in order to cross Cascade Creek, Wolf Island Creek, and Deep Creek. These crossing methods are the most feasible due to length of the crossings and workspace requirements and therefore, alternative crossing methods are not recommended at this time. Bore pits (entrance and exit) will be stabilized utilizing trench protection where required. The entrance / exit pits will be constructed with water collection sumps for dewatering and subsequent discharge into dewatering pits. Bore entrance and exit pits have been designed to allow for a vegetative buffer on each side of the waterbody crossing to the extent practicable. The Project will continue to work with agencies to determine the crossing method with the elast amount of impact to the waterbodies.

2.3.6.2 Impacts to Waterbodies from Potential Releases of Fuels, Lubricants, and Coolants, and Mitigation Measures

The use of heavy equipment to complete pipeline installation across waterbodies may increase the potential for accidental releases of fuels, lubricants, and coolants. Such releases could adversely affect aquatic species and contaminate public water supplies that rely on surface water intakes located downstream of the waterbody crossing. To mitigate these potential impacts, construction equipment, vehicles, hazardous materials, chemicals, fuels lubricating oils, and petroleum products will not be parked, stored, or serviced within a 100-foot radius of any waterbody or wetland. The Southgate Project will install signs along the right-of-way, including ATWS and contractor yards, to identify such areas.

The Southgate Project will implement its Project-specific Spill Prevention, Control and Countermeasure Plan ("SPCC Plan") and Unanticipated Discovery of Contamination Plan for implementation before and during construction (see Resource Report 1, Appendix 1-G). The SPCC Plan will describe preventive measures such as personnel training, equipment inspection, and refueling procedures to reduce the likelihood of spills. It will also include mitigation measures, such as containment and cleanup, to minimize potential impacts if a spill occurs. Riparian areas and floodplains will not be used as staging or refueling areas. Chemicals, solvents, and fuels will be kept at least 100 feet from wetlands, waterbodies, and riparian areas will be placed within secondary containment. Secondary containment consisting of materials that are impervious to the material being stored (e.g., diking and/or earthen berms with liner) will be used around liquids materials handling and storage areas to prevent spilled material from reaching the waters of the state. Areas that require containment include: (i) liquids stored in drums such as oils, chemicals, and hazardous waste, (ii) bulk storage tanks, and (iii) tanker trucks if parked at one location for more than two days. No chemicals or fuel will be transferred within 100 feet of stream banks. Drip pans or other suitable containment devices will be installed to collect all vehicle fluids when performing on-site maintenance. All waste fluids will be removed from the site and disposed of properly. The Project will minimize the potential impacts of spills of hazardous materials by adhering to this Project-specific SPCC Plan and Unanticipated Discovery of Contamination Plan, which will be available in the field during construction (see Resource Report 1, Appendix 1-G).

2.3.6.3 Impacts to Waterbodies from Turbidity and Sediment Runoff and Mitigation Measures

Pipeline construction across waterbodies and disturbance within the construction footprint for other facilities could result in increased potential for turbidity and sediment runoff from the construction right-of-way. Following FERC's Procedures, temporary erosion controls would be installed during construction

to reduce sediment runoff into waterbodies. Permanent erosion controls would be installed within the pipeline right-of-way for operation and maintenance to reduce stormwater flow into streams.

To reduce turbidity and sedimentation caused by construction and vehicular traffic crossing waterbodies for access to the Southgate Project right-of-way, the Project will install temporary equipment bridges within the approved construction right-of-way that would remain in place throughout construction. Equipment bridges would be constructed using methods and materials such as clean rock or gravel and culverts, equipment mats, portable prefabricated bridges, and railcars. If excessively soft soils are encountered in the streambed, or if high water flows occur, portable bridges may be utilized at minor stream crossings in lieu of flume pipes. Equipment bridges would be designed to accommodate normal to high stream flow during the period of construction.

To minimize turbidity caused by erosion, trench spoil excavated from within streams flowing at the time of construction would be stored at least 10 feet from the top of the bank, unless impractical due to topography. Sediment barriers such as silt fences and straw/hay bales will be placed around the spoil piles to prevent spoil flow into the waterbody.

Once the pipe is placed in the trench, the excavated material would be replaced and the stream banks and streambed would be restored to their pre-construction contours. Stream banks and riparian areas will be stabilized by using erosion-control devices and appropriate seed mixtures approved by the landowner/agency.

Riparian canopy or stabilizing vegetation would not be removed if possible. Crushing or shearing streamside woody vegetation is preferable to complete removal. Any area where vegetation is removed in conjunction with stream crossings would be stabilized immediately following the completion of the crossing.

2.3.6.4 Impacts to Waterbodies from Hydrostatic Testing Discharges and Mitigation Measures

Potential exists for scour, erosion and potential for sediment transport to adjacent waterbodies from hydrostatic testing discharges. To mitigate these potential impacts, water discharged over land will be directed into energy dissipation devices, filter bags, or straw bale structures, which will be removed upon completion of testing. Typical drawings provided in the Project's Project-specific E&SCP include a typical hydrostatic test dewatering structure. The actual discharge methodology will be confirmed based upon field conditions. The hydrostatic test dewatering structure will be placed on a vegetated upland site that will allow water to flow away from the structure and any nearby work areas. The discharge rate will be monitored and regulated using valves and energy dissipation devices to prevent erosion and sediment transport. These measures will minimize scour, erosion, and sediment transport from hydrostatic testing.

2.3.6.5 Impacts to Waterbodies from Rock Blasting and Mitigation Measures

Temporary impacts from blasting of rock to excavate the pipeline trench in an open-cut crossing of a flowing waterbody can include a short-term increase in the sediment load in the waterbody during the period of trenching and injury to fish and mussels from the shock wave created by the blast. Table 2.3-10 identifies waterbodies that will be crossed in areas where existing data shows potential for bedrock to be encountered within the trench depth (i.e., shallow bedrock) and where blasting could be required to excavate the trench.

Table 2.3-10

Waterbodies Crossed by the Pipeline in Areas of Shallow Bedrock a/

State/County	Milepost	Waterbody Name b/	Flow Type
Virginia			
Pittsylvania	23.0	S-F18-43 / Tributary to Trotters Creek	Intermittent
	24.4	S-F18-34 / Tributary to Dan River	Perennial
	24.8	S-F18-33/AS-F18-33 / Tributary to Dan River	Perennial
North Carolina			
Rockingham	32.5	S-S18-150/AS-A18-150 / Tributary to Town Creek	Ephemeral
	33.7	S-A18-225 / Tributary to Town Creek	Perennial
	34.7	C-18-53 / Tributary to Town Creek	Intermittent
	39.0	S-B18-72 / Tributary to Wolf Island Creek	Ephemeral
	40.4	S-A18-210 / Tributary to Lick Fork	Intermittent
	40.6	S-B18-51 / Tributary to Lick Fork	Perennial
	40.7	S-B18-52 / Tributary to Lick Fork	Perennial
	42.9	S-A18-256 / Tributary to Jones Creek	Intermittent
	44.1	S-C18-25 / Tributary to Jones Creek	Perennial
	44.1	S-A18-102 / Tributary to Jones Creek	Perennial
	45.8	S-B18-71/AS-B18-71 / Tributary to Hogans Creek	Perennial
	45.9	S-B18-68 / Tributary to Hogans Creek	Perennial
	46.5	S-A18-234 / Tributary to Hogans Creek	Intermittent
	46.5	S-A18-235 / Tributary to Hogans Creek	Perennial
	47.4	S-C18-79 / Tributary to Hogans Creek	Perennial
	47.6	S-A18-90 / Tributary to Hogans Creek	Perennial
Alamance	68.9	S-B18-11 / Tributary to Haw River	Intermittent
	71.0	S-A18-107 / Tributary to Haw River	Intermittent

a/ Analysis includes all waterbodies delineated as of September 20, 2018 crossed by the pipeline.
b/ Approximated waterbodies are indicated as "AS" in the Waterbody Name, and unless associated with a delineated stream, the AS Flow Type is also approximated.

To avoid these potential impacts, the following mitigation measures will be implemented by the Southgate Project:

- The Project will adhere to the FERC Plan and Procedures and implement its General Blasting Plan to follow when blasting rock in an open-cut crossing of a waterbody (see Resource Report 6, Appendix 6-D). Blasting for trench excavation will be considered only after all other reasonable means of excavation are determined to be unlikely to achieve the required results. Blasting in smaller (generally less than 20 feet wide) or intermittent streams, would be avoided during high flow events, and/or done during dry periods to the extent possible.

2.3.6.6 Waterbodies in Karst Areas

Working under or through streams in karst areas could provide direct conduits for rapid surface water flow into subsurface karst features and potentially impact subsurface karst features and the stream. Waterbodies that are crossed by the pipeline within karst areas are included in Table 2.3-11.

Table 2.3-11

Waterbodies Crossed by the Pipeline in Karst Areas a/

State/County	Milepost	Waterbody Name	Flow Type
Virginia			
Pittsylvania	0.1	S-F18-6 / Tributary to Little Cherrystone Creek	Intermittent
	0.4	S-F18-65 / Little Cherrystone Creek	Perennial
	0.6	S-F18-63 / Tributary to Sandy Creek	Intermittent
	15.2	S-A18-188 / Tributary to Silver Creek	Perennial
	15.7	S-D18-37 / Tributary to Silver Creek	Perennial
	15.9	S-A18-190 / Tributary to Silver Creek	Intermittent
	16.0	S-A18-194 / Tributary to Silver Creek	Perennial
	16.2	S-A18-195 / Tributary to Silver Creek	Perennial

a/ Analysis includes all waterbodies delineated as of September 20, 2018 crossed by the pipeline.

2.4 WETLAND RESOURCES

The USACE and USEPA jointly define wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory, 1987). The FERC defines wetlands as any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands. Wetlands generally include swamps, marshes, bogs, and similar areas.

2.4.1 Wetland Delineation Methodology

The Southgate Project conducted wetland delineations in accordance with the 1987 USACE Wetlands Delineation Manual (Environmental Laboratory, 1987) and the regional USACE supplements applicable to the Project. The Eastern Mountains and Piedmont Regional Supplement was used for the Project facilities (USACE, 2012). Wetland data discussed in this section of Resource Report 2 is based on field delineations where survey access has been granted and detailed desktop analysis taking into account several components (aerial imagery, NWI data [USFWS, 2009]), and hydrological conditions from nearby delineated resources) where survey access has not been granted. As of September 20, 2018, the Project has completed field delineation of wetlands along approximately 77 percent of the pipeline alignment where survey access was available. Appendix 2-B lists the wetland crossings for both approximated and survey field data. Appendix 2-G provides a list of areas that have not been surveyed as of this filing, Appendix 2-I provides wetland delineation reports (one for each state), and Appendix 2-J depicts NWI mapping along the Project. In addition to delineated resources in areas where survey permission was granted, the approximate resource boundaries further assist with the preliminary routing of the pipeline in an effort to minimize wetland impacts. The Project attempted to minimize the number and extent of wetland crossings to the extent practicable while maintaining a safe, constructible alignment. Table 2.4-1 is a summary of wetlands crossed by the Project. Wetland boundaries are depicted on the alignment sheets located in Appendix 1-A of Resource Report 1.

Table 2.4-1

Summary of Wetlands Crossed by the MVP Southgate Project

State / County	Wetland Type	Length of Pipeline Crossing (Feet)	Acres Impacted a/	
			Construction	Operation
Virginia				
Pittsylvania	PEM	3,167	6.6	0.7
	PFO	2,897	4.4	1.6
	PSS	472	0.7	0.1
Virginia Total		***6,537***	***11.8***	***2.5***
North Carolina				
Rockingham	PEM	971	2.4	0.2
	PFO	1,908	3.6	1.3
	PSS	193	0.4	0.0
Alamance	PEM	220	0.8	0.1
	PFO	1,711	2.7	1.2
	PSS	52	0.1	0.0
North Carolina Total		***5,056***	***9.9***	***2.8***
Project Total		***11,593***	***21.7***	***5.2***

a/ Construction impacts are impacts associated with all areas within the construction workspace limits, temporary and permanent. Operation impacts are impacts associated with vegetation maintenance (10 feet in PEM and PSS wetlands and 30 feet in PFO wetlands). Sums may not equal the total of addends due to rounding. Addends consist of six-decimal digits.

2.4.2 Types of Wetlands

The wetland classification system follows the naming convention found in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, 1979). This classification includes five major systems, including marine, estuarine, riverine, lacustrine, and palustrine. The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppm.

Three wetland classes are located in the Southgate Project survey corridor: palustrine emergent ("PEM"), palustrine scrub/shrub ("PSS"), palustrine forested ("PFO"). Classes describe the general appearance of the habitat in terms of either the dominant life form of the vegetation or the physiography and composition of the substrate. Life-forms (e.g., trees, shrubs, and emergents) are used to define classes because they are easily recognizable, do not change distribution rapidly, and have traditionally been used to classify wetlands. The four classes are as follows:

Palustrine Emergent ("PEM") – Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. PEM wetlands within the study corridor were typically dominated by sedges (e.g. *Carex crinata*, *Carex vulpinoidea*, *Carex scoparia*, *Carex lurida*), jewelweed (*Impatiens capensis*), soft rush (*Juncus effusus*), dark green bulrush (*Scirpus*

atrovirens), sensitive fern (*Onoclea sensibilis*), tapertip rush (*Juncus acuminatus*), panicled aster (*Symphyotrichum lanceolatum*), rice cut grass (*Leersia oryzoides*).

Palustrine Scrub/Shrub ("PSS") – Scrub/shrub wetlands are characterized by woody vegetation that is generally less than 6 meters (~20 feet) tall. The woody angiosperms (i.e., small trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season. PSS wetlands within the study corridor are typically dominated by black willow (*Salix nigra*), red maple (*Acer rumbrum*), American sycamore (*Platanus occidentalis*), sweetbay magnolia (*Magnolia virginiana*), black elder (*Sambucus nigra*), smooth alder (*Alnus serrulata*), sedges (e.g. *Carex lurida*, *Carex scoparia*), sensitive fern, jewelweed, and soft rush.

Palustrine Forested ("PFO") – Forested wetlands are characterized by woody vegetation that is 6 meters in height or taller. The woody angiosperms (i.e., trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season. PFO wetlands within the study corridor are typically dominated by green ash (*Fraxinus pennsylvanica*), red maple, sweetgum (*Liquidambar styraciflua*), American elm (*Ulmus Americana*), willow oak (*Quercus phellos*), swamp dewberry (*Rubus hispidus*), poison ivy (*Toxicondendron radicans*), and American sycamore.

The Virginia Department of Conservation and Recreation maintains the Virginia Wetlands Catalog, which is an inventory of wetlands and potential wetlands with prioritization summaries for conservation and restoration purposes by parcel, subwatershed and wetland boundaries. The Virginia Wetlands Catalog developed a wetlands and associated features layer by combining wetlands, potential wetlands, floodplains, and streams form the National Wetlands Inventory, the National Hydrography Dataset, the Digital Flood Insurance Rate Map Database, and the Soil Survey Geographic Database. The Catalog then uses information for ranking wetlands for either conservation or restoration purposes. Information used to produce the rankings include plant and animal biodiversity, significant natural communities, natural corridors, impaired waters, drinking sources, degraded watersheds, etc. Rankings range from the lowest rank (1- General) to the highest rank (5 – Outstanding). The Catalog can be used to prioritize wetlands, parcels and subwatersheds for conservation or restoration purposes, to inform project-design processes to make them more efficient, to assess impacts of proposed projects, and to identify possible mitigation sites (VDCR, 2018).

According to publicly available data regarding conservation ranking of wetlands, the majority of the Southgate Project crosses areas of the lowest two rankings (1- General and 2 – Moderate). A small area with a ranking of "3 – High" is within the Project area surrounding Trotters Creek. Similar to the conservation ranking of wetlands, the majority of the restoration ranking of wetlands within the Project are the lowest two rankings (1 – General and 2 – Moderate), however there are approximately 5 crossing of "3 – High" ranking restoration wetland along the Project (VDCR, 2018).

In North Carolina, the NCDEQ designates certain wetlands of exceptional state or national ecological significance and these wetlands require additional protection. These unique wetlands have been documented as essential habitat for the conservation of state or federally listed threatened or endangered species. According to publicly available mapping, the Southgate Project does not cross any of the 33 designated unique wetlands in North Carolina, nor are there any unique wetlands in Rockingham or Alamance County (NCDEQ, 2010b).

2.4.3 Wetland Crossing Methods

Crossing of jurisdictional wetlands will be completed in accordance with applicable state and federal approvals and the FERC Plan and Procedures. The FERC Plan and Procedures were developed to provide a standard set of wetland crossing methods that allow practical installation of a pipeline while avoiding and minimizing short and long-term impacts on wetlands to the greatest extent practical. Operation of construction equipment in wetlands will be limited to that needed to clear the right-of-way, dig the trench, fabricate the pipe, install the pipe, backfill the trench, and restore the right-of-way. The Project will segregate the topsoil up to one foot in depth over the trench line in wetlands where hydrologic conditions permit this practice (where soils are not saturated). Restoration and monitoring of wetland crossings will be conducted in accordance with the FERC Plan and Procedures to ensure successful wetland revegetation. Other Federal and State permit seeding requirements will be considered where applicable.

Hydrological conditions in wetlands will likely dictate the use of either wet or dry open ditch lay, or open ditch push/pull lay methods. Selection of the most appropriate method will depend on site-specific weather conditions, inundation, soil saturation, and soil stability at the time of construction. The conventional open ditch lay method will be the most frequently used technique for installation of the pipeline in wetlands. The Project will use the push/pull lay method in inundated or saturated wetland areas where groundwater conditions preclude conventional construction. Selection of the push/pull method will be decided during construction by the construction supervisor and/or the Southgate Project representative depending on the conditions at the time of construction.

Where wetlands cannot be avoided, the Southgate Project will seek to minimize impacts through the use of specialized wetland construction procedures. In accordance with FERC Procedures, fuel will not be stored within 100 feet of wetlands or other waterbodies during construction with the exception of pumps and HDD equipment. The Project is committed to constructing the Project in accordance with FERC Plan and Procedures and the Project's Project-specific E&SCP. Erosion control measures such as silt fences, interceptor dikes, and hay bale structures will be installed and maintained to minimize sedimentation within the wetland. Trench plugs will be installed where necessary to prevent the unintentional draining of water from the wetland. Upon completion of construction, the right-of-way will be restored, and a 10-foot wide strip centered on the pipeline will be maintained in an herbaceous state during operation. General wetland crossing methods are described in Section 1.4.1.1 of Resource Report 1; actual crossing methods will be dependent upon actual conditions in the field and agency requirements.

2.4.4 Construction and Operation Impacts and Mitigation

Although the majority of the wetland impacts will be temporary, there will be 0.03 acre of permanent wetland impacts associated with two permanent access roads (PA-RO-082 and PA-RO-113A) for the Southgate Project. The Project will initiate consultation with applicable state and / or federal agencies regarding mitigation measures for permanent wetland impacts. Temporary construction impacts in wetlands may include temporary loss of herbaceous and scrub/shrub vegetation; wildlife habitat disruption; soil disturbance associated with grading, trenching, and stump removal; soil compaction; sedimentation and turbidity increases; and hydrological profile changes. Impacts to forested wetlands may include conversion to emergent and/or scrub/shrub wetland types as a result of tree removal within the construction and operational right-of-way. Operation of construction equipment through wetlands will be limited to only that necessary for each stage of pipeline installation. Topsoil segregation techniques will be used in unsaturated wetlands to preserve the seed bank and to facilitate successful restoration. Wetland crossing

methods will be determined based on site-specific conditions. Wetlands with soils that can support construction equipment may be crossed using the open-ditch method, as described above, with the use of equipment mats to prevent soil rutting.

Wetland soils (hydric soils) are susceptible to compaction with operation of construction equipment over wet soils, thereby reducing the porosity and moisture-holding capacity of the soils and interfering with the hydrology of the wetland. To minimize compaction, the Southgate Project will limit construction traffic to only that required to accomplish the construction. Low-ground-pressure equipment will be used, or temporary equipment mats will be installed to allow passage of equipment with minimal disturbance of the surface soils and vegetation. Compacted areas will be tilled as necessary. Further discussion of soil compaction, construction activities in hydric soils, and restoration is included in Resource Report 7.

Outside of wetland areas, the width of the permanent right-of-way will be maintained in accordance with the FERC Plan, utilizing both mowing equipment and hand-cutting at least every three years; however, a ten-foot wide section directly over the pipeline may be maintained more regularly. In wetland areas, routine vegetation, mowing, or clearing will not occur over the entire permanent right-of-way. Woody vegetation with roots within 15 feet of the pipeline will be selectively cut and removed.

2.4.4.1 General Wetland Impact Minimization Measures

- In additional to reducing the construction workspace to 75 feet through wetland crossings, prioritizing avoidance and / or minimization during route design and selection of appropriate crossing techniques, the Southgate Project will limit wetland impacts by adherence to the FERC Plan and Procedures and applicable permit requirements;
- Trees will be cut to grade, but stumps will only be removed directly over the trench line, or where safety concerns dictate otherwise. This will allow existing vegetation to recover more rapidly in the remainder of the right-of-way once the equipment mats and spoil piles have been removed;
- Operation of construction equipment in wetlands will be limited to that needed to clear the right-of-way, excavate the trench, fabricate the pipe, install the pipe, backfill the trench, and restore the right-of-way;
- After the pipeline is installed in the trench, the Southgate Project will backfill the ditch with the spoil excavated from the wetland. If dewatering of the trench is necessary, it will be conducted in a manner designed to prevent heavily silt-laden water from entering a waterbody or undisturbed portions of the wetland. Following backfilling, the segregated topsoil will be spread over the area from which it was stripped and restored to approximate pre-construction contour. The Project will remove any timber riprap, equipment mats, or other material from the wetland after construction;
- No herbicides or pesticides will be used in or within 100 feet of a wetland or waterbody, unless specified by a federal or state agency; and
- In general, the Southgate Project will seed wetland areas that are not inundated with annual rye to provide soil stabilization while allowing the natural seedbank to revegetate the wetland area. Topsoil segregation in unsaturated wetlands will preserve the native seed source, which will facilitate regrowth of wetland herbaceous and/or woody plant species through natural succession. The Project will document communications with the USACE and appropriate state agencies regarding the development of any additional wetland mitigation measures that may be required as conditions of specific permits.

2.4.4.2 Impacts to Forested Wetlands and Mitigation Measures

As required by the FERC Procedures, the Southgate Project will maintain no more than a 10-foot-wide strip centered over the pipeline in an herbaceous state and will only remove woody vegetation within a 30-foot-wide strip centered over the pipeline.

2.4.4.3 Impacts to Adjacent Wetlands from Hydrological Profile Changes and Mitigation Measures

Hydrological profile changes from construction activities could adversely affect undisturbed wetlands adjacent to the construction right-of-way. To avoid these impacts, pre-construction wetland conditions including contours in the construction right-of-way will be restored to the extent possible. Hydric soils are susceptible to compaction and rutting depending on the saturation levels. The Project will minimize compaction and rutting of hydric soils by limiting access during wet periods, use low-ground pressure equipment, or temporary equipment mats to allow passage of equipment with minimal disturbance of the surface and vegetation.

The Southgate Project will follow FERC's Procedures requiring the use of trench breakers or installation of trench plugs in areas of shallow groundwater and on slopes. Trench breakers (or plugs) would prevent local shallow groundwater and recharge (via precipitation) from flowing along the pipeline trench and away from wetlands. Trench plugs are installed after the pipeline is installed in the trench and prior to trench backfilling.

2.4.4.4 Impacts to Adjacent Wetlands from Accidental Spills and Mitigation Measures

During construction, accidental spills of fuels, oils or other hazardous materials during wetland crossings could adversely affect adjacent undisturbed wetlands or reduce the successful restoration of wetlands in the construction right-of-way. To avoid these impacts, the Southgate Project will implement its Project-specific SPCC Plan and Unanticipated Discovery of Contamination Plan for implementation during construction. Section 2.3.6 above describes preventive measures such as personnel training, equipment inspections, and refueling procedures to reduce likelihood of spills included in the SPCC Plan and Unanticipated Discovery of Contamination Plan (see Resource Report 1, Appendix 1-G).

2.4.4.5 Alternative Measures to the FERC Procedures

ATWS areas may be required on either side of wetland crossings to stage construction, fabricate the pipeline, and store materials. ATWS areas will, to the extent practicable, be located in upland areas a minimum of 50 feet from the wetland edge. In most instances the ATWS is located beyond 50 feet of the wetland. However, there are locations where the Southgate Project has ATWS located within 50 feet of the wetland due to crossing techniques or other constraints. A list of ATWS located within 50 feet of wetlands and justification is included in Appendix 2-F.

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MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

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Waterbodies Crossed by MVP Southgate Project

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
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 - Dam and pump, Flume
H-650 Pipeline								
S-F18-65	0.4	Little Cherrystone Creek	Perennial	21	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-63	0.6	Trib. To Sandy Creek	Intermittent	14	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-18	1.1	Trib. To Cherrystone Creek	Intermittent	5	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-56	1.4	Trib. To Cherrystone Creek	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-18	1.7	Cherrystone Creek	Perennial	30	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-2	3.2	Trib. To Banister River	Intermittent	8	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-6	3.6	Trib. To Banister River	Intermittent	10	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-10	4	Trib. To Banister River	Intermittent	6	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-9	4.1	Trib. To Banister River	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-4	4.8	Trib. To Banister River	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-3	4.9	Banister River	Perennial	48	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-2	5	White Oak Creek	Perennial	33	Intermediate	WWH	AL, R, FC, PWS, W	Open Cut - Dam and pump, Flume
S-D18-2	5.1	White Oak Creek	Perennial	23	Intermediate	WWH	AL, R, FC, PWS, W	Open Cut - Dam and pump, Flume
S-D18-15	6	Trib. To White Oak Creek	Ephemeral	0	Minor	WWH	AL, R, FC, W	N/A
S-D18-36	6.6	Trib. To White Oak Creek	Intermittent	5	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-7	7	Trib. To White Oak Creek	Intermittent	4	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-6	7	Trib. To White Oak Creek	Intermittent	5	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-D18-13	7.6	Trib. To White Oak Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-13	8	Trib. To White Oak Creek	Intermittent	9	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-16	8.5	Trib. To White Oak Creek	Intermittent	8	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-14	8.6	Trib. To White Oak Creek	Perennial	9	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
WB-E18-24	9	Trib. To White Oak Creek	Intermittent	23	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-15	9.9	Trib. To White Oak Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-17	9.9	White Oak Creek	Perennial	14	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-20	11	Trib. To Sandy Creek	Perennial	40	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-22	11	Trib. To Sandy Creek	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
S-F18-28	11.4	Trib. To Sandy Creek	Intermittent	0	Minor	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 - Dam and pump, Flume
S-C18-85	11.6	Trib. To Sandy Creek	Perennial	4	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-C18-86	11.9	Trib. To Sandy Creek	Perennial	23	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-21	12.8	Sandy Creek	Perennial	15	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-27	13.4	Trib. To Sandy Creek	Perennial	16	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
*AS-D18-22 / S-D18-22	14.3	Trib. To Sandy Creek	Perennial	12	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-47	14.7	Trib. To Sandy Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-A18-188	15.2	Trib. To Silver Creek	Perennial	5	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-37	15.7	Trib. To Silver Creek	Perennial	24	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-A18-190	15.9	Trib. To Silver Creek	Intermittent	6	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-A18-194	16	Trib. To Silver Creek	Perennial	7	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-A18-195	16.2	Trib. To Silver Creek	Perennial	3	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-G18-10	16.2	Trib. To Silver Creek	Intermittent	0	Minor	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 - Dam and pump, Flume
S-B18-202	17	Trib. To Sandy River	Perennial	2	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-51	17.3	Trib. To Sandy River	Perennial	12	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-44	17.7	Sandy River	Perennial	85	Intermediate	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-E18-42	18	Trib. To Hardys Creek	Perennial	6	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-D18-38	19.4	Trib. To Sandy River	Ephemeral	4	Minor	WWH	AL, R, FC, W	Open Cut - Dam and pump, Flume
S-F18-50	19.7	Trib. To Sandy River	Perennial	9	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-E18-52	20.4	Trib. To Trayner Branch	Perennial	14	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-E18-54	20.6	Trib. To Trayner Branch	Perennial	6	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-D18-34	21	Trayner Branch	Perennial	8	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-D18-40	21.2	Trib. To Trayner Branch	Perennial	4	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-C18-94	21.7	Trib. To Trotters Creek	Intermittent	0	Minor	WWH	AL, R, FC, W, PWS	N/A
WB-C18-93	21.9	Trib. To Trotters Creek	Pond	0	Minor	WWH	AL, R, FC, W, PWS	N/A
S-A18-205	22	Trib. To Trotters Creek	Intermittent	19	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-A18-203	22.1	Trib. To Trotters Creek	Intermittent	1	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-A18-206	22.2	Trib. To Trotters Creek	Intermittent	8	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-F18-43	23	Trib. To Trotters Creek	Intermittent	4	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-F18-42	23.2	Trib. To Trotters Creek	Ephemeral	11	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-F18-40	23.2	Trotters Creek	Perennial	22	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-F18-38	23.5	Trib. To Dan River	Intermittent	4	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-F18-35	23.8	Trib. To Dan River	Ephemeral	7	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-E18-34	23.9	Trib. To Dan River	Perennial	0	Minor	WWH	AL, R, FC, W, PWS	N/A
S-F18-34	24.4	Trib. To Dan River	Perennial	8	Minor	WWH	AL, R, FC, W, PWS	Open Cut - 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 - Dam and pump, Flume
S-C18-89	25.1	Trib. To Dan River	Perennial	19	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-C18-90	25.7	Trib. To Dan River	Perennial	11	Intermediate	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
S-C18-92	25.9	Trib. To Dan River	Intermittent	6	Minor	WWH	AL, R, FC, W, PWS	Open Cut - Dam and pump, Flume
North Carolina								
Rockingham								
S-B18-99	26.5	Trib. To Cascade Creek	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-42	27.3	Trib. To Cascade Creek	Intermittent	15	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-40	27.5	Cascade Creek	Perennial	25	Intermediate	WWH	Class C	Conventional Bore
*AS-NHD-4000	27.5	Dry Creek	Perennial	36	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-31	28.3	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-32	28.4	Trib. To Dan River	Perennial	7	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-34	28.4	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-36	28.4	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-37	28.6	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-B18-49	28.8	Trib. To Dan River	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-47	29.1	Trib. To Dan River	Ephemeral	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-160	29.3	Trib. To Dan River	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-47	29.6	Trib. To Dan River	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-17	30.1	Dan River	Perennial	247	Major	WWH	Class C	HDD
S-B18-38	30.3	Trib. To Dan River	Ephemeral	3	Minor	WWH	Class C	HDD
*AS-B18-104	30.9	Trib. To Rock Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
*AS-B18-105	31.1	Trib. To Rock Creek	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-102	31.1	Trib. To Rock Creek	Perennial	0	Minor	WWH	Class C	N/A
*AS-B18-102 / S-B18-102	31.1	Trib. To Rock Creek	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-95	31.3	Rock Creek	Perennial	28	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-143 / S-A18-143	31.9	Trib. To Machine Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-140	31.9	Trib. To Machine Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-144	32	Trib. To Machine Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-140-2	32	Trib. To Machine Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-148	32.1	Trib. To Machine Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-147	32.2	Machine Creek	Perennial	20	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-150 / S-A18-150	32.5	Trib. To Town Creek	Ephemeral	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-153	32.6	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-151	32.6	Town Creek	Perennial	55	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-151-2	33	Town Creek	Perennial	48	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-154	33	Trib. To Town Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-154-2	33	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-154-3	33	Trib. To Town Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-220	33.3	Trib. To Town Creek	Ephemeral	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-221	33.3	Trib. To Town Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-52	33.4	Trib. To Town Creek	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-51	33.5	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-223	33.7	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-A18-225	33.7	Trib. To Town Creek	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-49	33.9	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-48	34	Trib. To Town Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-C18-38	34.2	Trib. To Town Creek	Intermittent	25	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-39	34.5	Trib. To Town Creek	Ephemeral	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-38-2	34.6	Trib. To Town Creek	Intermittent	17	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-53	34.7	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-38-3	34.8	Trib. To Town Creek	Intermittent	23	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-74	34.8	Trib. To Town Creek	Ephemeral	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-38-4	35	Trib. To Town Creek	Intermittent	8	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-57	35.1	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-35	36	Trib. To Town Creek	Perennial	10	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-94	37	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-97	37.2	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-101	37.3	Trib. To Wolf Island Creek	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-117	37.6	Trib. To Wolf Island Creek	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-117-2	37.7	Trib. To Wolf Island Creek	Perennial	10	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-2	38.2	Trib. To Wolf Island Creek	Perennial	20	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-9	38.4	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-4	38.5	Trib. To Wolf Island Creek	Perennial	0	Minor	WWH	Class C	N/A
S-A18-4-2	38.5	Trib. To Wolf Island Creek	Perennial	0	Minor	WWH	Class C	N/A
*AS-A18-8	38.7	Wolf Island Creek	Perennial	42	Intermediate	WWH	Class C	Conventional Bore

Appendix 2-A

Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-B18-72	39	Trib. To Wolf Island Creek	Ephemeral	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-73	39.1	Trib. To Wolf Island Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-74	39.1	Trib. To Wolf Island Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-74-2	39.6	Trib. To Wolf Island Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-108	40.2	Trib. To Lick Fork	Perennial	27	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-109	40.2	Trib. To Lick Fork	Ephemeral	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-210	40.4	Trib. To Lick Fork	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-210-2	40.4	Trib. To Lick Fork	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-51	40.6	Trib. To Lick Fork	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-52	40.7	Trib. To Lick Fork	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-57	41.1	Trib. To Lick Fork	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-56	41.1	Lick Fork	Perennial	39	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-171	41.2	Trib. To Lick Fork	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-44	41.6	Trib. To Lick Fork	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-45	41.7	Trib. To Lick Fork	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-44	41.7	Trib. To Lick Fork	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-41	41.8	Trib. To Lick Fork	Perennial	19	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-89	42.3	Trib. To Jones Creek	Ephemeral	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-256	42.9	Trib. To Jones Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-92	43.1	Trib. To Jones Creek	Perennial	12	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-176	43.3	Jones Creek	Perennial	26	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-181	43.3	Trib. To Jones Creek	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume

Appendix 2-A

Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-C18-80	43.7	Trib. To Jones Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-105	43.7	Trib. To Jones Creek	Perennial	53	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-25	44.1	Trib. To Jones Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-102	44.1	Trib. To Jones Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-226	44.4	Trib. To Jones Creek	Ephemeral	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-228	44.5	Trib. To Jones Creek	Ephemeral	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-213	45.7	Trib. To Hogans Creek	Intermittent	0	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-71 / S-B18-71	45.7	Trib. To Hogans Creek	Perennial	13	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-68	45.8	Trib. To Hogans Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-231	46.4	Trib. To Hogans Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-234	46.5	Trib. To Hogans Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-76	47	Hogans Creek	Perennial	19	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-235	46.5	Trib. To Hogans Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-79	47.4	Trib. To Hogans Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-90	47.6	Trib. To Hogans Creek	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-242 / S-A18-242	47.7	Trib. To Hogans Creek	Perennial	19	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-APS-01	47.7	Trib. To Hogans Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-60	48.7	Giles Creek	Perennial	4	Minor	WWH	Class C, WS-IV, NSW	Open Cut - Dam and pump, Flume
S-A18-55	49.3	Trib. To Giles Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-183	49.9	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-185	49.9	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
*AS-A18-182 / S-A18-182	49.9	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-A18-244	50.2	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-NHD-305	50.8	Trib. To Haw River	Perennial	16	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-22	51.2	Trib. To Haw River	Ephemeral	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-21	51.4	Trib. To Haw River	Perennial	7	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-15	52.1	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-217	52.1	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-219	52.4	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
Alamance								
S-B18-94	52.7	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-84	53.7	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-87	53.7	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-89	54	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-63	54.5	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-62	54.6	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-60	54.9	Trib. To Haw River	Intermittent	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-143	54.9	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-142	54.9	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-61	54.9	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-68	55.2	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-59	55.3	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-59 / S-B18-59	55.3	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-59-2	55.3	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-B18-65	56.4	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-120	56.4	Trib. To Haw River	Perennial	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
WB-A18-121	56.5	Trib. To Haw River	Pond	31	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-125	56.5	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-125-2	56.6	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-125-3	56.6	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-126	56.6	Trib. To Haw River	Ephemeral	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-125-4	56.6	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-132	57.1	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-2	57.9	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-13	58.7	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-11	58.7	Trib. To Haw River	Perennial	79	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-12	58.7	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 - Dam and pump, Flume
S-C18-30	60.7	Trib. To Haw River	Intermittent	13	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-28	60.8	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-78	61.8	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-77	61.8	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-70	62.4	Trib. To Haw River	Perennial	20	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-72	62.5	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-23	63	Trib. To Stony Creek Reservoir	Ephemeral	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-24	63	Trib. To Stony Creek Reservoir	Perennial	0	Minor	WWH	Class C	N/A

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-B18-12	63	Trib. To Stony Creek Reservoir	Perennial	0	Minor	WWH	Class C	N/A
S-B18-22	63	Trib. To Stony Creek Reservoir	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-22-2	63.1	Trib. To Stony Creek Reservoir	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-26	63.1	Trib. To Stony Creek Reservoir	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-12-2	63.1	Trib. To Stony Creek Reservoir	Perennial	6	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-12-3	63.1	Trib. To Stony Creek Reservoir	Perennial	6	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-29	63.1	Trib. To Stony Creek Reservoir	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-12-4	63.1	Trib. To Stony Creek Reservoir	Perennial	6	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-14	63.2	Trib. To Stony Creek Reservoir	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-14-1	63.2	Trib. To Stony Creek Reservoir	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-12-5	63.2	Trib. To Stony Creek Reservoir	Perennial	0	Minor	WWH	Class C	N/A
S-B18-12-6	63.2	Trib. To Stony Creek Reservoir	Perennial	21	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-15	63.5	Trib. To Stony Creek Reservoir	Intermittent	0	Minor	WWH	Class C	N/A
*AS-B18-16 / S-B18-16	63.6	Stony Creek Reservoir	Perennial	305	Major	WWH	Class C, WS-II, HQW, NSW, CA	HDD
*AS-B18-20	63.8	Trib. To Deep Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-NHD-1547	64	Deep Creek	Perennial	8	Minor	WWH	Class C, WS-II, HQW, NSW, CA	Conventional Bore
*AS-NHD-3040	64.5	Trib. To Deep Creek	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-251	65.6	Trib. To Boyds Creek	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-250	65.6	Trib. To Boyds Creek	Perennial	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-NHD-3025	66.8	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
*AS-A18-177	67.2	Trib. To Boyds Creek	Perennial	14	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-233 / S-A18-233	67.6	Boyds Creek	Perennial	25	Intermediate	WWH	Class C, WS-V, NSW	Open Cut - Dam and pump, Flume
*AS-NHD-1551	68.1	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
WB-B18-1	68.2	Trib. To Boyds Creek	Pond	0	Minor	WWH	Class C	N/A
S-B18-7	68.4	Trib. To Boyds Creek	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-NHD-1552	68.6	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-8	68.8	Trib. To Haw River	Intermittent	13	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-11	68.9	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-10	69.1	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-15	69.2	Trib. To Haw River	Intermittent	4	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-B18-132	69.5	Trib. To Haw River	Perennial	8	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-A18-115	69.9	Trib. To Haw River	Perennial	18	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-135	70.3	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-134	70.3	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-133	70.3	Trib. To Haw River	Perennial	12	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-82	70.4	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-C18-81	70.7	Trib. To Haw River	Perennial	24	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-109	70.9	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-108	71	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-107	71	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-64	71.5	Trib. To Haw River	Perennial	26	Intermediate	WWH	Class C	Open Cut - Dam and pump, Flume

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Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-A18-65	71.6	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-68	71.8	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
*AS-NHD-1560	72.1	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-A18-207	72.2	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-125	72.4	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-127	72.5	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-128	72.5	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
S-B18-129	72.6	Trib. To Haw River	Ephemeral	3	Minor	WWH	Class C	Open Cut - Dam and pump, Flume
Aboveground Facilities **North Carolina** **Rockingham**								
*AS-NHD-1513 - CY-05	30.6	Dry Creek	Intermittent	0	Minor	WWH	Class C	N/A
*AS-A18-248 / S-A18-248 - CY-05	30.6	Trib. To Dry Creek	Ephemeral	0	Minor	WWH	Class C	N/A
*AS-APP-1569 - CY-05	30.7	Trib. To Dry Creek	Pond	0	Minor	WWH	Class C	N/A
*AS-A18-246 / S-A18-246 - CY-06	30.7	Trib. To Dry Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-247 - CY-06	30.7	Trib. To Dry Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-38 - T-15 Dan River Interconnect	30.3	Trib. To Dan River	Ephemeral	0	Minor	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-D18-28 - TA-PI-034	13.7	Trib. To Sandy Creek	Perennial	7	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-D18-26 - TA-PI-034	13.7	Trib. To Sandy Creek	Perennial	8	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-F18-61 - TA-PI-035	14.2	Trib. To Sandy Creek	Perennial	0	Minor	WWH	AL, R, FC, W	N/A
*AS-NHD-2357 - TA-PI-035	14.3	Trib. To Sandy Creek	Perennial	5	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-A18-190 - TA-PI-038	15.9	Trib. To Silver Creek	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
S-F18-47 - TA-PI-043	17.2	Trib. To Sandy River	Intermittent	1	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-E18-45 - TA-PI-045	17.5	Trib. To Silver Creek	Ephemeral	0	Minor	WWH	AL, R, FC, W	N/A
S-E18-52 TA-PI-052	20.6	Trib. To Trayner Branch	Perennial	10	Minor	WWH	AL, R, FC, W	Bridge or Flume

Appendix 2-A

Waterbodies Crossed by MVP 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 g/	Crossing Method h/
S-E18-40 - TA-PI-061	22.7	Trib. To Trotters Creek	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
S-E18-39 - TA-PI-061	22.6	Trib. To Trotters Creek	Intermittent	4	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-E18-38 - TA-PI-061	22.6	Trib. To Trotters Creek	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
S-E18-32 - TA-PI-063	24	Trib. To Dan River	Intermittent	5	Minor	WWH	AL, R, FC, W	Bridge or Flume
S-C18-88 - TA-PI-067	25	Trib. To Dan River	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
S-C18-88 - TA-PI-067	25	Trib. To Dan River	Intermittent	0	Minor	WWH	AL, R, FC, W	N/A
North Carolina								
Rockingham								
WB-A18-45 - TA-RO-072	26.9	Trib. To Dan River	Pond	0	Minor	WWH	Class C	N/A
*AS-NHD-6003 - TA-RO-073A	27.4	Trib. To Cascade Creek	Perennial	5	Minor	WWH	Class C	Bridge or Flume
*AS-A18-40 - TA-RO-073A	27.4	Cascade Creek	Perennial	37	Minor	WWH	Class C	Bridge or Flume
S-A18-23 - TA-RO-076	28.3	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-27 - TA-RO-076	28.4	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
*AS-NHD-6002 - PA-RO-000	28.6	Trib. To Dan River	Intermittent	5	Minor	WWH	Class C	Bridge or Flume
S-A18-19 - TA-RO-080	29.8	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-19 - TA-RO-080	29.7	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-C18-50 - TA-RO-089	34.1	Trib. To Town Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-1 - TA-RO-103	38.1	Trib. To Wolf Island Creek	Ephemeral	1	Minor	WWH	Class C	Bridge or Flume
S-B18-42 - PA-RO-113A	41.8	Trib. To Lick Fork	Intermittent	4	Minor	WWH	Class C	Bridge or Flume
S-A18-239 - TA-RO-129	46.7	Trib. To Hogans Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-71 - TA-RO-139	50.2	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
S-C18-18 - TA-RO-140	51.5	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
S-C18-15 - TA-RO-144	52.2	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
Alamance								
WB-A18-88 - TA-AL-153	53.9	Trib. To Haw River	Pond	0	Minor	WWH	Class C	N/A
S-A18-216 - TA-AL-155	54.6	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Bridge or Flume
S-A18-215 - TA-AL-155	54.6	Trib. To Haw River	Perennial	6	Minor	WWH	Class C	Bridge or Flume
*AS-NHD-1554 - PA-AL-164	58.9	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Bridge or Flume
S-A18-70 - TA-AL-169	62.4	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-72 - TA-AL-169	62.5	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
*AS-B18-138 - TA-AL-172	63.8	Trib. To Stony Creek Reservoir	Perennial	5	Minor	WWH	Class C	Bridge or Flume
S-B18-137 - TA-AL-172	63.7	Trib. To Stony Creek Reservoir	Intermittent	2	Minor	WWH	Class C	Bridge or Flume
*AS-NHD-7000 - TA-AL-179A	66.5	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Bridge or Flume

Appendix 2-A

Waterbodies Crossed by MVP 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 g/	Crossing Method h/
*AS-APP-5006 - TA-AL-180	67.3	Trib. To Boyds Creek	Pond	0	Minor	WWH	Class C	N/A

a/ Data is based on waterbody field delineations completed through September 20, 2018 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.

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. 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.

e/ FERC Classification from the 2013 FERC Procedures. Minor (≤10 feet); Intermediate (>10 - ≤100 feet); Major (>100 feet).

f/ WWH - Warm Water Habitat.

g/ Virginia Water Quality Classifications (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/ HDD: Horizontal Directional Drill. Conventional Crossing will only be used when there is no discernable flow within the waterbody at the time of crossing. Dry Crossing will consist of either Flume, Dam and Pump, or Cofferdam. N/A indicates that the waterbody is not crossed by centerline.

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
Virginia **Pittsylvania** **H-605 Pipeline**						
W-F18-7	PEM	0.1	12	0.0	0.0	Open-cut
H-650 Pipeline						
W-F18-11	PFO	0.2	58	0.1	<0.1	Open-cut
W-F18-66	PEM	0.4	356	0.5	0.1	Open-cut
W-F18-66	PFO	0.4	0	0.1	0.0	Workspace Only
W-F18-64	PEM	0.6	225	0.4	0.1	Open-cut
W-G18-2	PEM	1	13	<0.1	<0.1	Open-cut
W-G18-2	PFO	1	0	<0.1	<0.1	Workspace Only
W-F18-57	PEM	1.1	0	<0.1	0.0	Workspace Only
W-F18-57	PEM	1.1	0	<0.1	0.0	Workspace Only
W-F18-5	PFO	1.4	156	0.2	0.1	Open-cut
W-F18-5	PEM	1.4	0	<0.1	<0.1	Workspace Only
W-F18-5	PFO	1.4	11	<0.1	<0.1	Open-cut
W-F18-5	PFO	1.4	255	0.4	0.2	Open-cut
W-F18-5	PEM	1.5	770	1.4	0.2	Open-cut
W-F18-5	PSS	1.5	0	0.1	0.0	Workspace Only
W-F18-5	PEM	1.7	55	0.1	<0.1	Open-cut
W-F18-5	PSS	1.8	362	0.5	0.1	Open-cut
W-F18-5	PEM	2	1470	3.1	0.3	Open-cut
W-F18-5	PFO	1.9	290	0.3	0.2	Open-cut
W-D18-5	PFO	3.6	44	0.1	<0.1	Open-cut
W-D18-5	PFO	3.6	1	<0.1	<0.1	Open-cut
W-D18-11	PFO	4	0	<0.1	0.0	Workspace Only
W-D18-11	PFO	4	5	<0.1	<0.1	Open-cut
W-D18-7	PFO	4.9	373	0.5	0.3	Open-cut
W-D18-7	PEM	4.9	9	0.2	<0.1	Open-cut
W-D18-1	PFO	5	14	<0.1	<0.1	Open-cut
W-D18-1	PFO	5	123	0.2	0.1	Open-cut
W-D18-1	PFO	5.1	86	0.1	<0.1	Open-cut
W-D18-1	PFO	5.2	309	0.5	0.2	Open-cut
W-D18-1	PFO	5.2	0	0.1	0.0	Workspace Only
W-D18-1	PFO	5.2	113	0.3	0.1	Open-cut

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-D18-1	PFO	5.2	10	<0.1	0.0	Open-cut
W-D18-10	PFO	6.5	0	<0.1	0.0	Workspace Only
W-D18-10	PEM	6.6	0	0.1	<0.1	Workspace Only
W-D18-10	PFO	6.6	53	0.1	<0.1	Open-cut
W-D18-8	PEM	7	0	<0.1	0.0	Workspace Only
W-D18-8	PEM	7	0	<0.1	0.0	Workspace Only
W-D18-14	PEM	7.6	0	<0.1	0.0	Workspace Only
W-D18-14	PFO	7.6	0	<0.1	0.0	Workspace Only
W-F18-14	PEM	8	0	<0.1	0.0	Workspace Only
W-F18-14	PEM	8	0	<0.1	0.0	Workspace Only
W-F18-14	PFO	8	3	<0.1	<0.1	Open-cut
W-F18-14	PEM	8	0	<0.1	<0.1	Workspace Only
W-F18-14	PFO	8	5	<0.1	<0.1	Open-cut
W-E18-17	PEM	8.4	98	0.2	<0.1	Open-cut
W-E18-13	PFO	8.5	93	0.1	0.1	Open-cut
W-E18-13	PEM	8.5	0	<0.1	0.0	Workspace Only
W-E18-13	PFO	8.6	32	0.1	<0.1	Open-cut
W-E18-13	PEM	8.6	0	<0.1	0.0	Workspace Only
W-E18-13	PFO	8.6	47	0.1	<0.1	Open-cut
W-E18-13	PEM	8.6	0	<0.1	0.0	Workspace Only
W-E18-24	PFO	9	0	<0.1	<0.1	Workspace Only
W-E18-24	PEM	9.1	0	0.1	0.0	Workspace Only
W-F18-16	PFO	9.9	27	<0.1	<0.1	Open-cut
W-F18-18	PFO	9.9	0	<0.1	<0.1	Workspace Only
W-F18-18	PFO	9.9	0	<0.1	0.0	Workspace Only
W-F18-18	PFO	9.9	40	0.1	<0.1	Open-cut
W-E18-23	PEM	10.1	0	<0.1	0.0	Workspace Only
W-E18-23	PFO	10.1	3	<0.1	<0.1	Open-cut
W-F18-24	PFO	11	0	<0.1	0.0	Workspace Only
W-F18-21	PFO	11	0	<0.1	0.0	Workspace Only
W-F18-21	PFO	11.1	0	<0.1	0.0	Workspace Only
W-F18-29	PFO	11.4	0	<0.1	0.0	Workspace Only
W-F18-27	PFO	11.4	0	<0.1	<0.1	Workspace Only
W-C18-84	PFO	11.6	29	0.1	<0.1	Open-cut
W-C18-84	PFO	11.6	20	<0.1	<0.1	Open-cut

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-F18-53	PFO	12.8	7	<0.1	<0.1	Open-cut
W-F18-53	PFO	12.8	0	<0.1	0.0	Workspace Only
W-F18-53	PFO	12.8	6	<0.1	<0.1	Open-cut
W-F18-53	PFO	12.8	0	<0.1	0.0	Workspace Only
W-E18-28	PFO	13.4	56	0.1	<0.1	Open-cut
W-E18-28	PFO	13.5	0	<0.1	<0.1	Workspace Only
W-E18-28	PFO	13.5	5	<0.1	<0.1	Open-cut
W-E18-28	PFO	13.5	24	<0.1	<0.1	Open-cut
W-D18-23	PFO	14.2	56	0.1	<0.1	Open-cut
*AW-D18-23	PFO	14.3	0	<0.1	0.0	Workspace Only
W-E18-45	PEM	14.7	0	<0.1	0.0	Workspace Only
W-E18-45	PEM	14.7	0	<0.1	0.0	Workspace Only
W-E18-45	PEM	14.7	3	<0.1	<0.1	Open-cut
W-E18-45	PEM	14.7	0	<0.1	0.0	Workspace Only
W-A18-198	PEM	16.2	39	<0.1	<0.1	Open-cut
W-A18-198	PFO	16.2	0	<0.1	0.0	Workspace Only
W-A18-200	PSS	16.7	0	0.1	0.0	Workspace Only
W-A18-201	PEM	16.7	0	<0.1	0.0	Workspace Only
W-A18-201	PEM	16.8	0	<0.1	0.0	Workspace Only
W-E18-43	PEM	18	0	<0.1	0.0	Workspace Only
W-E18-43	PFO	18	0	<0.1	0.0	Workspace Only
W-E18-43	PFO	18	0	<0.1	0.0	Workspace Only
W-D18-42	PEM	19.4	0	<0.1	0.0	Workspace Only
W-F18-51	PFO	19.7	0	<0.1	0.0	Workspace Only
W-E18-53	PEM	20.4	0	<0.1	0.0	Workspace Only
W-E18-53	PEM	20.4	0	<0.1	0.0	Workspace Only
W-E18-53	PEM	20.4	0	<0.1	0.0	Workspace Only
W-E18-53	PEM	20.4	0	<0.1	0.0	Workspace Only
W-E18-53	PEM	20.4	5	<0.1	<0.1	Open-cut
W-E18-53	PEM	20.4	0	<0.1	0.0	Workspace Only
W-E18-53	PEM	20.4	3	<0.1	<0.1	Open-cut
W-E18-55	PEM	20.6	0	<0.1	0.0	Workspace Only
W-E18-55	PEM	20.6	2	<0.1	<0.1	Open-cut
W-D18-35	PFO	21	54	0.1	<0.1	Open-cut
W-D18-35	PEM	21	0	<0.1	0.0	Workspace Only

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-D18-41	PEM	21.2	47	0.1	<0.1	Open-cut
W-D18-41	PFO	21.2	7	<0.1	<0.1	Open-cut
W-D18-41	PFO	21.2	75	0.1	<0.1	Open-cut
W-D18-41	PEM	21.3	8	0.1	<0.1	Open-cut
W-C18-95	PEM	21.7	0	<0.1	0.0	Workspace Only
W-A18-204	PFO	22	0	<0.1	0.0	Workspace Only
W-A18-204	PFO	22	2	<0.1	<0.1	Open-cut
W-A18-204	PFO	22	40	0.1	<0.1	Open-cut
W-A18-204	PEM	22.1	0	<0.1	0.0	Workspace Only
W-A18-204	PEM	22.1	0	<0.1	0.0	Workspace Only
W-A18-204	PFO	22.1	19	<0.1	<0.1	Open-cut
W-F18-44	PEM	23	0	<0.1	0.0	Workspace Only
W-G18-16	PEM	23.5	0	<0.1	0.0	Workspace Only
W-F18-36	PFO	23.8	0	<0.1	0.0	Workspace Only
W-F18-36	PEM	23.8	0	<0.1	0.0	Workspace Only
W-E18-33	PFO	23.9	6	<0.1	<0.1	Open-cut
W-C18-91	PFO	25.9	22	<0.1	<0.1	Open-cut
W-C18-91	PFO	25.8	0	<0.1	0.0	Workspace Only
W-C18-96	PEM	26.1	0	<0.1	<0.1	Workspace Only
W-C18-96	PFO	26.1	97	0.1	<0.1	Open-cut
		Virginia Subtotal	6,152	11.5	2.5	
North Carolina **Rockingham**						
W-C18-96	PFO	26.1	0	<0.1	<0.1	Workspace Only
W-B18-98	PFO	26.5	15	<0.1	<0.1	Open-cut
W-A18-22	PEM	26.7	77	0.2	<0.1	Open-cut
*AW-A18-44	PEM	27.3	31	0.1	<0.1	Open-cut
W-A18-26	PEM	28.1	22	<0.1	<0.1	Open-cut
*AW-A18-26	PEM	28.1	21	<0.1	<0.1	Open-cut
W-A18-30	PEM	28.3	26	<0.1	<0.1	Open-cut
W-A18-30	PFO	28.3	5	<0.1	<0.1	Open-cut
W-A18-33	PEM	28.3	0	<0.1	0.0	Workspace Only
W-A18-38	PEM	28.6	29	<0.1	<0.1	Open-cut
W-A18-38	PFO	28.6	0	<0.1	0.0	Workspace Only
W-B18-48	PFO	29.1	23	0.1	<0.1	Open-cut

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-B18-48	PEM	29.1	0	<0.1	<0.1	Workspace Only
W-A18-18	PFO	29.7	935	1.9	0.6	Open-cut
W-A18-18	PEM	29.9	50	0.1	<0.1	Open-cut
W-B18-39	PEM	30.2	25	0.0	0.0	HDD
W-B18-39	PEM	30.2	40	0.0	0.0	HDD
W-B18-39	PEM	30.2	30	0.0	0.0	HDD
W-B18-39	PEM	30.2	32	0.0	0.0	HDD
W-B18-36	PEM	30.2	36	0.0	0.0	HDD
W-B18-36	PEM	30.3	16	0.0	0.0	HDD
W-B18-36	PFO	30.3	32	0.0	0.0	HDD
W-B18-36	PEM	30.3	18	0.0	0.0	HDD
W-B18-36	PEM	30.4	0	0.0	0.0	HDD
W-B18-36	PEM	30.4	27	0.0	0.0	HDD
W-B18-36	PEM	30.4	0	0.0	0.0	HDD
W-B18-34	PFO	30.5	179	0.5	0.1	Open-cut
W-A18-54	PEM	30.7	11	<0.1	<0.1	Open-cut
W-B18-103	PEM	31.1	0	<0.1	0.0	Workspace Only
W-A18-141	PFO	32	183	0.3	0.1	Open-cut
W-A18-141	PEM	32	0	<0.1	0.0	Workspace Only
W-A18-149	PEM	32.2	53	0.2	<0.1	Open-cut
W-A18-149	PSS	32.2	51	0.1	<0.1	Open-cut
W-A18-152	PEM	32.6	21	0.1	<0.1	Open-cut
W-A18-152	PFO	32.6	29	<0.1	<0.1	Open-cut
W-A18-155	PEM	33.1	0	0.1	0.0	Workspace Only
W-A18-155	PSS	33.1	0	<0.1	0.0	Workspace Only
W-A18-155	PSS	33.1	68	0.2	<0.1	Open-cut
W-A18-222	PFO	33.4	43	0.1	<0.1	Open-cut
W-A18-222	PEM	33.4	0	<0.1	0.0	Workspace Only
W-A18-224	PFO	33.7	11	<0.1	<0.1	Open-cut
W-A18-224	PEM	33.7	0	<0.1	0.0	Workspace Only
W-C18-40	PEM	34.6	0	<0.1	0.0	Workspace Only
*AW-AWB-01	PFO	36	0	<0.1	0.0	Workspace Only
W-A18-95	PEM	37	8	<0.1	<0.1	Open-cut
W-A18-98	PFO	37.2	0	<0.1	0.0	Workspace Only
W-A18-6	PFO	38.5	130	0.2	0.1	Open-cut

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-A18-6	PFO	38.5	0	<0.1	0.0	Workspace Only
W-A18-6	PFO	38.5	92	0.1	0.1	Open-cut
W-A18-6	PEM	38.5	46	0.1	<0.1	Open-cut
W-A18-7	PFO	38.6	0	<0.1	0.0	Workspace Only
W-A18-7	PEM	38.6	76	0.2	<0.1	Open-cut
W-A18-7	PSS	38.6	34	0.1	<0.1	Open-cut
W-A18-7	PEM	38.6	0	<0.1	0.0	Workspace Only
W-A18-7	PEM	38.7	16	<0.1	<0.1	Open-cut
W-A18-7	PEM	38.7	29	0.1	<0.1	Open-cut
W-A18-7	PEM	38.7	16	<0.1	<0.1	Open-cut
W-B18-78	PFO	39.7	56	0.1	<0.1	Open-cut
W-B18-112	PEM	40.1	0	<0.1	0.0	Workspace Only
W-B18-110	PFO	40.2	0	<0.1	<0.1	Workspace Only
W-B18-55	PEM	41.1	0	<0.1	0.0	Workspace Only
W-B18-55	PFO	41.1	84	0.1	0.1	Open-cut
W-B18-46	PFO	41.7	6	<0.1	<0.1	Open-cut
*AW-B18-67	PEM	44.7	0	<0.1	0.0	Workspace Only
W-C18-77	PFO	47	47	0.1	<0.1	Open-cut
W-B18-139	PFO	48.5	24	<0.1	<0.1	Open-cut
W-A18-62	PSS	48.6	40	0.1	<0.1	Open-cut
W-A18-62	PSS	48.6	0	<0.1	0.0	Workspace Only
W-A18-61	PEM	48.7	0	<0.1	<0.1	Workspace Only
W-A18-184	PEM	49.9	57	0.1	<0.1	Open-cut
W-A18-184	PEM	49.9	0	<0.1	<0.1	Workspace Only
W-A18-184	PFO	49.9	0	<0.1	0.0	Workspace Only
W-B18-140	PEM	50.2	0	<0.1	0.0	Workspace Only
W-C18-20	PFO	51.4	16	0.1	<0.1	Open-cut
W-C18-20	PEM	51.4	55	0.1	<0.1	Open-cut
Rockingham County Subtotal			2,968	5.5	1.5	
Alamance						
W-A18-83	PEM	53.3	26	0.1	<0.1	Open-cut
W-A18-85	PEM	53.6	9	<0.1	<0.1	Open-cut
W-A18-85	PSS	53.7	0	<0.1	0.0	Workspace Only
W-A18-85	PEM	53.7	0	<0.1	0.0	Workspace Only
W-C18-67	PFO	54.3	103	0.1	0.1	Open-cut

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-C18-69	PFO	55.3	37	0.1	<0.1	Open-cut
W-B18-60	PSS	55.3	0	<0.1	0.0	Workspace Only
W-B18-61	PEM	55.5	39	0.1	<0.1	Open-cut
W-A18-119	PFO	56.4	95	0.1	0.1	Open-cut
W-A18-119	PEM	56.4	0	0.1	<0.1	Workspace Only
W-A18-119	PFO	56.5	297	0.5	0.2	Open-cut
W-A18-119	PEM	56.5	0	0.1	0.0	Workspace Only
W-A18-127	PEM	56.6	0	<0.1	<0.1	Workspace Only
W-A18-127	PFO	56.6	61	0.1	<0.1	Open-cut
W-A18-127	PEM	56.6	0	<0.1	<0.1	Workspace Only
W-A18-130	PEM	56.8	0	<0.1	0.0	Workspace Only
W-A18-130	PFO	56.9	17	0.1	<0.1	Open-cut
W-A18-133	PFO	57.1	56	0.1	<0.1	Open-cut
W-A18-133	PEM	57.1	0	<0.1	0.0	Workspace Only
W-A18-133	PEM	57.1	0	<0.1	0.0	Workspace Only
W-A18-135	PFO	57.2	146	0.2	0.1	Open-cut
W-A18-135	PEM	57.2	0	<0.1	0.0	Workspace Only
W-A18-254	PFO	57.6	152	0.2	0.1	Open-cut
W-C18-3	PEM	57.8	13	<0.1	<0.1	Open-cut
W-C18-3	PFO	57.9	0	<0.1	0.0	Workspace Only
W-C18-3	PEM	57.9	13	<0.1	<0.1	Open-cut
W-C18-3	PFO	57.9	8	<0.1	<0.1	Open-cut
W-C18-5	PSS	58	52	0.1	<0.1	Open-cut
W-C18-5	PEM	58	0	<0.1	<0.1	Workspace Only
W-C18-29	PFO	60.8	317	0.5	0.2	Open-cut
W-A18-79	PFO	61.8	0	0.0	0.0	Workspace Only
W-A18-73	PFO	62.5	0	<0.1	<0.1	Workspace Only
W-A18-74	PFO	62.5	8	<0.1	<0.1	Open-cut
W-A18-80	PEM	62.7	64	0.1	<0.1	Open-cut
W-B18-32	PEM	62.9	0	<0.1	0.0	Workspace Only
W-B18-28	PFO	63.1	313	0.5	0.2	Open-cut
*AW-B18-19	PFO	63.8	50	0.1	<0.1	Open-cut
*AW-B18-5	PFO	68.4	6	<0.1	<0.1	Open-cut
W-B18-5	PFO	68.4	0	<0.1	0.0	Workspace Only
W-A18-67	PFO	71.8	44	<0.1	<0.1	Open-cut

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-A18-67	PFO	71.8	0	<0.1	0.0	Workspace Only
W-A18-208	PEM	72.2	0	<0.1	0.0	Workspace Only
W-A18-111	PEM	73	57	0.2	<0.1	Open-cut
Alamance County Subtotal			1,983	3.5	1.2	
North Carolina Subtotal			4,951	9.0	2.7	
Pipeline Subtotal			11,103	20.5	5.2	
Aboveground Facilities **North Carolina** **Rockingham**						
W-A18-249 - CY 05	PEM	30.6	0	0.1	0.0	Workspace Only
*AW-NWI-540 - CY 05	PEM	30.7	0	0.2	0.0	Workspace Only
*AW-NWI-541 - CY 05	PEM	30.7	0	0.1	0.0	Workspace Only
W-A18-245 - CY 06	PEM	30.7	0	0.2	0.0	Workspace Only
W-A18-245 - CY 06	PEM	30.7	0	<0.1	0.0	Workspace Only
*AW-B18-36 - T15 Dan River Interconnect	PEM	30.3	0	0.1	0.0	Workspace Only
W-B18-36 - T15 Dan River Interconnect	PEM	30.3	0	0.1	0.0	Workspace Only
W-B18-36 - T15 Dan River Interconnect	PEM	30.4	0	<0.1	0.0	Workspace Only
W-B18-36 - T15 Dan River Interconnect	PEM	30.4	0	<0.1	0.0	Workspace Only
W-B18-36 - T15 Dan River Interconnect	PEM	30.4	0	<0.1	0.0	Workspace Only
Alamance						
W-A18-111 - T-21 Haw River Interconnect	PEM	73	0	<0.1	0.0	Workspace Only
Aboveground Facilities Subtotal			0	0.8	0.0	
Temporary Access Roads **Virginia** **Pittsylvania**						
*AW-F18-5 - TA-PI-005	PEM	2.2	34	<0.1	0.0	Workspace Only
W-F18-1 - TA-PI-011	PSS	5.2	110	0.1	0.0	Workspace Only
W-D18-29 - TA-PI-034	PFO	13.7	10	<0.1	0.0	Workspace Only
W-D18-29 - TA-PI-034	PFO	13.7	3	<0.1	0.0	Workspace Only
W-D18-29 - TA-PI-034	PFO	13.7	0	<0.1	0.0	Workspace Only
W-D18-27 - TA-PI-034	PFO	13.7	100	0.1	0.0	Workspace Only
W-F18-62 - TA-PI-035	PEM	14.2	0	<0.1	0.0	Workspace Only
W-F18-62 - TA-PI-035	PEM	14.2	0	<0.1	0.0	Workspace Only
W-F18-46 - TA-PI-043	PFO	17.1	0	<0.1	0.0	Workspace Only

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/
W-E18-53 - TA-PI-052	PEM	20.6	0	<0.1	0.0	Workspace Only
W-E18-53 - TA-PI-052	PEM	20.6	0	<0.1	0.0	Workspace Only
W-E18-53 - TA-PI-052	PEM	20.6	18	<0.1	0.0	Workspace Only
W-F18-54 - TA-PI-052	PEM	20.5	0	<0.1	0.0	Workspace Only
W-E18-37 - TA-PI-061	PFO	22.7	0	<0.1	0.0	Workspace Only
W-E18-37 - TA-PI-061	PFO	22.6	0	<0.1	0.0	Workspace Only
W-E18-31 - TA-PI-063	PFO	24	0	<0.1	0.0	Workspace Only
W-C18-87 - TA-PI-067	PFO	25	110	0.1	0.0	Workspace Only
W-C18-87 - TA-PI-067	PFO	25	0	<0.1	0.0	Workspace Only
Virginia Access Road Subtotal			385	0.2	0.0	
North Carolina **Rockingham**						
W-B18-97 - TA-PI-068	PEM	26.1	20	<0.1	0.0	Workspace Only
W-A18-44 - TA-RO-073	PEM	27.1	0	<0.1	0.0	Workspace Only
W-A18-44 - TA-RO-073	PEM	27.1	0	<0.1	0.0	Workspace Only
W-A18-44 - TA-RO-073	PEM	27.1	10	<0.1	0.0	Workspace Only
W-A18-28 - TA-RO-076	PEM	28.4	11	<0.1	0.0	Workspace Only
W-A18-20 - TA-RO-080	PEM	29.7	0	<0.1	0.0	Workspace Only
W-A18-20 - TA-RO-080	PEM	29.7	0	<0.1	0.0	Workspace Only
W-A18-20 - TA-RO-080	PEM	29.7	0	<0.1	0.0	Workspace Only
W-A18-18 - TA-RO-080	PEM	30	0	<0.1	0.0	Workspace Only
W-A18-7 - TA-RO-104	PEM	38.6	0	<0.1	0.0	Workspace Only
W-C18-17 - TA-RO-140	PSS	51.5	0	<0.1	0.0	Workspace Only
North Carolina Access Road Subtotal			41	0.1	0.0	
Temporary Access Road Subtotal			426	0.3	0.0	
Permanent Access Road North Carolina Rockingham						
W-B18-34 - PA-RO-082	PFO	30.4	0	<0.1	<0.1	Workspace Only
W-B18-43 - PA-RO-113A	PEM	41.8	64	<0.1	<0.1	Workspace Only
Permanent Access Road Subtotal			64	<0.1	<0.1	
Project Total			**11,593**	**21.7**	**5.2**	

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (feet) c/	Total Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Construction Crossing Method f/

a/ Data is based on wetland field delineations completed through September 20, 2018 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 "*"

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 "0.0" indicates the impact is less than 0.1 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 "0.0" indicates the impact is less than 0.1 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 Only" indicates that the wetland is not crossed by the pipeline but is located within construction workspace.

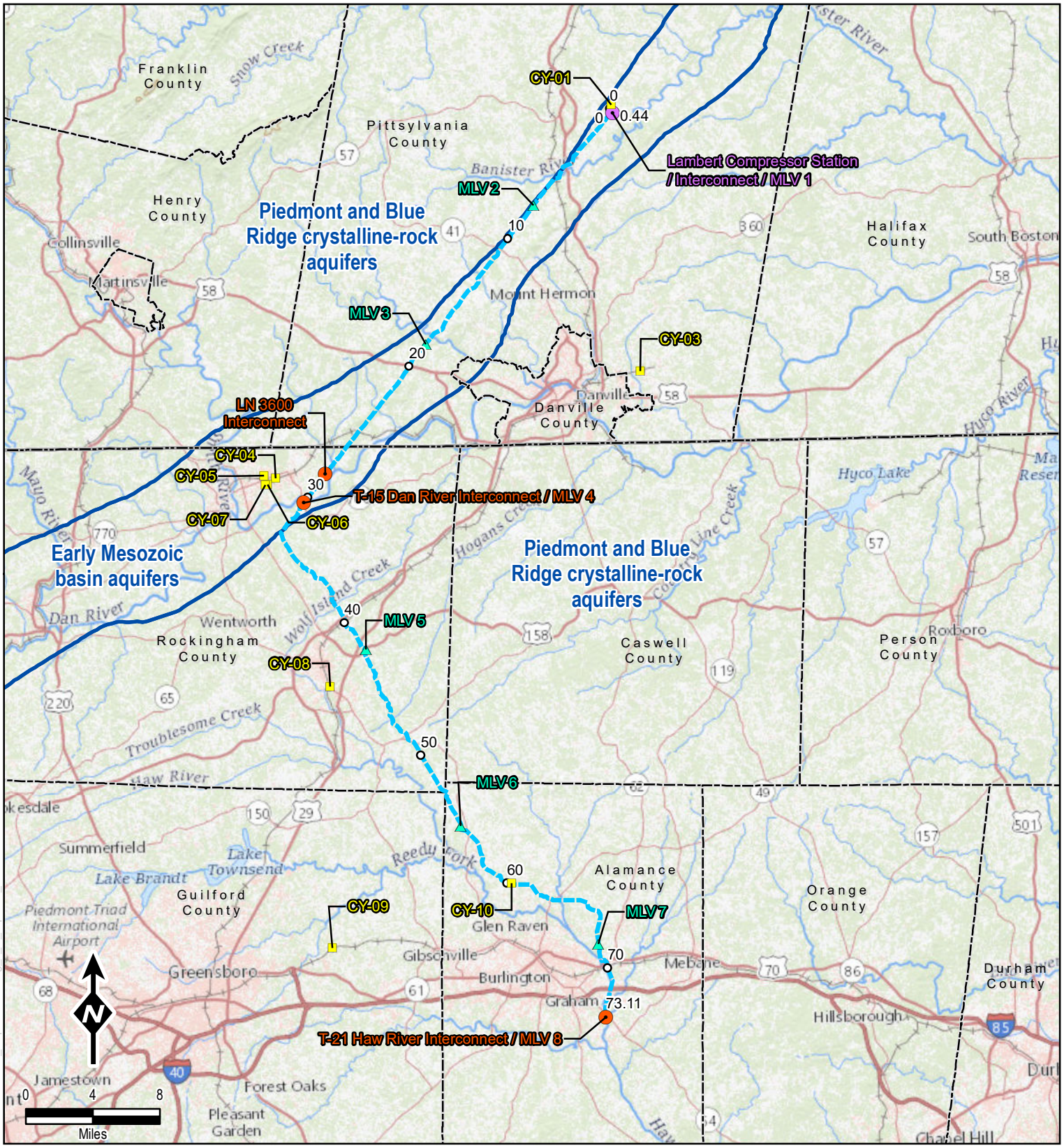
MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-C

Figures



Legend

- Aquifer Boundary
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE, LLC

Figure 2-C-1

Regional Aquifers Along the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

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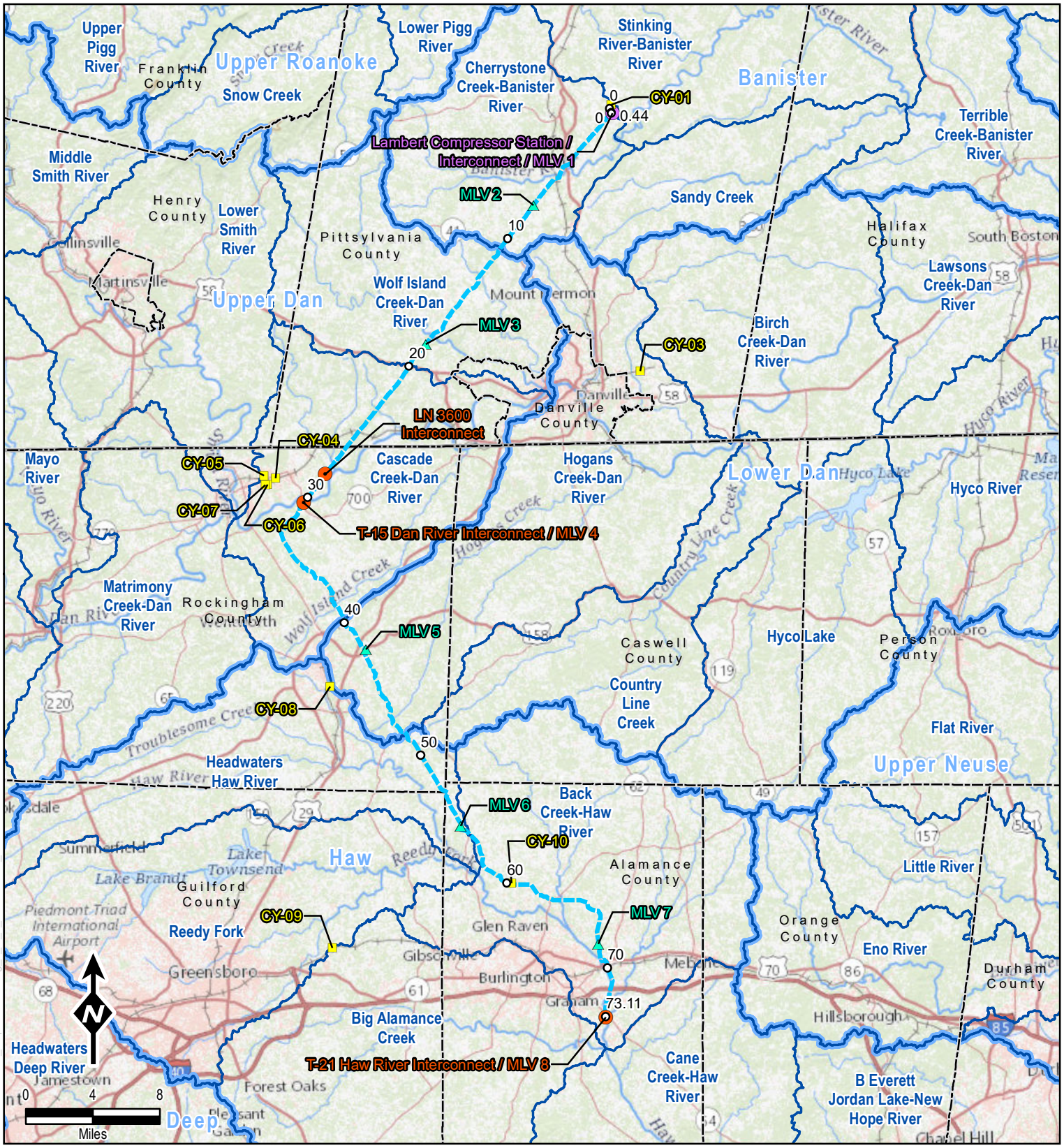


Legend

- 8 Digit Watershed Boundary
- 10 Digit Watershed Boundary
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

8 Digit HUC Name

10 Digit HUC Name

Note: All 8 and 10 digit boundaries shown fall within the 2 digit South Atlantic-Gulf Region watershed boundary.

1 inch = 8 miles
When Printed 8.5x11

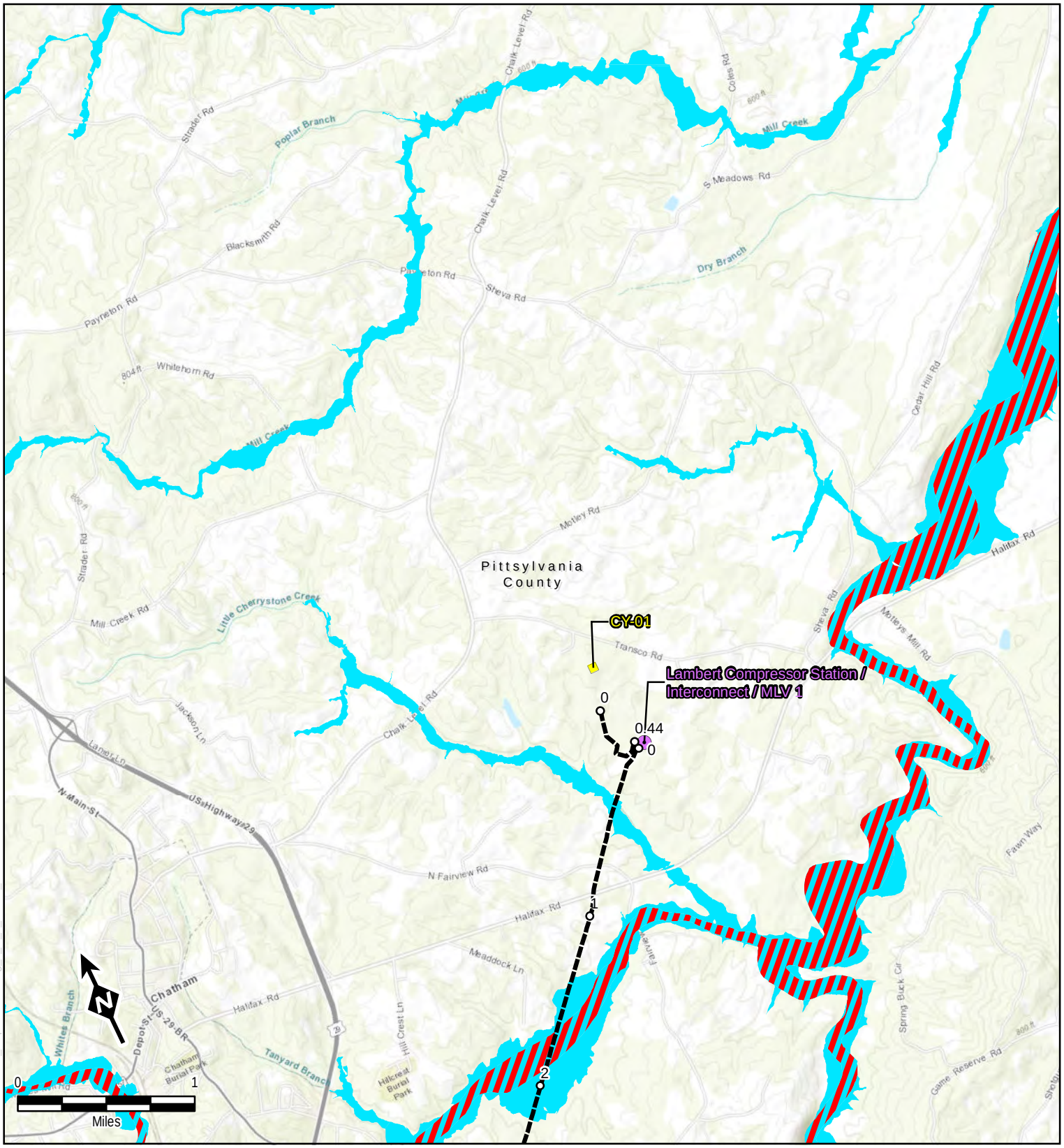
Data Sources: ESRI, USGS, TRC, EQT

Mountain Valley PIPELINE LLC

Figure 2-C-2

Watersheds in Virginia and North Carolina

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382



Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

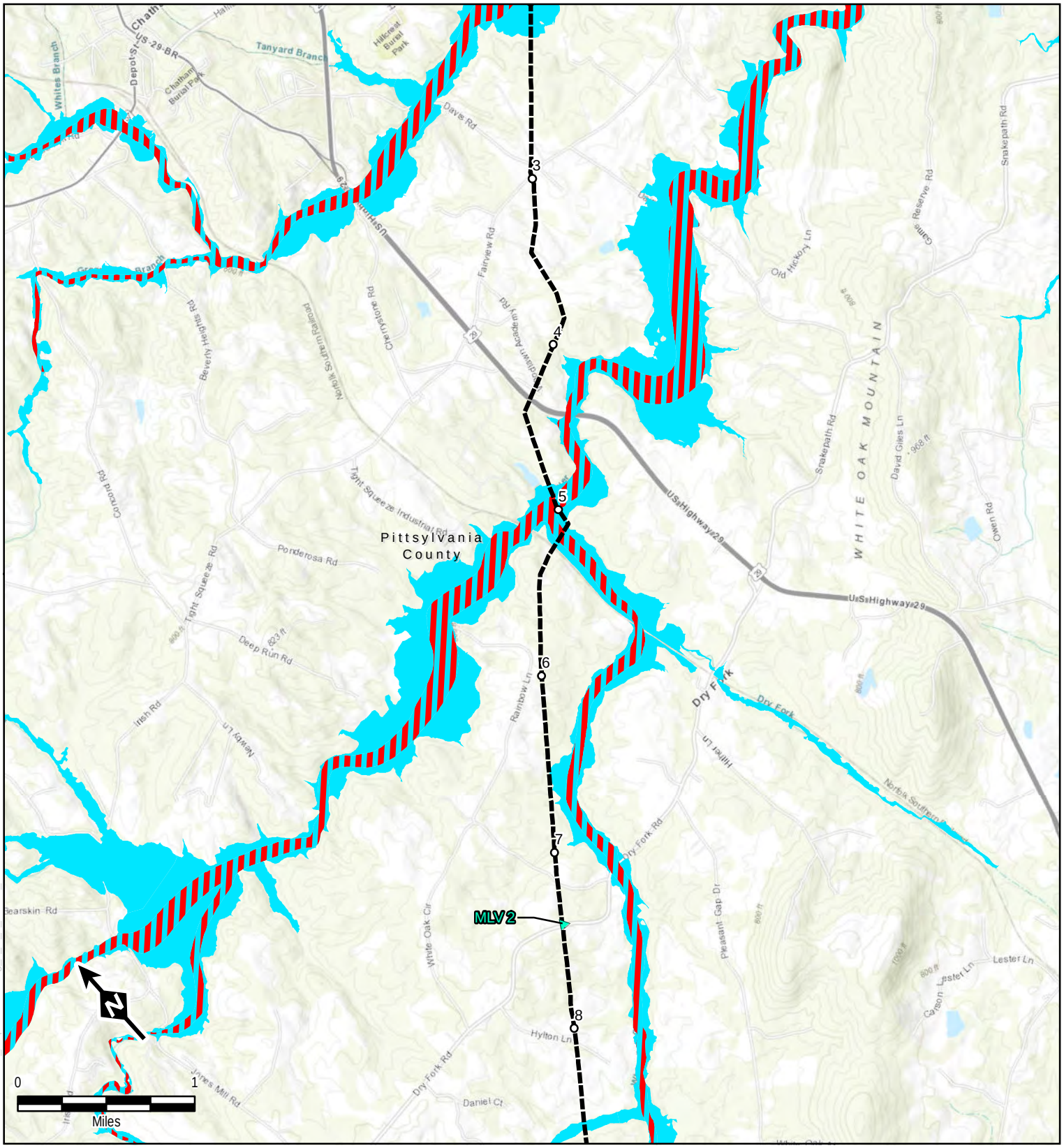
1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 1 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382



Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 2 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

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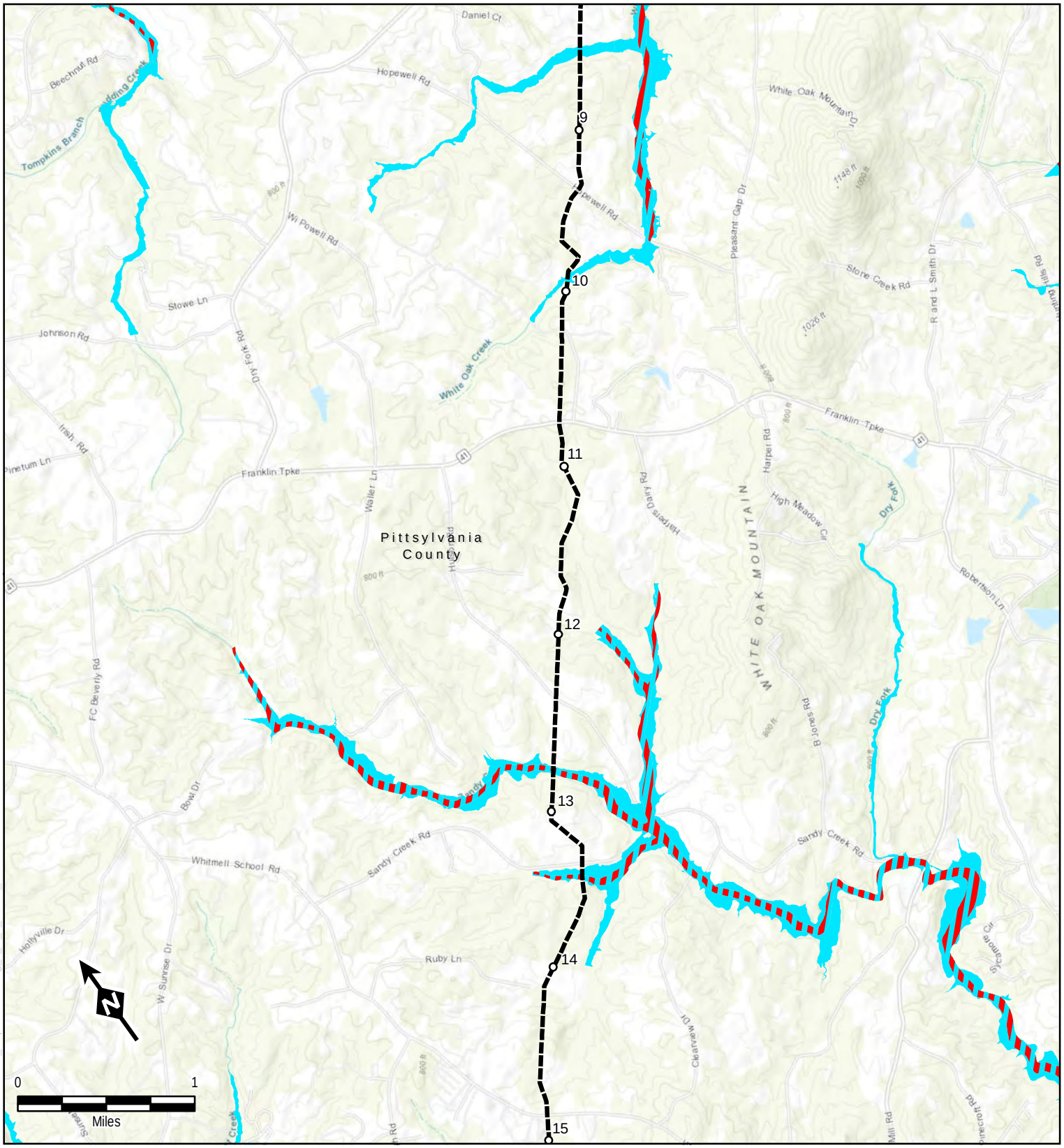

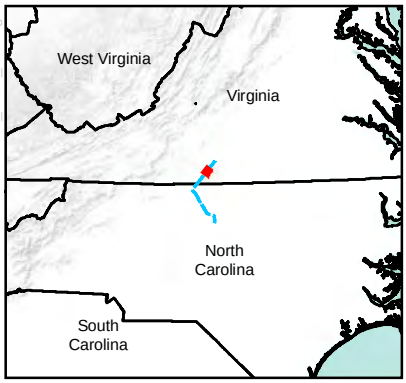

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 3 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

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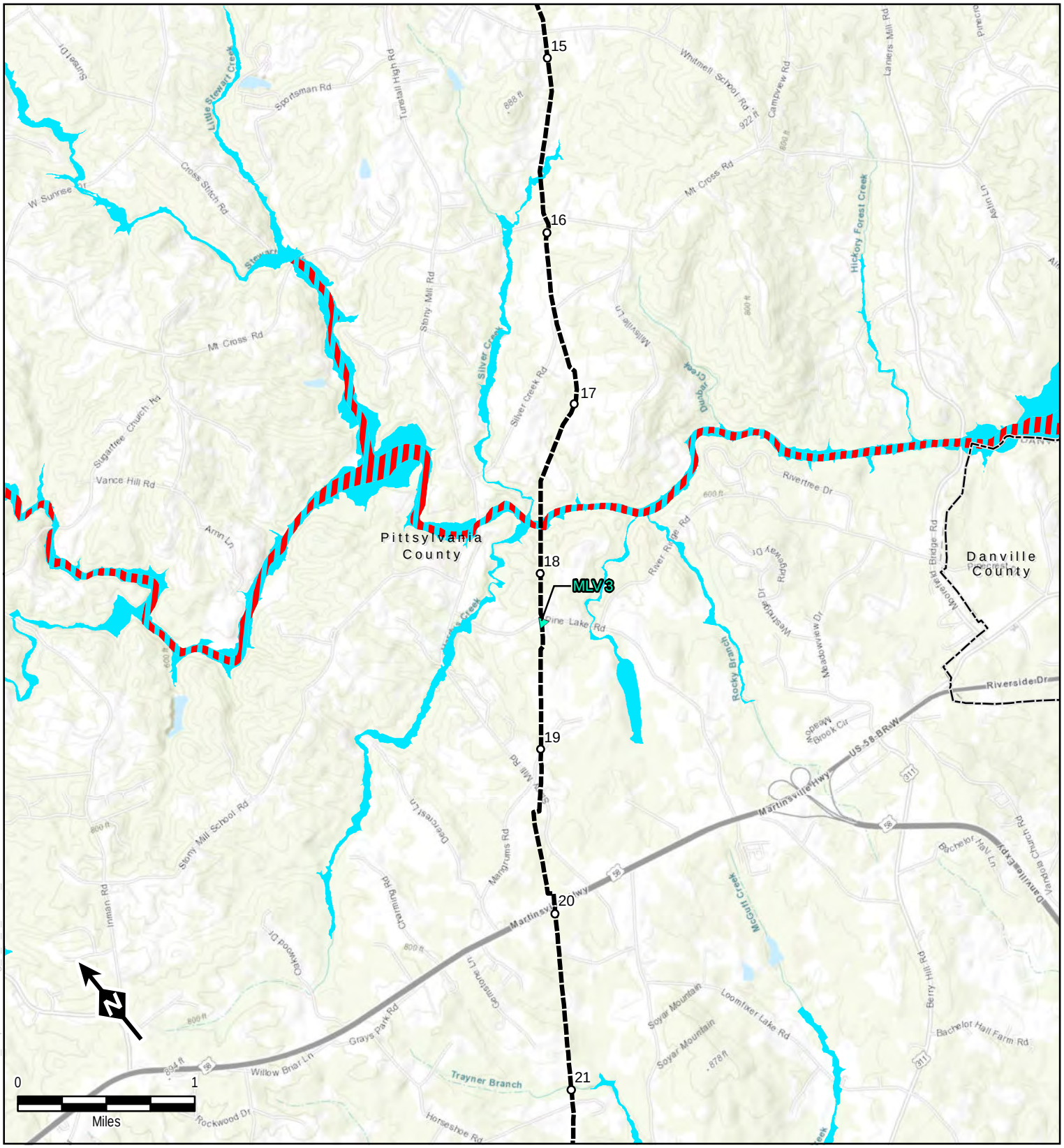

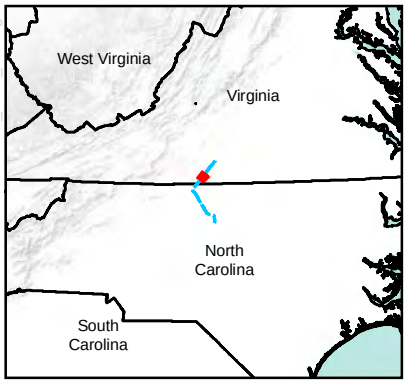

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 4 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

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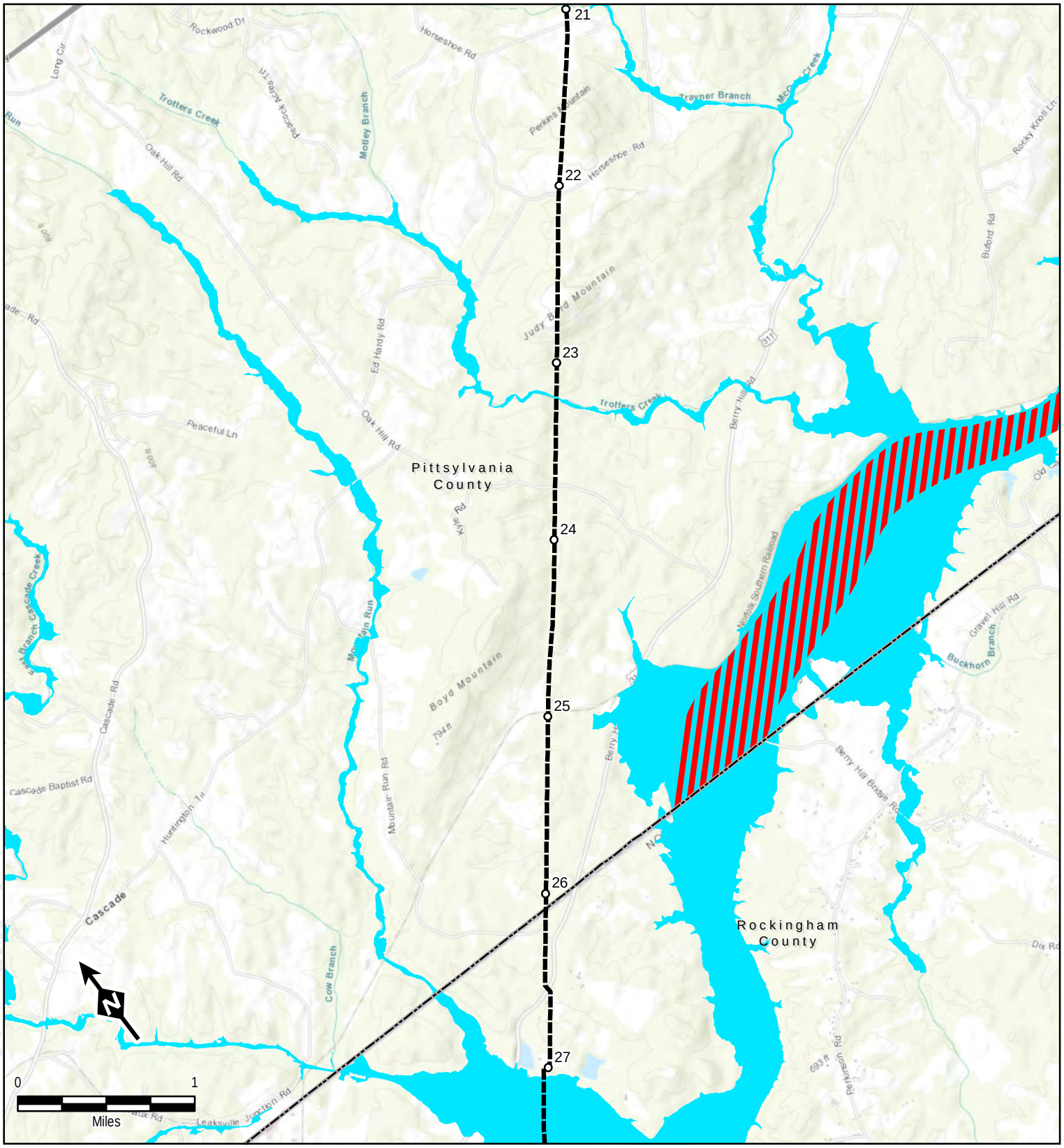

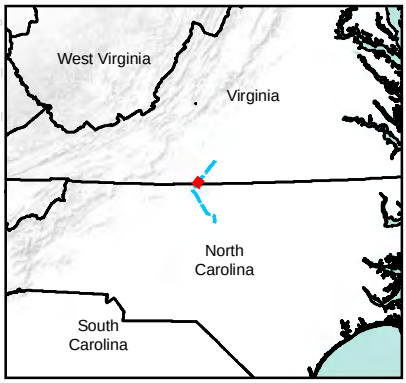

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 5 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

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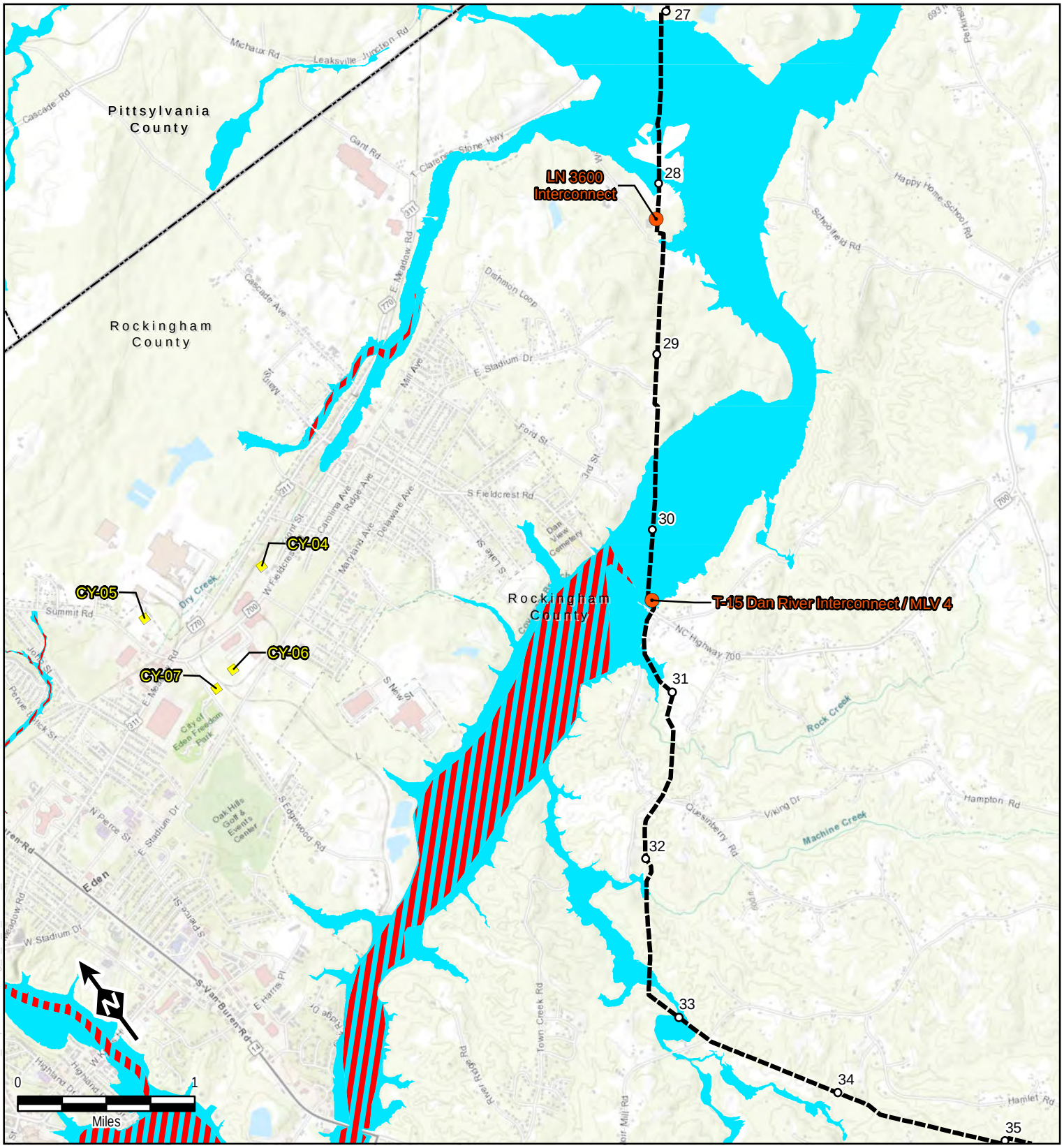

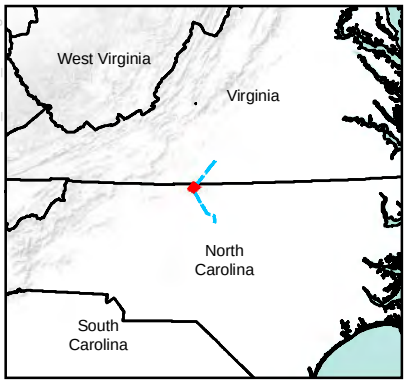

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 6 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

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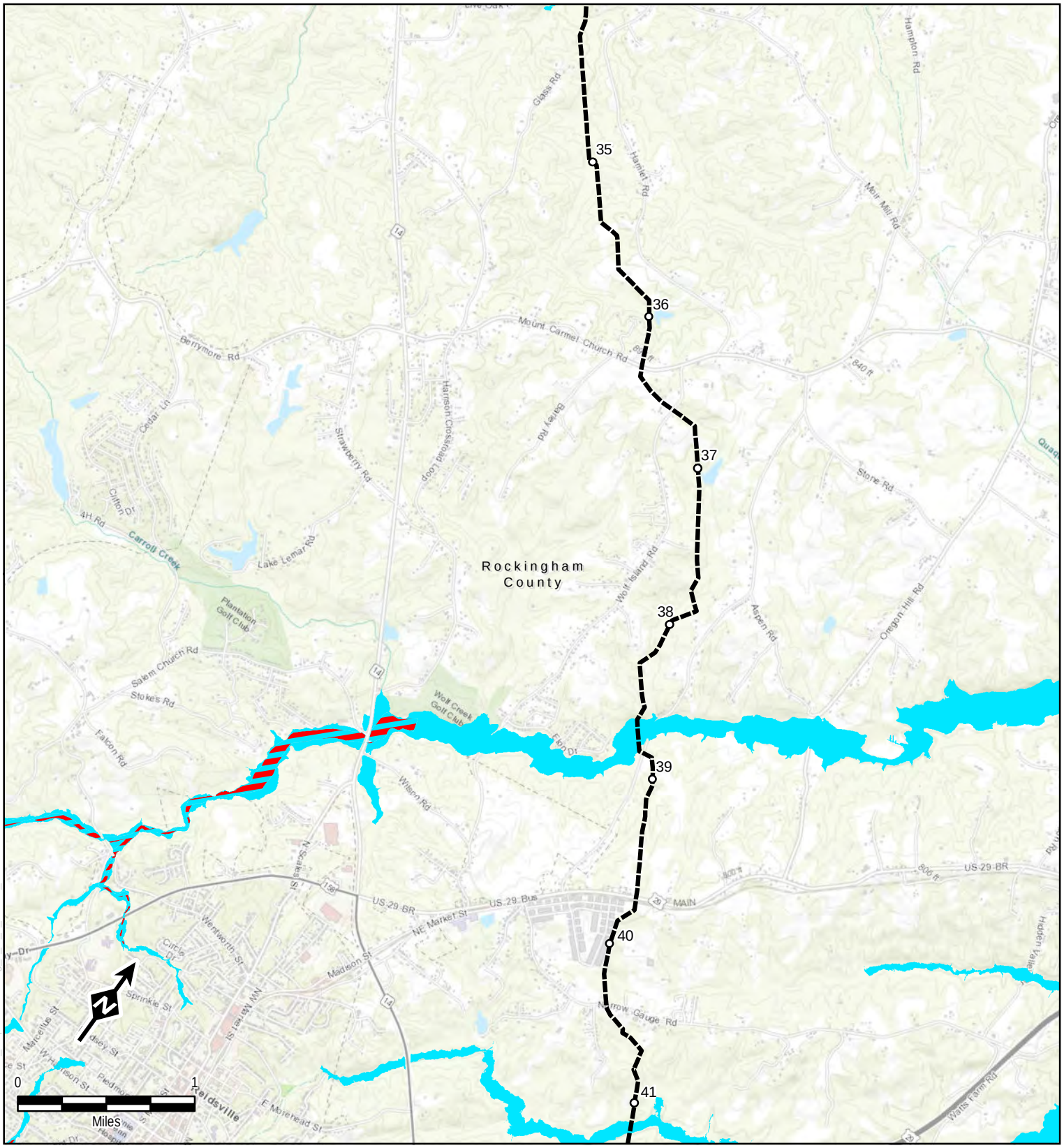
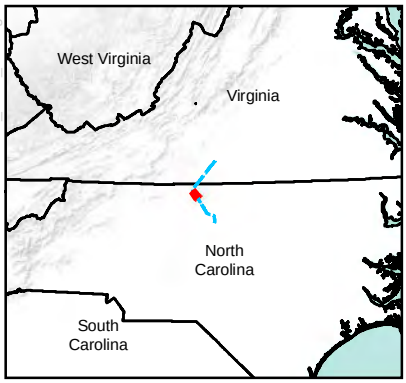




Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

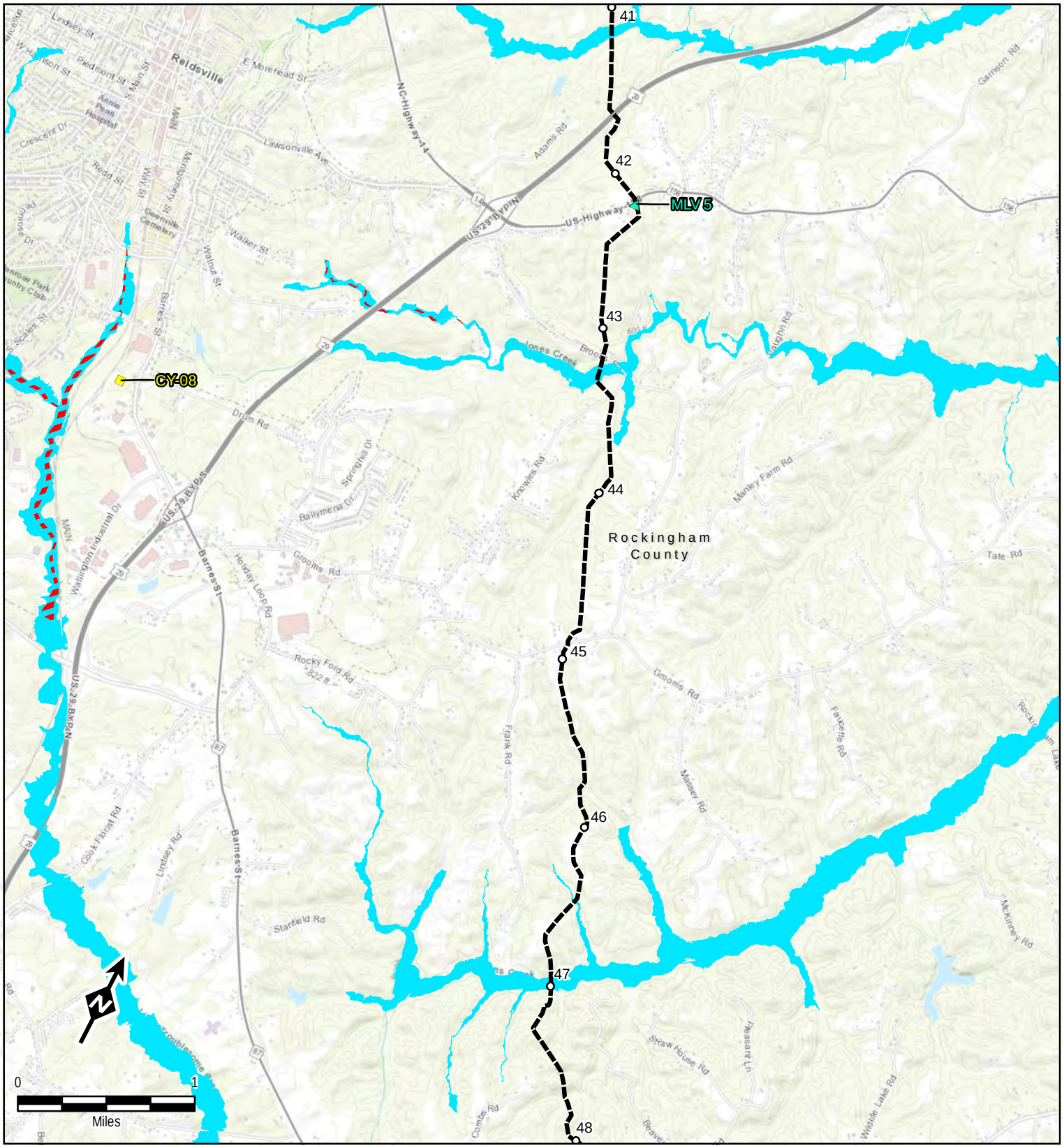
1 inch = 0.76 miles
When Printed 8.5x11

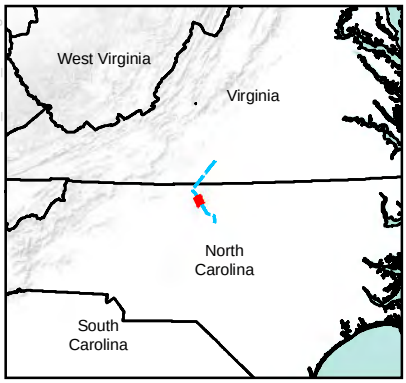
Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 7 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382





Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
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- County Boundary

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Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 8 of 14

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West Chester, PA 19382

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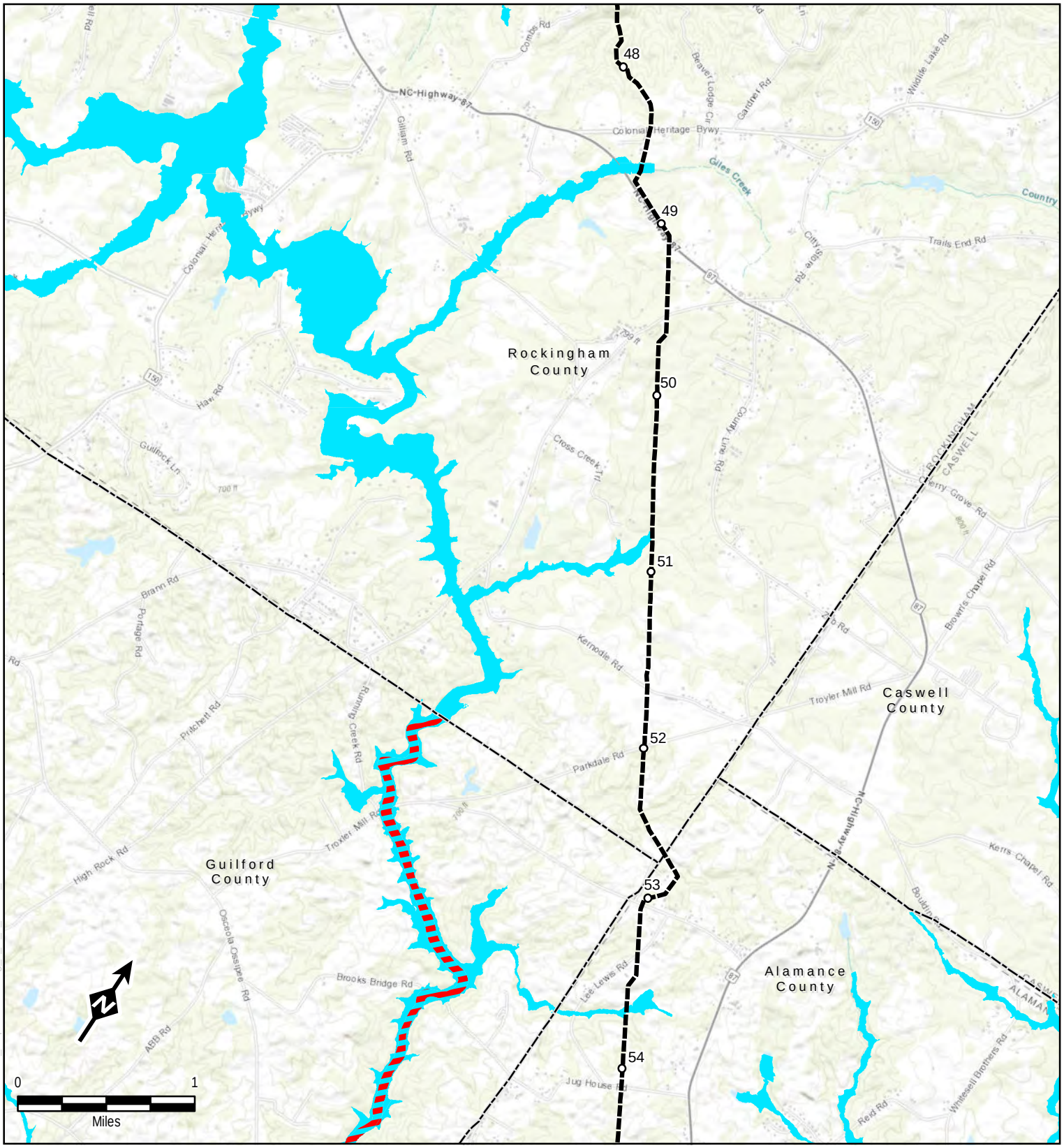

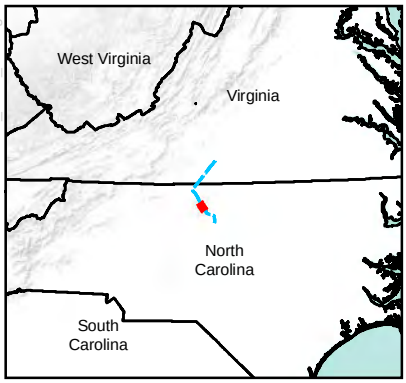

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West Chester, PA 19382

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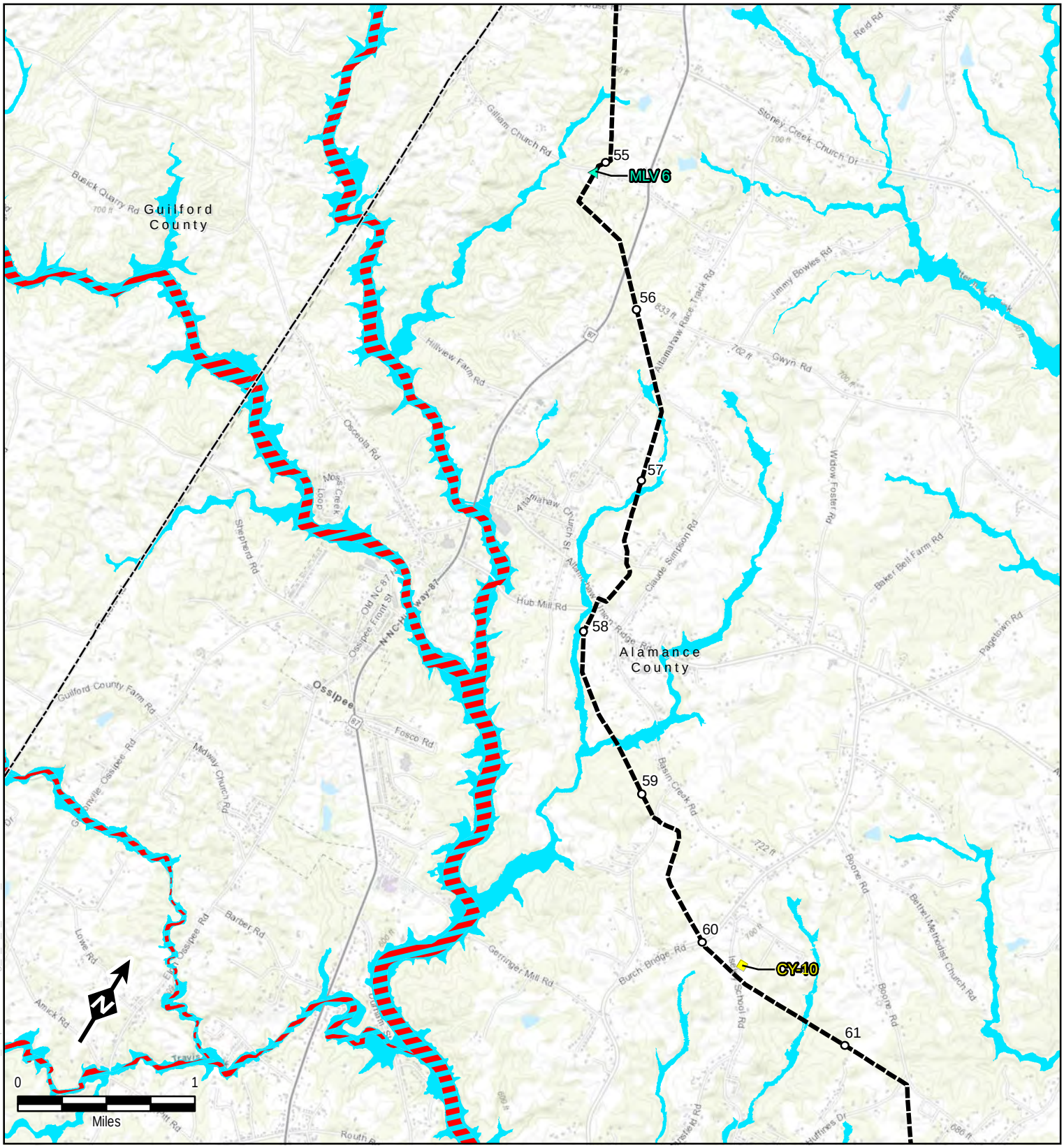
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Alamance County
MLV6
CY-10
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56
57
58
59
60
61
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Hillview Farm Rd
Osceola Rd
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Hub Mill Rd
Fosco Rd
Midway Church Rd
Barber Rd
Lowe Rd
Annick Rd
Gerringer Mill Rd
Burch Bridge Rd
Basin Creek Rd
Claude Simpson Rd
Baker Bell Farm Rd
Pagetown Rd
Widow Foster Rd
Jimmy Bowles Rd
Gwyn Rd
Boone Rd
Bethel Methodist Church Rd
Stoney Creek Church Dr
Reid Rd
Guilford County Farm Rd
Busick Quarry Rd
Gilliam Church Rd
Old NC 87 / Ossipee Front St
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North Carolina
South Carolina
Legend
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Data Sources: ESRI, FEMA, TRC, EQT
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Mountain Valley PIPELINE
Figure 2-C-3
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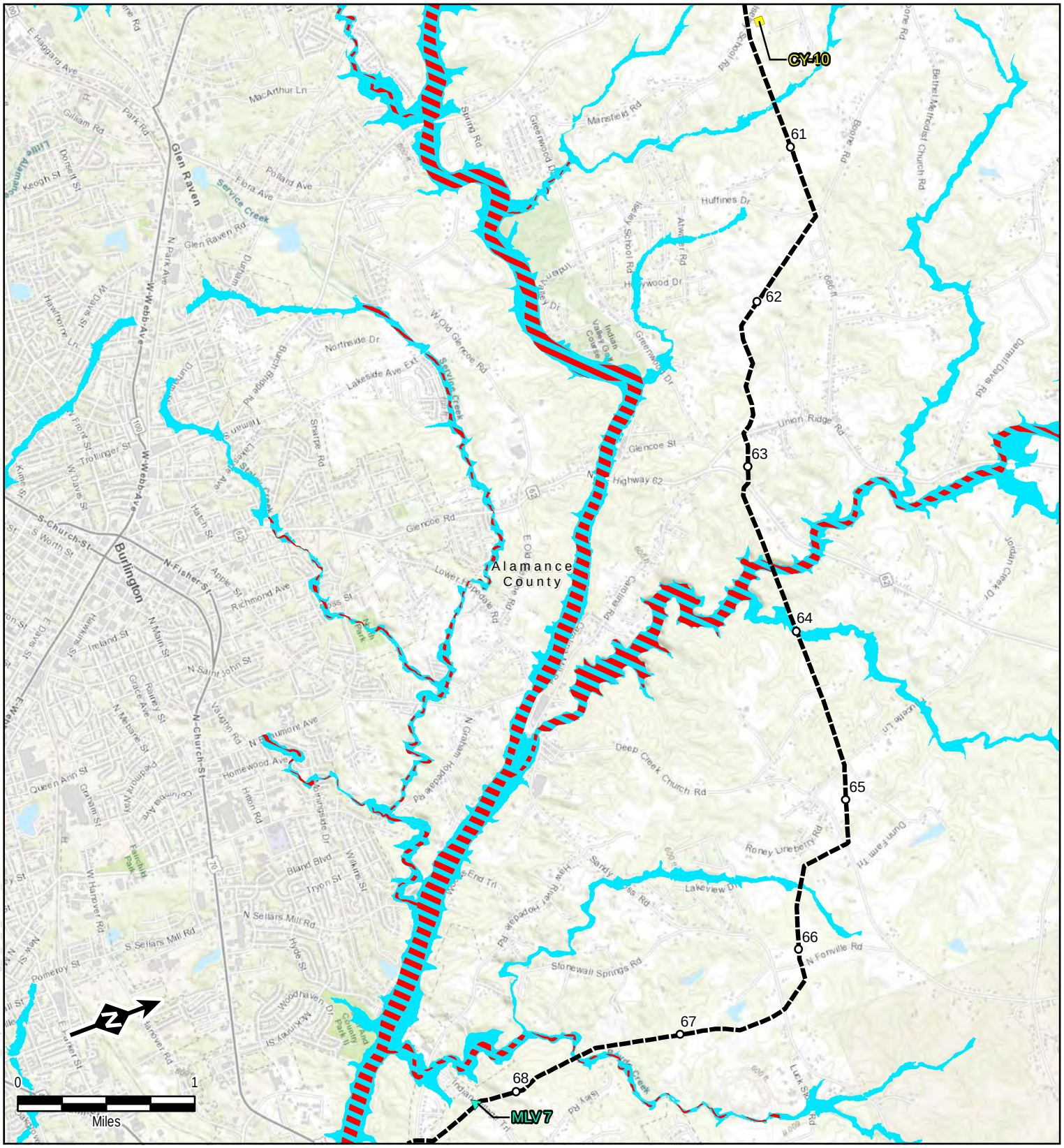

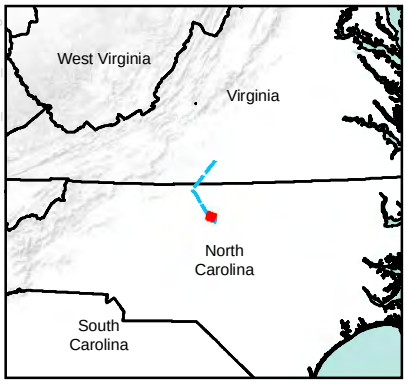

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Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 11 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

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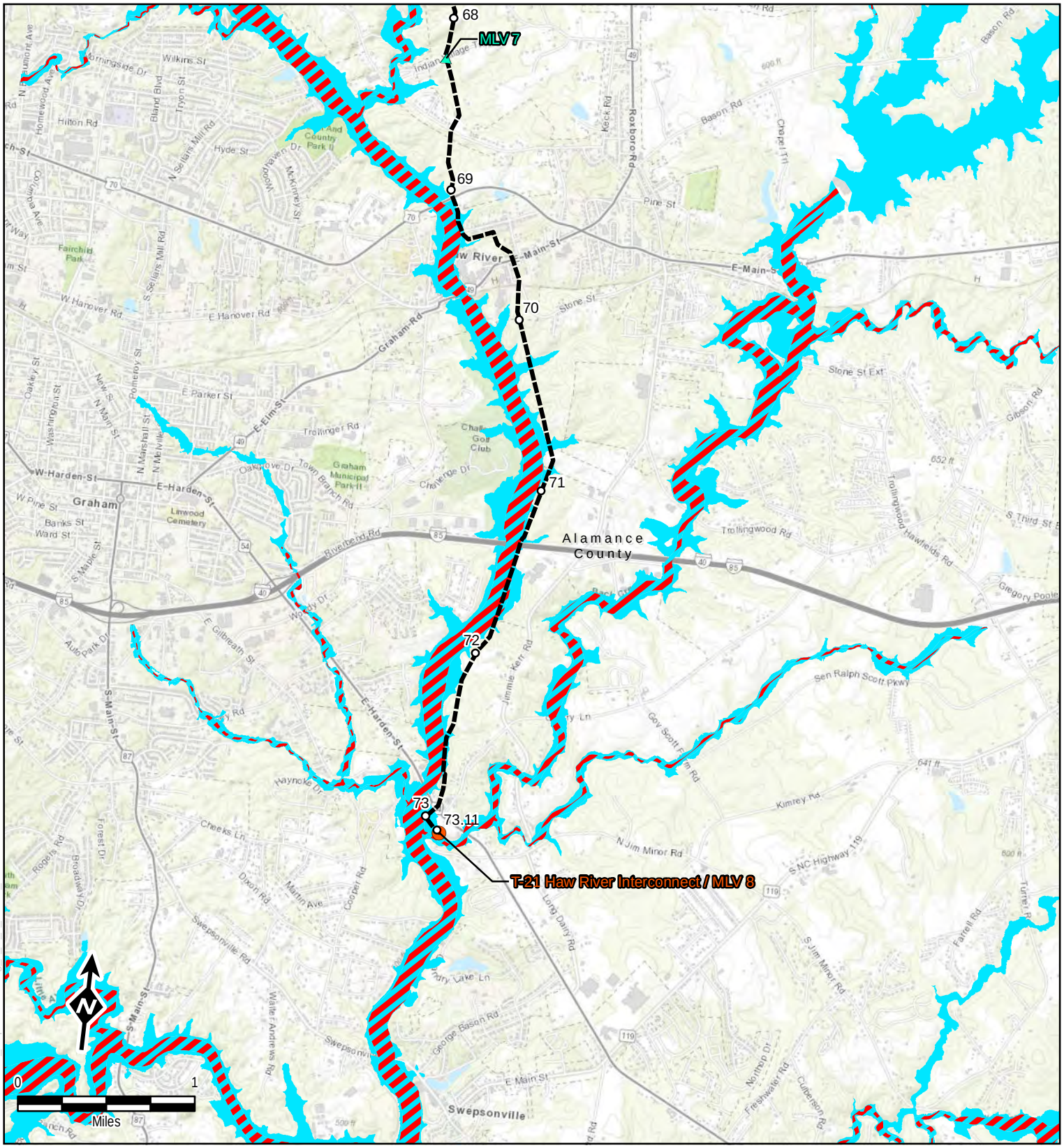

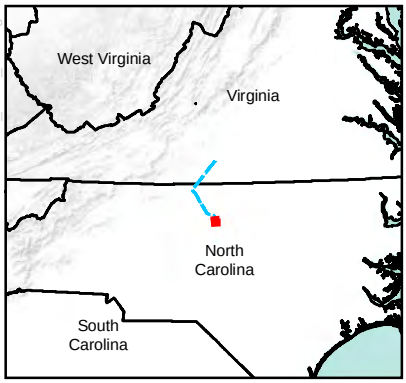

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When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 12 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC Results you can rely on
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West Chester, PA 19382

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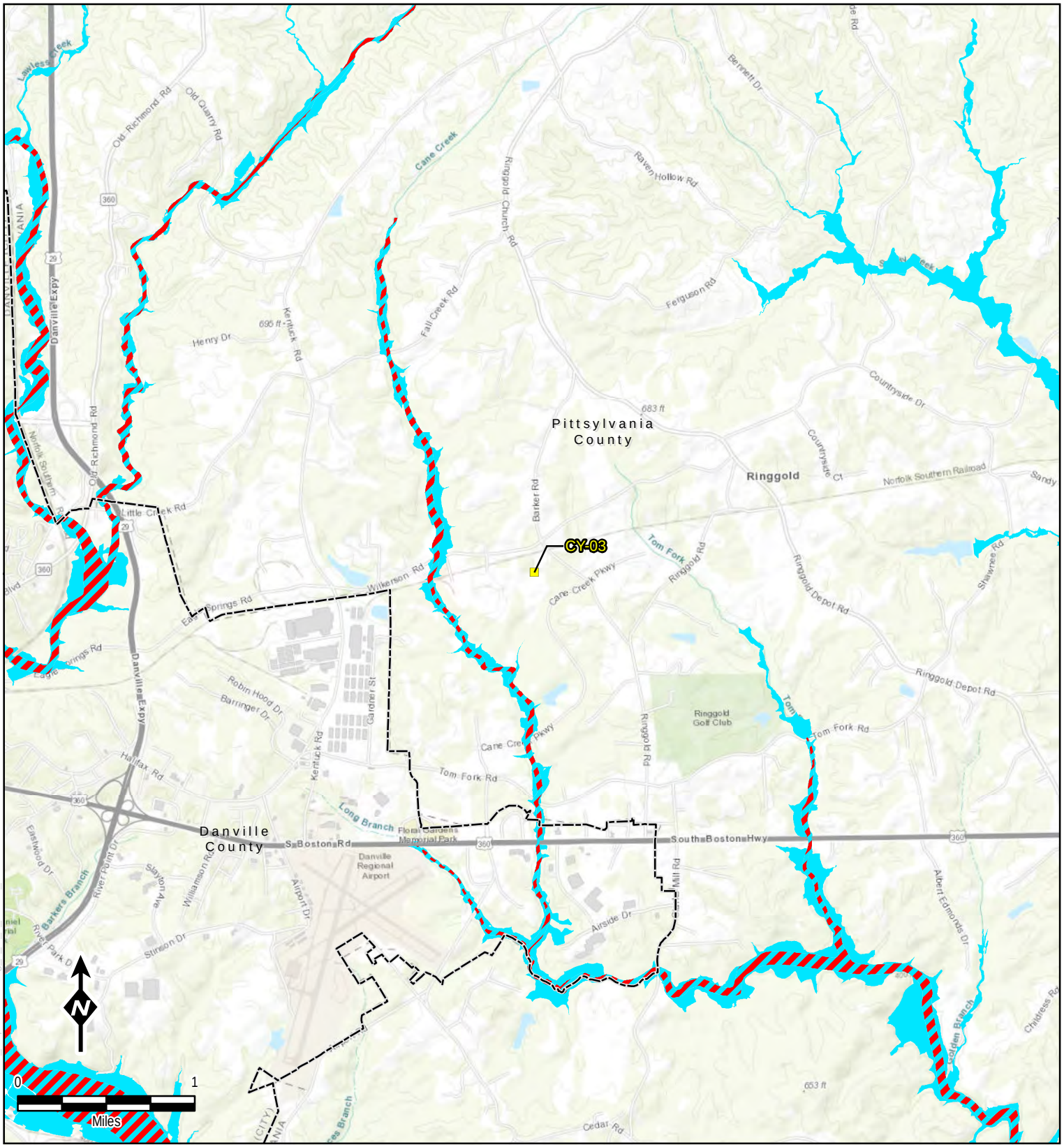

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When Printed 8.5x11

Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 13 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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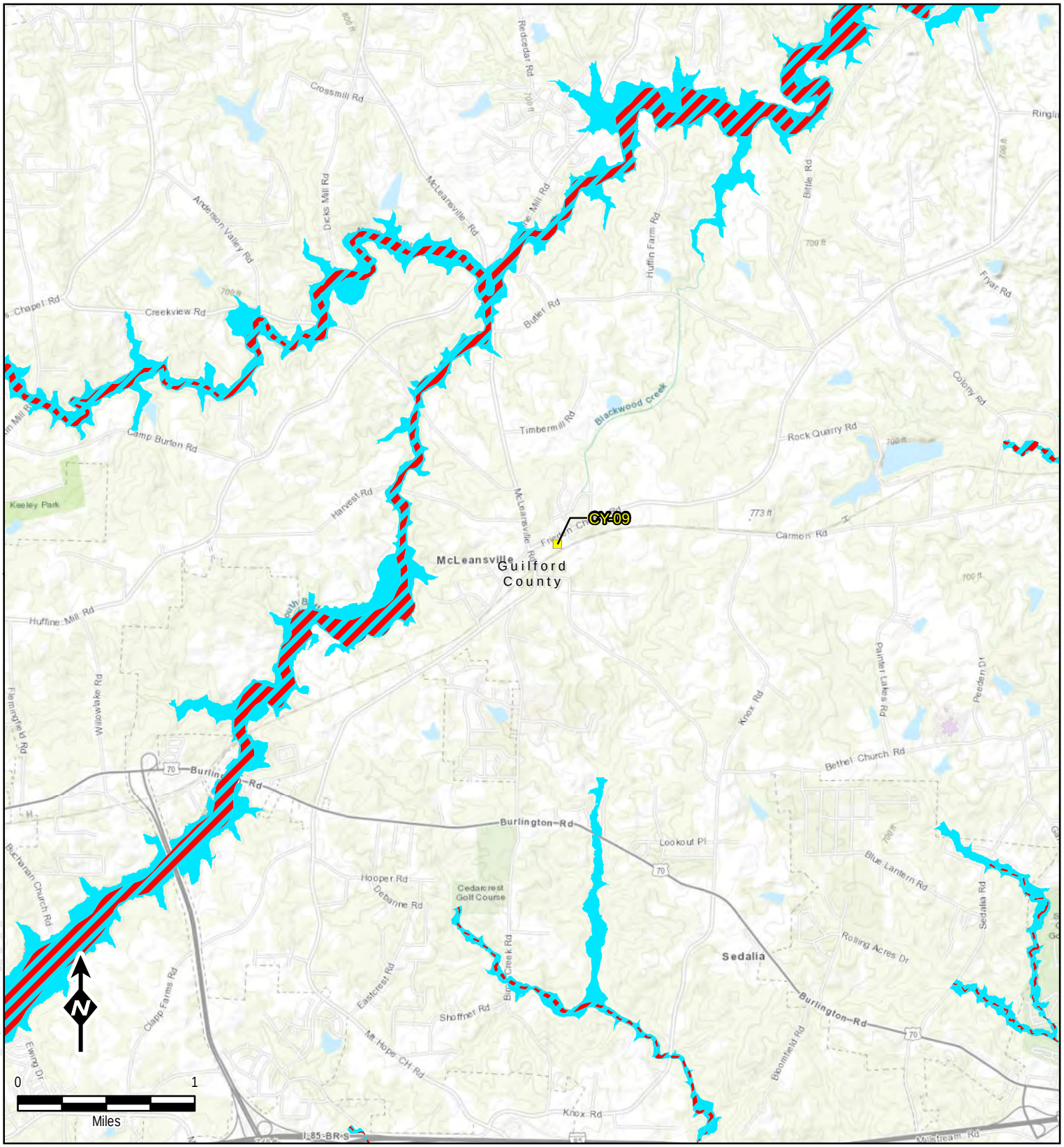
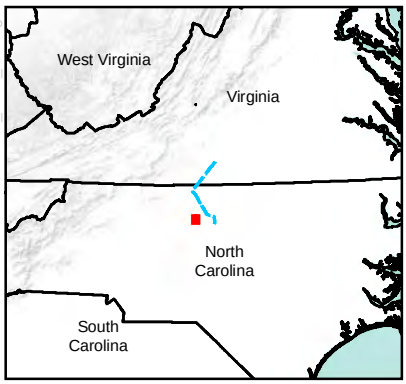
West Chester, PA 19382





Legend

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Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 14 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Fig_2_C_3_FEMA_10122018.mxd

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-D

Identified Sites of Potential Contamination Concern within 0.25 Mile of the MVP Southgate Project Work Space

Appendix 2-D

Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities

Milepost	Site Name / Address	Distance from Project (feet)	Databases a/	Status and Contamination Issues	Comments
2.3	Raymond Batterman Residence 556 Batterman Road Chatham, VA 24531	1,311	VA LUST, VA RGA LUST	Closed	VA LUST: There was a confirmed release in 2011. The status of the spill is closed. No further information was given. VA RGA LUST: Two listings for this address, no further information given
2.9	Davis Road & Fairview Road Chatham, VA	242	SPILLS	Closed	SPILLS: In October 20166 State Officials and Pipeline personnel became aware of a natural gas leak in the Columbia Gas Pipeline. 1A non-emergency response action was initiated. The discharge volume was reported as zero. The status is closed and the closure comment is “No further PREP involvement.”
3.1	Vanderhyde Dairy 868 Fairview Road Chatham, VA	811	SPILLS	Closed	SPILLS: May 2002 an anonymous caller reported that the farm was spreading liquid manure, and the smell was very bad. An inspection was performed on 05.10.02. No deficiencies or violations were found. No further action was taken.
4.1	Scolpini Residence 669 Woodlawn Academy Road Chatham, VA	1,182	SPILLS	Closed	SPILLS: A call was made on 07.15.03 over concern that a private well potentially had petroleum in it. An oily residue was reported in the water that stains reddish brown on skin and black flecks settle out. An inspection was made on 07.24.03 and saw no obvious sources of potential contamination.

Appendix 2-D

Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities

Milepost	Site Name / Address	Distance from Project (feet)	Databases a/	Status and Contamination Issues	Comments
6.3	Pittsylvania County Sanitary Landfill, 382 Rainbow Lane Dry Fork, VA	964	FINDS, LF, FINANCIAL ASSURANCE, RGA LF, SWF/LF, UST	Active Landfill, no violations. USTs have been removed.	Pipeline crossing is adjacent to an existing corridor and upgradient from known landfill area. LF FINANCIAL ASSURANCE: This listing indicates that the landfill closure includes corrective action. FINDS: Landfill gas recovery system was listed under this database. UST: This listing indicates that two 3000 gallon diesel USTs were installed in 1974 and one 3000 gallon diesel UST was installed in 1985. All three tanks have the status of being removed from the ground. SWF/LF: This listing contains the permits for landfill trenches to be dug and then closed. This listing also reports that annual groundwater monitoring reports were received. RGA LF: This listing just lists the landfill name and address for the years 2006 to 2012. FINDS: FINDS contains both facility information and pointers to other sources that contain more detail. This facility is an active municipal waste landfill. It currently accepts municipal solid waste from Pittsylvania County. This facility does not treat, store or dispose of hazardous waste; This facility has received no RCRA violations, has not been subject to corrective actions (CORRACTS); this facility does not handle PCBs or radioactive materials; has not reported leaking underground storage tanks nor releases to the environment; this facility is not being considered for a Superfund site.

Appendix 2-D

Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities

Milepost	Site Name / Address	Distance from Project (feet)	Databases a/	Status and Contamination Issues	Comments
10.3	Emerson Road Farm, Inc. 548 Tobacco Road Dry Fork, VA	405	AST, UST	AST is Active. USTs are Permanently Out of Use.	AST: There is one active 2,000 gallon diesel AST on the property. Its status is currently in use. The tank was installed in 1991. UST: There are five inactive USTs on the property. There are two 1,000 gallon gasoline USTs. They were installed in 1961 and their status is "PERM OUT OF USE." There is one 1,000 gallon gasoline UST that was installed in 1978. Its status is "PERM OUT OF USE." There is one 1,000 gallon gasoline UST installed in 1980. Its status is "PERM OUT OF USE." There is one 3,000 gallon diesel UST installed in 1982. Its status is "REM FROM GRID." No UST closure information was available.
10.8	Annette Parrish Residence, 8240 Franklin Turnpike Dry Fork, VA	1,1306	LUST REG SC	Closed	There was a confirmed release in 2012. The status of the spill is closed.
14.9	Richard Rust Residence, 5498 Whitmell School Road Dry Fork, VA	315	LUST REG SC	Closed	There was a confirmed release in 2011. The status of the spill is closed. No further information was given.
16.7	Stowe David Residence 920 Silver Creek Road Danville, VA	609	LUST REG WC	Closed	A release was reported in 2013. The status of the release is closed. No further information was given.
18.3	Fred Evans Residence 2073 Pine Lake Road Danville, VA	456624	LUST REG SC	Closed	A release was reported in 2013. The status of the release is closed. No further information was given.
26.0	Sam W. Smith Jr., Inc. Landfill Contact Address: 1773 Hwy 135 West Eden, NC Facility Address: 12910 NC-770 Eden, NJ 27289	825	LF	Open No violations found.	Pipeline crossing is adjacent to an existing corridor and upgradient from known landfill area. According to the EDR, this is an open, active landfill facility. The waste code for this facility is "LCID." No further information was given. No violations found. A facility compliance inspection report dated 10/19/2016 indicated that the landfill was closed and being sold. This landfill once included mining operations under a separate permit. No violations reported on the inspection report. Pipeline route crosses landfill.

Appendix 2-D

Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities

Milepost	Site Name / Address	Distance from Project (feet)	Databases a/	Status and Contamination Issues	Comments
40.4	Strader Residence 582 Narrow Gauge Road Reidsville, NC	53	LAST, PIRF, IMD	Incident closed, no further action deemed necessary	LAST: 2004: An AST turned over spilling approximately 200 gallons of heating oil onto the ground and around the water supply well serving the residence. All affected areas of soil were excavated. No impact on the well, sampling for VOCs & SVOCs tested clean. Incident closed with no further action deemed necessary.
48.9	Patterson Property 2250 HWY 87 Reidsville, NC 27320	85	IMD, LUST	Closed	LUST: Contamination type was total petroleum hydrocarbons (TPH) with a release to groundwater. Cleanup actions were planned in 2004. Incident closed out in 2009.
54.2	Pike Electric-Hydraulic Oil HWY 87/Jughouse Road Altamahaw, NC	147	LAST	Closed	LAST: Release on 07/14/2010. Level of soil clean up achieved: Not reported. Current status: Closed. Comments: Equipment break-hydraulic oil.
54.9	Whitesell Property 4140 N. NC 87 Elon, NC 27244	1288	LAST	No closure status given.	LAST: Reported on 01/03/2018. Level of soil clean up achieved: Not reported. Current status: Not reported.
58.9	US Express I-85, MM 142 Burlington, NC	501	LAST, PIRF	Closed	LAST: 09/17/2015: Level of soil clean up achieved: Not reported. Current status: Closed. Comments: Approximately 50 gallons of diesel fuel was released during a vehicular accident on I-85 at MM 142. No further information given.
61.1	Vacant House 834 Boone Road Burlington, NC	779	ASBESTOS	Demolished	ASBESTOS: Demo start date: 04-12-14. Demo end date: 04-12-14.
62.7	Residence 2806 Union Ridge Road Burlington, NC	439	ASBESTOS	Demolished	ASBESTOS: Demo start date: 04-18-15. Demo end date: 04-18-15
62.7	Harold Smith Grocer 2774 Union Ridge Road Burlington, NC	405	LUST, LUST TRUST, IMD, RGA LUST	Incident Phase: Remedial Action Implemented. Corrective Action Planned 09-24-1997.	LUST: Contamination type was gasoline and diesel fuel with a release to groundwater. Cleanup actions were planned in 1997. Records do not indicate if cleanup was completed.
62.9	Vacant Building 2649 Union Ridge Road Burlington, NC	671	ASBESTOS	Removed, demolished	ASBESTOS: Removal start date: 06/04/16. Removal end date: 06/09/16. Demo start date: 06/13/16. Demo end date: 06/23/16.

Appendix 2-D

Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities

Milepost	Site Name / Address	Distance from Project (feet)	Databases a/	Status and Contamination Issues	Comments
66.5	House Uplift 2201 Sandy Cross Road Burlington, NC	1,238	ASBESTOS	Removed, demolished	ASBESTOS: Removal start date: 05/30/14. Removal end date: 06/16/14.
69.0	Eastside WWTP 225 Stone Quarry Road Burlington, NC	1,206	ICIS, FINDS, ECHO, NPDES	Enforcement Actions	ICIS: Seven enforcement actions. Enforcement action types: Letter of violation/warning letter, State CWA Penalty AO, State Administrative Order of Consent.
69.3	Cone Mills Corp Granite Finishing Co PO Box 148 Haw River, NC (Old US 70 NC 49)	537-962	HSDS, AST, UST	Listed on the NC Hazardous Substance Disposal Site database,	HSDS: Listed on the NC Hazardous Substance Disposal Site database, no further information given. AST: Registration number 41030044. No further information given. UST: Tank 1, 10,000 gallon gasoline tank, removed. Tank 2, 3000 gallon other, hazardous tank, removed.
69.3	Granite Mill 122 E. Main Street Haw River, NC	962	Brownfields	Eligible for Brownfields funding	Brownfields: Active eligible projects
69.6	Haw River Daytona 714 E. Main Street Haw River, NC 27258	1178	UST, LF	UST Tank Status: Current.	UST: Three current 10,000-gallon gasoline, gas mixture tanks installed on 05/16/1966.
69.6	Haw River Mobil Home Supply 410 E Main Street Haw River, NC 27258	87	HIST AUTO	No violations found.	HIST AUTO: Listed as Gasoline Service Station for 2005 and 2006. No database evidence of a release to soil or groundwater.
69.6	Isley Residence 408 W. Main Street Haw River, NC	35	RGA LUST, LUST	Closed	RGA LUST: Listed for years 2003-2012. LUST: Contamination type was not reported. Cleanup actions were planned in 1995. Incident closed out in 1996.
69.7	Wilco #161 515 E. Main Street Haw River, NC	655	RGA LUST, LUST TRUST, IMD	No closure status given.	RGA LUST: Listings for 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012. No further information given. Releases of diesel fuel and gasoline to soil reported. No database records of closure.

Appendix 2-D

Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities

Milepost	Site Name / Address	Distance from Project (feet)	Databases a/	Status and Contamination Issues	Comments
69.7	Haw River Elementary 701 East Main Street Haw River, NC	1,272	ASBESTOS, UST	Asbestos removal and UST removal.	ASBESTOS: Removal start date: 11/08/14. Removal end date: 11/10/14. UST: 10,000-gallon tank removed on 11/30/1993.
73.0	Graham Disposal From I-40 W., Take EXIT 148. Turn left on NC 54 and go 1.2 miles. Graham, NC	1,031	NC OLI, FINDS, ECHO, DocketHWC/ECHO	Facility is listed on NC's database of Old Landfills.	NC OLI: Old Landfill Inventory Location Information. Facility does not generate, treat, store, or dispose of hazardous materials onsite. Facility has received no RCRA violations and has no CORRACTS corrective actions. Facility does not handle PCBs or radioactive materials. No USTs or ASTs. Facility is not a Superfund Site nor a State Hazardous Waste Site. Facility is a Hazardous Waste/Enforcement and Compliance History Site (DocketHWC/ECHO). No further information given.

a/ Acronyms:
ASBESTOS – NC Asbestos Notification Sites;
AST – Above-ground Storage Tank database containing registered Underground Storage Tanks;
AIRS (AFS) – Aerometric Information Retrieval System Facility Subsystem; Used to track emissions and compliance data from industrial plants;
CORRACTS – Corrective Action Report;
ECHO – Enforcement & Compliance History Information;
EDR – Environmental Data Resources, Inc.;
FINDS – Facility Index System;
HIST AUTO-Historic Autobody;
HSDS – Hazardous Substance Disposal Site;
IMD – NC Incident Management Database;
ICIS – Integrated Compliance Information System;
LAST – Leaking Above Ground Storage Tank;
LUST – Leaking Underground Storage Tank;
LUST TRUST – State Trust Fund Database
LF FINANCIAL ASSURANCE – All facilities that treat, store or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean-up, closure, and post-closure care of their facilities;
MP – Milepost;
NA – Not Applicable;
NC – North Carolina;
NC OLI – Old Landfill Inventory Location Information;
NPDES – National Pollution Discharge Elimination System;
RCRA NonGen – RCRA sites not generating hazardous waste;
RCRA NonGen/NLR – RCRA database of sites, non-generators do not presently generate hazardous waste;
SPILLS – Database containing records of spill incidents;
SVOC – Semi Volatile Organic Compound;
SWF / LF – Solid Waste Facility / Landfill;

Appendix 2-D Environmental Database Sites of Interest Identified within 0.25 Mile of the MVP Southgate Project Facilities					
Milepost	**Site Name / Address**	**Distance from Project (feet)**	**Databases a/**	**Status and Contamination Issues**	**Comments**
SWRCY – NC Recycling Center Listing; UST – Underground Storage Tank database containing registered Underground Storage Tanks; VA – Virginia; and VOC – Volatile Organic Compounds.					

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-E

Water Resources Identification and Testing Plan

MVP Southgate Project

Water Resources Identification and Testing Plan

November 2018

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APPENDICES

1.0 WATER RESOURCES IDENTIFICATION AND TESTING PLAN

The MVP Southgate Project ("Project" or "Southgate Project") prepared and will execute the terms of this Water Resources Identification and Testing Plan ("Plan") to document pre-construction (baseline) and post-construction water quality and quantity of privately owned water supply systems.

This Plan summarizes protocols for identifying and assessing water supplies in the vicinity of the Project and related components. The Project documented locations and characteristics of private water supplies within 150 feet of the construction workspaces. The Project will conduct pre-construction testing of private wells located within 150 feet of the construction workspace. Upon request by a landowner who had a pre-construction test, a post-construction test will be performed.

This Plan discusses the outreach methodology that will be followed by the Project, and the general plan for testing.

Private water resources identified for water quality and quantity testing within 150 feet of the construction workspace are summarized in Table 1. Prior to construction, the private water supply owners will be contacted by the Project via certified mail to confirm the location and characteristics of water resource(s) on the owner's property and to request permission for the Project to conduct water quality and quantity sampling.

Field confirmation of private water sources has not been completed on some parcels because property access permission has not been granted. Therefore, this Plan is subject to change following the completion of field environmental investigations.

2.0 IDENTIFYING WATER RESOURCES

2.1 Private Wells and Springs

Private wells and springs located within 150 feet of the construction workspace will be identified by route alignment civil surveying, as well as desktop review and field observation (where property access was granted). The private water supply sources will be confirmed through pre-construction water supply testing (see Table 1) as described in this Plan.

As part of the desktop review for potential drinking water sources an indirect method was employed to supplement the civil survey to identify potential private wells. GIS data taken from the various counties were used to identify if a structure was present on the parcel. To maximize the potential for identifying private water resources all structures were assumed to have one or more private wells.

As discussed in this Plan, the property owners identified by civil survey, and desktop review, along the Project route will be contacted by the Project prior to construction via certified mail to confirm drinking water sources on the identified property and to request permission to conduct water quality and quantity testing.

If a private property owner does not respond to the certified mail request for information within approximately four (4) weeks of submittal by the Project, a second request will be sent. If no response is provided to the Project through the second submittal, no further contacts will be initiated with the property owner regarding water resources.

Private well and spring locations identified to date as described above, are listed in Table 1. Appendix A provides a list of information that will be requested from the water supply owners during the initial contact along with a request for permission to sample the water supply.

2.2 Public Water Supplies

Public water suppliers in Virginia and North Carolina were identified from publicly available data sources (VDEQ, 2018, NCDEQ, 2018). Specific locations and conditions of the water supply sources (wells, springs or surface water intakes) will be confirmed through contacts with the public supply owner or operator.

3.0 WATER RESOURCE EVALUATION

The following discussion outlines protocols water supply testing activities. The testing results will be documented by the Southgate Project and provided directly to the water supply owner.

3.1 Private Water Supplies

1. The Southgate Project will conduct pre-construction testing of all private wells located within 150 feet of the construction workspace. The Project will conduct post-construction tests if requested by a landowner who had a pre-construction test. The Project proposes to collect one sample approximately six (6) months before construction, and a second sample within three (3) months prior to construction, and conduct a well yield test (protocol described below).

2. All private property owners with a known or suspected water source (see earlier discussion) will be contacted prior to construction as discussed below:

    a. Send contact by mail to mailing address listed for the property owner;

    b. If no response is received within approximately 4 weeks of sending the first letter, a second follow-up letter will be sent;

    c. If no response is provided by property owner after two (2) attempts this result will be documented and the Project will suspend further contact to the property owner regarding water quality testing;

    d. If a property owner declines permission for the Project to conduct water quality testing, this will be documented and the Project will suspend further contact with the property owner regarding water quality testing;

3. Property and water supply access approval documentation will be secured by the Project before entering the property. The property / supply owner will be notified prior to the

Project entering the property for sampling. See Appendix A for information to be collected from the water supply owner during initial and follow-up contact.

4. A two-person field crew will be deployed to collect water samples at the identified locations.

5. The sampling location coordinates will be collected using GPS (1-meter resolution) and recorded.

6. Field testing, sample collection and sample management techniques will be implemented consistent with industry standards and approved guidance (U.S. EPA, Virginia Department of Environmental Quality and North Carolina Department of Environmental Quality).

7. For surface water resources, a decontaminated or new one-time-use sample collection device suitable for the surface water resource will be inserted in a flowing portion of the spring or stream and the water sample transferred directly to the appropriate sample container provided by the laboratory.

8. A decontaminated field meter will be inserted in a flowing portion of the spring or stream, and the field parameters recorded along with date and time.

9. For water well testing, a water sample will be collected from a flowing spigot (after a minimum of 10 minutes purging) upstream of any treatment system (if applicable) in order to collect a raw water sample in the appropriate laboratory-prepared sample bottle with appropriate preservatives. Field parameters will be analyzed at the time of water sample collection.

    a. If the well does not have a pump installed, or does not demonstrate artesian flow, a new, disposable one-time use bailer and clean nylon string will be used to collect the water sample. There will be limited ability to purge the well bore of water using the bailer.

10. Water samples will be kept cool and transported \ to the analytical laboratory(ies) under Chain of Custody.

11. The target analyte list is comprised of a general water quality analyte suite and pollutant-specific suite (Table 2). The baseline target analyte list includes field parameters, coliform bacteria, major elements and water quality parameters. The expanded target analyte list adds a full suite of Volatile Organic Compounds and Semivolatile Organic Compounds included in USEPA drinking water testing methods EPA 524.2, EPA 525.2, respectively, and Total Petroleum Hydrocarbons buy EPA SW846 8015C.

    a. The first pre-construction sampling event will be comprised analysis of the full expanded target analyte list (Table 2). The second pre-construction sampling event will include the baseline water quality (reduced list, Table 2) suite, unless there is a

concern noted by the property owner, or if the Project observers a verified detection of a VOC or SVOC or TPH from the first sampling event.

b. National Environmental Laboratory Accreditation Program ("NELAP")-accredited laboratories will be utilized for water sample analyses. For samples collected in Virginia the laboratories will have current Virginia (V)ELAP accreditation. For samples collected in North Carolina the laboratories will be certified by the North Carolina Department of Health and Human Services.

12. Water resources testing activities (including the condition of the water resource and equipment) will be photo-documented. All field activities and meter calibration for each water resources sampling event will be documented.

13. The first pre-construction sampling event provided the Project with the opportunity to evaluate the condition of each well, spring or intake, surrounding topography and land characteristics and land-use, and generally assess the overall vulnerability of the water supply to existing or future sources of impact.

14. The Southgate Project will provide the water supply owner with the water supply testing results. Concurrent with providing the owner these results, the Project will discuss with the owner any conditions that observed at the water supply that represent potential for existing or future sources of impacts.

15. The second sampling event will also include well yield testing. The water supply owner will be apprised of the well yield testing procedure, and the Project will request permission to access the well for the quantity testing, at the owner's discretion.

16. The Southgate Project will consult with an owner who appears to have a compromised water supply based on pre-construction sampling results. The Project will tailor an evaluation protocol for the second round of water quality testing as appropriate to evaluate the integrity of the water supply and ensure a comprehensive pre-construction assessment is completed.

3.2 Public Water Suppliers

The Southgate Project will contact and discuss the Project with public water suppliers, and address specific concerns. The Project is completing water supply contingency planning efforts for public suppliers that have a surface water intake within three miles down gradient of a pipeline water body crossing. The Project will communicate directly with the pubic suppliers, and work directly with specific suppliers for contingency planning.

4.0 POST-CONSTRUCTION BASELINE WATER RESOURCE TESTING

Upon request by a landowner who had a pre-construction test, a post-construction test will be performed. The Southgate Project will follow the same procedures described above for water supply sampling, comprehensive target analyte list laboratory analysis and water quantity testing. The Project will provide the post-construction monitoring results directly to the property owner.

The Project will maintain water supply contingency planning efforts that are specified in the respective supplier's Contingency Plan, through the construction period and until final land reclamation is completed.

5.0 COMPLAINT RESOLUTION PROCESS

The potential for impacts to private water supplies and springs is negligible. However, if a claim of impact is made by a water supply owner, a thorough investigation of the alleged impact will be conducted by qualified groundwater and surface water scientists and engineers using industry-standard hydrogeologic investigative practices. This will include a review of the timing of the claim relative to the construction schedule, detailed interview with the supply owner, mechanical evaluation of the water system, possible resampling and analysis of the supply, performance of a hydrogeologic assessment, and other pertinent evaluations. Because each water supply system and hydrogeologic setting is unique, the only means to establish a clear link between a water supply quality or quantity issue and Project activities is through a comprehensive evaluation leading to complaint resolution.

If the Southgate Project determines that an impact was related to its pipeline construction, then the investigations described above will provide valuable information concerning the appropriate remedies. Restoration of a water supply could include:

- temporary supplied water until the water quality returns to baseline;
- connection to secondary on-site sources, if available; and/or
- temporary treatment to establish baseline quality (or better).

If the hydrogeologic assessment indicates that a long term solution is needed, the Project would provide the following as appropriate to restore water quality and quantity to pre- construction conditions:

- a permanent treatment system; or
- a new on-site source (new water well); or a combination of source replacement and treatment options.

6.0 REFERENCES

National Environmental Laboratory Accreditation Program (NELAP), 2016. http://www.nelac-institute.org/content/NELAP/index.php

Tables

Table 1.

Private Water Supplies for Water Quality and Quantity Testing

Project Mile Post	Parcel Number	Water Source	Latitude	Longitude

Table 2.

Target Analytes for Private Water Supply Testing

Target Analyte (baseline water quality)	Notes / Rationale for Testing
pH	Field-measured indicator parameter characterizing the relative acid- base nature of water and a major indicator of overall water quality.
Specific conductivity (mS/cm)	Field-measured indicator parameter characterizing the dissolved ion content of water and a major indicator of overall water quality.
Temperature (oC)	Field-measured indicator parameter that is a general water quality descriptor.
Turbidity (turb. units)	Field-measured indicator parameter characterizing the suspended solids content of water.
Total and Fecal coliform bacteria (MPN/100 ml)	Measures bacteria content of water. Indicator of surface water and / or septic field impact to the water well.
Total dissolved solids (TDS) (mg/L)	Measures amount of charged ions that are dissolved in water. Indicative of dissolved mineral content of the water.
Total suspended solids (TSS) (mg/L)	Measures amount of solid material suspended in water. Similar to turbidity field indicator, but provides a quantitative assessment of suspended solids mass.
Hardness (mg/L)	Major water quality indicator. Hardness is commonly used to measure dissolved calcium and magnesium. “Hard” water is high in dissolved minerals. Hardness, TDS and Specific conductivity are evaluated in common to characterize the relative mineralization of groundwater. Report in CaCO3 equivalent (mg/L).
Alkalinity (mg/L)	Measures the ability of water to neutralize acid (buffering capacity) and is part of an overall water quality indicator. Report in CaCO3 equivalent (mg/L)
Sulfate (mg/L)	Common major anion (negatively-charged compound) in groundwater and at high concentrations may lead to scaling of plumbing and impart poor taste to potable water. This is also used to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each well.
Chloride (mg/L)	Common major anion (negatively charged) that is an indicator of overall salt content of water. This is also used to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each well.
Nitrate (total) (mg/L)	Common major anion (negatively charged compound) that is typically used as an indicator of surface water or septic influence on groundwater. Nitrate and bacteria analyses are evaluated in tandem to identify potential impacts to groundwater sources. This is also used to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each well.
Bicarbonate (mg/L)	Common major anion (negatively charged compound) used to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each well. Evaluating bicarbonate content along with alkalinity assists in understanding overall water quality.
Calcium and Magnesium (mg/L)	Common major cation (positively charged element) that will assist in characterizing overall water quality and Hardness, and will be used to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each well.
Sodium and Potassium (mg/L)	Common major cation (positively charged element) that will assist in characterizing overall water quality and to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each

Table 2.

Target Analytes for Private Water Supply Testing

Target Analyte (baseline water quality)	Notes / Rationale for Testing
	well. High levels of sodium may also have health effects for persons with high blood pressure.
Iron and Manganese (mg/L)	Common major cation (positively charged element) that will assist in characterizing overall water quality and to evaluate charge balance (balanced anions and cations) of the overall water quality data set for each well. These major elements, when dissolved in water at a high enough concentration, can have aesthetic concerns for staining home fixtures or affecting laundry.
Volatile Organic Compounds (VOCs); EPA Method 524.2	Volatile organic compounds such as petroleum products, chlorinated compounds, solvents and degreasers, industrial chemicals, etc.
Semivolatile Organic Compounds (SVOCs); EPA Method 525.2	Semivolatile organic compounds potentially derived from industrial activity and materials.
Total Petroleum Hydrocarbons (TPH) EPA Method 1664	Range of petroleum products (see Note 1, below)
Note 1: Total Petroleum Hydrocarbon ("TPH") Method 1664 captures a broad range of petroleum related hydrocarbons (including oil-range, diesel-range, gasoline-range and lighter-range). FERC suggested including Oil and Grease, but this analysis would capture fats and greases from animals, fry oils, waxes, soap, etc. There is no reasonable expectation that these types of substances will be associated with pipeline construction. The target analyte list in Table 3, including Method 1664 TPH, will provide a comprehensive analysis of potential contaminants in groundwater that would have a reasonably-expected potential derivation from pipeline construction.	

Appendix A

Information to be Collected from Water Supply Owners

1 Route Specific Sort Order
2 Parcel Number(s)
3 APN(s)
4 Name (Last, First or Company)
5 Permission to Enter
6 Date on Form
7 Signed
8 Address Line 1
9 Address Line 2
10 City, State, Zip
11 Telephone Number
12 Email Address
13 Preferred Day/Time of Contact
14 Community or Municipal Water
15 Water Wells
16 Drilled or Dug
17 Used for Drinking
18 Well Depth
19 Treatment System or Filter
20 Other Water Wells
21 Number of Other Wells
22 Drilled or Dug
23 Used for Drinking
24 Well Depth
25 Treatment system
26 Springs
27 Number of Springs
28 Used for Livestock/Irrigation
29 Streams
30 Number of Streams
31 Used for Livestock/Irrigation
32 Other Bodies of Water
33 Number of Other Bodies of Water
34 Description
35 Used for Livestock/Irrigation
36 Comments

Appendix B

Private Well Yield Testing Protocol

The following outlines the methodology for measuring pre-construction well yield at private water supply wells. Public water supplies have documented production data and this will be used for pre- construction baseline data.

Two procedures are presented below. The first is well yield testing when the well is accessible for measuring water level during pumping and recovery. The second is a flow testing protocol when the well is not accessible, or the property owner does not authorize the Project to access the well but requests a well yield test.

If the property owner requests a post-construction well yield test, it is critical that the test be conducted under the same conditions as the pre-construction test, to the extent possible, in order to provide as accurate a comparison as possible. Since pumping rate and the test duration both affect the well yield estimate, these parameters need to be nearly the same to compare results of post-construction to pre-construction tests. If possible, the two tests should be conducted during the same season of the year because seasonal variation of well recharge can influence the yield estimate.

Yield Testing Protocol for Accessible Wells - Specific Capacity

The "specific capacity" of a well is the number of gallons of water produced per minute for each foot of well drawdown.

A test duration of 1 hour at a pumping rate of 5 gallons per minute ("gpm") will be conducted to estimate well specific capacity.

Procedure

Request that the well owner not operate the well for as long as practical prior to conducting the test. Record when the owner last used the water system.

Well plumbing fixtures, such as the pressure shutoff switch, sediment filter and pressure tank may need to be by-passed or disconnected to maintain a stable, steady pumping rate.

Ensure that the discharged water is collected, or discharged away from the well so that it does not artificially recharge the well.

Measure and record the depth to water from the top of the well casing.

Measure and record the depth to the pump from the top of the well casing, if possible. Record any pump installation data that are available.

Record time that flow testing begins.

The following measurements should be taken during the pumping period:

Pumping rate – measure at the start of the test; at five minute intervals during the initial stages of the test; at 10 minute intervals during the latter stages of the test; and at the conclusion of pumping. Adjust flow controls as necessary to maintain the optimal 5 gpm pumping rate.

Water level – measure at the start of the test; at one or two minute intervals during the first 10 to 20 minutes; at five minute intervals during the remainder of the pumping period; and at the conclusion of pumping.

Terminate pumping if the water level drops within 5 feet of the pump, so the pump is not damaged by running it dry.

Record time that flow testing ends.

At the conclusion of the pumping test, commence recovery measurements in accordance with the following guidelines:

0 – 5 minute interval: every 30 seconds

5 - 10 minute interval: every 60 seconds

10 - 20 minute interval: every two minutes

20 - 60 minute interval: every five minutes

If after one hour the level of recovery is less than 50% of the depth of drawdown, continue to measure water levels at five minute intervals until water level has recovered to 90% of the depth of drawdown or until three hours since the start of recovery, whichever occurs first.

Tabulate pumping rate, drawdown and recovery data, and prepare a graph of water level vs. time.

Well yield can be calculated from specific capacity by multiplying the available drawdown in the well (the distance between the static water level and the normal pump setting in feet) with the specific capacity (units in gallons per minute per feet of drawdown), the result having the units of gpm. This calculated yield takes into consideration both the storage capacity of the well and the aquifer performance under the limited conditions of the specific capacity test.

$SC=R/D$

Where: SC = specific capacity (gpm/ft), R = adjusted discharge rate (gpm), and D = total drawdown (ft.)

$R = (Vt - Vs) / t$

Where: Vt = total volume of water discharged during test (gallons), Vs = volume of water discharged from borehole storage (gallons), and t = duration of the test (minutes).

$Vs = 23.5D\ r2$

Where: Vs = volume of water discharged from borehole storage (gallons), D = total drawdown (feet), r = well radius in feet.

(Note, for a standard 6-1/2 inch diameter well, Vs = 1.72 gal./ft. X D) Yield (gpm) = AD x SC

Where: AD = available drawdown (ft) = depth to pump intake - static water level - 5 ft.

Well storage may be overemphasized in specific capacity tests. Unlike a long-duration test of a high-performance, industrial well, a short-duration test of a low-yielding well, especially a deep

well, may result in borehole storage water representing most of the water discharged during the test. A borehole storage problem becomes significant if the specific capacity is then multiplied by the available drawdown to calculate a yield. A poor-performing, unreliable well can appear to have a relatively good yield when borehole storage is large relative to the specific capacity. Mountain Valley will document both specific capacity from the test, and calculated well yield.

Yield Testing Protocol for Inaccessible Wells - Peak Demand Test

The Peak Demand Test (PDT) will be used if a well is inaccessible for direct monitoring of water level during pumping and recovery. The PDT is used to simulate well usage during peak demands, and does not provide an actual yield value. It only tests a delivery system's ability to provide water to the user.

Procedure

The test will be performed by running the water from an outdoor spigot or indoor faucet.

If possible, well plumbing fixtures, such as the pressure shutoff switch, sediment filter and pressure tank may need to be by-passed or disconnected to maintain a stable, steady flow rate.

Ensure that the discharged water is collected, or discharged away from the well so that it does not artificially recharge the well.

Open spigot or faucet for flow at 5 gpm for 15 minutes and then stop flow for recovery for 15 minutes.

The on/off pumping cycles are repeated for 4 hours or until the well fails, whichever comes first.

Record time at the beginning and end of each cycle.

The discharge rate (flow rate) will be recorded every 5 minutes (three times per pumping cycle).

If the pump intake breaks suction and the discharge rate drops noticeably, record the time when this occurs.

The parameters of the PDT must be carefully recorded. Maintaining a constant discharge rate can be difficult to achieve because an in-place water delivery system for a home can be difficult to control and the discharge rate may decline as the test advances.

Because the PDT does not require entry to the well bore, liability concerns from well damage are less. The test also provides a means of testing water supplies not physically accessible for water level measurements. A disadvantage of the test is that the PDT takes longer to perform than the short-duration specific capacity test. Because of the on-and-off cycles, the PDT will not adequately test the well if its duration is shortened to less than 4 hours. The PDT should only be allowed where borehole access requires an extraordinary effort, or the well owner does not authorize entry.

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-F

ATWS within 50 feet of Wetlands and Waterbodies

Appendix 2-F

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Within 50 ft of a Wetland	Within 50 ft of a Waterbody	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)
Virginia, Pittsylvania County							
1052	5.2	X		W-D18-1	0	ATWS situated in this location to support conventional bore and associated equipment.	Y
1113	13.4	X		W-E18-28	19	ATWS situated in this location to support conventional bore and associated equipment.	Y
North Carolina, Rockingham County							
1244	29.9	X		W-A18-18	0	ATWS situated in this location to support HDD and associated equipment.	Y
1244A	29.9	X		W-A18-18	2	ATWS is located in a cultivated area. ATWS situated in this location to support HDD and associated equipment.	N
1249	30.3 - 30.4	X		AW-B18-36 / W-B18-36	0	ATWS situated in this location to support HDD and associated equipment// hydrostatic testing equipment.	Y
1251	30.4	X		W-B18-36	0	ATWS situated in this location to support HDD and associated equipment.	Y
1250	30.5	X		W-B18-34	0	ATWS situated in this location to support conventional bore and associated equipment.	Y
1368	41.6		X	S-B18-44	15	ATWS situated in this location to support conventional bore and associated equipment.	Y
1369	41.6		X	AS-B-18-44	45	ATWS situated in this location to support conventional bore and associated equipment.	Y
North Carolina, Alamance County							
1692	73	X		W-A18-111	0	ATWS situated in this location to support conventional bore and associated equipement / hydrostatic test support equipment.	Y

Appendix 2-F

ATWS Within 50 feet of Wetland or Waterbody

ATWS ID	Milepost	Within 50 ft of a Wetland	Within 50 ft of a Waterbody	Feature ID	Distance from Resource Area (feet) a/	Justification	Variance Required (Y/N)
1692A	73	X		W-A18-111	0	ATWS situated in this location to support conventional bore and associated equipment.	Y

a/ Distance from resource area of 0 feet indicate the wetland or waterbody is located within the ATWS.

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-G

Areas along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Facility, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/	Road / Railroad Crossing
Virginia				
Pittsylvania				
H-605 Pipeline				
VA-PI-001.000	0.0	0.0		
VA-PI-001.000	0.0	0.1		
VA-PI-002.000	0.2	0.3		
H-650 Pipeline				
VA-PI-003.000.RC	0.7	0.7		X
VA-PI-005.000.RC	0.9	0.9		X
VA-PI-014.000.RC	2.9	2.9		X
VA-PI-016.000.RC	3.0	3.0		X
VA-PI-026.000.RC	4.2	4.2		X
VA-PI-026.000.RC	4.3	4.3		X
VA-PI-031.000.RC	4.3	4.3		X
VA-PI-034.000.RR	5.2	5.3		X
VA-PI-040.000.RC	7.2	7.2		X
VA-PI-042.000.RC	7.4	7.4		X
VA-PI-045.000.RC	8.1	8.1		X
VA-PI-052.000.RC	9.3	9.4		X
VA-PI-053.000	9.7	9.8		
VA-PI-065.000.RC	10.7	10.8		X
VA-PI-075.000	11.1	11.1		
VA-PI-075.000	11.1	11.2		
VA-PI-075.001.ASC	11.2	11.2		
VA-PI-079.000.RC	12.3	12.4		X
VA-PI-087.000.RC	13.4	13.4		X
VA-PI-096.000	14.7	14.8		
VA-PI-096.000.RC	14.8	14.9		X
VA-PI-099.000	14.9	14.9		
VA-PI-103.000.RC	15.9	15.9		X
VA-PI-121.000.RC	18.2	18.3		X
VA-PI-129.000.RC	19.0	19.0		X
VA-PI-143.000.RC	19.2	19.3		X
VA-PI-151.000	19.9	19.9		
VA-PI-151.000.RC	19.9	20.0		X
VA-PI-152.000	20.0	20.1		
VA-PI-153.000.ABU	20.1	20.2		
VA-PI-154.000.ABU	20.2	20.2		
VA-PI-154.200	20.2	20.3		
VA-PI-160.000	20.3	20.3		
VA-PI-175.000	23.6	23.7		
VA-PI-178.000	24.4	24.6		
VA-PI-179.000	25.0	25.0		
VA-PI-179.000.RR	25.0	25.0		X

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Facility, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/	Road / Railroad Crossing
North Carolina				
Rockingham				
NC-RO-005.000	27.0	27.5		
NC-RO-006.000	27.5	28.1		
NC-RO-006.000	28.1	28.1		
NC-RO-006.000	28.1	28.3		
NC-RO-022.000	30.8	30.9		
NC-RO-025.000	30.9	31.1		
NC-RO-030.000.RC	31.6	31.6		X
NC-RO-038.000	32.4	32.4		
NC-RO-058.000	36.0	36.0	X	
NC-RO-076.000	37.5	37.5		
NC-RO-077.000	37.5	37.7		
NC-RO-081.000	37.7	37.8		
NC-RO-080.000	37.8	37.8		
NC-RO-081.000	37.9	38.0		
NC-RO-090.000	38.7	38.8		
NC-RO-090.000.RC	38.8	38.8		X
NC-RO-095.000.RC	39.7	39.7		X
NC-RO-098.000	39.7	39.7		
NC-RO-097.000.RR	39.7	39.7		X
NC-RO-111.000.RC	41.6	41.6		X
NC-RO-111.000.RC	41.6	41.6		X
NC-RO-112.000.RC	42.2	42.2		X
NC-RO-117.250	43.1	43.1		
NC-RO-117.000.RC	43.1	43.2		X
NC-RO-138.000	44.7	44.7	X	
NC-RO-142.000	45.7	45.7	X	
NC-RO-157.000.RC	48.4	48.4		X
NC-RO-166.000	49.3	49.3		
NC-RO-168.000.RC	49.5	49.5		X
NC-RO-169.000	49.5	49.7		
NC-RO-173.000	49.9	50.1		
NC-RO-176.000	50.3	50.3		
NC-RO-177.000	50.3	50.5		
NC-RO-178.000	50.5	50.6		
NC-RO-179.000	50.6	50.8		
Alamance				
NC-AL-000.020	52.8	52.9		
NC-AL-000.045	52.9	53.0		
NC-AL-000.045.RC	53.0	53.1		X
NC-AL-004.000	53.9	53.9		
NC-AL-005.000.RC	54.1	54.1		X
NC-AL-016.000	55.3	55.3		
NC-AL-043.000.RC	57.8	57.8		X
NC-AL-044.000.RC	57.8	57.9		X
NC-AL-050.000	58.2	58.5		

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Facility, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/	Road / Railroad Crossing
NC-AL-052.000	58.7	58.9		
NC-AL-053.000	58.9	59.1		
NC-AL-054.000	59.1	59.2		
NC-AL-054.000.RC	59.2	59.2		X
NC-AL-058.000	59.2	59.3		
NC-AL-057.000	59.3	59.4		
NC-AL-059.000	59.4	59.5		
NC-AL-062.000	59.5	59.6		
NC-AL-064.000	59.6	59.7		
NC-AL-077.000	61.2	61.4		
NC-AL-077.000.RC	61.4	61.4		X
NC-AL-080.000	61.4	61.4		
NC-AL-097.000.WBC	63.6	63.6		
NC-AL-104.000	63.6	64.0		
NC-AL-104.000	64.0	64.0		
NC-AL-104.000	64.0	64.1		
NC-AL-106.000	64.1	64.3		
MVF-NC-AL-001.000	64.3	64.4		
MVF-NC-AL-002.000	64.4	64.5		
MVF-NC-AL-003.000	64.5	64.5		
MVF-NC-AL-002.000	64.5	64.5		
MVF-NC-AL-004.000	64.5	64.6		
MVF-NC-AL-005.000	64.6	64.7		
MVF-NC-AL-006.000	64.7	64.7		
MVF-NC-AL-005.000	64.7	64.8		
MVF-NC-AL-005.000.RC	64.8	64.8		X
MVF-NC-AL-007.000	64.8	65.1		
MVF-NC-AL-010.000	65.1	65.2		
MVF-NC-AL-007.000	65.2	65.3		
NC-AL-110.000.RC	65.3	65.3		
MVF-NC-AL-011.000	65.3	65.5		
MVF-NC-AL-016.000	65.5	65.5		
MVF-NC-AL-017.000	65.5	65.5		
MVF-NC-AL-013.000	65.5	65.6		
FA34-AL-001.000	65.9	66.1		
FA34-AL-001.000.RC	66.1	66.1		X
FA3-AL-002.000	66.1	66.1		
FA3-AL-003.000	66.1	66.2		
FA3-AL-005.000	66.2	66.4		
NC-AL-122.000.RC	66.4	66.4		X
FA3-AL-006.000	66.4	66.5		
FA3-AL-007.000	66.5	66.5		
FA3-AL-008.000	66.5	66.6		
FA3-AL-009.000	66.6	66.7		
FA3-AL-010.000	66.7	66.7		
NC-AL-128.000	66.7	67.3		
NC-AL-134.000	67.3	67.5		

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Facility, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/	Road / Railroad Crossing
NC-AL-137.000	67.6	67.7		
NC-AL-138.000	67.7	67.9		
NC-AL-139.000	67.9	68.0		
NC-AL-140.000	68.0	68.1		
NC-AL-141.000	68.1	68.1		
NC-AL-142.000	68.1	68.2		
NC-AL-143.000	68.4	68.4	X	
NC-AL-145.000	68.5	68.6		
NC-AL-144.000	68.6	68.6		
NC-AL-144.000.RC	68.6	68.7		X
NC-AL-149.000.RC	69.0	69.1		X
NC-AL-150.000	69.1	69.1		
NC-AL-166.000	69.5	69.6		
NC-AL-169.000.ABU	69.6	69.6		
NC-AL-166.000	69.6	69.6		
NC-AL-169.000.ABU	69.6	69.6		
NC-AL-166.400	69.6	69.6		
NC-AL-166.000.RC	69.6	69.7		X
NC-AL-170.000.ABU	69.7	69.7		
NC-AL-176.000.ABU	69.7	69.7		
NC-AL-179.000.ABU	69.7	69.7		
NC-AL-180.000.ABU	69.7	69.8		
NC-AL-181.000.ABU	69.8	69.8		
NC-AL-166.001.RC	69.8	69.8		X
NC-AL-166.000.RR	69.8	69.8		X
NC-AL-182.000	69.8	69.8		
NC-AL-183.000.ABU	69.8	69.9		
NC-AL-184.000	69.9	69.9		
NC-AL-191.000.RC	71.3	71.4		X
NC-AL-194.000	71.9	72.1		
NC-AL-195.000	72.1	72.1		
NC-AL-196.000	72.1	72.2		
NC-AL-206.000	72.8	72.9		
NC-AL-207.000.RC	72.9	72.9		X
NC-AL-210.000	73.0	73.0		
NC-AL-210.000	73.1	73.1		

a/ Properties surveyed as of September 20, 2018
b/ Biological survey field crews had partial access to the property during field visit

MVP Southgate Project

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Resource Report 2

Appendix 2-H

MVP Southgate Project Horizontal Directional Drill Contingency Plan

MVP Southgate Project

Horizontal Directional Drill Contingency Plan

November 2018

TABLE OF CONTENTS

ACRONYMS

HDD	Horizontal Directional Drilling
IR	inadvertent return
Project or Southgate Project	MVP Southgate Project

1.0 INTRODUCTION

Horizontal Directional Drilling ("HDD") is a trenchless excavation method that is accomplished in three phases. The first phase consists of drilling a small diameter pilot hole along a designed directional path. The second phase consists of enlarging the pilot hole to a diameter suitable for installation of the pipe. The third phase consists of pulling the pipe into the enlarged hole. HDD is accomplished using a specialized horizontal drilling rig with ancillary tools and equipment. A properly executed HDD crossing will allow for the pipeline to be installed in a minimally invasive manner.

The HDD method is proposed for the MVP Southgate Project ("Project" or "Southgate Project") crossings in North Carolina of the Dan River in Rockingham County and Stony Creek Reservoir in Alamance County.

The inadvertent return ("IR") of drilling lubricant is a potential concern when HDD methods are utilized. The HDD procedure for these crossings will utilize bentonite for drilling lubricant. In general, IRs can occur as a result of existing rock fractures, low density soils, or unconsolidated geology. There is a potential for inadvertent returns to directly impact surface and ground waters via existing or enhanced fracture zones or if there is a release upland which flows over ground into wetlands or streams.

2.0 PURPOSE

The purpose of this Contingency Plan is to:

- Minimize the potential for an IR associated with horizontal directional drilling activities.
- Provide for the timely detection of an IR.
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources).
- Provide an organized, timely, and "minimum-impact" response in the event of an IR.
- Provide that all appropriate notifications are made to the North Carolina Department of Environmental Quality and other appropriate regulatory agencies, and that documentation is completed.
- Provide an alternative crossing method if the HDD is deemed unsuccessful.

3.0 PREPARATION

Prior to implementation of the HDD, the Southgate Project and the contractor will identify the potential for inadvertent releases at the HDD location. The review will include a visual review of entry and exit points, and entire HDD drill path. The contractor will review the Project's HDD Geotechnical Investigations Report, which may include descriptions of subsurface conditions, laboratory testing, design recommendations, and construction recommendations.

In addition, private water supplies within 150 feet, if identified, will be protected by implementing the following measures:

- The drilling contractor will review the site conditions prior to the start of work.
- Construction limits will be clearly marked.

- Barriers will be erected between the bore site and nearby sensitive resources prior to drilling as per the Project-specific Erosion and Sediment Control Plan.
- On-site briefings will be conducted for the workers to identify and locate sensitive resources at the site.
- Provide that all field personnel understand their responsibility for timely reporting of IRs.
- Maintaining necessary response equipment on-site and in good working order.

The primary areas of concern for IRs occur at the entrance and exit points where the drilling equipment is generally at their shallowest depths. The likelihood of an IR decreases as the depth of the pipe increases.

To minimize the potential extent of impacts from an IR, HDD operations will be continuously monitored to look for observable IR conditions or lowered pressure readings on the drilling equipment. Early detection is essential to minimizing the area of potential impact.

No oil or gas wells were identified within 0.25 mile of the Project areas based on review of Virginia and North Carolina databases (VDMME, 2018 and NCGS, 2016).

4.0 TRAINING

Prior to the start of construction, the Site Supervisor/Foreman will ensure that the crew members receive training on the following:

- The provisions of this Contingency Plan.
- Inspection procedures for IR prevention and containment equipment materials.
- Contractor/crew obligation to immediately stop the drilling operation upon first evidence of the occurrence of an IR and to immediately report any IRs to the Project's Environmental Inspector and Environmental Coordinator.
- Contractor/crew member responsibilities in the event of an IR.
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate.
- Protocols for communication with agency representatives who might be on site during the clean-up effort.
- Copies of this contingency plan and the contractor's site specific contingency plan will be maintained at the HDD entry and exit sites in a visible and accessible location at all times.

5.0 EQUIPMENT

The Site Supervisor will verify that:

- All equipment and vehicles are inspected and maintained daily to prevent leaks of hazardous materials.
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good working order.

- Equipment required to contain and clean up an IR is available at the bore sites during drilling activities.

*NOTE: It is the drilling contractor's responsibility to provide any IR containment materials that are necessary to respond to the release of drill fluids. The materials listed in this contingency plan are not to be considered inclusive and may require additional equipment depending on site conditions.

6.0 DRILLING PROCEDURES

Drilling pressures will be closely monitored so they do not exceed those needed to penetrate the formation. Pressure levels will be monitored continuously by the operator. Pressure levels will be set at a minimum level to reduce the risk of IRs. During the pilot bore, maintain the drilled annulus. Cutters and reamers will be pulled back into previously drilled sections after each joint of pipe is added.

Entry and exit pits will be enclosed by sediment barriers as specified in the Project-specific Erosion and Sediment Control Plan and straw bales. A spill kit will be on-site and used if an IR occurs. Except as noted below, a vacuum truck will be readily available on-site prior to and during all drilling operations. Per the Project's Spill Prevention, Control, and Countermeasure plan, containment materials (straw, fabric filter fence, sand bags, spill kits, boom and turbidity curtain, etc.) will be staged on-site at a location where they are readily available and easily mobilized for immediate use in the event of an IR. Filter Fence or Filter Sock will be installed between the bore sites and the edge of water sources prior to drilling.

If the site of the IR is not able to be accessed by a vacuum truck, a pump with sufficient power to convey the released drill fluid to a containment area will be used instead. Along with the pump, an adequate amount of hose, several filter bags, straw bales, sand bags, and 18" Fabric Filter Fence (or Compost Filter Sock) will be kept on site to create a containment area on site.

Once the drill rig is in place and drilling begins, the drill operator will stop work immediately whenever the pressure in the drill rig drops or there is a lack of returns in the entrance pit. At this time the Site Supervisor/Foreman will be informed of the potential IR. The Site Supervisor/Foreman and the drill rig operator(s) will work to coordinate the likely location of the IR. The location will be recorded and notes made on the location and measures taken to address the concern. Measures will then be taken according to the type of IR (i.e. Terrestrial or Aquatic) as listed below. The Site Supervisor/Foreman will then begin notifying the appropriate parties as listed in the "Contacts" section of this document.

Water containing mud, silt, drilling fluid, or other materials from equipment washing or other activities, will not be allowed to enter a lake, flowing stream, or any other water source. The bentonite used in the drilling process will be either disposed of at an approved disposal facility or recycled in an approved manner. Other construction materials and wastes will be recycled, or disposed of, as appropriate.

7.0 TERRESTRIAL IR PROCEDURES

- Stop work immediately.
- The bore stem will be pulled back to relieve pressure on the IR.
- Isolate the area with hay bales, sand bags, filter sock, or silt fencing to surround and contain the drilling mud.
- Determine and document the following to the extent reasonably possible:

  - Quantity (gallons) of material released
  - Distance (feet) to the nearest waterbody
  - Name of the waterbody affected, if any
- Immediately contact the appropriate parties as listed in the "Required Notifications" section at the end of this document.
- A mobile vacuum truck (or pump if in an inaccessible area) will be used to pump the drilling mud from the contained area and into either a return pit or (if using a pump) into a filter bag surrounded by 18" Fabric Filter Fence or Compost Filter Sock.
- Once excess drilling mud is removed, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation.
- When there is no visible indication of flow at the IR location, the IR will be considered stabilized.

After the IR is stabilized, document the IR from discovery through post-cleanup conditions with photographs and prepare an IR incident report describing time, place, actions taken to remediate IR, and measures implemented to prevent recurrence. The incident report will be provided to the Project Environmental Coordinator within 24 hours of the occurrence.

8.0 AQUATIC (UNDERWATER) IR PROCEDURES

- Stop work immediately.
- The bore stem will be pulled back to relieve pressure on the IR.
- Isolate the area with hay bales, sand bags (cofferdam), plastic sheeting, filter sock, silt fence or other appropriate containment structure to surround and contain the IR;
- Immediately contact the appropriate parties as listed in the "Required Notifications" section at the end of this document.
- Utilize clean water pumps to establish a pump around to convey upstream flow around the IR;
- Turbidity curtains may be deployed (depending on site conditions at time of IR);
- Determine and document the following to the extent reasonably possible:
  - Quantity (gallons) of the IR
  - Quantity (gallons) that was released to the waterbody
  - Distance (feet) the material traveled down the waterbody
  - Name of the affected waterbody
- A mobile vacuum truck (or pump if in an inaccessible area) will be used to pump the drilling mud from the contained area and into either a return pit or (if using a pump) into a filter bag surrounded by 18" Fabric Filter Fence or Compost Filter Sock.

- Drilling mud will be collected and typically recycled through the drilling mud reclaimer, reused or disposed of at a licensed disposal facility.
- When there is no visible indication of flow at the IR location, the IR will be considered stabilized.

After the IR is stabilized, document the IR from discovery through post-cleanup conditions with photographs and prepare an IR incident report describing time, place, actions taken to remediate IR, and measures implemented to prevent recurrence. The incident report will be provided to the Project Environmental Coordinator within 24 hours of the occurrence.

9.0 POTENTIAL PRIVATE WATER SUPPLY IMPACTS

If an IR impacts a private drinking water supply, the Southgate Project will supply temporary drinking water supply in accordance with the Project's Water Resources Identification and Testing Plan immediately after the problem is discovered. The temporary water would be supplied until testing confirms that the water quality of the water supply returns to baseline. Additional long-term measures will be employed in accordance with the Water Resources Identification and Testing Plan if necessary, including the installation of permanent treatment, connection to a secondary water source, or establishment of a new on-site source.

10.0 ABANDONMENT AND ALTERNATIVE CROSSINGS

If the HDD installation is unsuccessful and the Southgate Project determines abandonment of the HDD is necessary, the Project's proposed alternative is to use the Contingency Plan. The Contingency Plan includes implementation of an open cut dry ditch crossing method. This alternative crossing method would require Federal Energy Regulatory Commission and other environmental permitting approvals.

11.0 REQUIRED NOTIFICATIONS

In the event of an IR, the following parties are to be notified IMMEDIATELY: EQM Midstream Partners, LP Environmental Team:

Mr. Cory Chalmers
Environmental Coordinator 304-848-0061 (office)
304-627-8173 (cell)

Ms. Megan Stahl
Environmental Permitting - Supervisor 412-553-7783 (office)
412-737-2587 (cell)

Ms. Hanna McCoy
Director - Environmental Permitting 724-873-3476 (office)
412-216-9316 (cell)

Include the following information:

- Time the spill was first identified
- Description of where the spill occurred – Project MP/Station
- Latitude and Longitude of spill
- Size of spill and control measures in place

- Name of affected water resource (if known/applicable)
- Photographs of spill area and corrective measures – when available. (Do not wait to notify the Project until pictures are available. Photo documentation should begin immediately upon detection and continued throughout the duration of the cleanup).

The Southgate Project Environmental Department will contact State and/or Federal environmental agencies (if applicable) for notification requirements in the event of an IR.

12.0 REFERENCES

This Contingency Plan was adapted from the following websites:

http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/cfodocs/greencore.Par.0871.File.dat/P ODappH.pdf

https://www.csx.com/index.cfm/library/files/customers/property-real-estate/permitting/sample-fraction-mitigation-plan/

http://www.energy.ca.gov/sitingcases/smud/documents/applicants_files/Data_Response_Set-1Q/APPENDIX_C_FRAC_OUT_PLAN3.PDF

Other References include:

Virginia Department of Environmental Quality (VDEQ). 2018. Division of Mineral Mining. Available online at: https://dmme.virginia.gov/DMM/uraniumpermit.shtml Accessed July 19, 2018.

North Carolina Geological Survey (NCGS). 2016. NC Oil and Gas Wells. Available online at: https://files.nc.gov/ncdeq/Energy%20Mineral%20and%20Land%20Resources/Energy/documents/Energy/NC_Oil_%26_Gas_Wells_terrane_plot.jpg Accessed July 16, 2018.

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-I

MVP Southgate Project Wetland Delineation Reports

(Provided Under Separate Cover)

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

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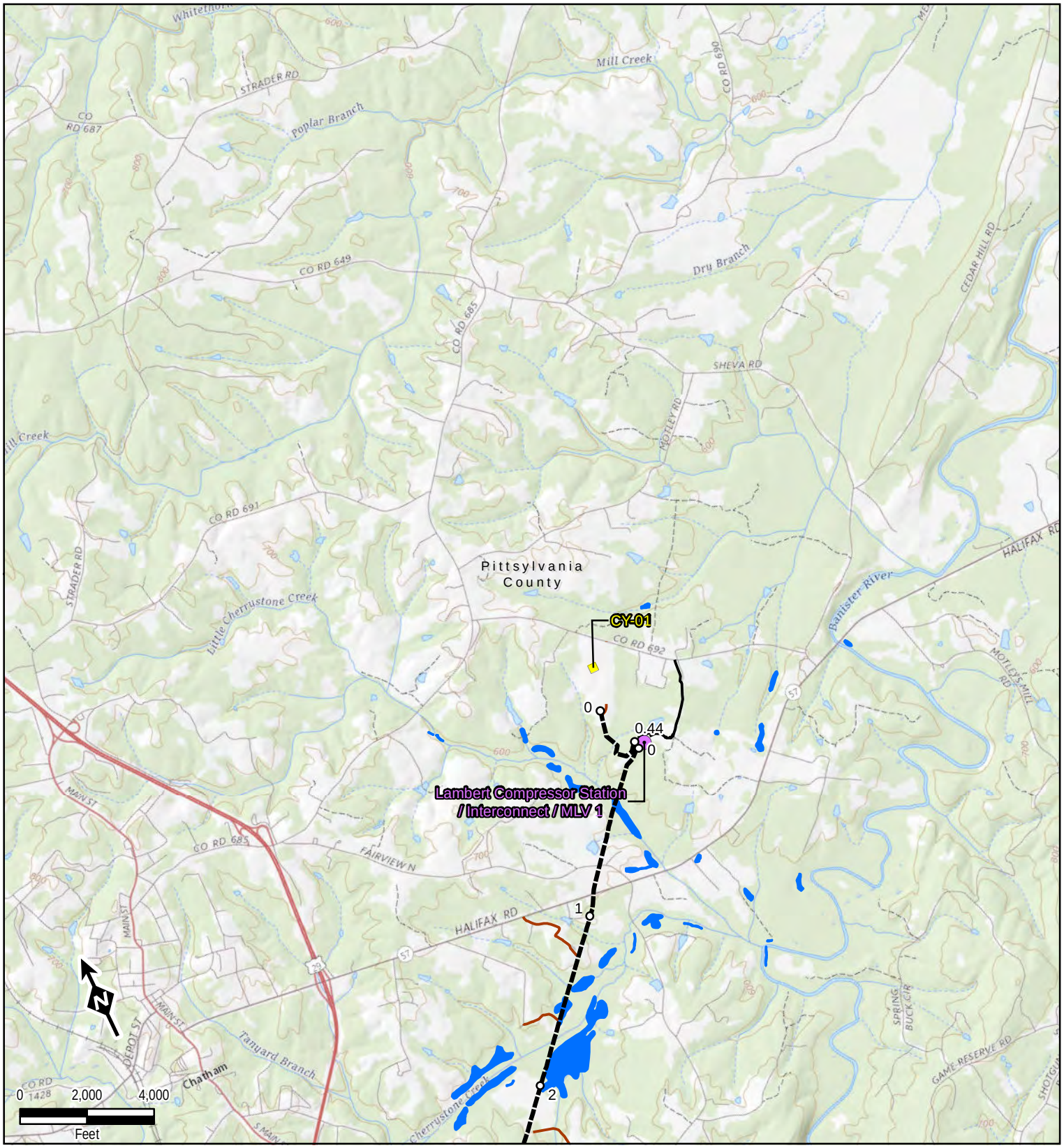
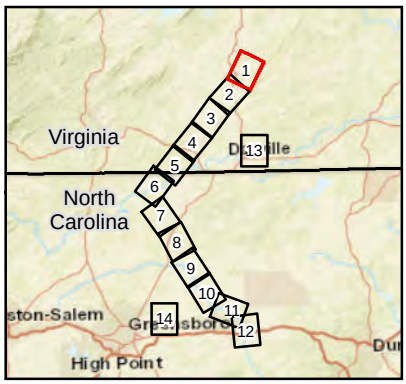
National Wetlands Inventory Mapping along the MVP Southgate Project





Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley Pipeline, LLC

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NWI Wetlands

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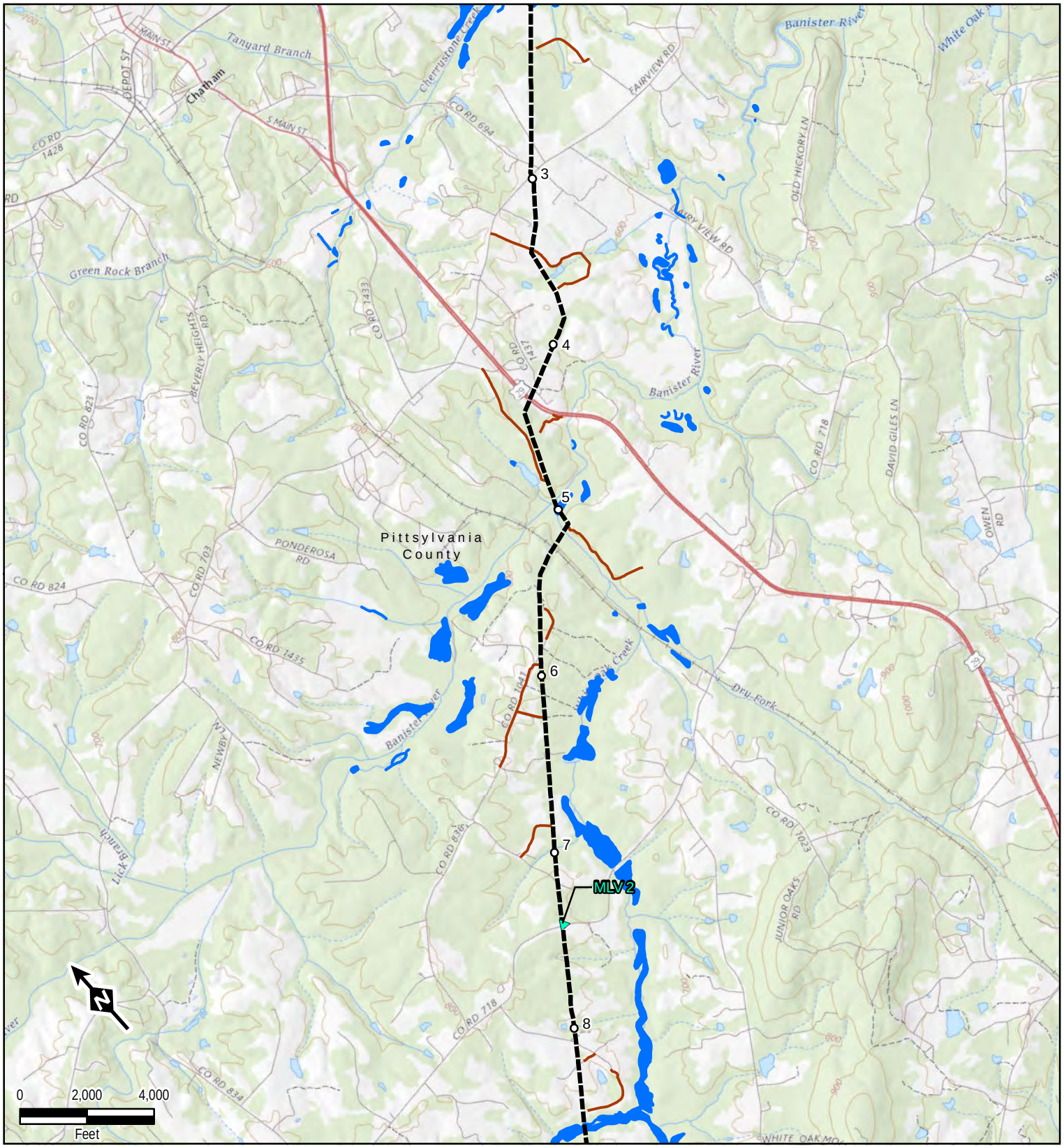

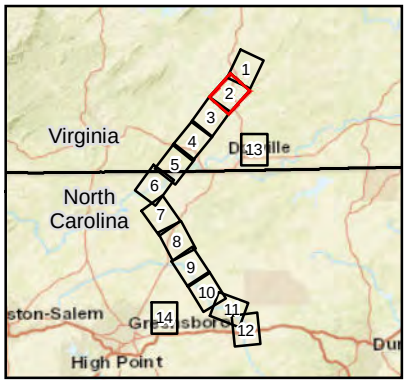

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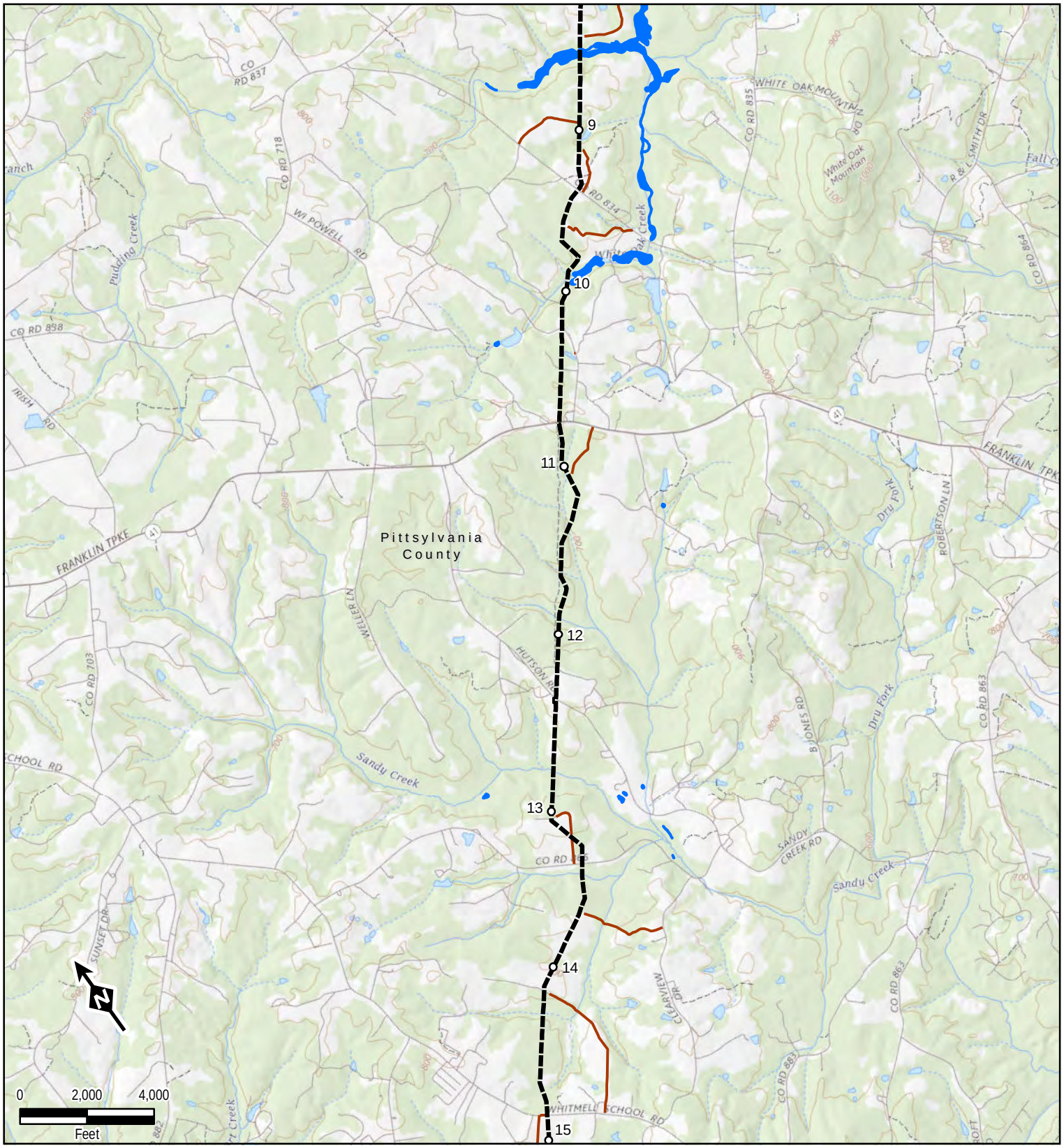

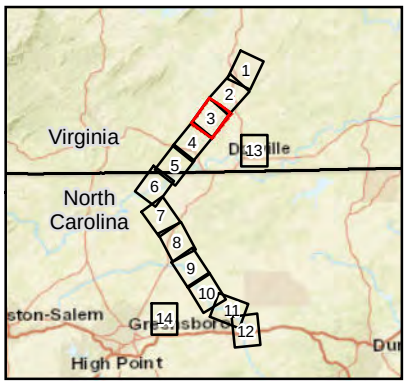

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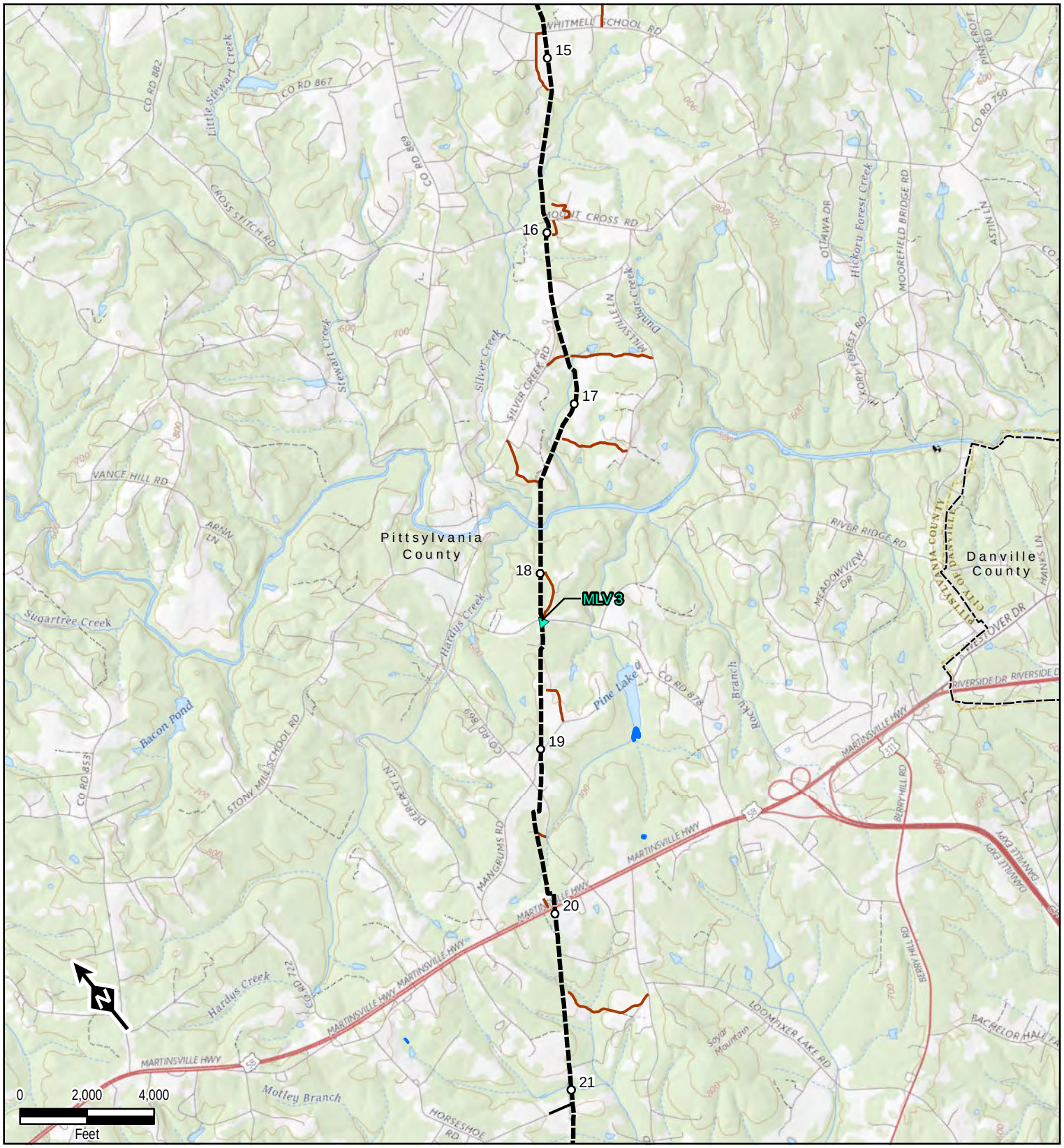

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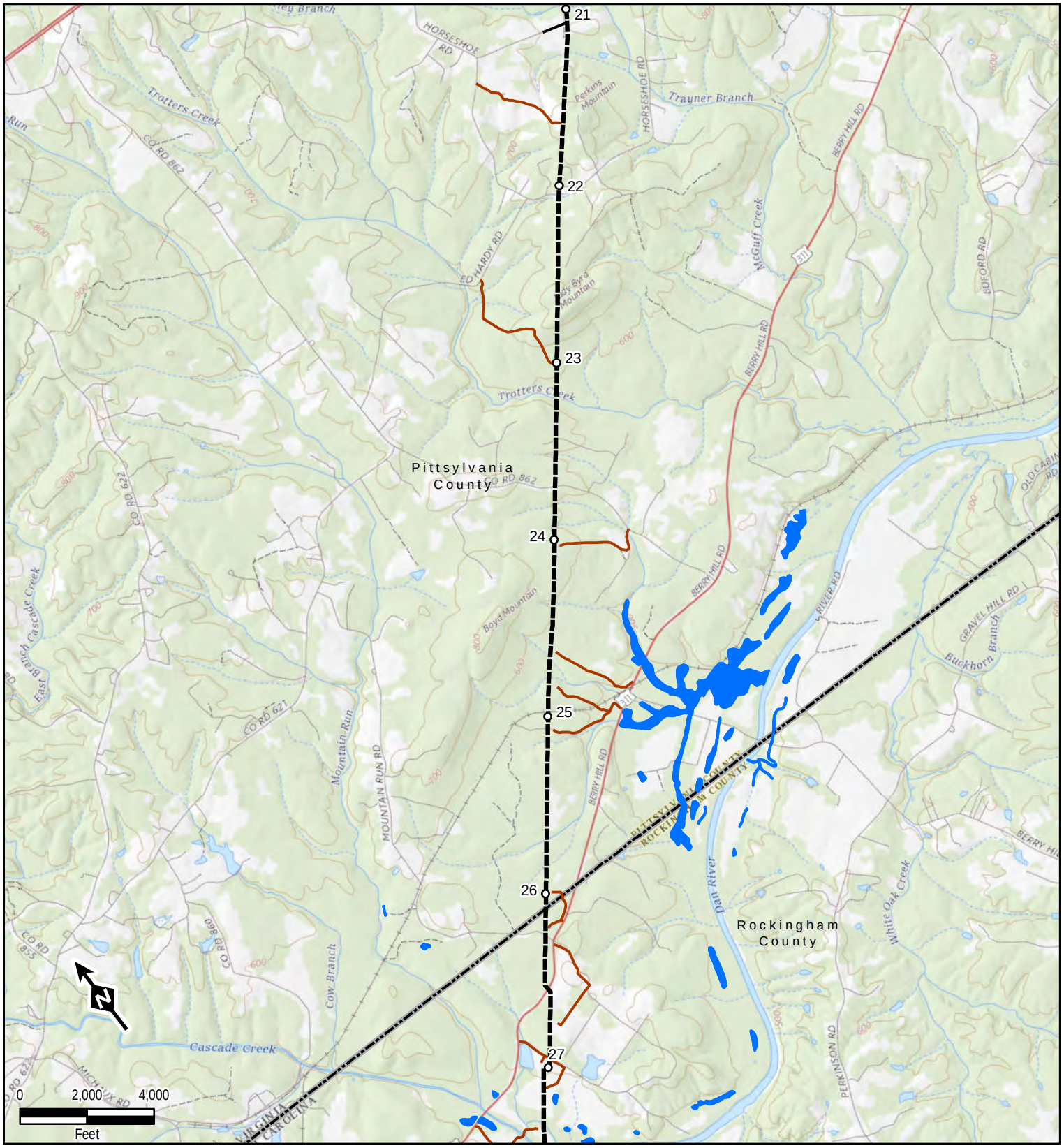

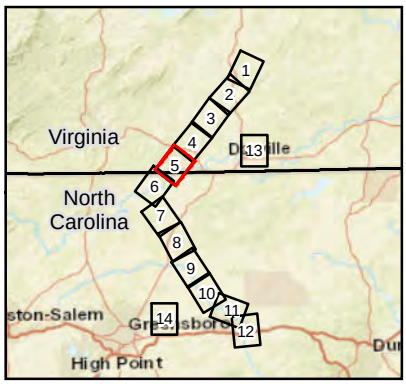

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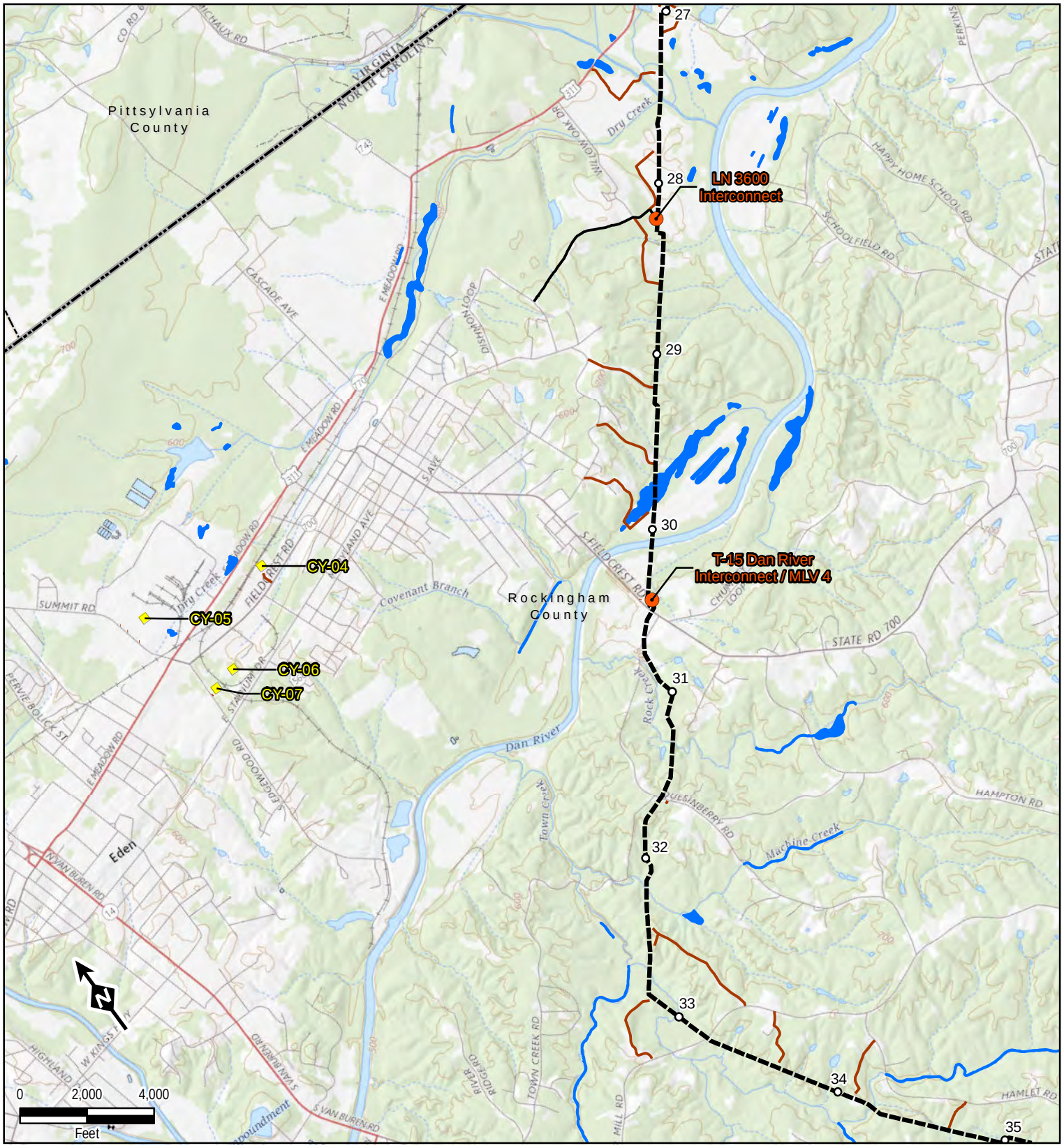

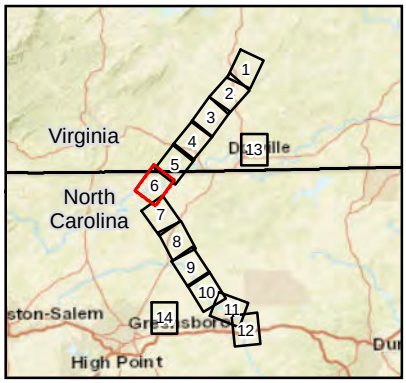

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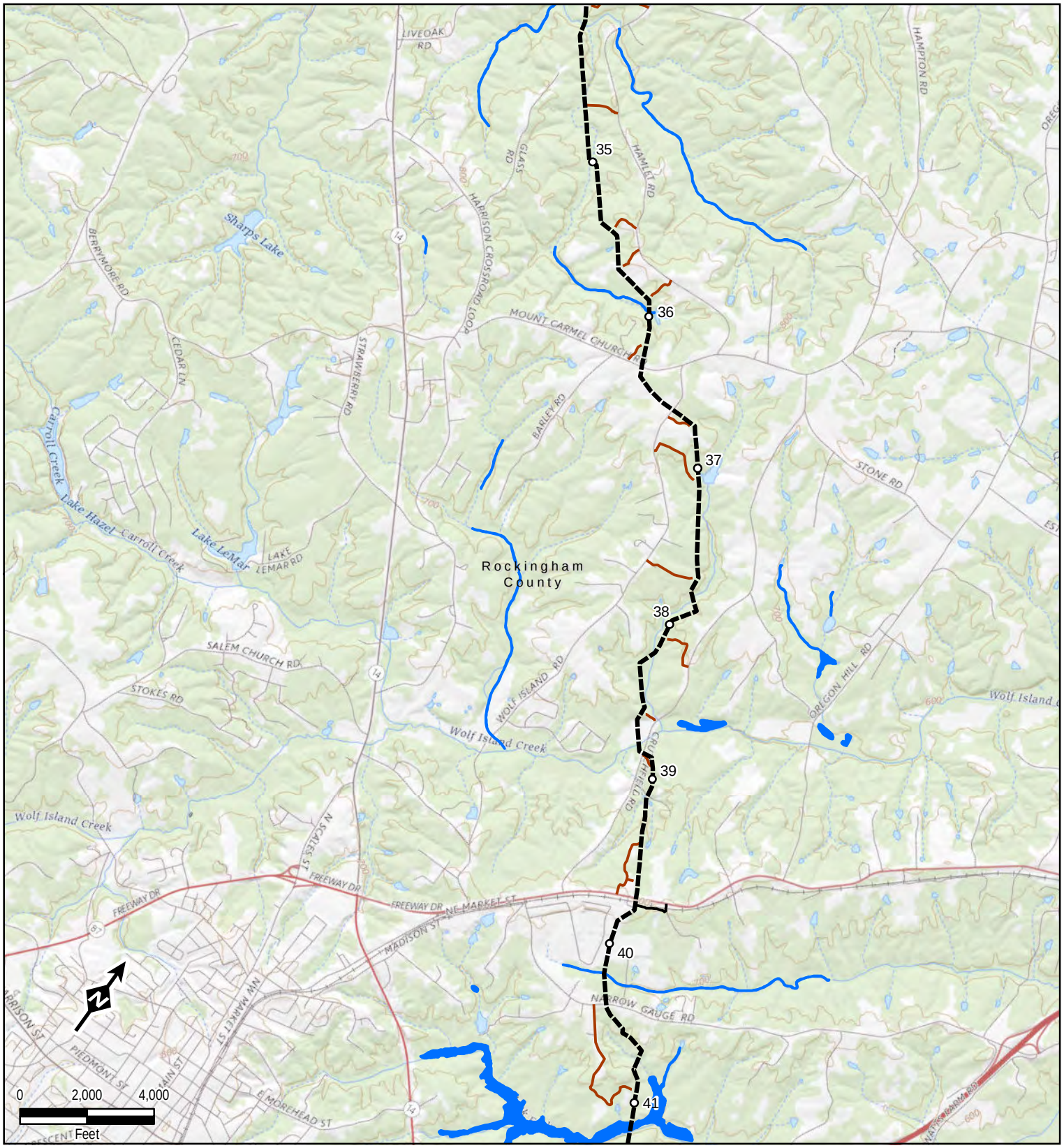

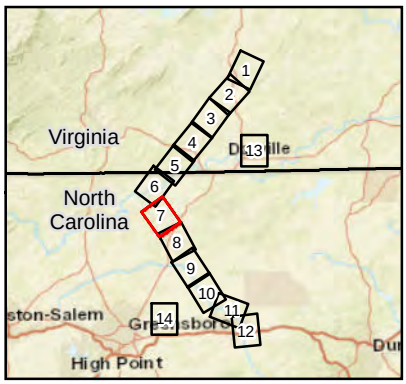

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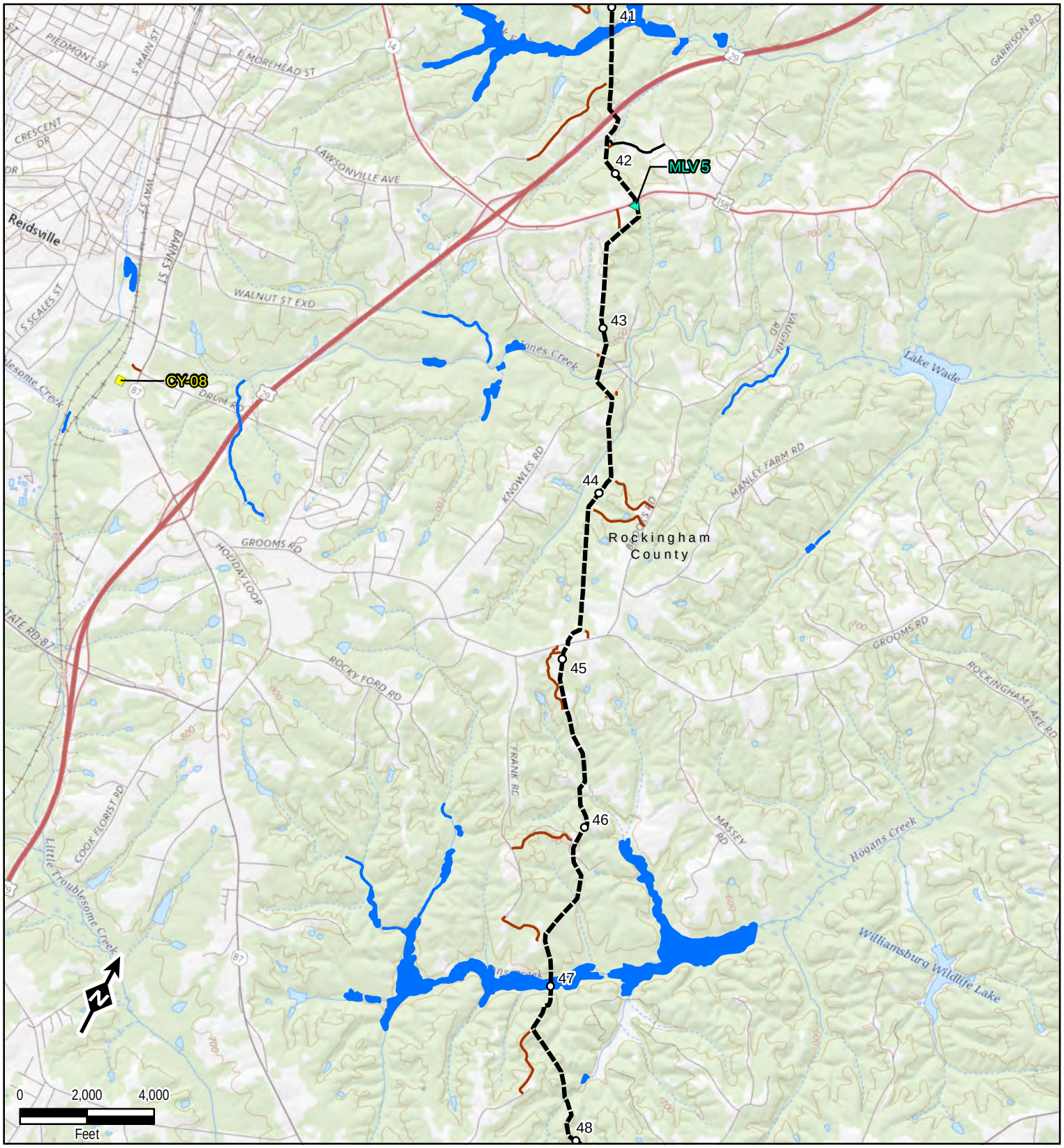

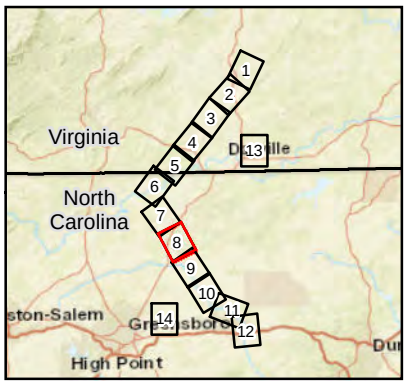

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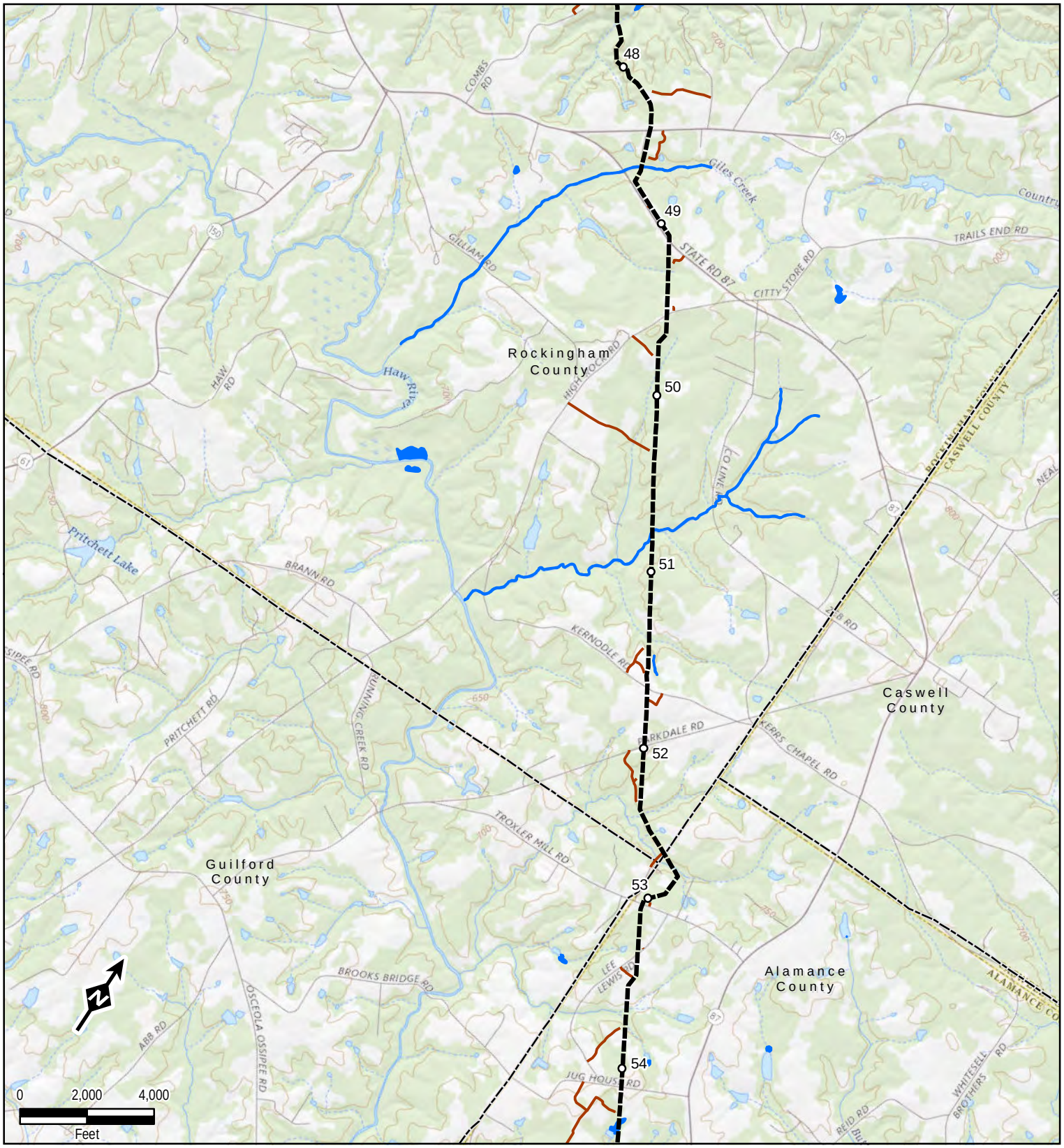
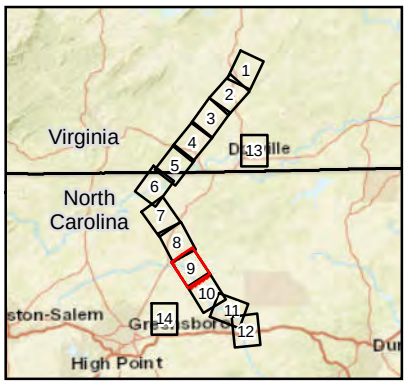




Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley Pipeline, LLC

Appendix 2-J

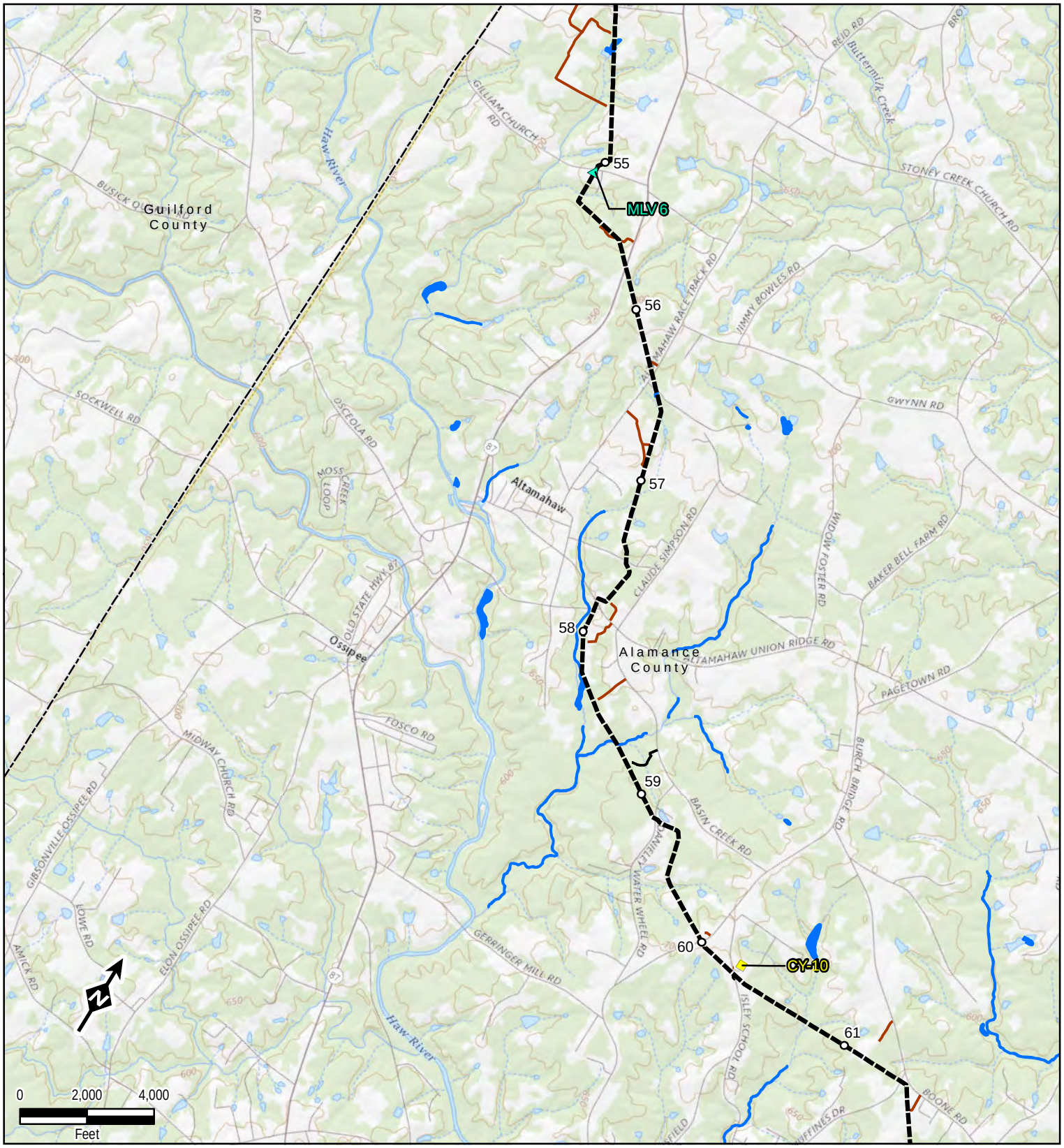
NWI Wetlands

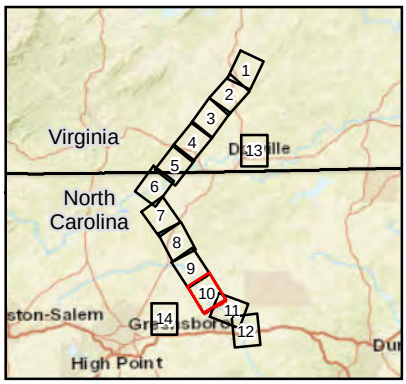
Sheet 9 of 14

TRC

600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI_10122018.mxd





Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley Pipeline, LLC

Appendix 2-J

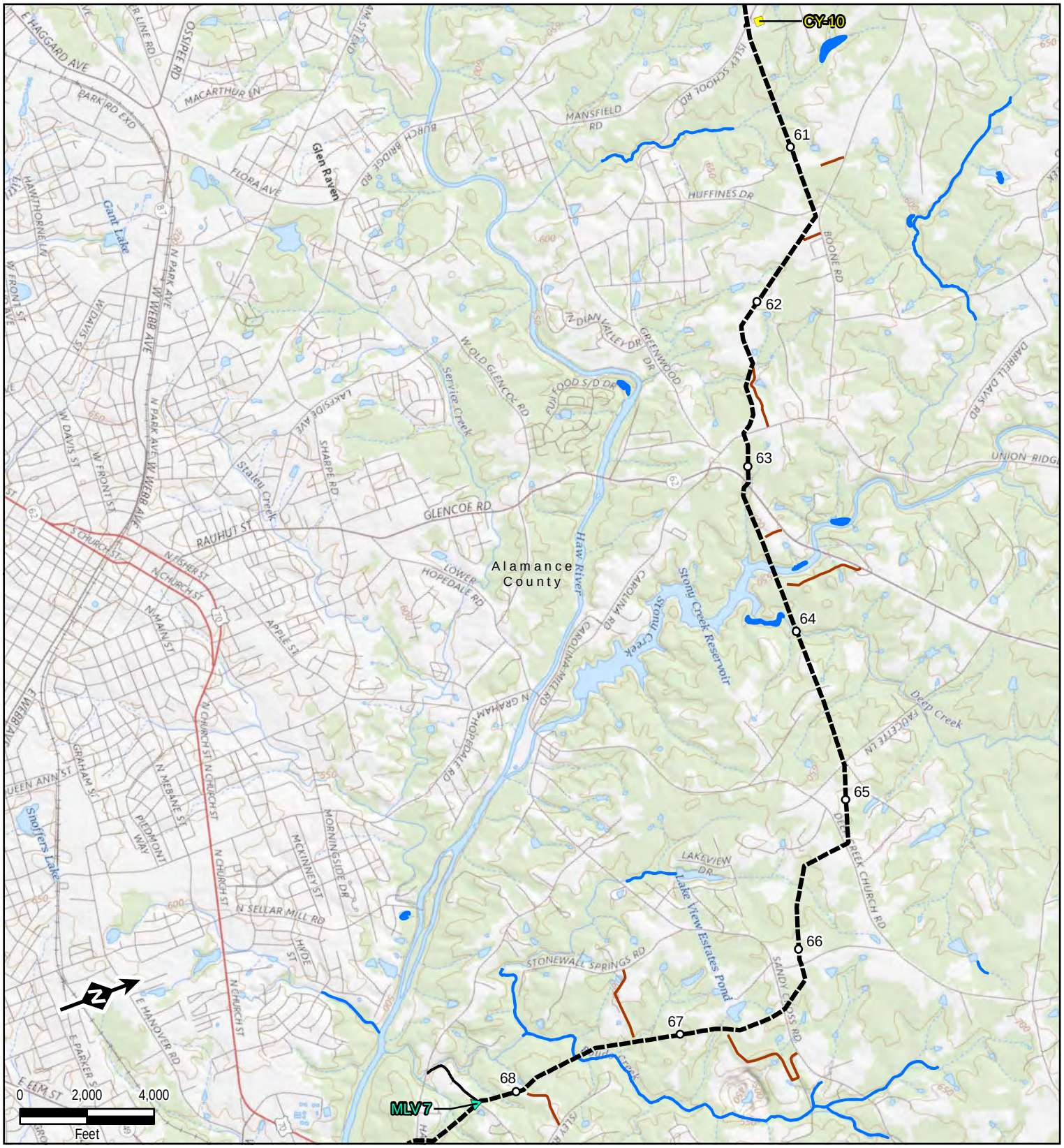
NWI Wetlands

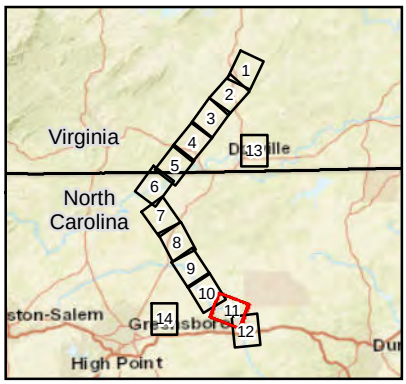
Sheet 10 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI_10122018.mxd





Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley PIPELINE LLC

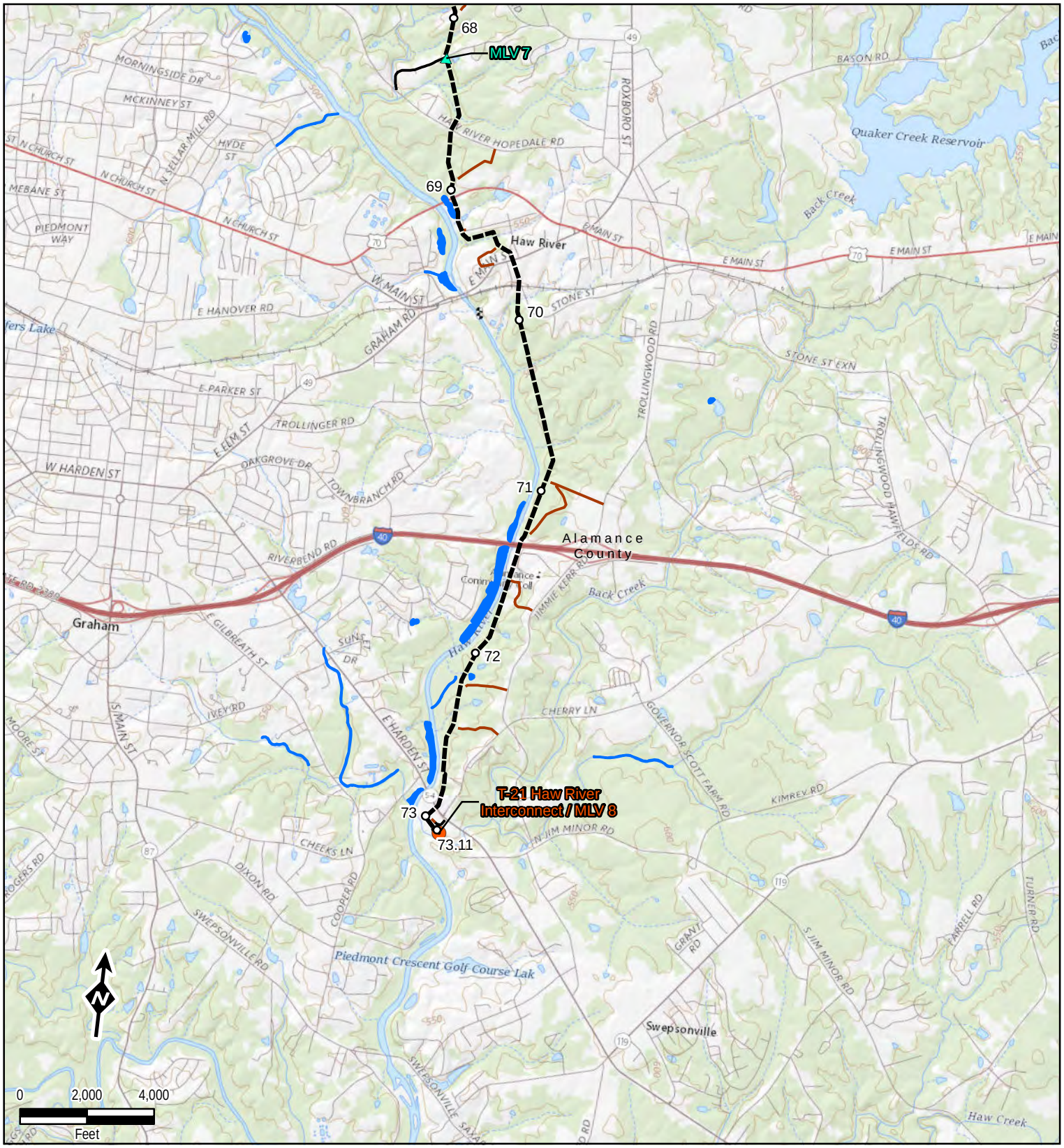
Appendix 2-J

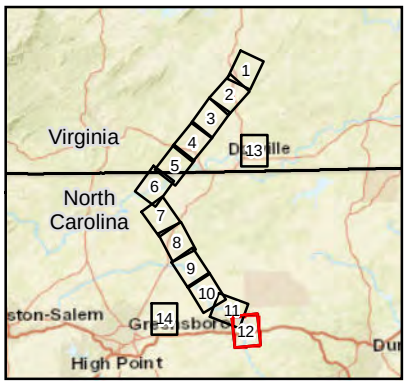
NWI Wetlands

Sheet 11 of 14

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI_10122018.mxd





Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley PIPELINE LLC

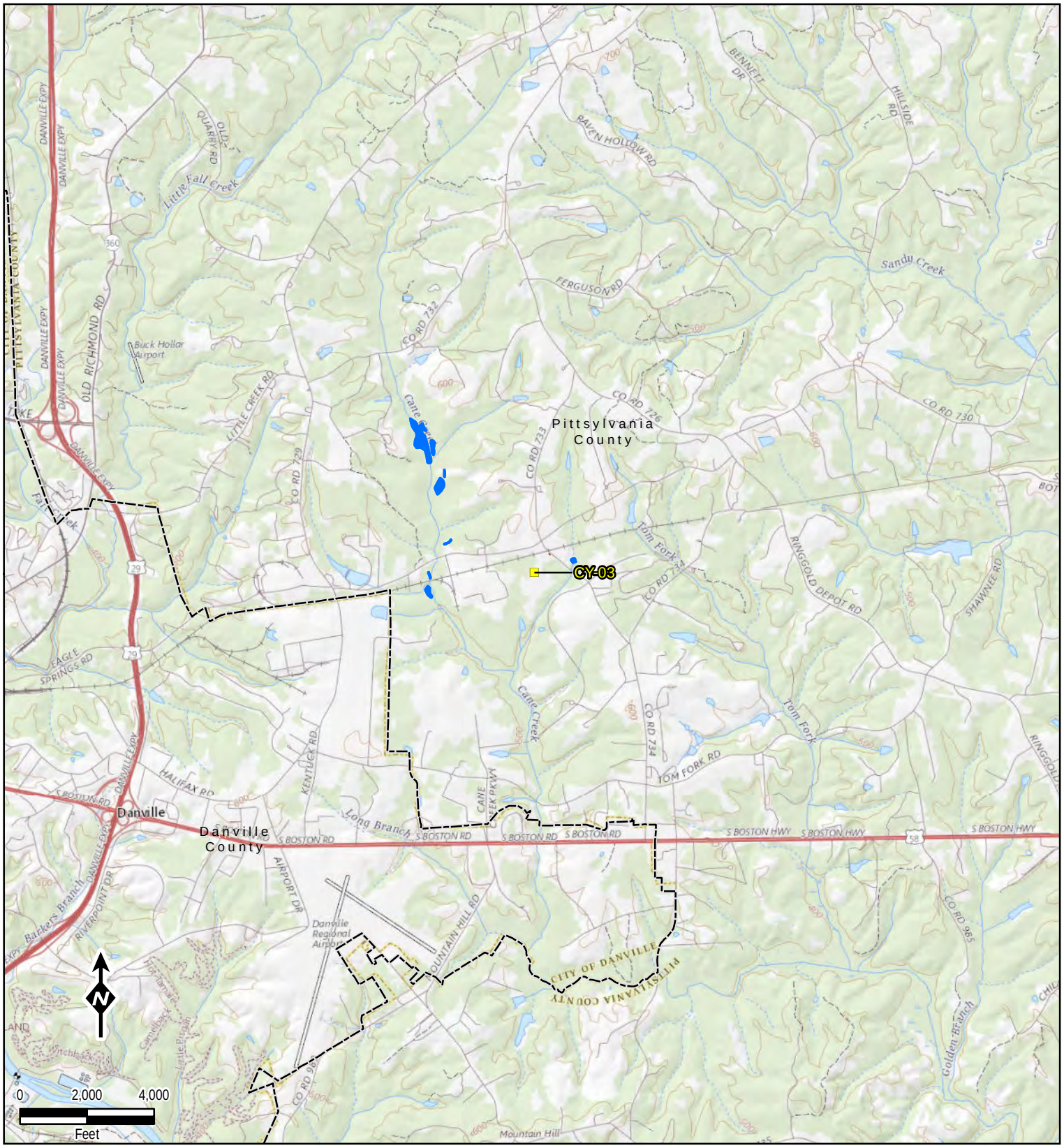
Appendix 2-J

NWI Wetlands

Sheet 12 of 14

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI_10122018.mxd



Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley Pipeline, LLC

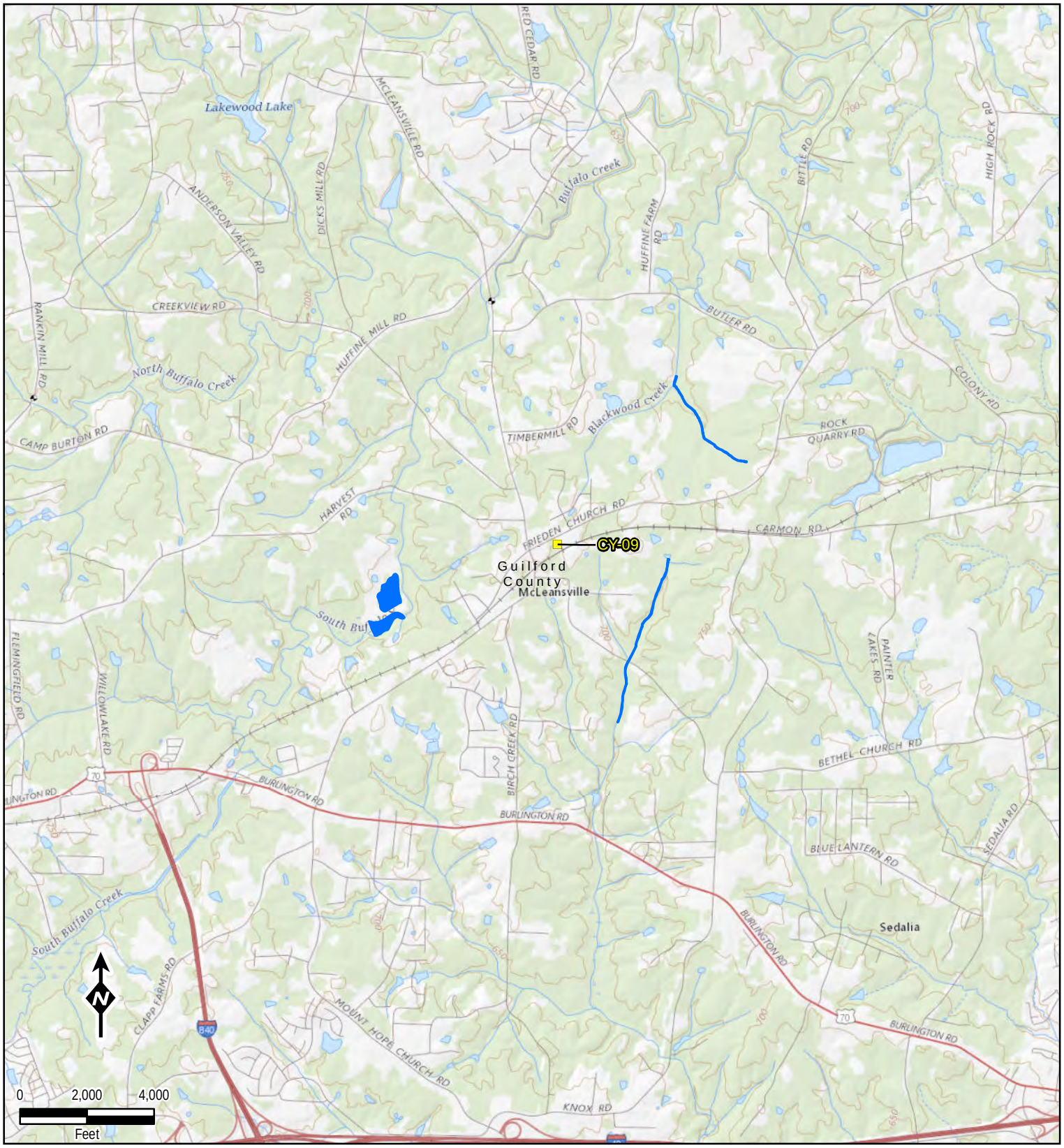
Appendix 2-J

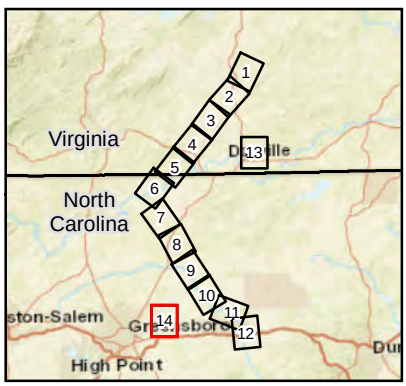
NWI Wetlands

Sheet 13 of 14

TRC
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI_10122018.mxd





Legend

- Mileposts
- Compressor Station
- Contractor Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands (1 Mile Proximity)
- State Boundary
- County Boundary

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

Mountain Valley PIPELINE LLC

Appendix 2-J

NWI Wetlands

Sheet 14 of 14

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI_10122018.mxd

MVP Southgate Project

Docket No. CP19-XX-000

Resource Report 2

Appendix 2-K

Waterbodies (and Associated Wetlands) within 15 Feet of the Construction Workspace along the MVP Southgate Project Mapping

AW-F18-18
AS-F18-17
W-F18-18
MP 9.8
S-F18-17
S-F18-15
MP 9.9
MP 10
W-F18-16

Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

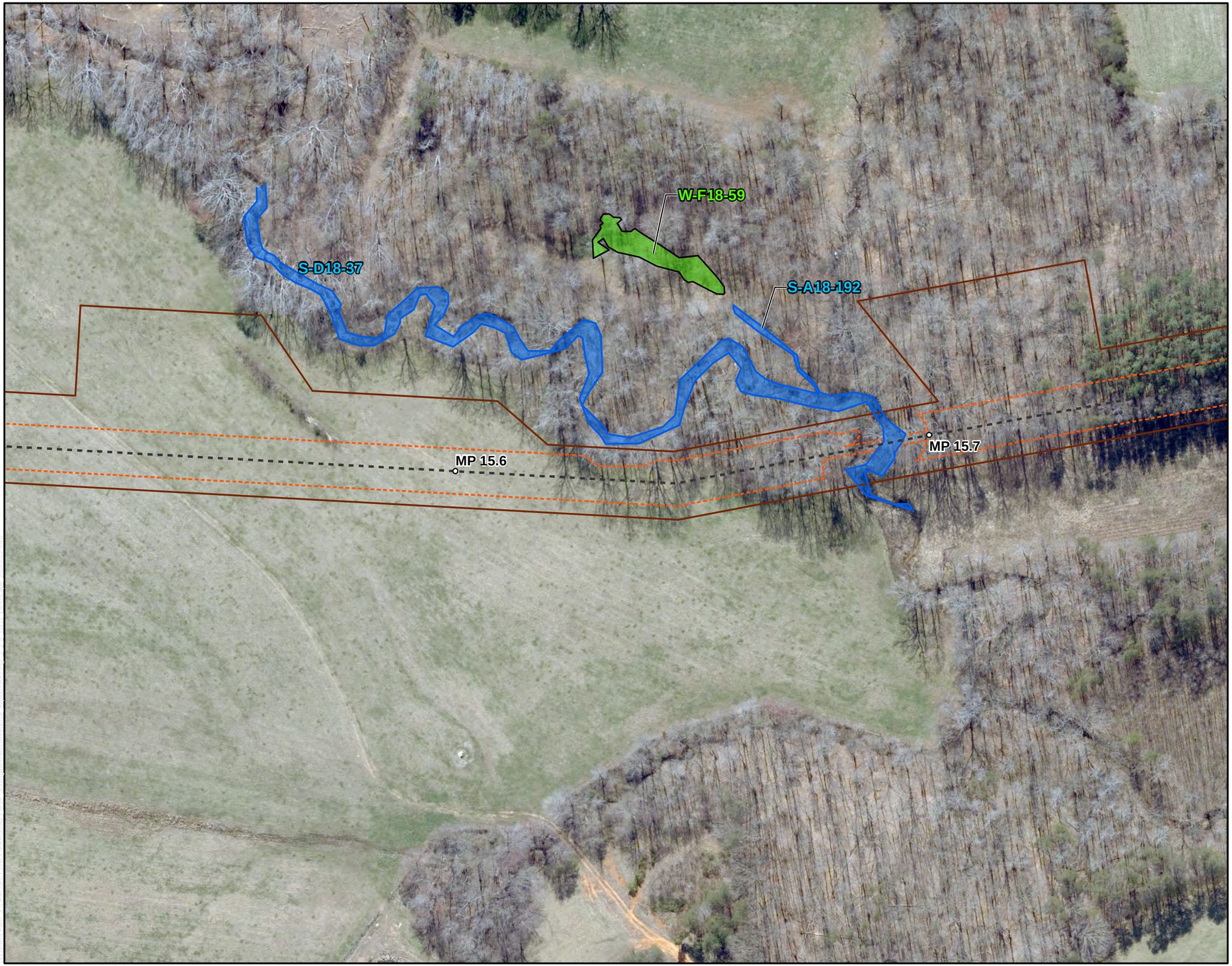
Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018

Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Pittsylvania County, VA
Sheet 1 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018



Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

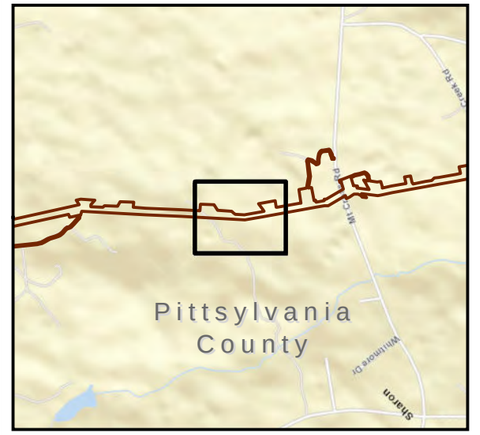
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

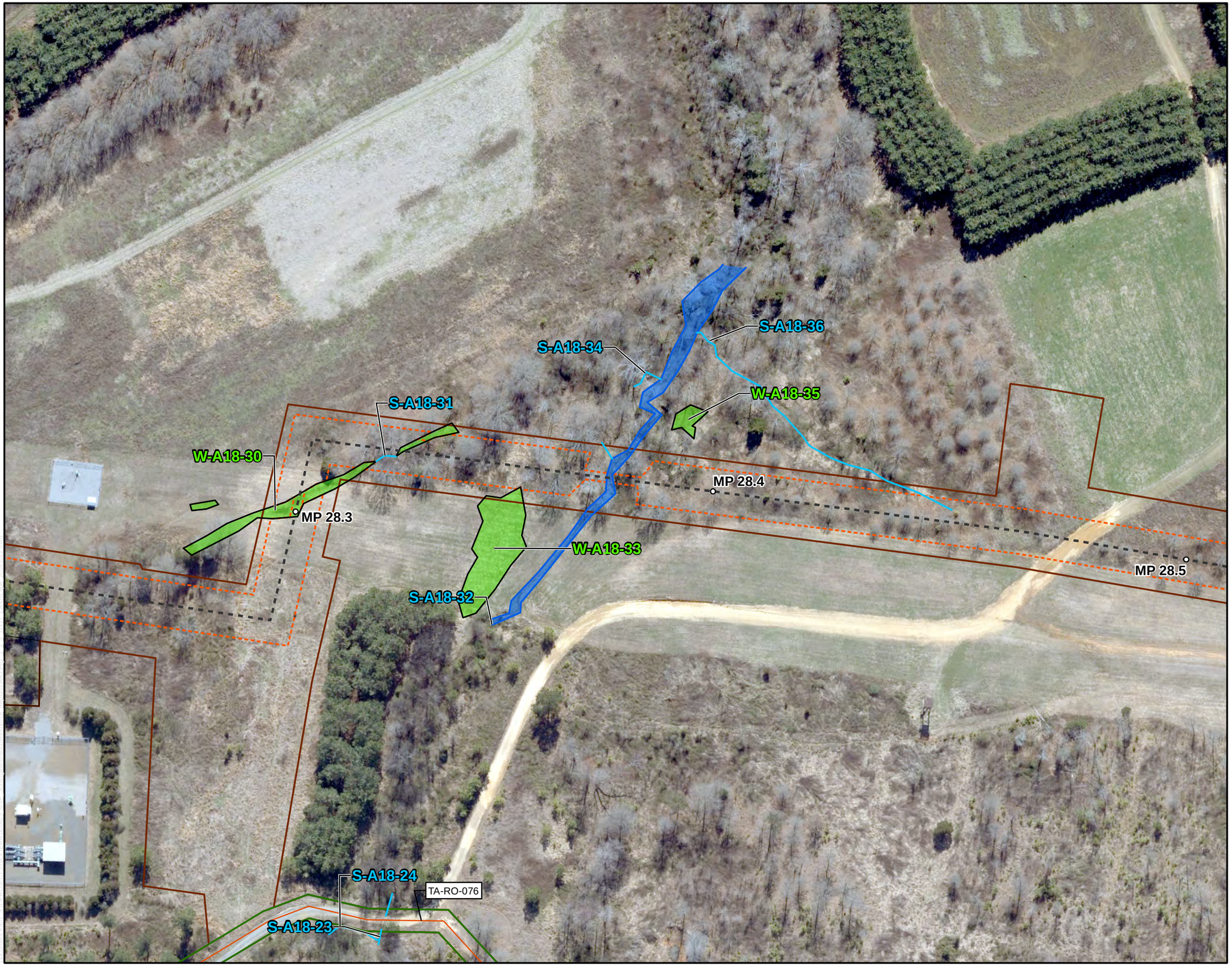
Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Pittsylvania County, VA
Sheet 2 of 18

TRC
600 Willowbrook Ln
West Chester, PA 19382
Date: October 2018



Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

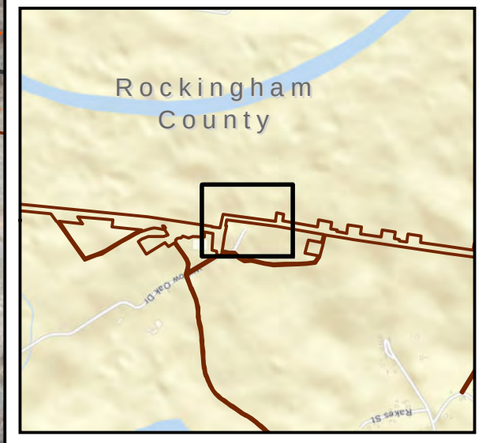
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 3 of 18

TRC
600 Willowbrook Ln
West Chester, PA 19382
Date: October 2018

Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

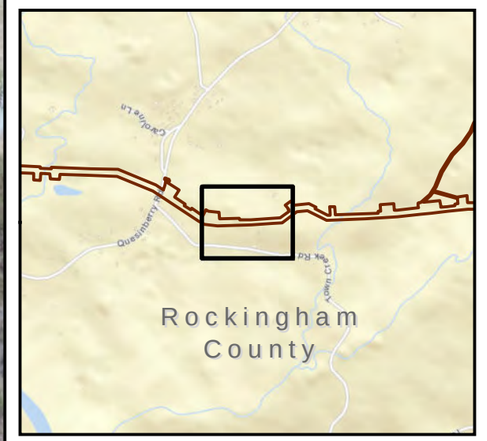
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200 Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 4 of 18

TRC
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

TA-RO-086
S-A18-150
MP 32.5
AS-A18-150
W-A18-152
MP 32.6
S-A18-153
S-A18-151
AS-A18-151
MP 32.7

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

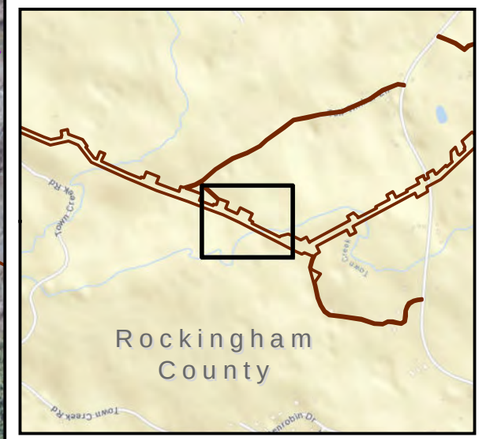
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 5 of 18

TRC
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

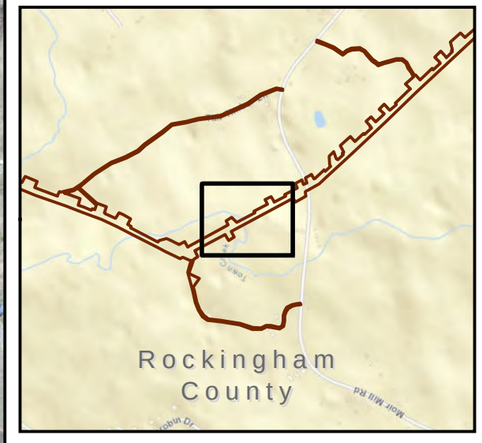
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 6 of 18

TRC
600 Willowbrook Ln
West Chester, PA 19382
Date: October 2018

WB-A18-96

W-A18-95

MP 37

MP 36.9

S-A18-94

TA-RO-100

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

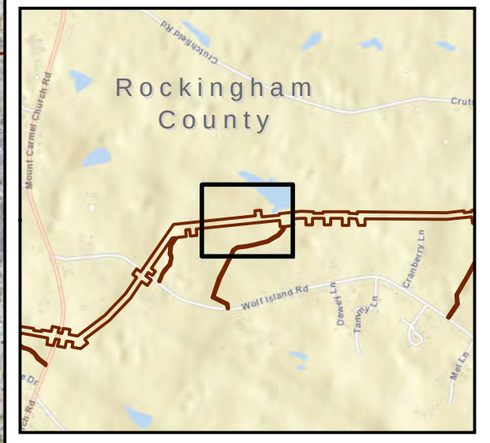
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley PIPELINE, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 7 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

W-A18-5
S-A18-4
MP 38.4
MP 38.5
W-A18-7
TA-RO-104
W-A18-6
MP 38.6
A18-9

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

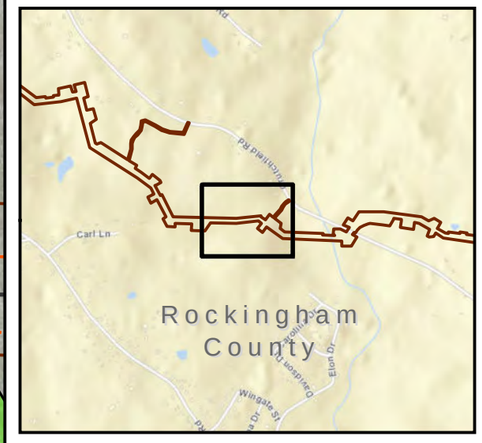
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 8 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

W-A18-214
S-A18-212
S-A18-213
S-B18-71
MP 45.6
MP 45.7
S-A18-211
AS-B18-71
AS-A18-211
S-B18-68
MP 45.8
S-B18-69
AS-B18-69
AS-B18-68

Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

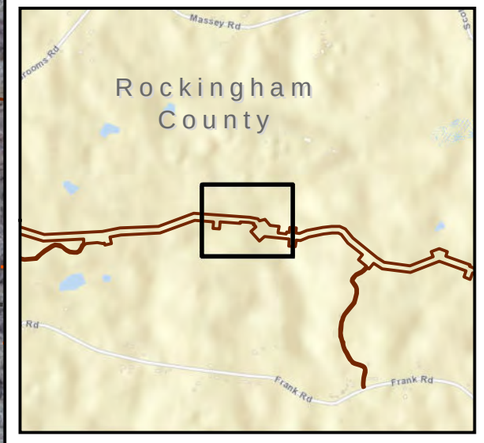
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 9 of 18

TRC
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

AW-A18-184
W-A18-184
S-A18-182
AS-A18-182
MP 49.9
MP 49.8
S-A18-185
S-A18-183
AS-A18-183
TA-RO-138

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

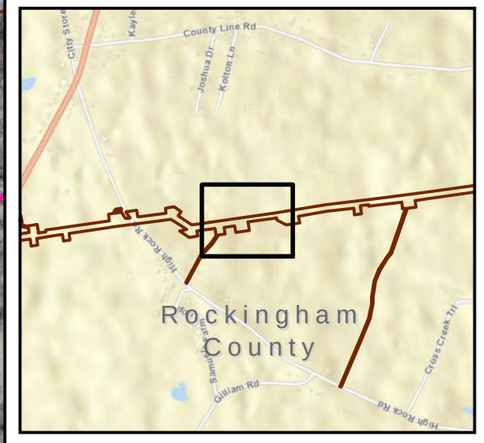
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Rockingham County, NC
Sheet 10 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

W-A18-85
AS-A18-84
AW-A18-85
S-A18-84
AS-A18-87
MP 53.8
MP 53.7
MP 53.6
S-A18-86
S-A18-87
TA-AL-153

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

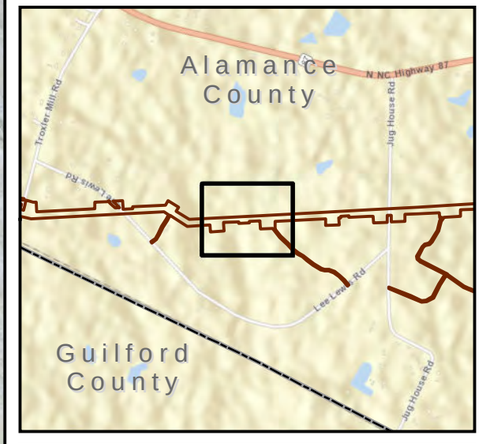
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley PIPELINE, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
Sheet 11 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

MP 55.2
MP 55.3
MP 55.4
S-C18-68
S-B18-59
W-C18-69
AS-B18-59
W-B18-60

Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

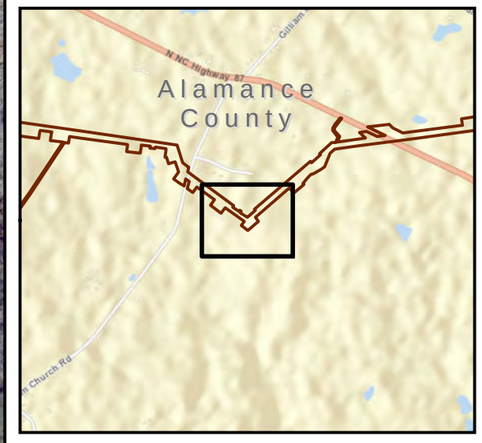
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
Sheet 12 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

S-A18-129
S-A18-123
W-A18-119
WB-A18-128
MP 56.6
S-A18-125
S-A18-126
S-A18-124
W-A18-127
MP 56.7
MP 56.8
TA-AL-159B
TA-AL-159A

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
- County Boundary

Streams:

- Approximated Stream Top Of Bank
- Stream Centerline
- Delineated Stream Top Of Bank
- Delineated Stream Centerline
- Surface Water
- Delineated Surface Water

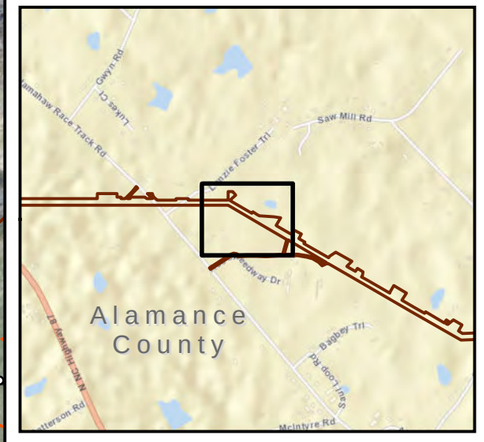
Wetlands:

- Wetland Boundary
- Aproximated Wetland
- Delineated Wetland

0 50 100 200
Feet

1 inch = 100 Feet

Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
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TRC
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

S-A18-129
W-A18-127
WB-A18-128
S-A18-125
MP 56.6
S-A18-126
S-A18-124
W-A18-119
MP 56.7
MP 56.8
W-A18-130
TA-AL-159B
TA-AL-159A

Legend

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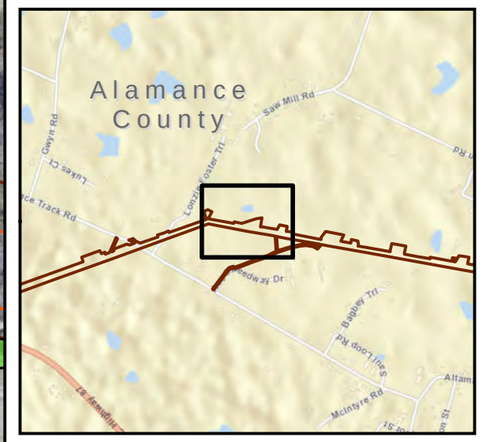
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley PIPELINE LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
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TRC
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

AS-A18-70
WB-B18-141
S-A18-70
MP 62.4
S-A18-72
TA-AL-169
W-A18-75
W-A18-73
MP 62.5
S-A18-71
W-A18-74

Legend

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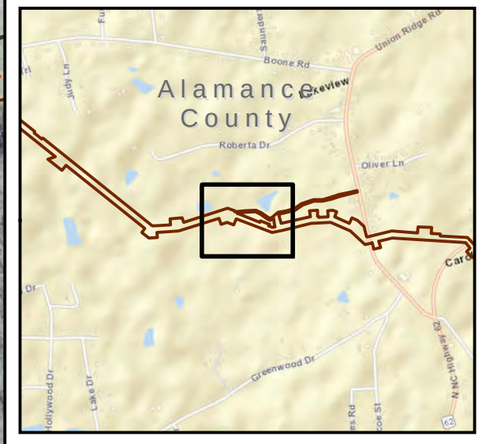
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley PIPELINE LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
Sheet 15 of 18

TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

S-B18-26
S-B18-29
W-B18-28
S-B18-22
MP 63.1
2898
S-B18-14
S-B18-12
MP 63.3
MP 63.2
S-B18-113
AW-B18-115
W-B18-115

Legend

- Mileposts
- H-650 Pipeline
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- Construction Workspace
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Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018

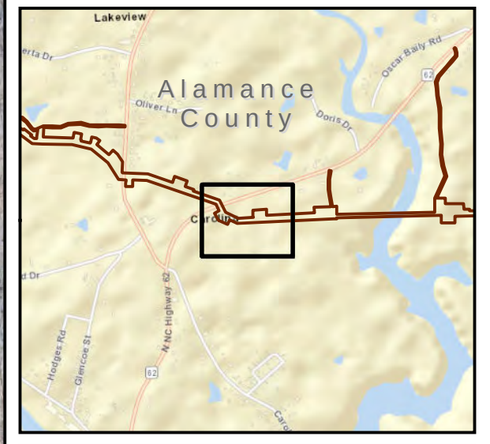

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Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
Sheet 16 of 18

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

Document Path: S:\PROJECTS\NEXTERA\90423 MVP_Southgate\6-MXD\Resource Reports\RP02\Fig_2.3.8_11x17_Landscape_20181012.mxd

Legend

- Mileposts
- Temporary Access Road
- H-650 Pipeline
- Operational Workspace
- Temporary Access Road
- Construction Workspace
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Data Sources: EQT, ESRI, TRC, USGS
Basemap: ESRI, Project Imagery 4/2018

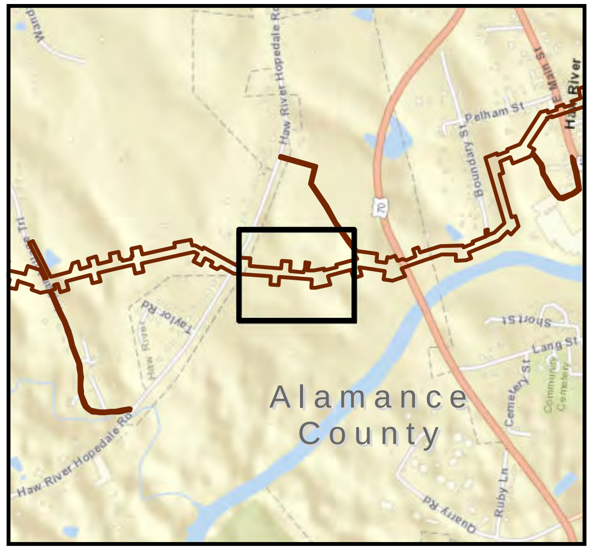

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Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
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TRC

600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018

S-B18-134
S-B18-135
S-B18-133
MP 70.2
MP 70.3
MP 70.4
S-C18-82

Legend

- Mileposts
- H-650 Pipeline
- Operational Workspace
- Construction Workspace
- County Boundary

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- Delineated Surface Water

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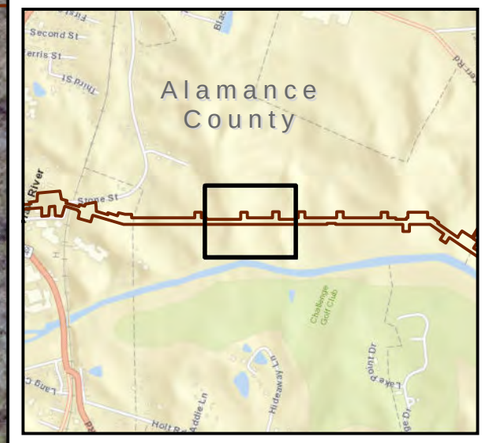
Basemap: ESRI, Project Imagery 4/2018



Mountain Valley Pipeline, LLC

Figure 2.3-8
Construction Workspace Parallels Waterbody (or Wetland) Within 15 Feet
Alamance County, NC
Sheet 18 of 18

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

Date: October 2018