



MVP Southgate Project

Docket No. CP19-14-000

Attachment Resource Report 2

Appendix 2-I

North Carolina Wetland and Waters Delineation Report – Addendum #1

March 2019



MVP Southgate Project

Docket No. CP19-14-000

North Carolina Wetland and Waters Delineation Report – Addendum #1

March 2019

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LIST OF ACRONYMS AND ABBREVIATIONS

1987 Manual	Corps of Engineers Wetlands Delineation Manual
MVP	Mountain Valley Pipeline
NCDWR	North Carolina Department of Water Resources
PEM	Palustrine Emergent
PFO	Palustrine Forested
Project	MVP Southgate Project
PSS	Palustrine Scrub-Shrub
PUB	Palustrine Unconsolidated Bottom
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (“Mountain Valley”) has prepared this addendum to the November 2018 Wetland Delineation Report to summarize the January 2019 stage of wetland delineation surveys for the MVP Southgate Project (“Southgate Project” or “Project”).

Wetland and waterbody delineations are being conducted for the Southgate Project area to support state and federal permitting. This addendum summarizes the additional aquatic resources surveyed in January 2019 in North Carolina. All desktop review, data collection and field methods, along with regulatory guidance, plant community classifications and waterbody classifications followed the methods specifically described in the November 2018 Wetland Delineation Report.

A preliminary jurisdictional determination (“PJD”) is on-going with the U.S. Army Corps of Engineers (“USACE”) Wilmington District. A separate wetlands and waterways delineation report was prepared for the Virginia portion of the Project, which is in the USACE – Norfolk District. To date, additional surveys have not occurred along the Virginia portion of the Project.

1.1 Additional Survey Areas

The January 2019 survey areas within North Carolina consisted of 192 additional parcels within a 300 to 400-foot-wide corridor along the 46.4 miles of proposed pipeline route. It also included additional survey of temporary workspaces, above ground facilities, construction yards, staging areas, and access roads. A 50-foot wide corridor centered over the proposed access road was surveyed for all access roads. To date, approximately 90% of the survey area in North Carolina has been completed.

2.0 METHODS

Wetland and waterbody delineation assessments were conducted in January of 2019 following the field methods described in the November 2018 Wetland Delineation Report. Like the initial round of surveying, all wetlands, streams, and waterbodies (lakes or ponds) were named according to resource type (wetland, stream, or waterbody), team identifier (team A, B, C, etc.), year (19 for 2019), and a unique sequential resource number (e.g., W-A19-50 is the fiftieth wetland delineated by Team A completed in 2019). Each individual resource number is used to identify a particular resource. Each individual resource was assigned a number, for example, Team A’s first resource (wetland, stream or waterbody) was identified as W-A19-1 (wetland), or S-A19-1 (stream), or WB-A19-1 (waterbody). Team A’s second resource (wetland, stream or waterbody) was identified as W-A19-2 (wetland), or S-A19-2 (stream), or WB-A19-2 (waterbody). Like the 2018 round of surveys, the naming scheme was strictly sequential based on resources delineated (not based on resource area/complex).

Except where landowners or land agents have asked for flags to not be placed, pink flagging with the words “wetland delineation” were used by the field survey teams to mark the boundaries of all wetlands, and blue-and-white striped flagging were used to mark OHWM boundaries in streams. The field teams wrote the wetland identifier (as outlined above) and the individual flag number (e.g., W-A19-1-1) on the flags. Field teams also wrote “start open”, “end open”, “start closed”, or “end closed”, as appropriate.

Like the initial 2018 surveys, the wetland delineation was performed by qualified wetland scientists using the routine on-site determination methods described in the Corps of Engineers Wetlands Delineation Manual (USACE, Environmental Laboratory 1987), hereafter referred to as the “1987 Manual,” and is consistent with the methods, guidelines, and indicators present in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (“Regional

Supplement”) (USACE 2012). The on-site determination and delineation of WOTUS was conducted for the portions of the Southgate Project survey area where there was available survey permission in January of 2019, which is included in this report. Surveys are scheduled to continue in April of 2019 in an effort to collect data for all of the Project’s workspace.

3.0 RESULTS

3.1 Wetlands

Additional wetlands that were located during the January 2019 Stage II Surveys are identified in Appendix A-1, by resource identification (“ID”), milepost, and vegetative wetland community type. Maps depicting the limits of the delineated wetlands are included in Appendix B, and USACE wetland data forms and photographs are provided in Appendix C. It should be noted that some of these wetlands are extensions of wetlands delineated in 2018, where additional survey corridor was added and/or was granted access. Extended wetlands are shown on the figures in Appendix B.

Like in 2018, the majority of wetlands within the survey area are associated with stream and river floodplains. The plant community type(s) within each wetland fell within the Palustrine emergent (“PEM”), Palustrine forested (“PFO”), and Palustrine scrub-shrub (“PSS”) Cowardin classification (Cowardin et. al., 1979). The most common hydric soil indicators identified during the field delineations included depleted matrix (F3), redox dark surface (F6), and redox depressions (F8) (USACE 2012). Typical primary hydrologic indicators observed in the wetlands include the presence of surface water (2 to 6 inches deep), soil saturation, high water table, and water-stained leaves. Commonly observed secondary indicators include drainage patterns, geomorphic position, and microtopographic relief.

3.2 Waterbodies

Additional waterbodies that were located during the January 2019 Stage II Surveys are identified in Appendix A-2, which includes the resource ID #, milepost, stream name, flow type, and watershed. None of the delineated resources are classified as Section 10 waterways by the USACE-Wilmington District. All delineated waterbodies are shown on the figures in Appendix B. Note that some of these waterbodies are extensions of waterbodies delineated in 2018, where additional survey corridor was added and/or was granted access. Waterbody data sheets and photographs are included in Appendix D.

3.3 Upland Plant Communities

The upland areas found in the North Carolina Project survey area typically consisted of agricultural fields, improved pastureland, shrub dominated areas, mesic mixed hardwood forests, and commercial pine plantations. Agricultural fields in the survey area were commonly planted with corn, tobacco, and soybeans. The improved pasture was dominated by typical pasture grasses used for hay production and grazing, including Bahia grass (*Paspalum notatum*) and crabgrass. Shrub species observed included saplings of red maple, tulip poplar, and sweetgum as well as blackberry (*Rubus* spp.). Dominant upland forest canopy species included white oak (*Quercus alba*), red oak (*Quercus rubra*), American beech (*Fagus grandifolia*), flowering dogwood (*Cornus florida*), shortleaf pine (*Pinus echinata*), several species of hickory’s (*Carya* spp.), tulip poplar, sweetgum, red maple, elms (*Ulmus* spp.), and loblolly pine. Dominant pine species in commercial pine plantations included loblolly pine and Virginia pine (*Pinus virginiana*).

4.0 SUMMARY

In January of 2019, the Southgate Project continued a second round of field surveys within the North Carolina Project survey area to identify the presence and delineate the boundaries of wetlands and other waters potentially subject to regulation by the USACE and North Carolina. New resources identified and delineated in the field included 17 new wetlands, 15 extended wetlands, 2 approximated wetlands, 3 new ponds, 29 new streams and 40 extended streams. The preliminary jurisdictional determination is currently ongoing with the USACE-Wilmington district to review the delineated resources. To-date, several field visits have taken place with the USACE and NCDWR (in September of 2018). Additional field visits are planned to occur in spring of 2019.

5.0 REFERENCES

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, Washington, D.C.
- U.S. Army Corps of Engineers (USACE), Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. U.S. Army Corps of Engineers, Waterways Experiment Station, Wetlands Research Program, Technical Report Y-87-1. Vicksburg, MS. January 1987 - Final Report. 92 pp. + app.
- U.S. Army Corps of Engineers (USACE). 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0), ed. J. F. Berkowitz, R. W. Lichvar, and C. V. Noble, J. S. Wakeley. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Appendix A-1

Wetlands Delineated in the North Carolina Southgate Project Survey Area – Stage II Surveys, January 2019

Appendix A-1					
Wetlands Delineated within the MVP Southgate Project area in January 2019					
County	Milepost/ Contractor Yard (CY)	Wetland ID	Cowardin Type	Latitude	Longitude
Rockingham	27.1-27.3	W-A18-44*	PSS, PEM, PFO	36.530142	-79.643957
Rockingham	27.4	W-A19-282	PEM/PSS	36.528321	-79.649727
Rockingham	27.5	W-A18-26*	PEM	36.519132	-79.654783
Rockingham	27.5	W-A19-274	PEM	36.525575	-79.648779
Rockingham	28	W-A18-39*	PEM	36.520859	-79.653331
Rockingham	28.5	W-A19-280	PEM	36.519196	-79.669802
Rockingham	29.9	W-A18-18*	PEM	36.499656	-79.673716
Rockingham	30.2	W-B18-39*	PEM	36.495973	-79.677734
Rockingham	30.3	W-B18-36*	PEM	36.495507	-79.678228
Rockingham	31.1	W-B18-103*	PEM	36.485665	-79.68523
Rockingham	36	W-A19-268	PEM	36.4335878	-79.670946
Rockingham	37.2	W-S18-1*	PFO	36.422114	-79.655108
Rockingham	37.25	W-B19-156	PFO	36.4221524	-79.655121
Rockingham	38.8	W-A19-270	PFO	36.40362	-79.646599
Rockingham	41.8	W-A19-277	PEM	36.368744	-79.621619
Rockingham	41.8	W-B18-43*	PEM	36.369693	-79.619872
Rockingham	41.8	W-B18-67*	PEM	36.3339819	-79.6021059
Rockingham	44.1	W-A19-287	PEM	36.3413962	-79.6061698
Rockingham	49.3	W-B19-165	PFO	36.278478	-79.559647
Rockingham	49.8	W-A18-184*	PEM/PFO	36.274967	-79.558856
Rockingham	50.8	W-A19-288	PEM	36.2634532	-79.5508953
Rockingham	51.2	W-A19-284	PEM	36.258826	-79.546354
Rockingham	51.3	W-C18-20*	PFO	36.256448	-79.545371
Alamance	56.4	W-A18-119*	PFO	36.19942	-79.500733
Alamance	63.2	W-B18-115*	PFO	36.1462138	-79.4188285
Alamance	63.8	AW-B18-19**	PFO	36.146437	-79.407138
Alamance	65.3	W-B19-159	PFO	36.1432976	-79.3829895
Alamance	65.5	W-B19-161	PFO	36.1401398	-79.3825376
Alamance	65.6	W-B19-168	PEM/PFO	36.139849	-79.381373
Alamance	66.6	W-B19-164	PFO	36.130739	-79.369009
Alamance	66.6	AW-B19-164**	PFO	36.130669	-79.368993
Alamance	68.3	W-B18-5*	PFO	36.106095	-79.371151
Alamance	69.7	W-B19-146	PFO	36.091034	-79.362321
Alamance	73	W-B19-151	PEM	36.046741	-79.366391

*These wetlands are extensions of previously delineated wetlands, where additional study corridor was added and/or access was granted.

** These wetlands are currently approximated, because they have yet to be surveyed.

Appendix A-2

**Waterbodies Delineated in the North Carolina Southgate
Project Survey Area - Stage II Surveys, January 2019**

Appendix A-2

Waterbodies Delineated within the MVP Southgate Project area in January 2019

County	Milepost/ Contractor Yard (CY)	Resource ID	HUC8	Stream Name	Flow type	Latitude	Longitude
Rockingham	27.5	WB-A19-281	Upper Dan - 03010103	Trib to Cascade Creek	Pond	36.5296587	-79.6516657
Rockingham	27.4	S-A19-271	Upper Dan - 03010103	Trib to Cascade Creek	Intermittent	36.5284808	-79.6463647
Rockingham	27.4	S-A19-283	Upper Dan - 03010103	Trib to Cascade Creek	Intermittent	36.5281251	-79.6488542
Rockingham	27.4	S-A18-42*	Upper Dan - 03010103	Trib to Cascade Creek	Intermittent	36.5264717	-79.6465469
Rockingham	27.5	S-A19-273	Upper Dan - 03010103	Dry Creek	Perennial	36.525958	-79.6490815
Rockingham	27.5	S-A19-275	Upper Dan - 03010103	Trib to Dry Creek	Intermittent	36.5259482	-79.6489823
Rockingham	27.5	S-A19-276	Upper Dan - 03010103	Trib to Dry Creek	Ephemeral	36.5259295	-79.6485134
Rockingham	27.4	S-A18-40*	Upper Dan - 03010103	Cascade Creek	Perennial	36.5250325	-79.6476307
Rockingham	28.5	S-A19-279	Upper Dan - 03010103	Trib to Dan River	Intermittent	36.519781	-79.6679981
Rockingham	28.2	S-A19-278	Upper Dan - 03010103	Trib to Dan River	Intermittent	36.5196279	-79.658769
Rockingham	30.3	S-B18-38*	Upper Dan - 03010103	Trib to Dan River	Ephemeral	36.4952994	-79.6783592
Rockingham	30.85	S-B18-104*	Upper Dan - 03010103	Trib to Rock Creek	Perennial	36.4887799	-79.6841809
Rockingham	30.9	S-B19-153	Upper Dan - 03010103	Trib to Rock Creek	Intermittent	36.4874235	-79.6834655
Rockingham	30.9	S-B19-154	Upper Dan - 03010103	Trib to Rock Creek	Ephemeral	36.487346	-79.6834448
Rockingham	31.1	S-B18-105*	Upper Dan - 03010103	Trib to Rock Creek	Intermittent	36.4868407	-79.6854313
Rockingham	31.1	S-B18-102*	Upper Dan - 03010103	Trib to Rock Creek	Perennial	36.4856341	-79.685156
Rockingham	31.1	S-B19-155	Upper Dan - 03010103	Trib to Rock Creek	Ephemeral	36.4854915	-79.6849589
Rockingham	31.7	S-B18-120*	Upper Dan - 03010103	Trib to Town Creek	Ephemeral	36.479563	-79.6925896
Rockingham	31.7	S-A19-267	Upper Dan - 03010103	Trib to Town Creek	Ephemeral	36.4793728	-79.6918903
Rockingham	31.9	S-A18-143*	Upper Dan - 03010103	Trib to Machine Creek	Intermittent	36.4782921	-79.6947593
Rockingham	31.9	S-A18-142*	Upper Dan - 03010103	Trib to Machine Creek	Intermittent	36.4774734	-79.6956271
Rockingham	31.9	S-A18-140*	Upper Dan - 03010103	Trib to Machine Creek	Perennial	36.4772514	-79.6955983
Rockingham	32.1	S-A18-148*	Upper Dan - 03010103	Trib to Machine Creek	Ephemeral	36.4756012	-79.6971135
Rockingham	32.5	S-A18-150*	Upper Dan - 03010103	Trib to Town Creek	Ephemeral	36.4713621	-79.7010792

Appendix A-2

Waterbodies Delineated within the MVP Southgate Project area in January 2019

County	Milepost/ Contractor Yard (CY)	Resource ID	HUC8	Stream Name	Flow type	Latitude	Longitude
Rockingham	37.6	S-B19-158	Upper Dan - 03010103	Trib to Wolf Island Creek	Ephemeral	36.4182891	-79.6519023
Rockingham	37.6	S-B19-157	Upper Dan - 03010103	Trib to Wolf Island Creek	Perennial	36.4181669	-79.6519851
Rockingham	37.7	S-B18-117*	Upper Dan - 03010103	Trib to Wolf Island Creek	Perennial	36.4169134	-79.6503488
Rockingham	38.75	S-A19-269	Upper Dan - 03010103	Trib to Wolf Island Creek	Intermittent	36.4070258	-79.6468279
Rockingham	38.8	S-A18-8*	Upper Dan - 03010103	Wolf Island Creek	Perennial	36.4041256	-79.6467659
Rockingham	40.7	S-B18-52*	Lower Dan - 03010104	Trib to Lick Fork	Perennial	36.383199	-79.628158
Rockingham	41.2	S-B18-56*	Lower Dan - 03010104	Lick Fork	Perennial	36.3773942	-79.6252066
Rockingham	41.8	S-B18-42*	Lower Dan - 03010104	Trib to Lick Fork	Intermittent	36.3696007	-79.6197758
Rockingham	41.8	S-B18-41*	Lower Dan - 03010104	Trib to Lick Fork	Perennial	36.369576	-79.620653
Rockingham	44	S-C18-25*	Lower Dan - 03010104	Trib to Jones Creek	Perennial	36.3424923	-79.6057245
Rockingham	44.1	S-A18-102*	Lower Dan - 03010104	Trib to Jones Creek	Perennial	36.3416606	-79.6058149
Rockingham	44.5	S-A18-229*	Lower Dan - 03010104	Trib to Jones Creek	Perennial	36.3361956	-79.6022192
Rockingham	44.5	S-A18-230*	Lower Dan - 03010104	Trib to Jones Creek	Intermittent	36.3361954	-79.6023213
Rockingham	44.7	S-B18-66*	Lower Dan - 03010104	Trib to Jones Creek	Ephemeral	36.3340271	-79.6022555
Rockingham	45.7	S-A18-211*	Lower Dan - 03010104	Trib to Hogans Creek	Ephemeral	36.3231625	-79.5956415
Rockingham	45.7	S-B18-71*	Lower Dan - 03010104	Trib to Hogans Creek	Perennial	36.3229528	-79.596341
Rockingham	45.8	S-B18-69*	Lower Dan - 03010104	Trib to Hogans Creek	Perennial	36.3203805	-79.5941427
Rockingham	45.8	S-B18-68*	Lower Dan - 03010104	Trib to Hogans Creek	Perennial	36.3202096	-79.5939072
Rockingham	45.9	S-B18-119*	Lower Dan - 03010104	Trib to Hogans Creek	Ephemeral	36.3193412	-79.5935722
Rockingham	45.9	S-B18-118*	Lower Dan - 03010104	Trib to Hogans Creek	Intermittent	36.3188646	-79.5932087
Rockingham	46.7	S-A18-238*	Lower Dan - 03010104	Trib to Hogans Creek	Intermittent	36.3085975	-79.5947623
Rockingham	46.7	S-A18-239*	Lower Dan - 03010104	Trib to Hogans Creek	Intermittent	36.3084302	-79.5934306
Rockingham	46.7	S-A19-291	Lower Dan - 03010104	Trib to Hogans Creek	Intermittent	36.3079174	-79.5946743
Rockingham	47.7	S-A18-242*	Lower Dan - 03010104	Trib to Hogans Creek	Perennial	36.2976176	-79.5812589

Appendix A-2

Waterbodies Delineated within the MVP Southgate Project area in January 2019

County	Milepost/ Contractor Yard (CY)	Resource ID	HUC8	Stream Name	Flow type	Latitude	Longitude
Rockingham	47.7	S-B19-167	Lower Dan - 03010104	Trib to Hogans Creek	Intermittent	36.2976168	-79.5820282
Rockingham	49.3	S-B19-166	Lower Dan - 03010104	Trib to Giles Creek	Intermittent	36.283131	-79.5631956
Rockingham	49.3	S-A18-55*	Haw - 03030002	Trib to Giles Creek	Perennial	36.2824509	-79.5640092
Rockingham	49.8	S-A18-183*	Haw - 03030002	Trib to Haw River	Perennial	36.2747995	-79.5590965
Rockingham	49.8	S-A18-182*	Haw - 03030002	Trib to Haw River	Intermittent	36.2746887	-79.5584437
Rockingham	50.8	S-A19-289	Haw - 03030002	Trib to Haw River	Intermittent	36.2689131	-79.533472
Rockingham	50.8	S-A19-286	Haw - 03030002	Trib to Haw River	Perennial	36.264305	-79.550845
Rockingham	51.2	S-A19-285	Haw - 03030002	Trib to Haw River	Intermittent	36.258693	-79.546322
Rockingham	51.2	AS-A19-285	Haw - 03030002	Trib to Haw River	Intermittent	36.258334	-79.546610
Alamance	55.3	S-B18-59*	Haw - 03030002	Trib to Haw River	Perennial	36.2088178	-79.5159789
Alamance	56.4	S-A18-120*	Haw - 03030002	Trib to Haw River	Perennial	36.1997769	-79.5004784
Alamance	57.5	S-A19-290	Haw - 03030002	Trib to Haw River	Ephemeral	36.1855174	-79.4941879
Alamance	62.3	WB-B18-141*	Haw - 03030002	Trib to Haw River	Pond	36.15146	-79.432329
Alamance	63.7	S-B18-138*	Haw - 03030002	Trib to Stony Creek Reservoir	Perennial	36.1494008	-79.4090689
Alamance	65.5	S-B19-162	Haw - 03030002	Trib. to Boyds Creek	Ephemeral	36.1404202	-79.3825891
Alamance	65.5	S-B19-160	Haw - 03030002	Trib. to Boyds Creek	Intermittent	36.1402659	-79.3825974
Alamance	65.6	S-A18-252*	Haw - 03030002	Trib. to Boyds Creek	Intermittent	36.1392599	-79.3802933
Alamance	65.6	S-A18-250*	Haw - 03030002	Trib to Boyds Creek	Perennial	36.1389459	-79.3805345
Alamance	63.2	WB-B19-169	Haw - 03030002	Trib. to Boyds Creek	Pond	36.1334447	-79.3696695
Alamance	66.6	S-B19-163	Haw - 03030002	Trib. to Boyds Creek	Ephemeral	36.1311825	-79.3695292
Alamance	67.3	WB-B19-144	Haw - 03030002	WB-B19-144	Pond	36.1222604	-79.3797206
Alamance	68.3	S-B19-145	Haw - 03030002	Boyds Creek	Perennial	36.1053083	-79.3768618
Alamance	69.1	S-B19-152	Haw - 03030002	Trib to Haw River	Ephemeral	36.0962356	-79.370119
Alamance	69.1	S-A18-10*	Haw - 03030002	Trib to Haw River	Ephemeral	36.0960034	-79.3691353

Appendix A-2

Waterbodies Delineated within the MVP Southgate Project area in January 2019

County	Milepost/ Contractor Yard (CY)	Resource ID	HUC8	Stream Name	Flow type	Latitude	Longitude
Alamance	69.7	S-B19-147	Haw - 03030002	Trib to Haw River	Ephemeral	36.0910088	-79.3622637
Alamance	69.7	S-B19-148	Haw - 03030002	Trib to Haw River	Intermittent	36.0909851	-79.362098
Rockingham	27.4	S-A19-272	Upper Dan - 03010103	Trib. to Cascade Creek	Intermittent	36.0768969	-79.9620748

*These streams are extensions of previously delineated streams, where additional study corridor was added and/or access was granted.

** These streams are currently approximated, because they have yet to be surveyed.

Appendix B

Revised Wetland and Waterway Delineation Maps

(Revised Figure 4 from November 2018 Wetland Delineation Report)

Appendix C

USACE Upland and Wetland Data Forms and Photographs – January 2019

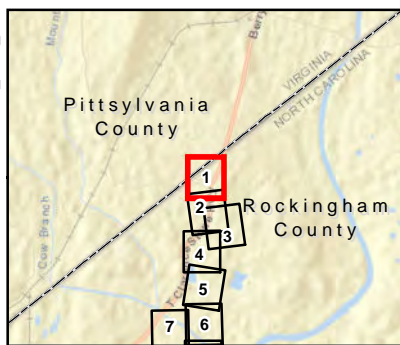


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 1 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019

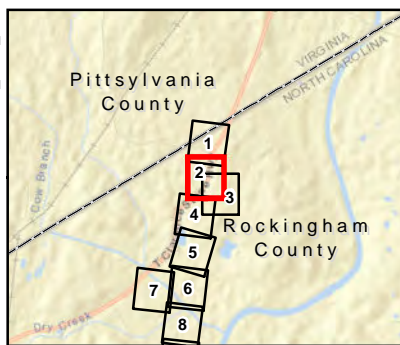
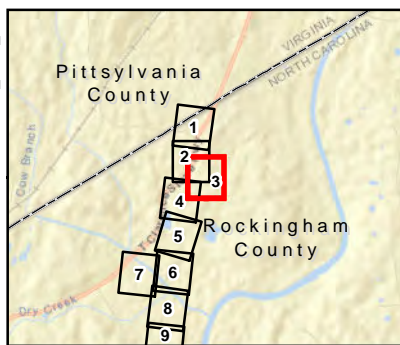


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 2 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- Survey Area

Stream Type

- Perennial
- Intermittent
- Ephemeral
- Approx. Stream Bank/Edge
- Approx. Stream Centerline
- Surface Water

- Approx. Surface Water
- Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Approx. Wetland
- Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps
Rockingham County, NC

Sheet 3 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019

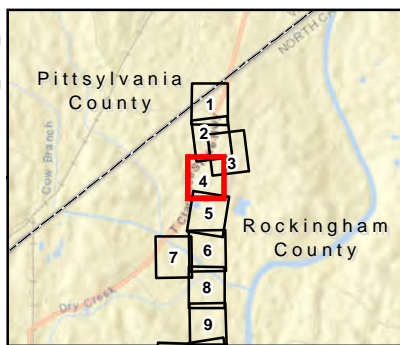


Figure 4
Wetland & Waterway Delineation Maps
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

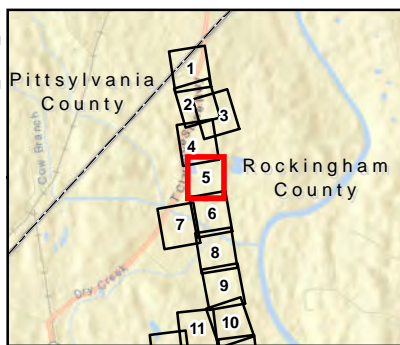
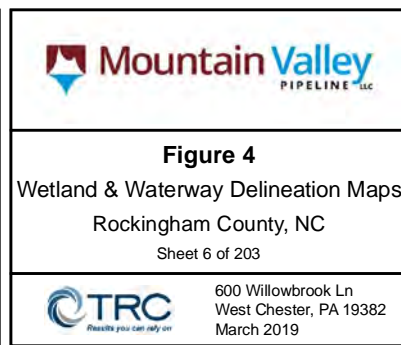
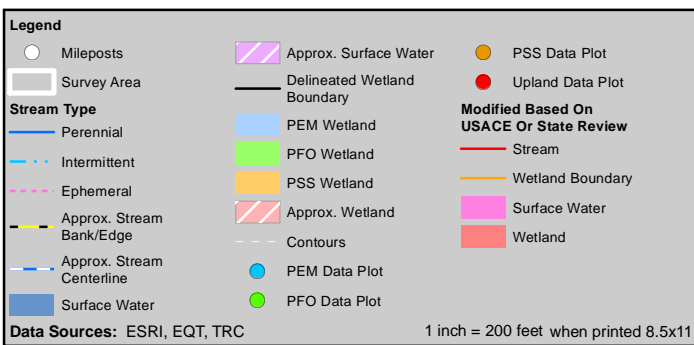
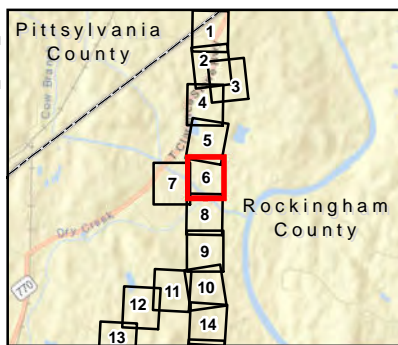
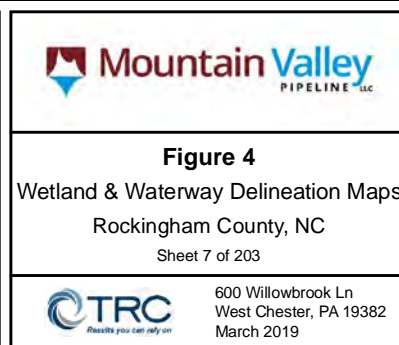
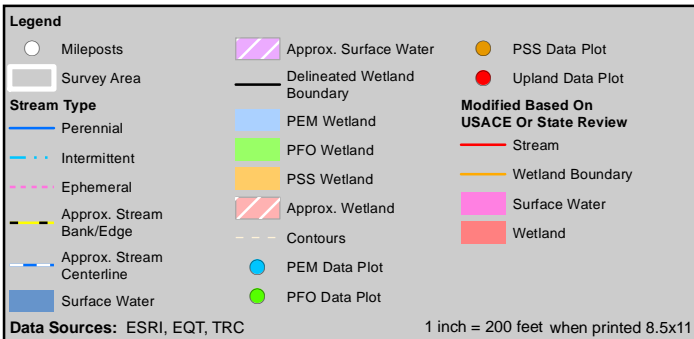
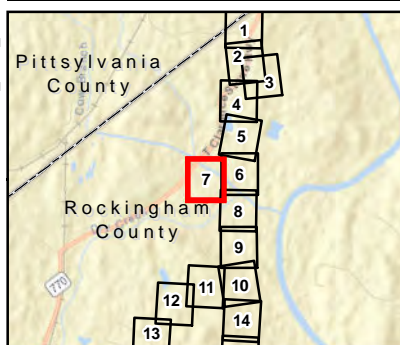


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019





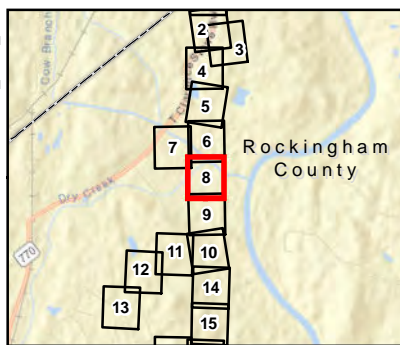


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

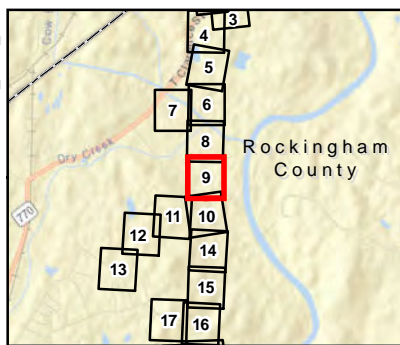
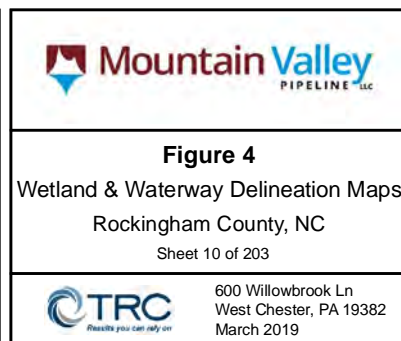
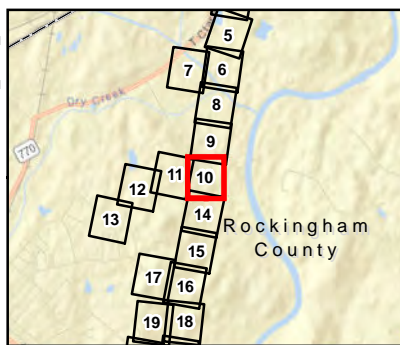


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



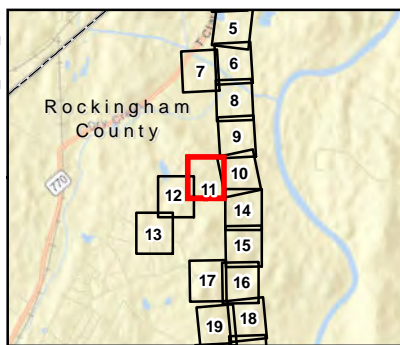
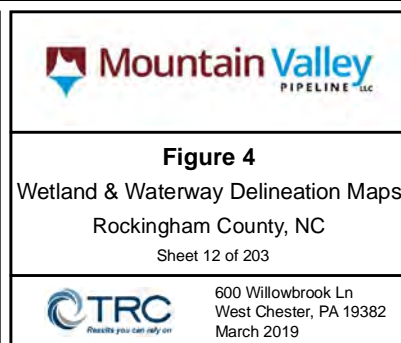
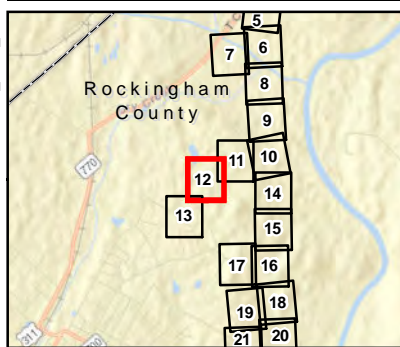
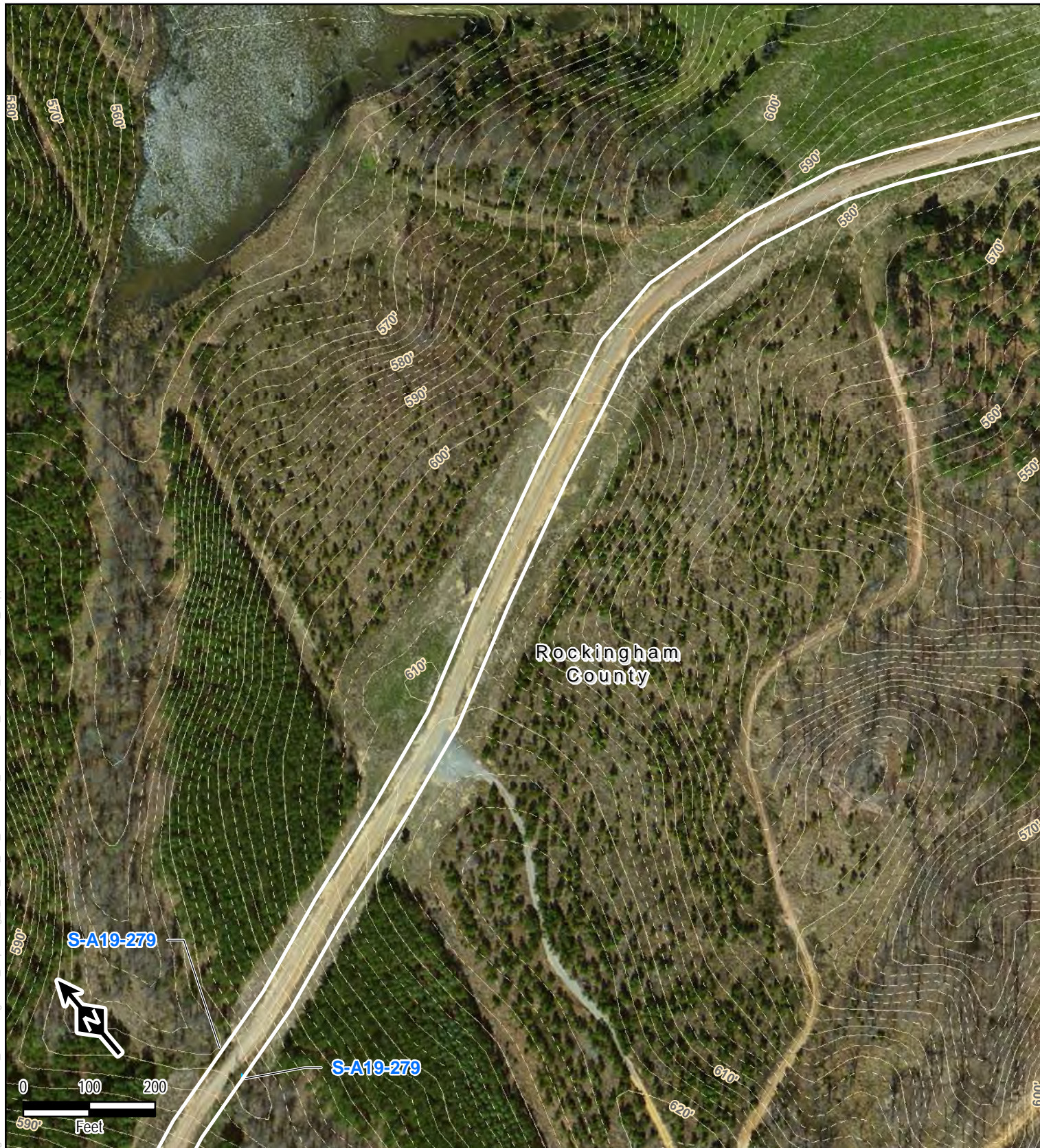
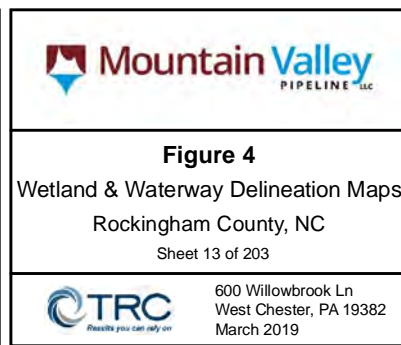
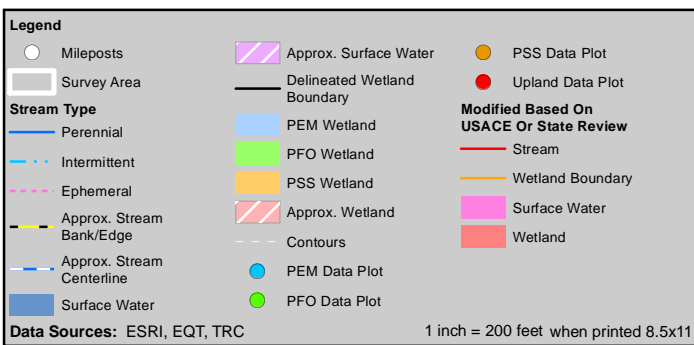
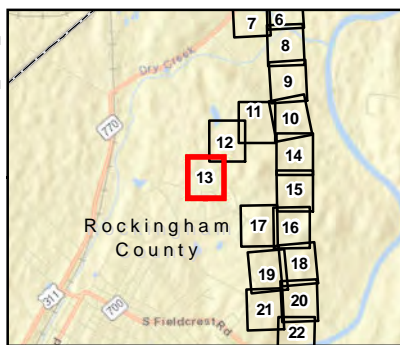
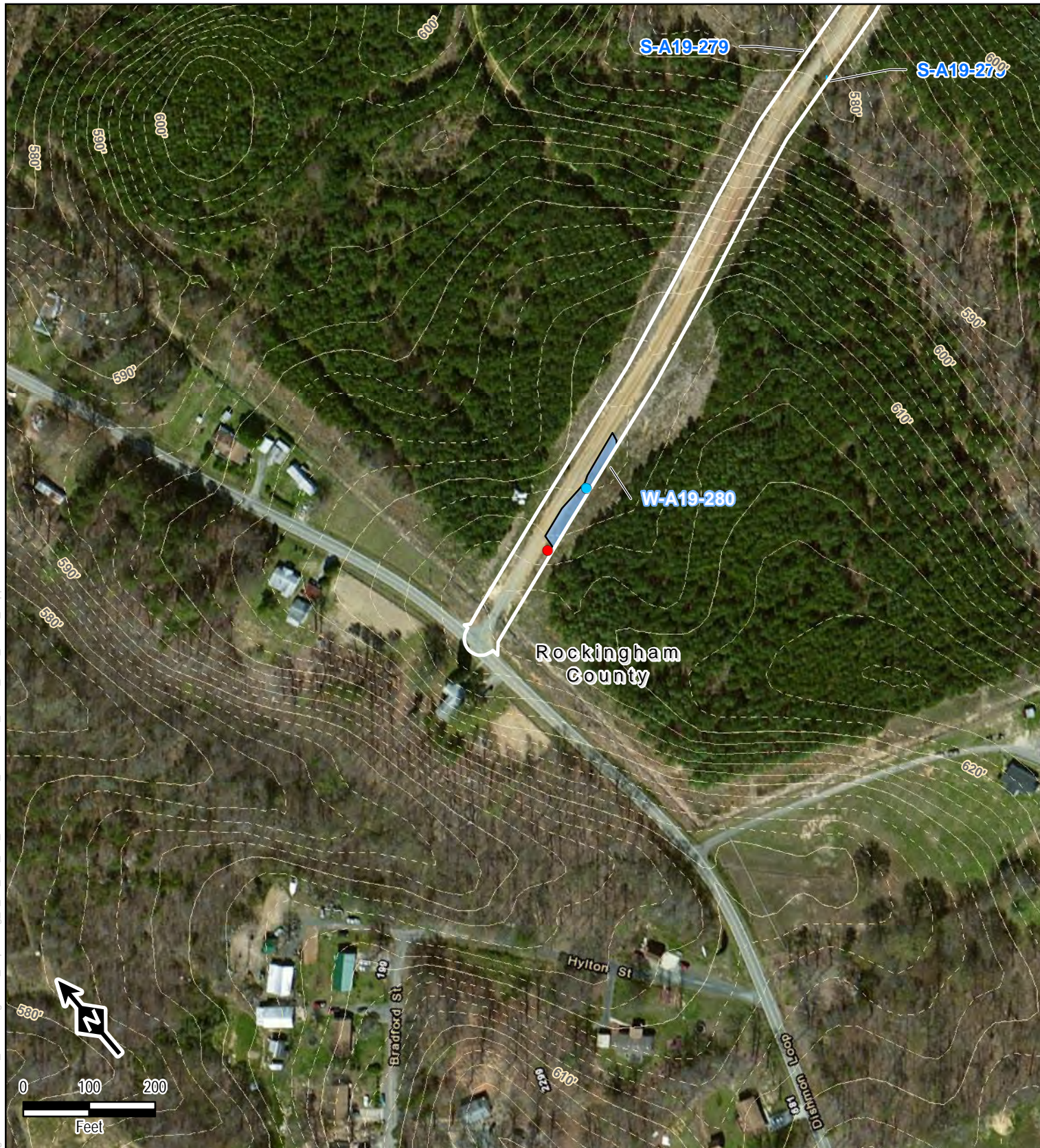


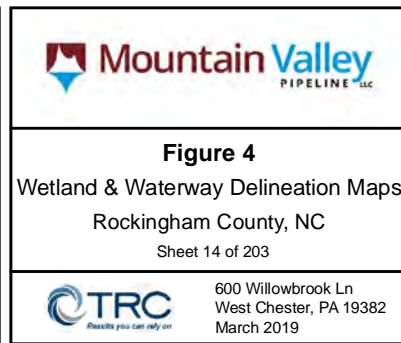
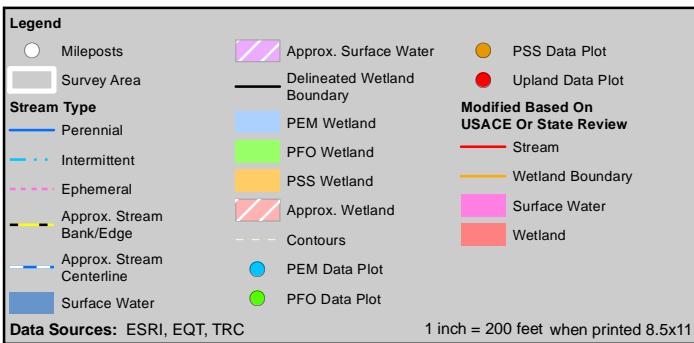
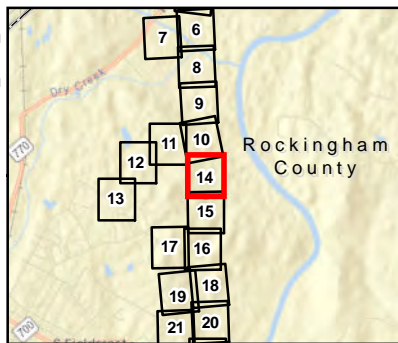
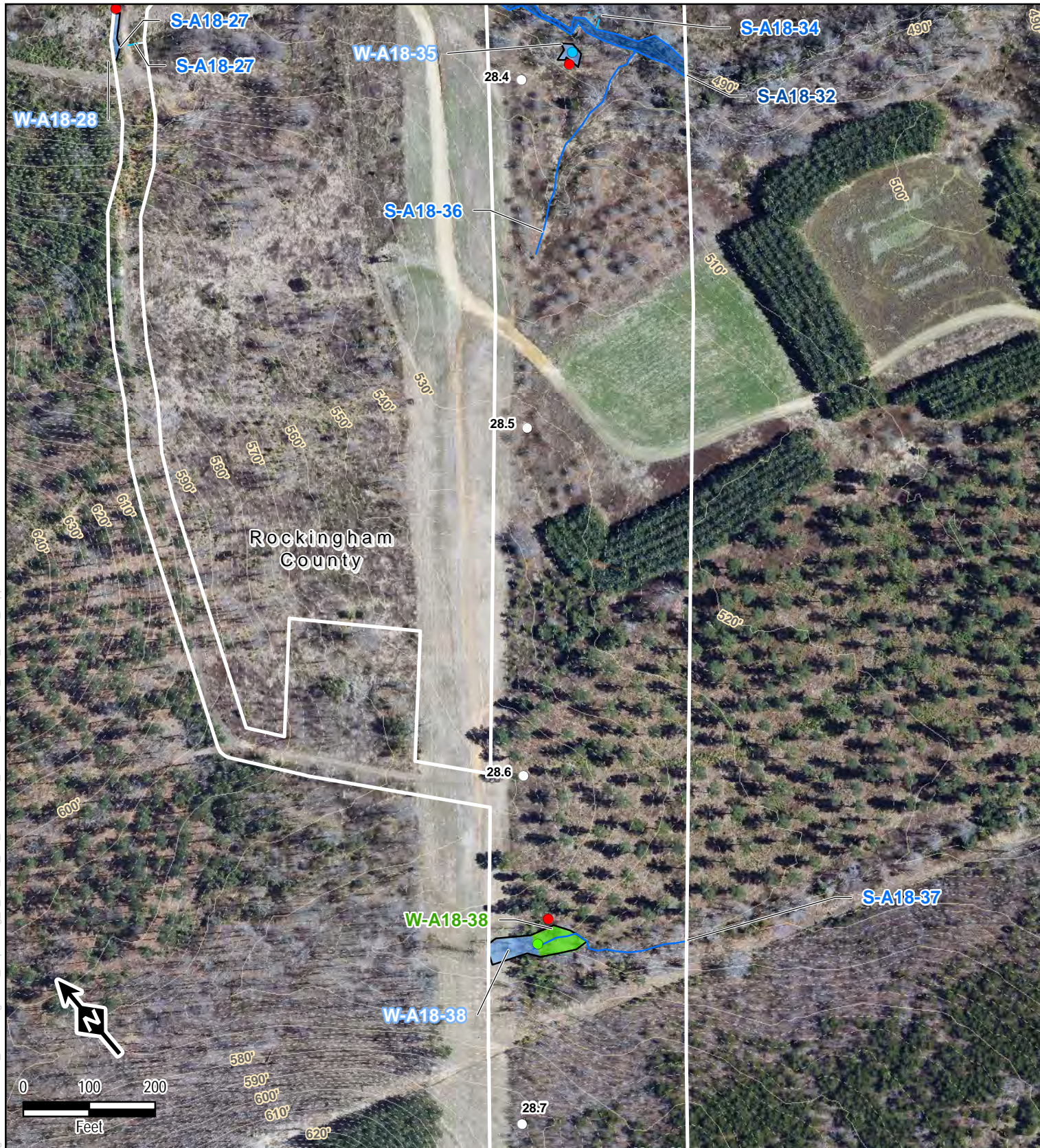
Figure 4
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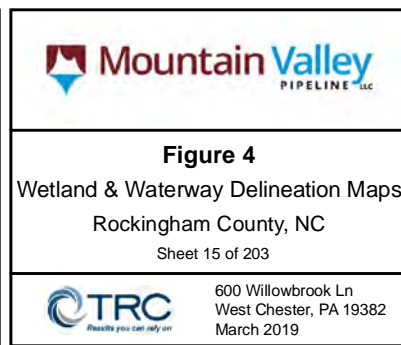
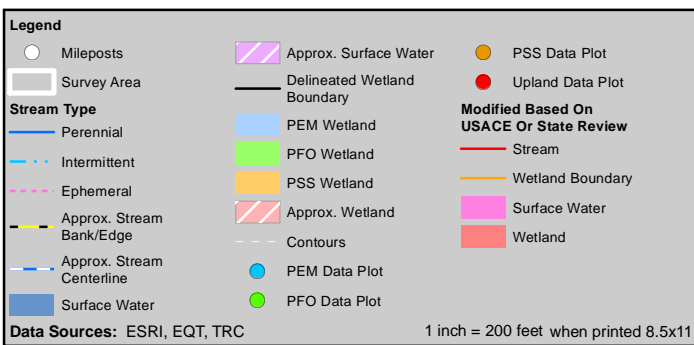
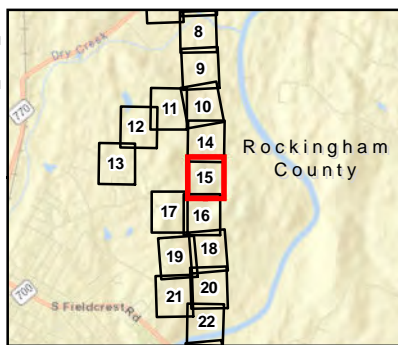


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March 2019









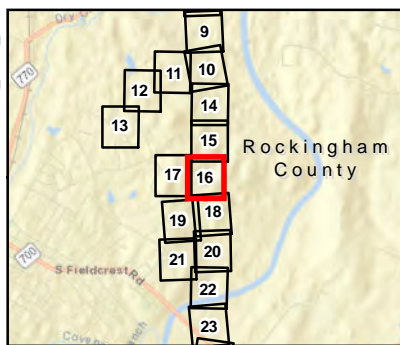
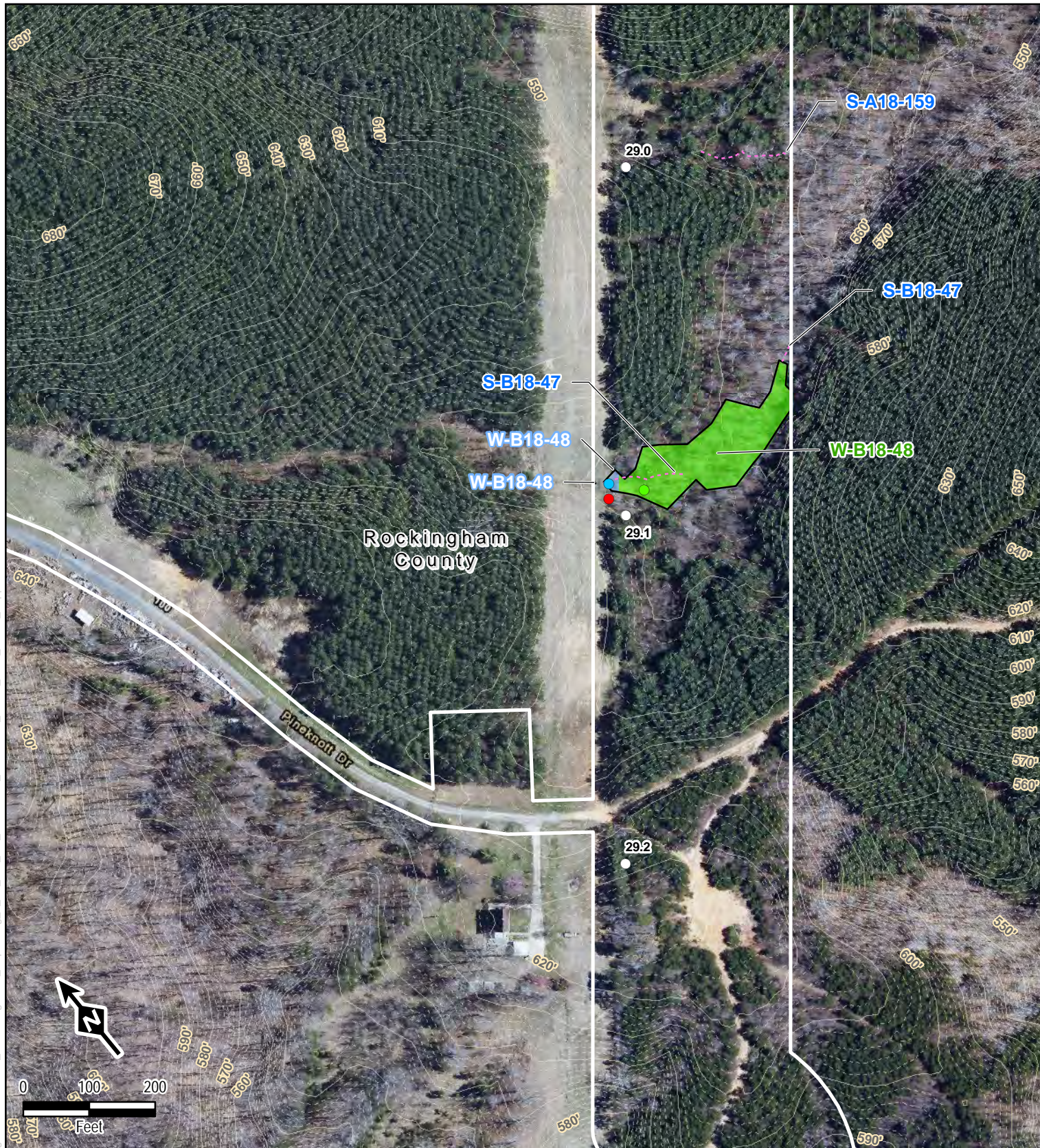
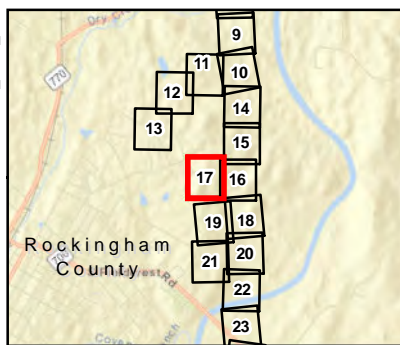
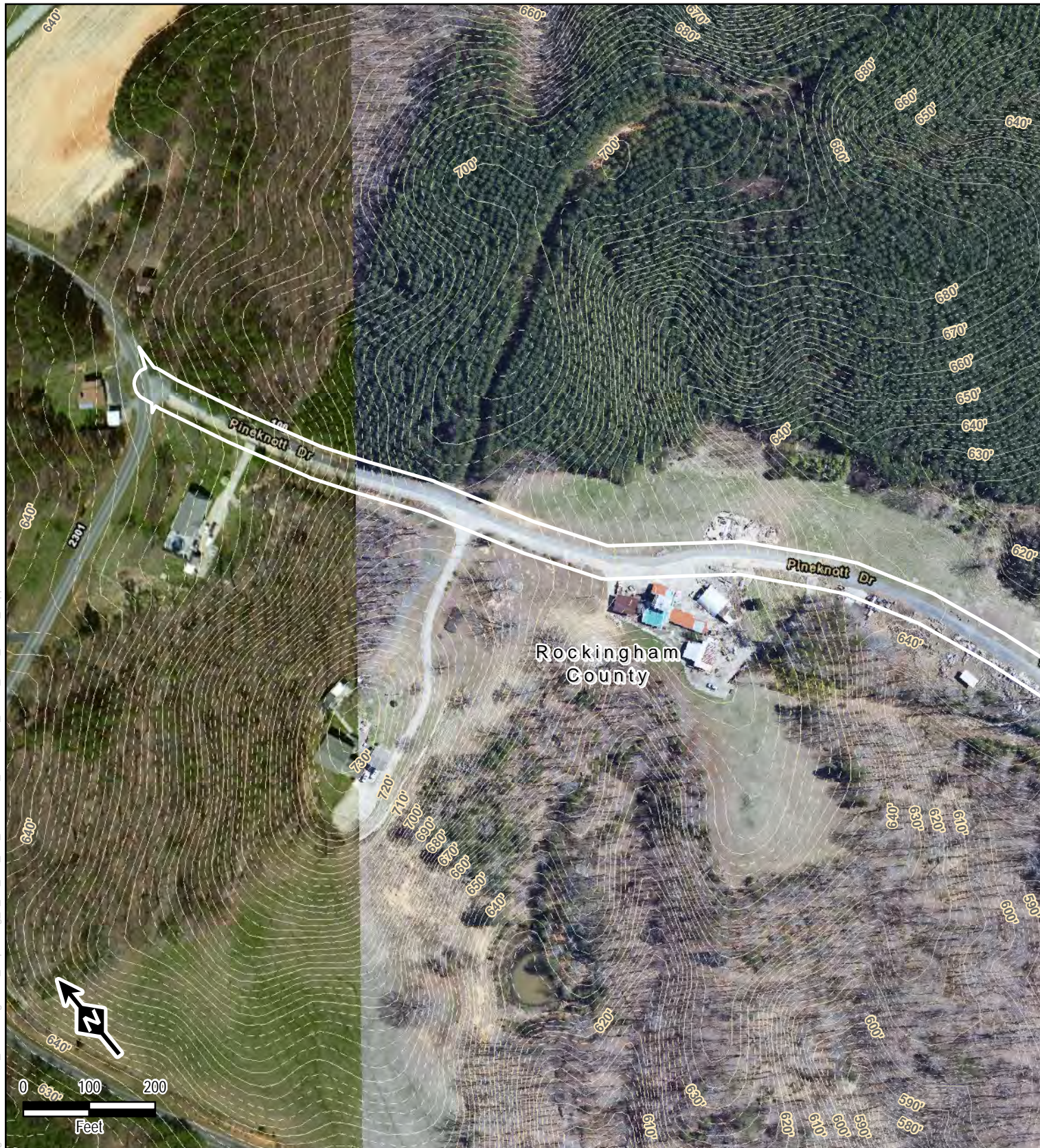


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- ▭ Survey Area

Stream Type

- Perennial
- - - Intermittent
- · - · - Ephemeral
- - - Approx. Stream Bank/Edge
- - - Approx. Stream Centerline
- Surface Water

- ▨ Approx. Surface Water
- ▬ Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- ▨ Approx. Wetland
- - - Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps
Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

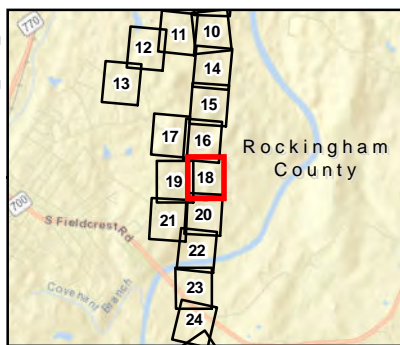
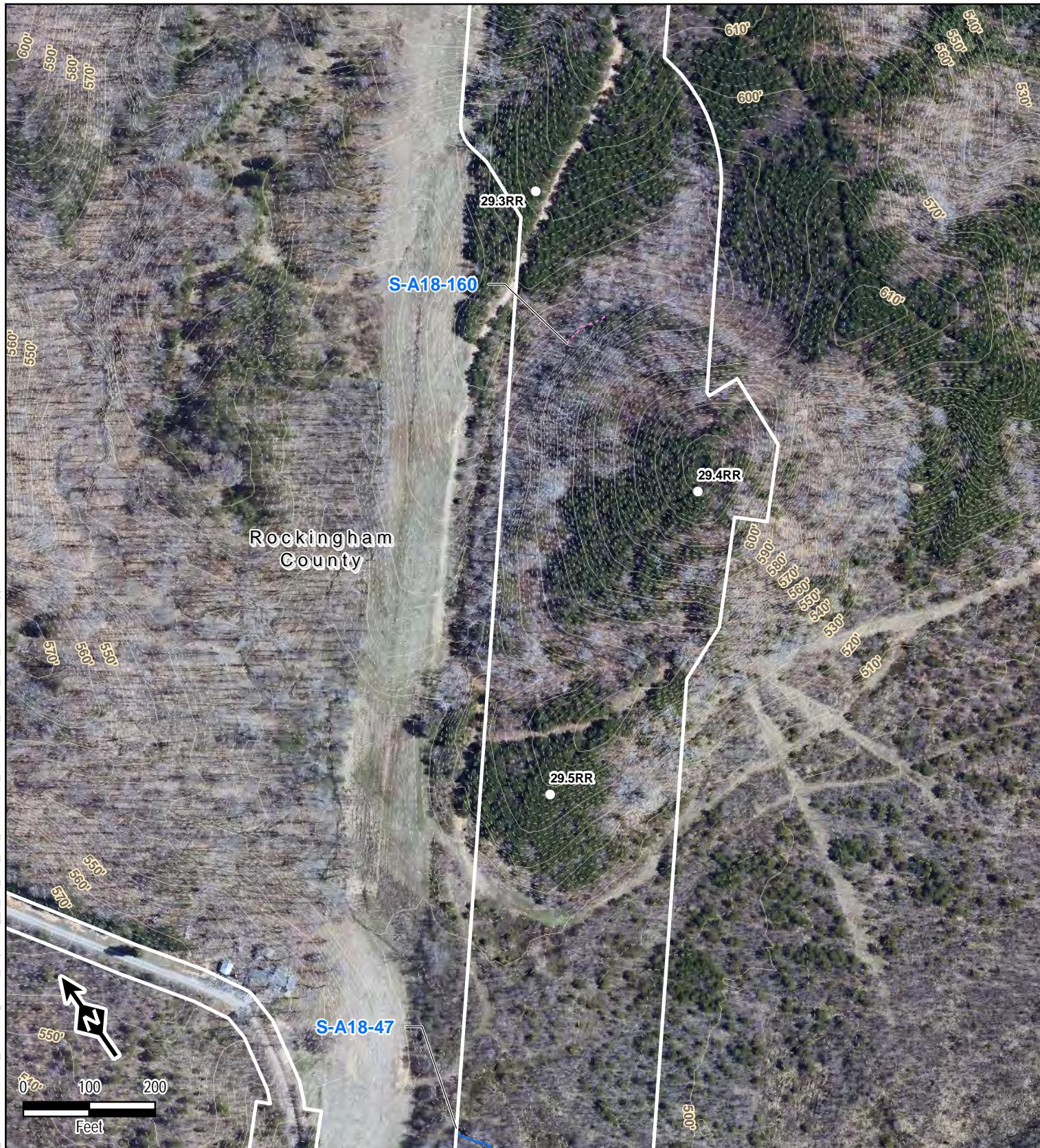


Figure 4
Wetland & Waterway Delineation Maps
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

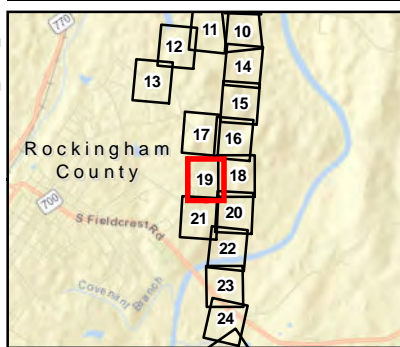
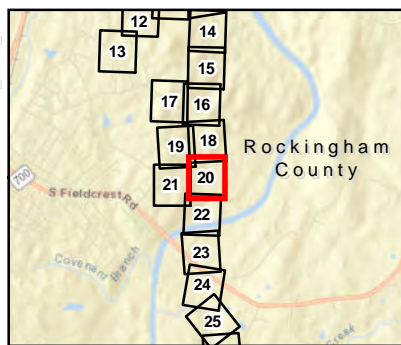


Figure 4
Wetland & Waterway Delineation Maps
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- ▭ Survey Area

Stream Type

- Perennial
- - - Intermittent
- · - · - Ephemeral
- - - Approx. Stream Bank/Edge
- - - Approx. Stream Centerline
- Surface Water

- ▨ Approx. Surface Water
- Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- ▨ Approx. Wetland
- - - Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps
Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

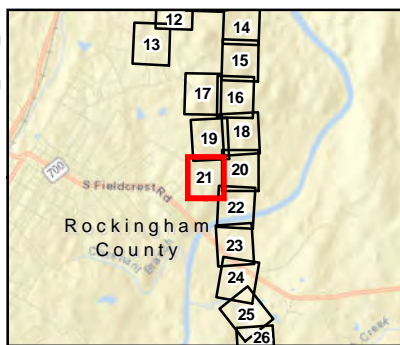
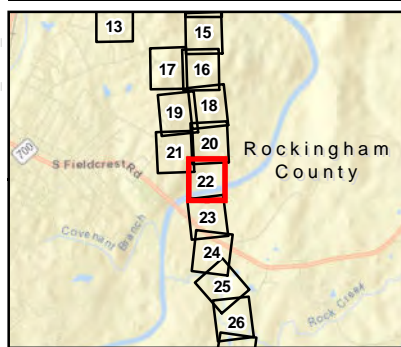


Figure 4
Wetland & Waterway Delineation Maps
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West Chester, PA 19382
March 2019



Legend

- | | | |
|-----------------------------|-----------------------------|------------------------------|
| ○ Mileposts | Approx. Surface Water | ● PSS Data Plot |
| Survey Area | Delineated Wetland Boundary | ● Upland Data Plot |
| Stream Type | PEM Wetland | Modified Based On |
| — Perennial | PFO Wetland | USACE Or State Review |
| - - - Intermittent | PSS Wetland | — Stream |
| - - - Ephemeral | Approx. Wetland | — Wetland Boundary |
| — Approx. Stream Bank/Edge | Contours | — Surface Water |
| — Approx. Stream Centerline | PEM Data Plot | — Wetland |
| — Surface Water | PFO Data Plot | |

Data Sources: ESRI, EQT, TRC

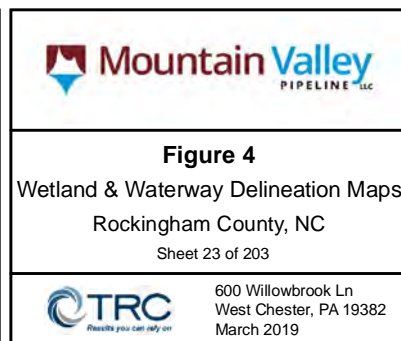
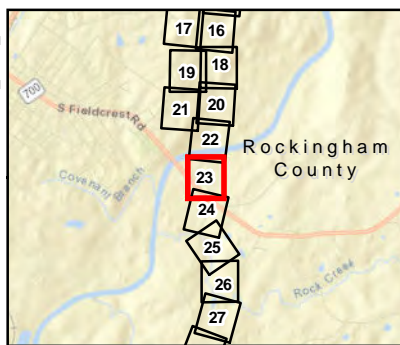
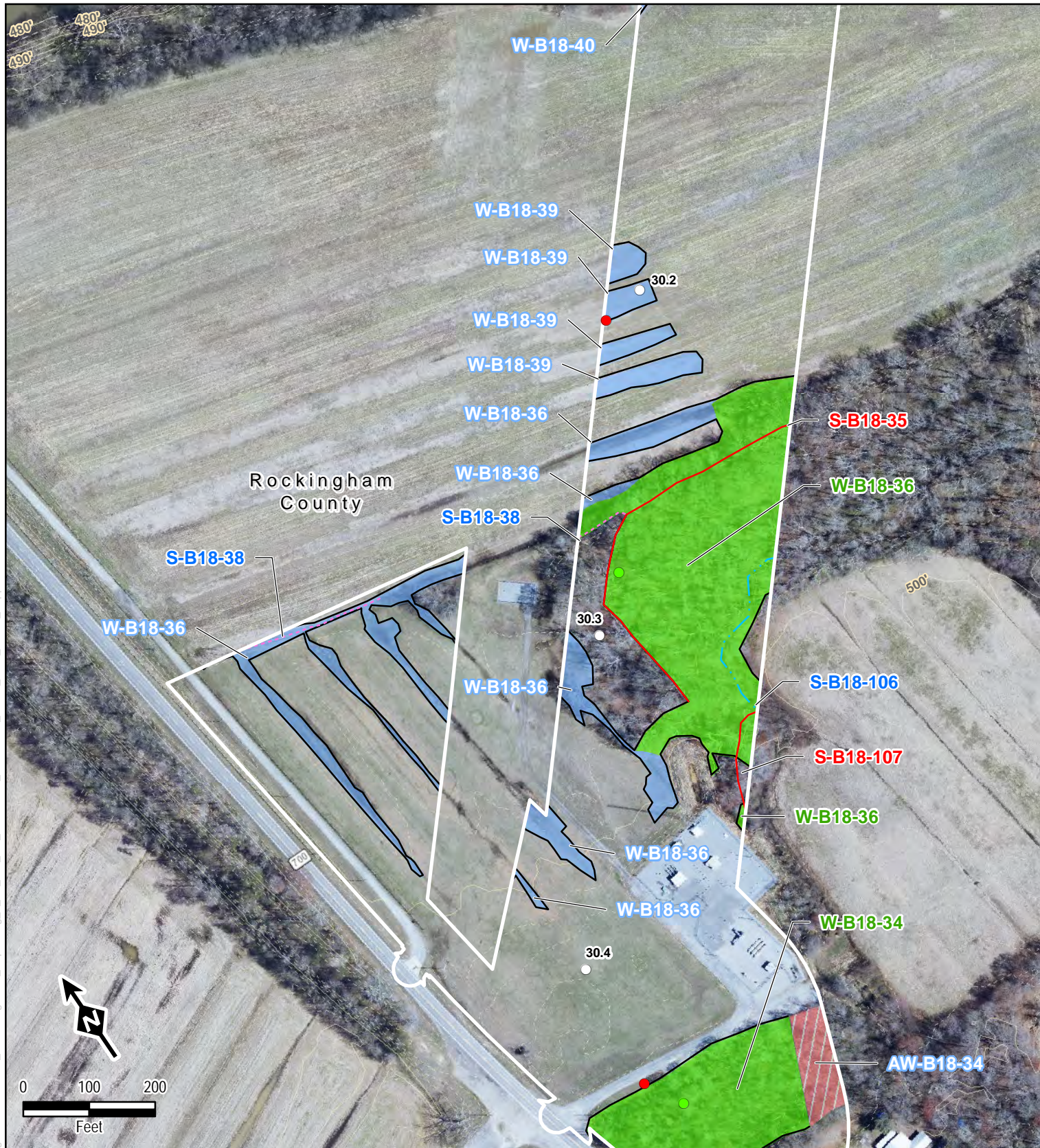
1 inch = 200 feet when printed 8.5x11



Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
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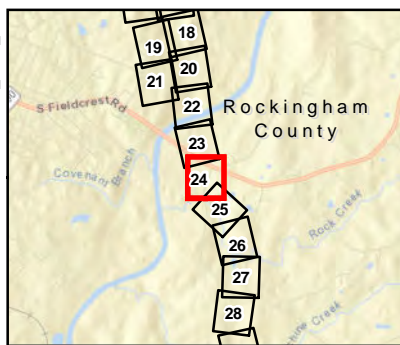


Figure 4
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600 Willowbrook Ln
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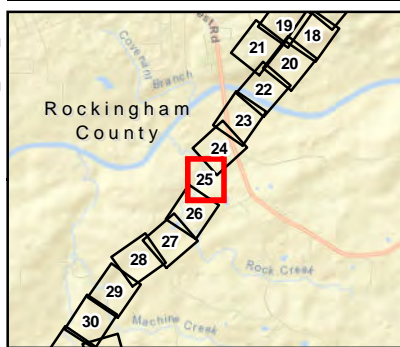


Figure 4
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

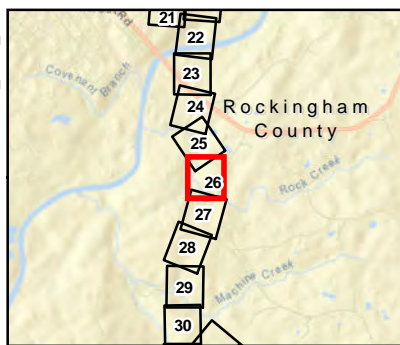


Figure 4
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West Chester, PA 19382
March 2019

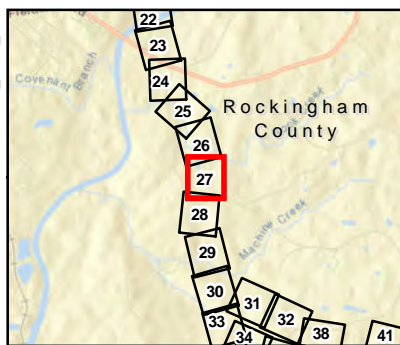
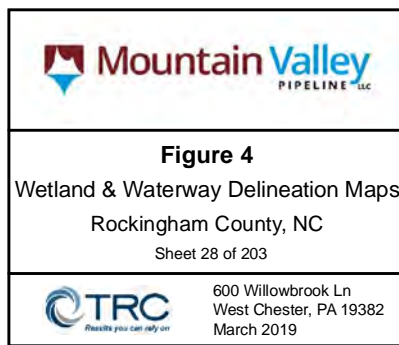
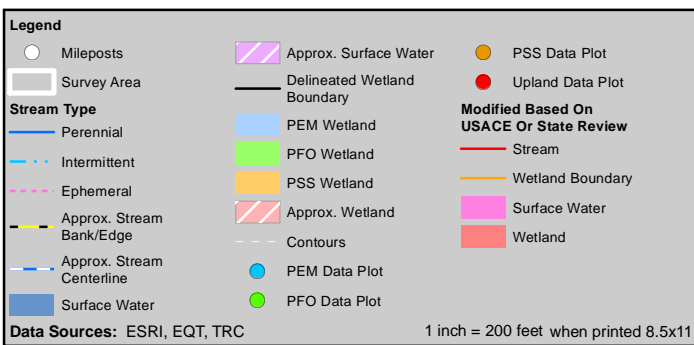
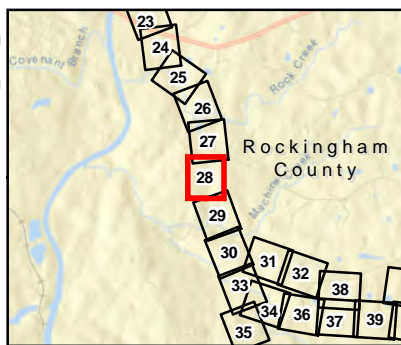
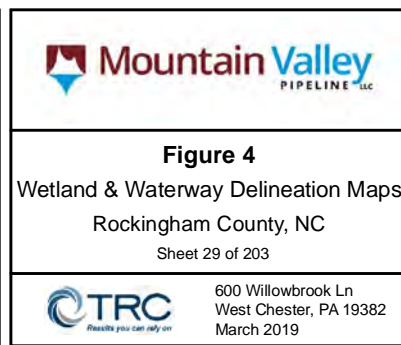
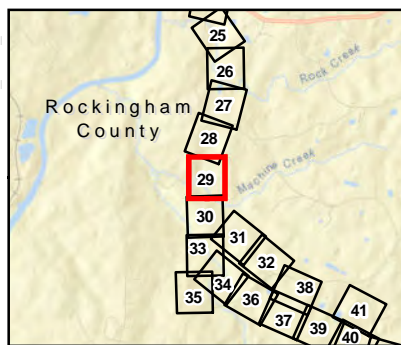
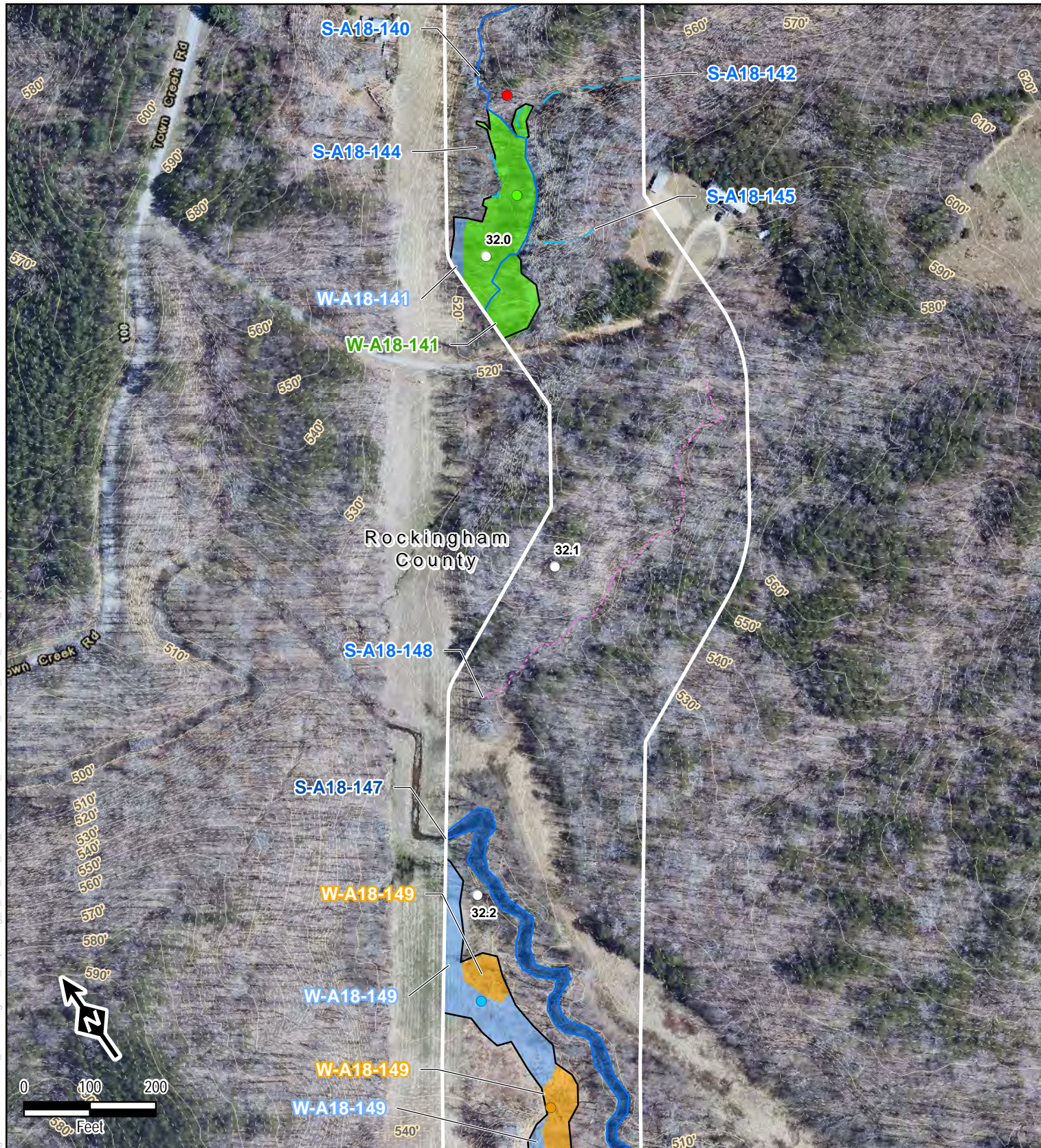


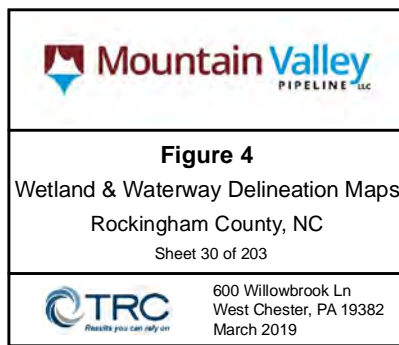
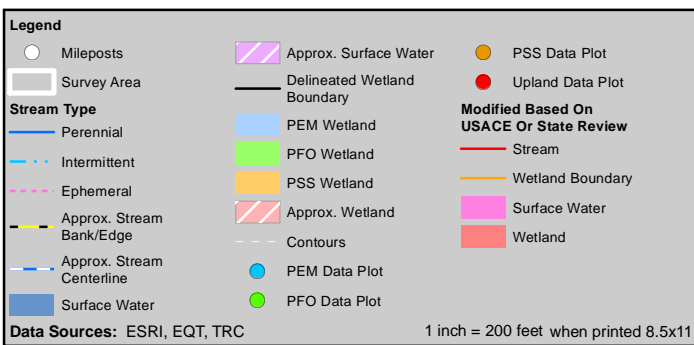
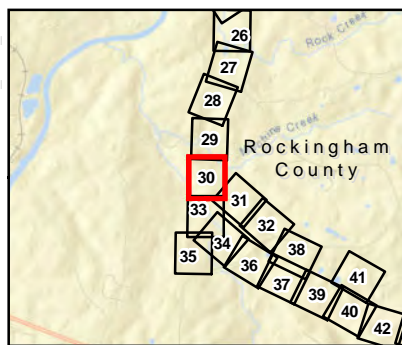
Figure 4
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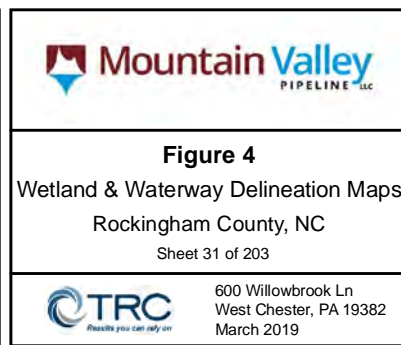
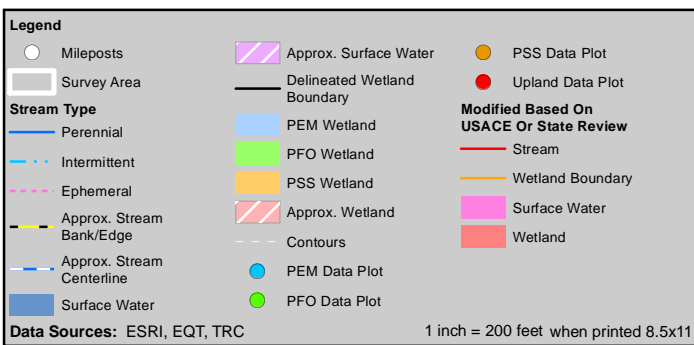
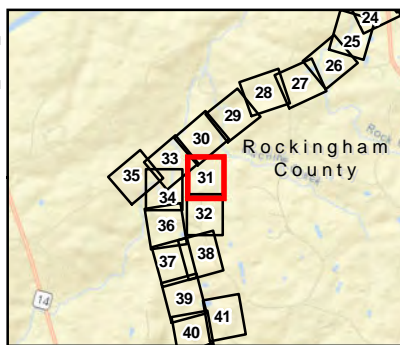
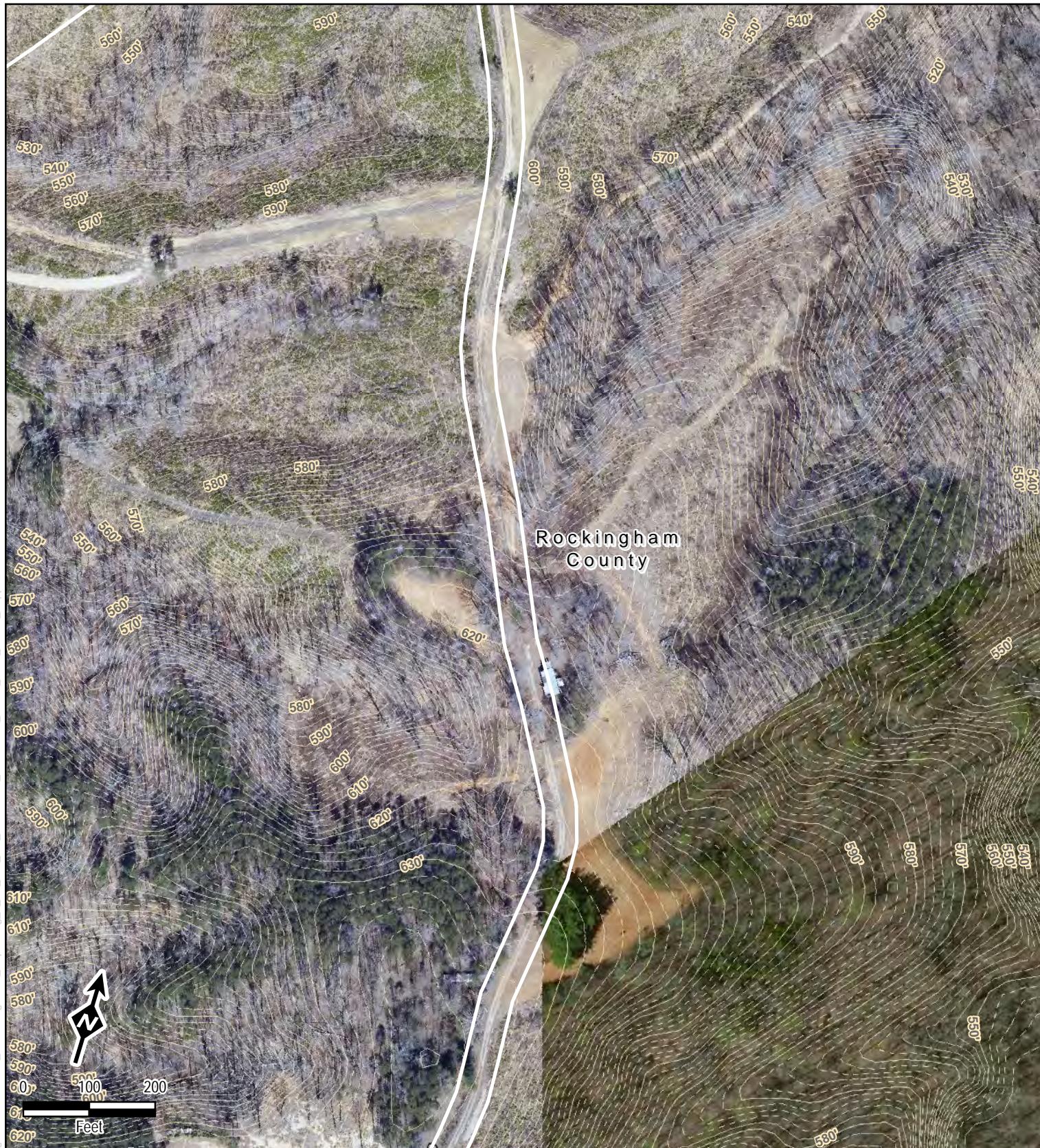


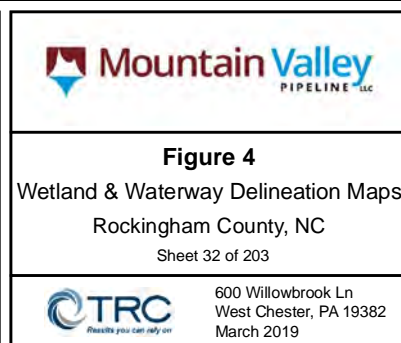
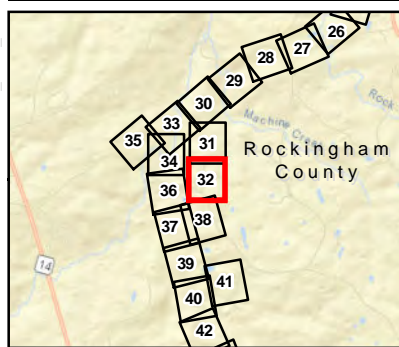
600 Willowbrook Ln
West Chester, PA 19382
March 2019











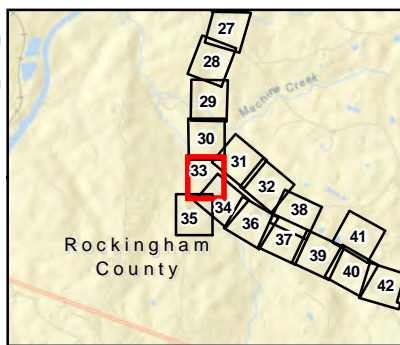
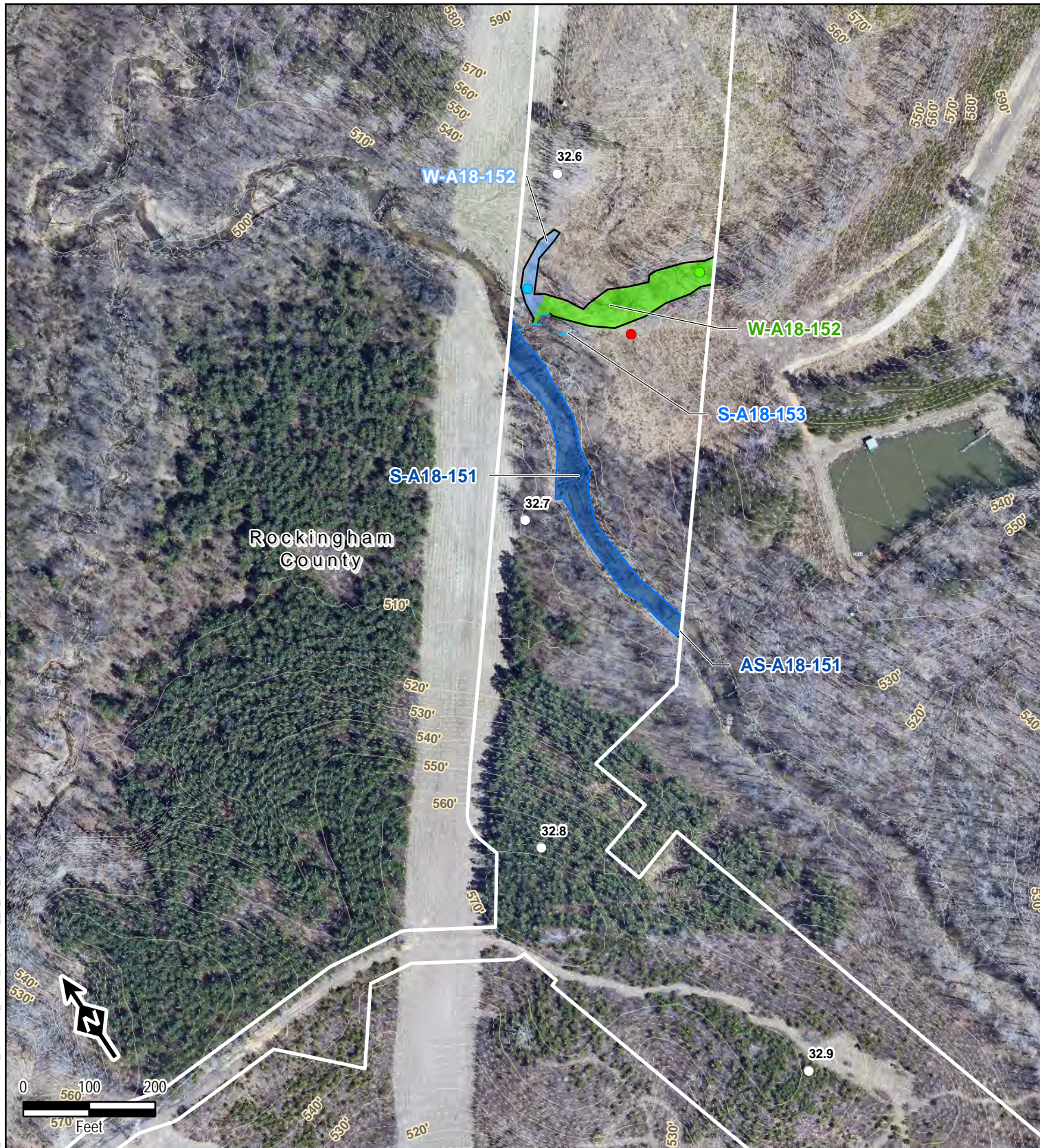


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March 2019

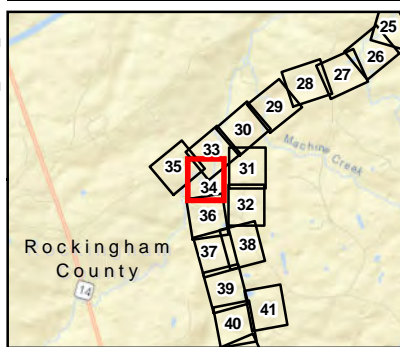
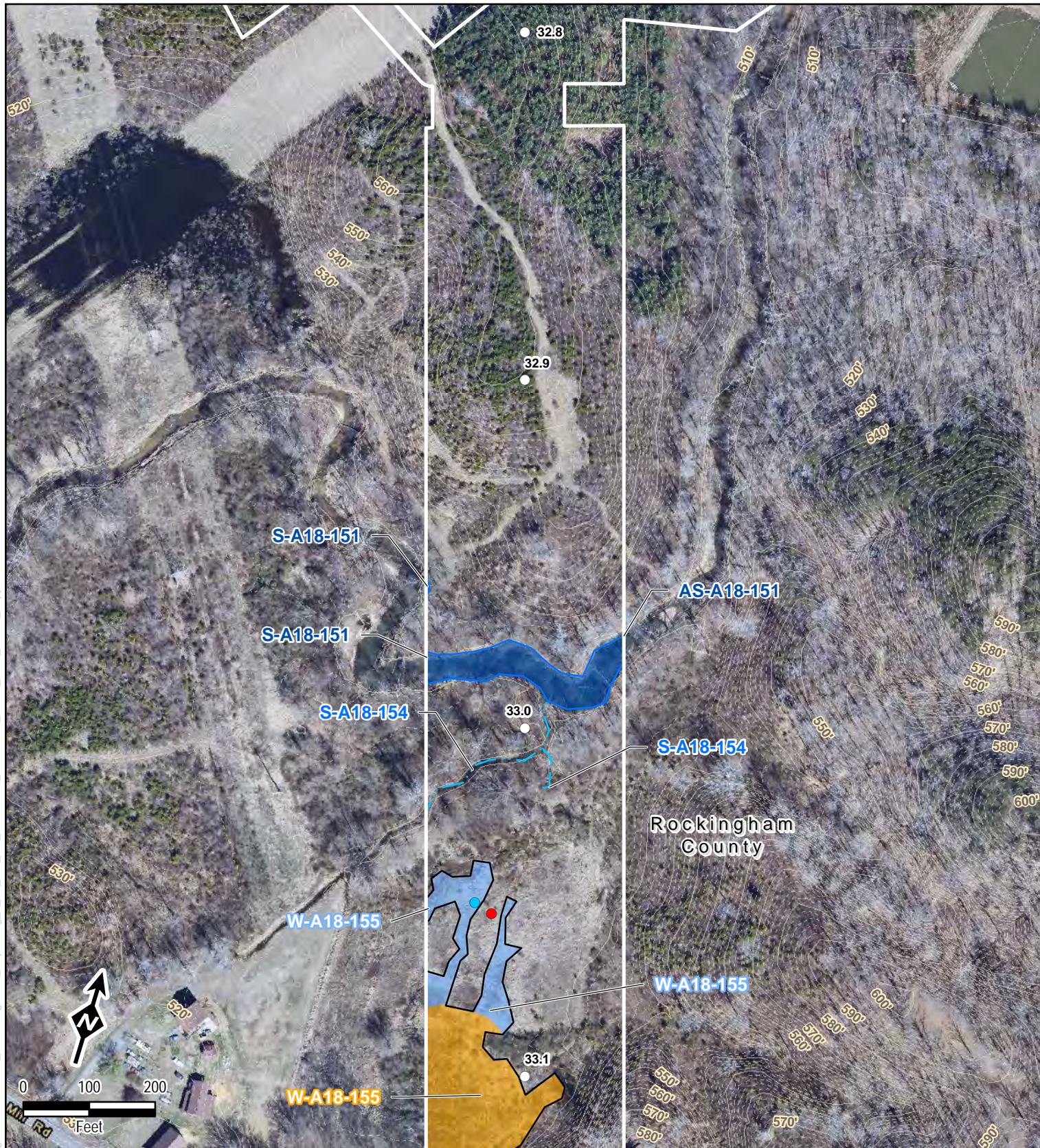
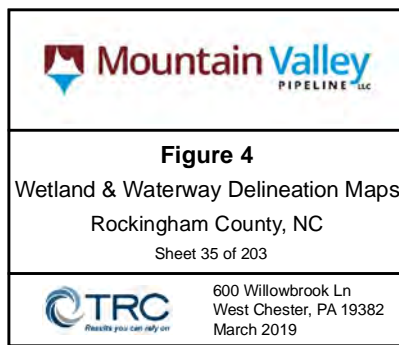
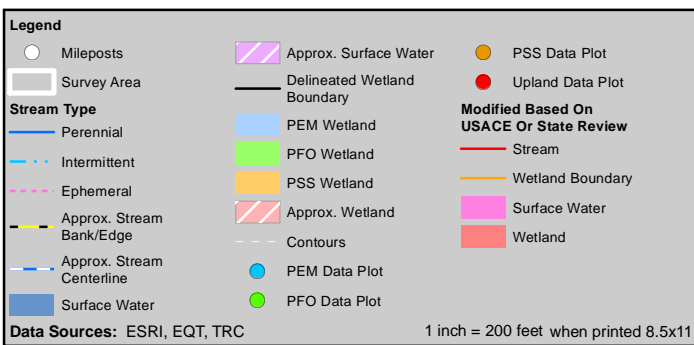
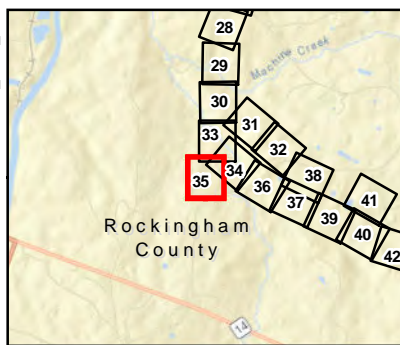
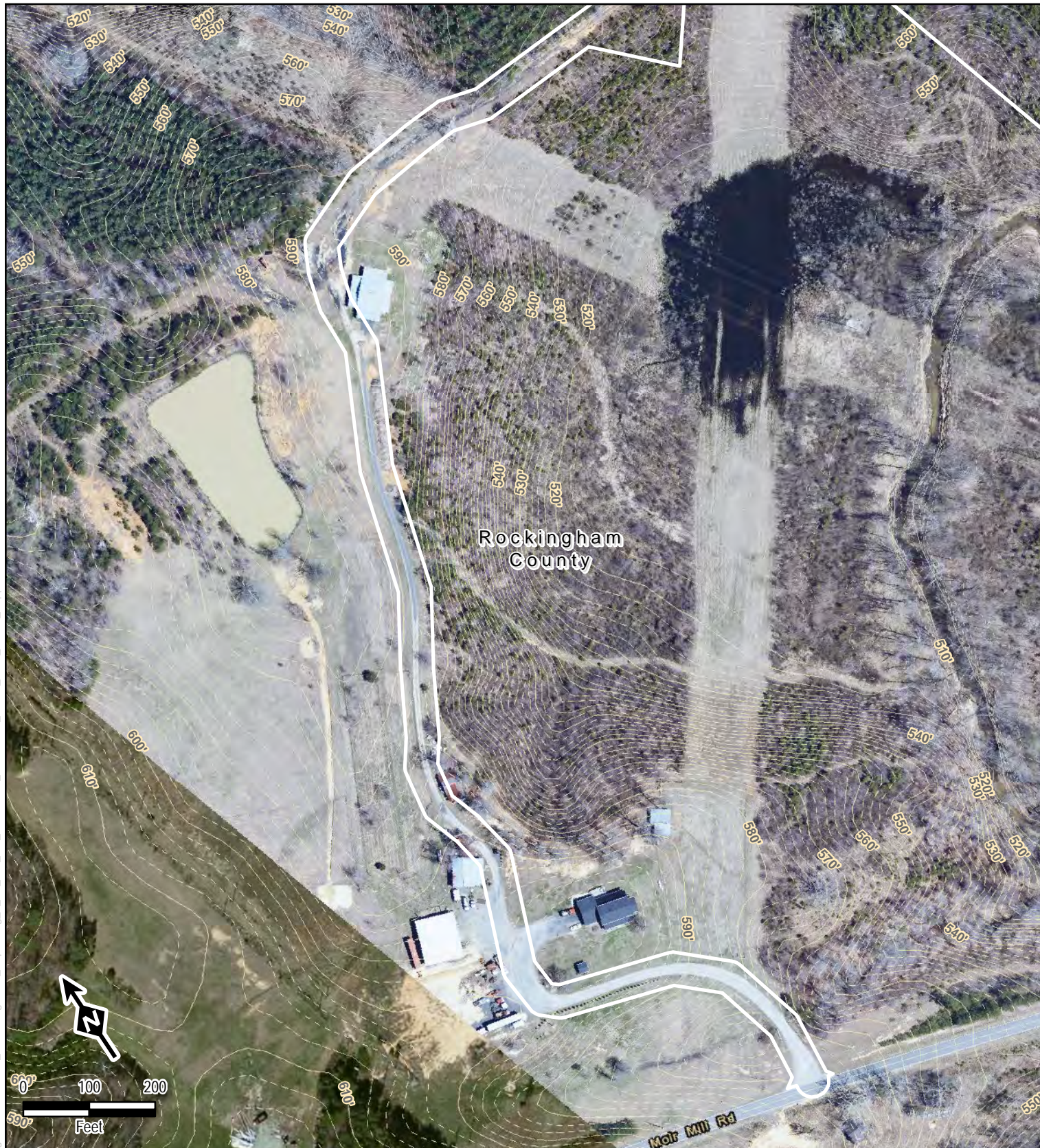
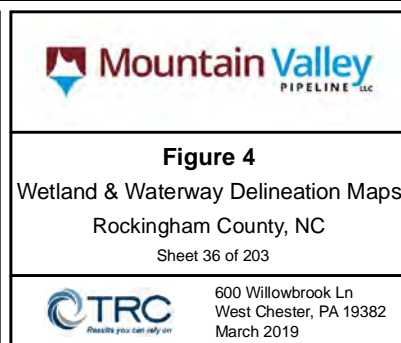
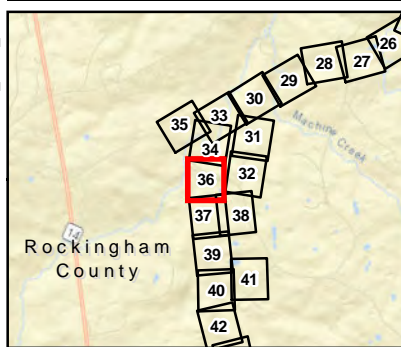
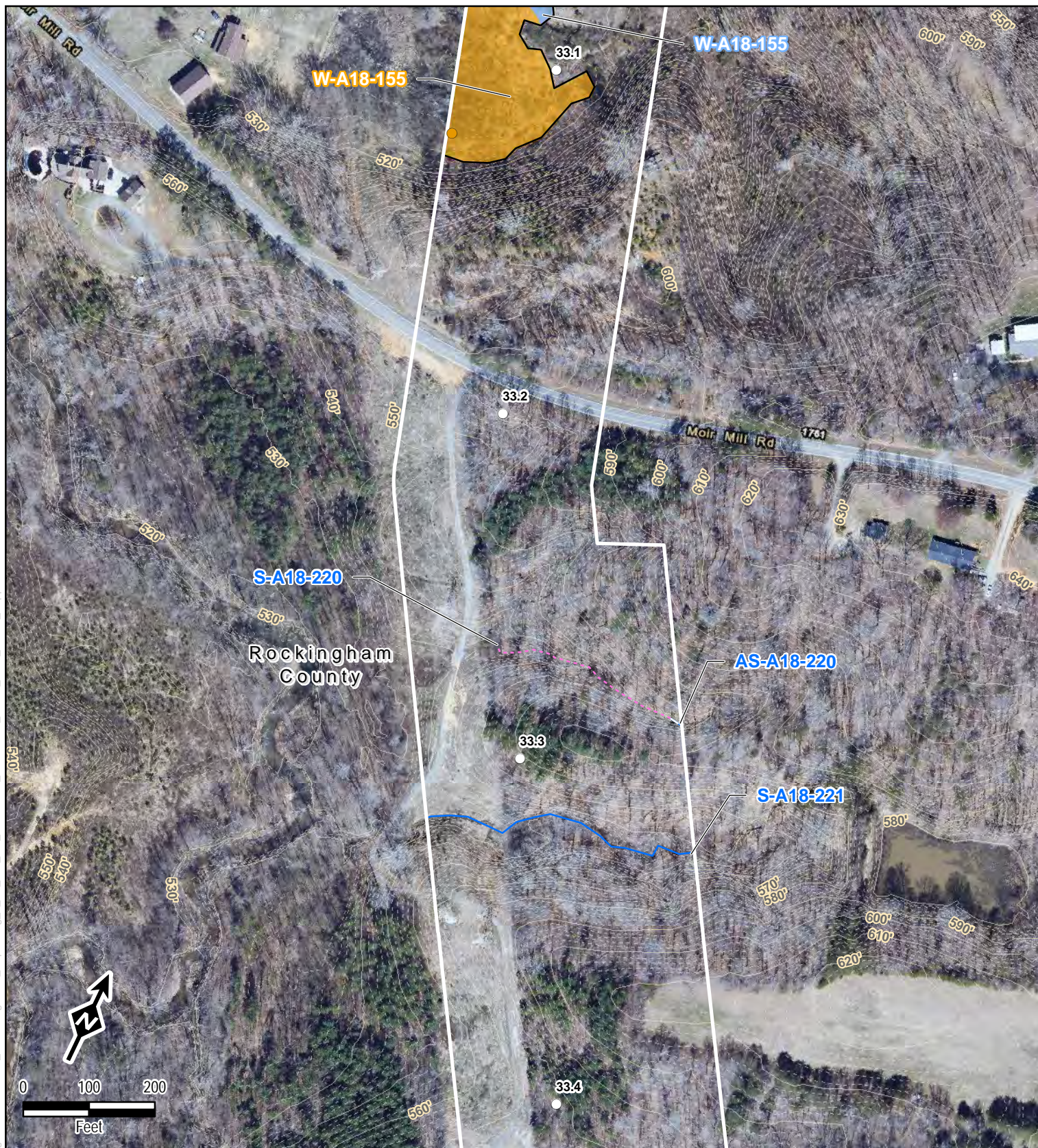


Figure 4
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March 2019





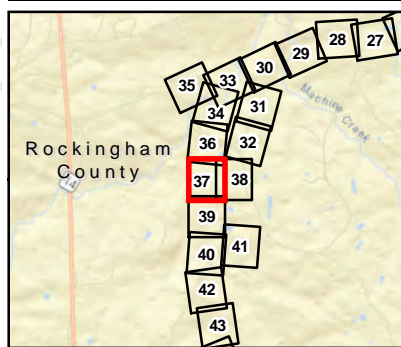


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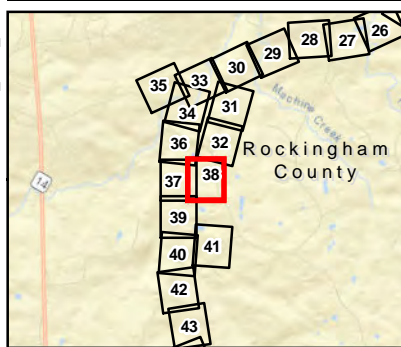
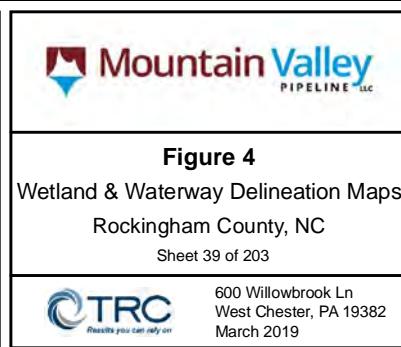
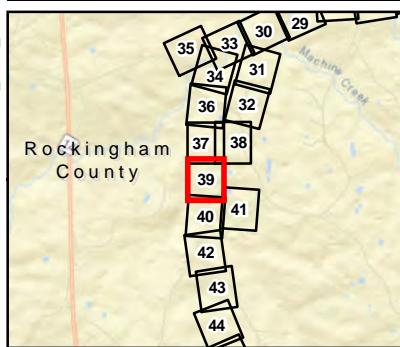
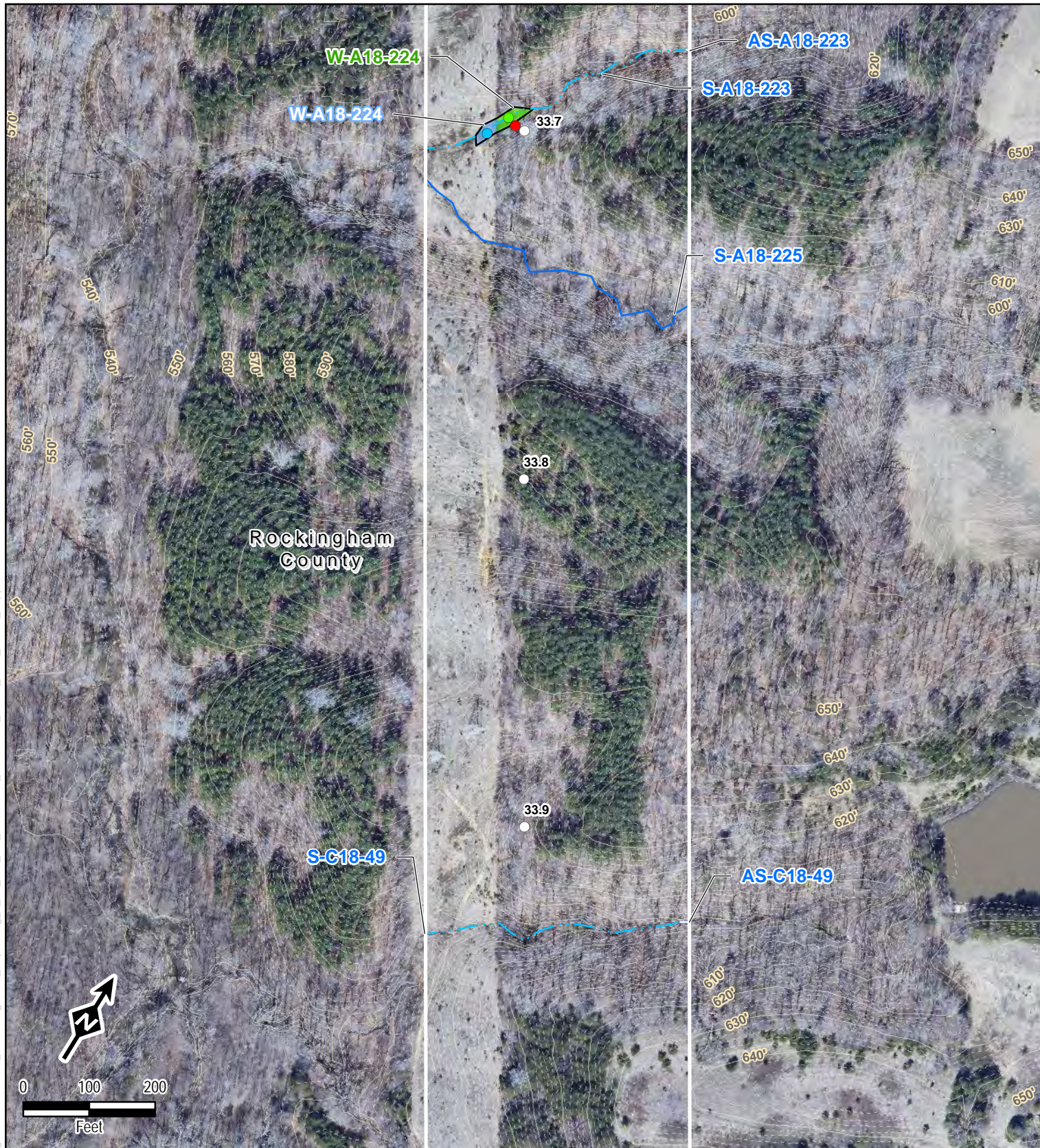


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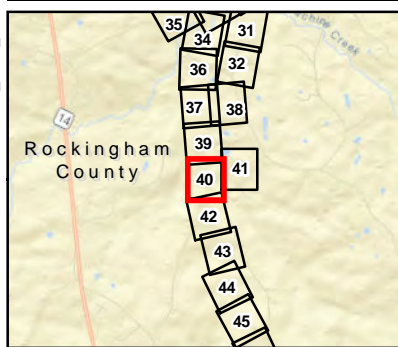


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West Chester, PA 19382
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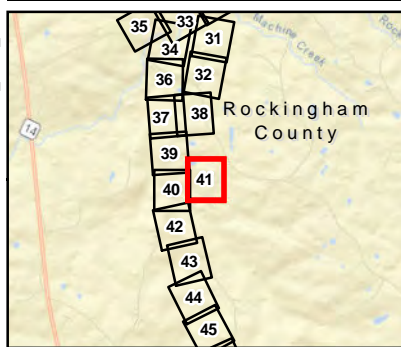


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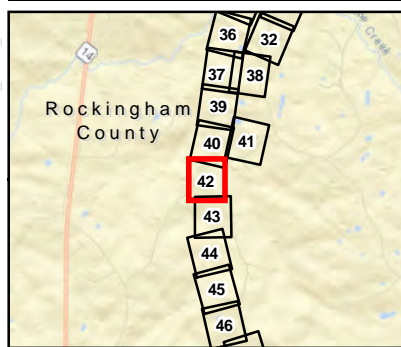
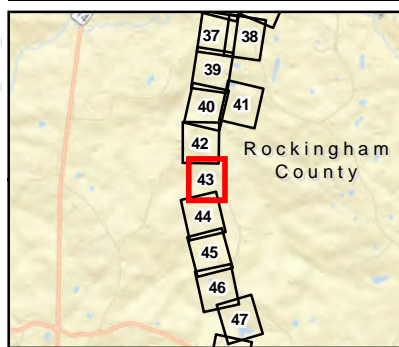
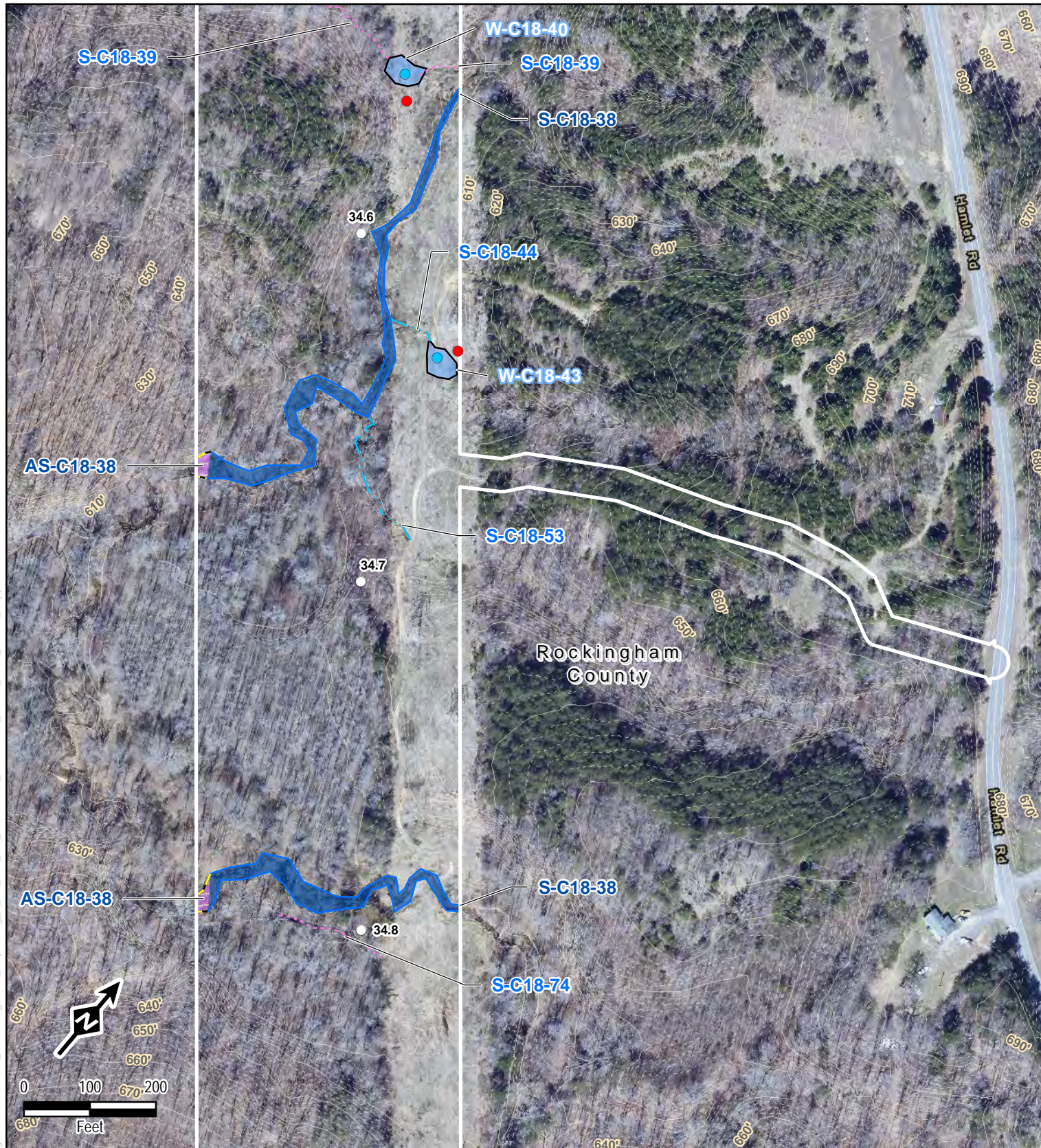


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 42 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- | | | |
|-----------------------------|-----------------------------|--------------------------|
| ○ Mileposts | Approx. Surface Water | ● PSS Data Plot |
| Survey Area | Delineated Wetland Boundary | ● Upland Data Plot |
| Stream Type | PEM Wetland | Modified Based On |
| — Perennial | PFO Wetland | USACE Or State Review |
| - - - Intermittent | PSS Wetland | — Stream |
| · · · Ephemeral | Approx. Wetland | — Wetland Boundary |
| — Approx. Stream Bank/Edge | Contours | — Surface Water |
| — Approx. Stream Centerline | PEM Data Plot | — Wetland |
| — Surface Water | PFO Data Plot | |

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 43 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019

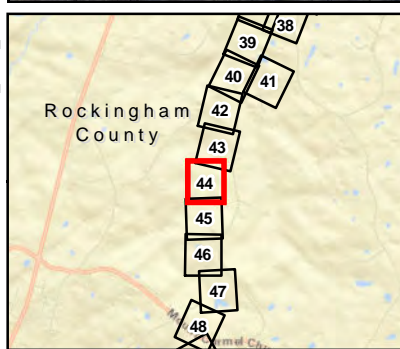
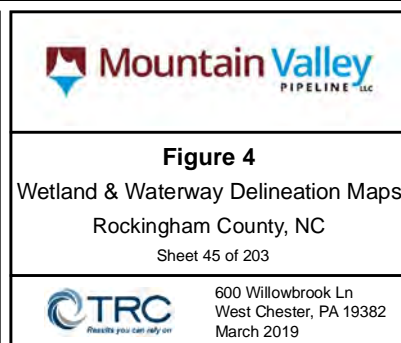
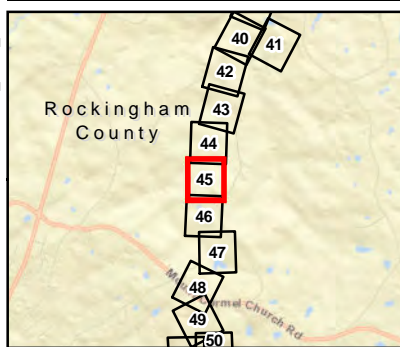


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



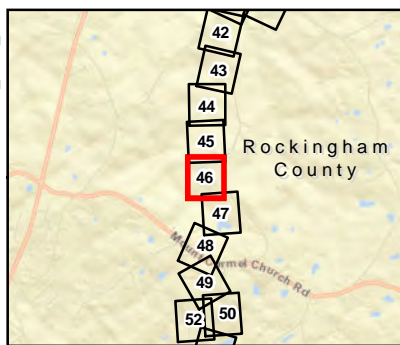


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

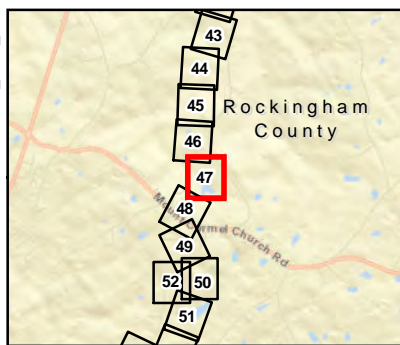


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 47 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019

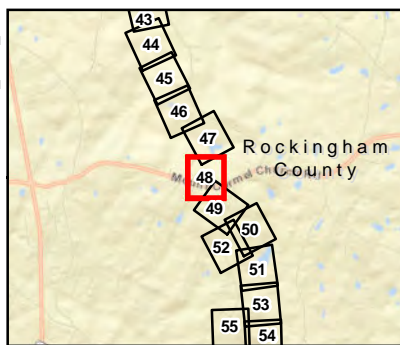
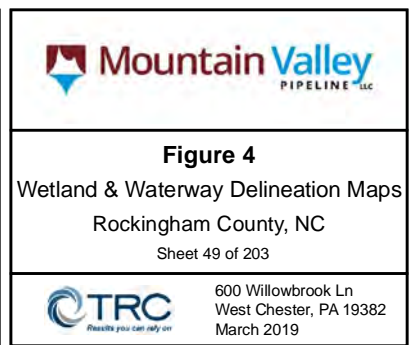
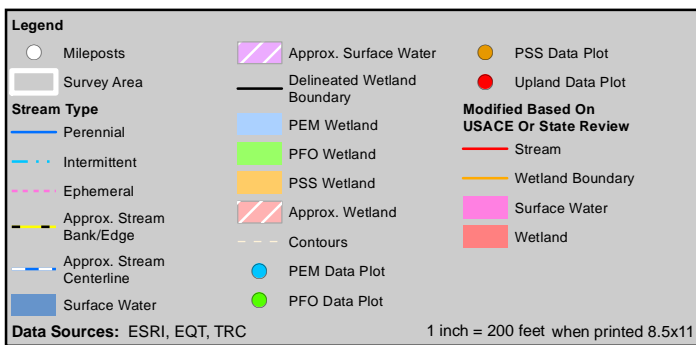
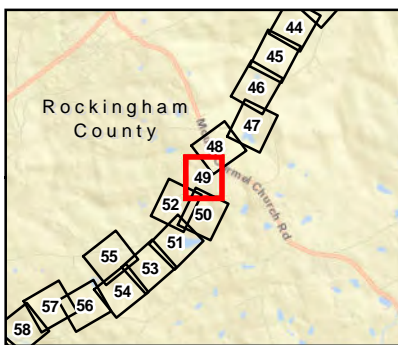


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



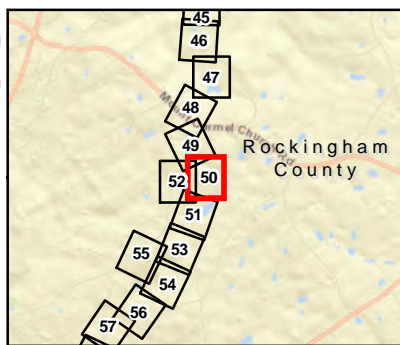
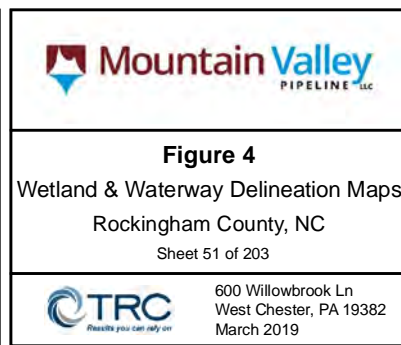
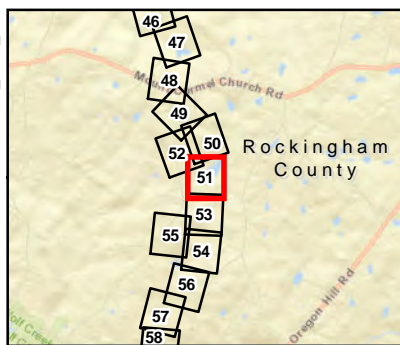
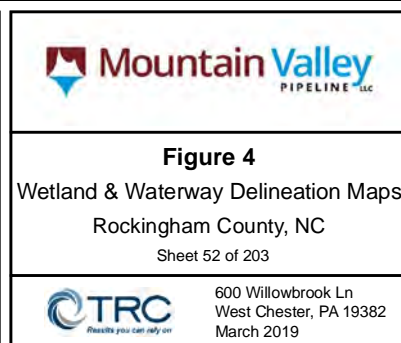
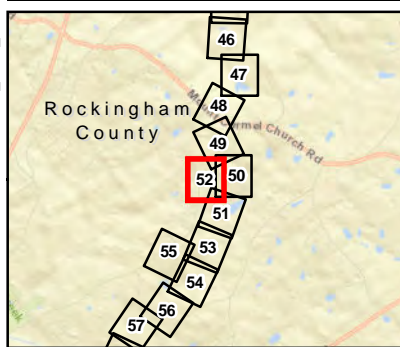


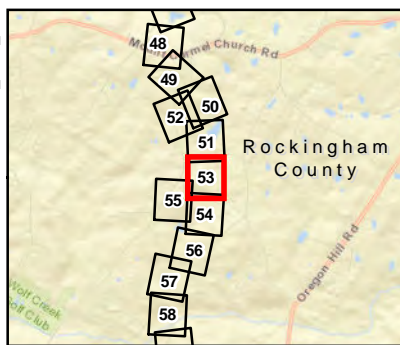
Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019







Legend

○ Mileposts

▭ Survey Area

Stream Type

— Perennial

- - - Intermittent

· · · Ephemeral

— Approx. Stream Bank/Edge

— Approx. Stream Centerline

▭ Surface Water

▨ Approx. Surface Water

— Delineated Wetland Boundary

▭ PEM Wetland

▭ PFO Wetland

▭ PSS Wetland

▨ Approx. Wetland

— Contours

● PEM Data Plot

● PFO Data Plot

● PSS Data Plot

● Upland Data Plot

Modified Based On USACE Or State Review

— Stream

— Wetland Boundary

▭ Surface Water

▭ Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

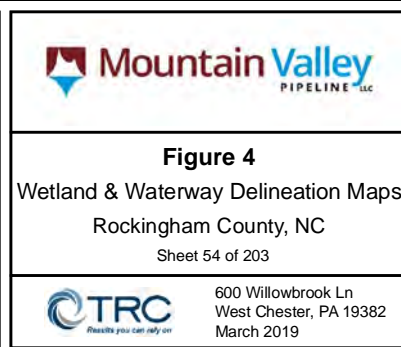
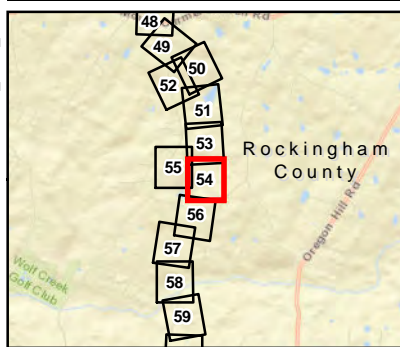
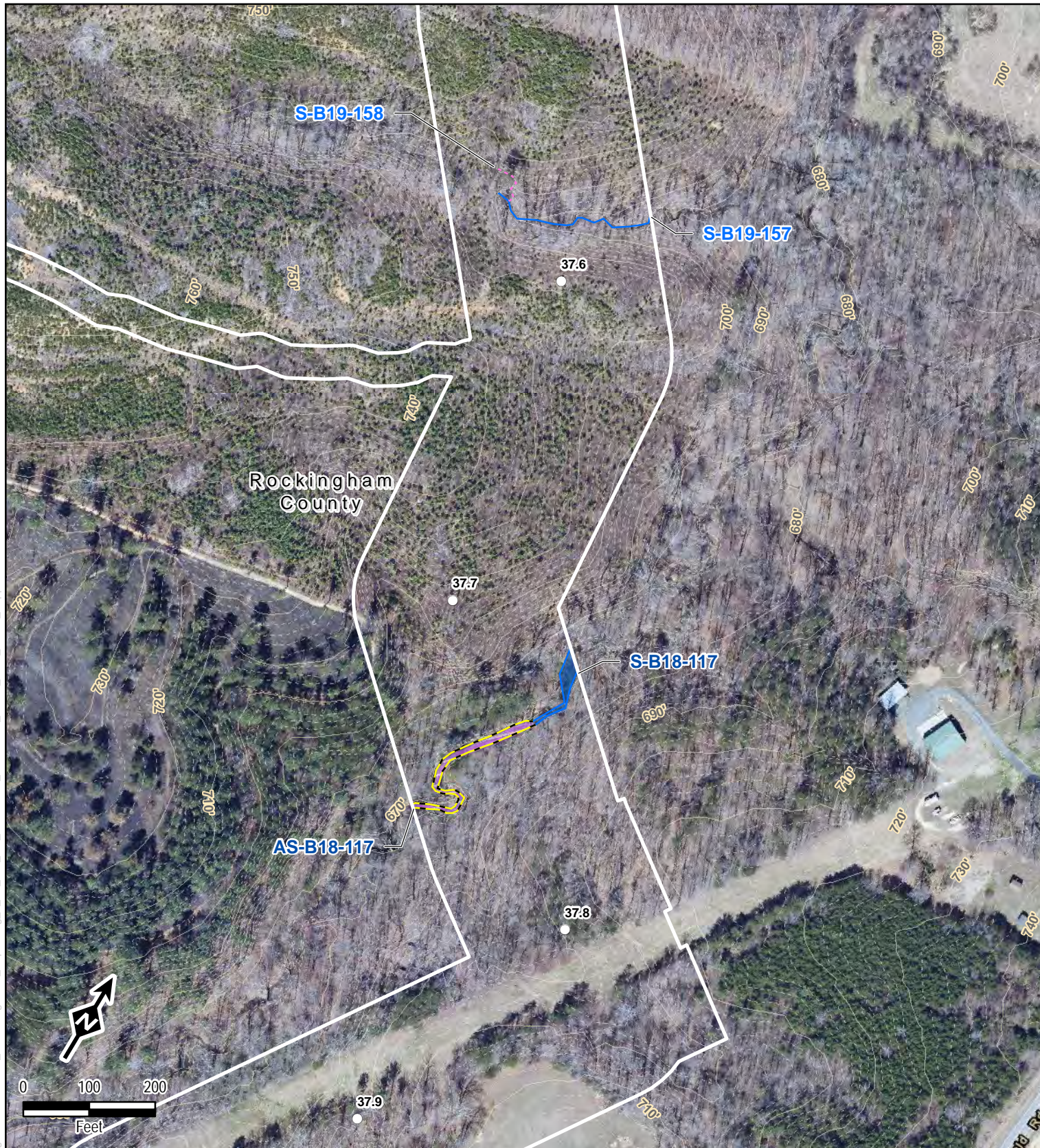
Wetland & Waterway Delineation Maps

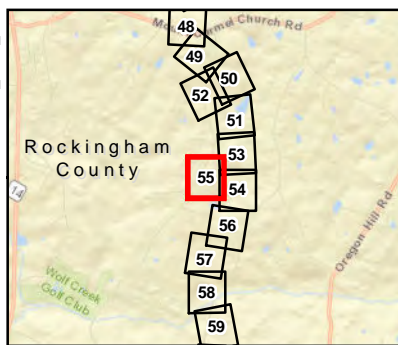
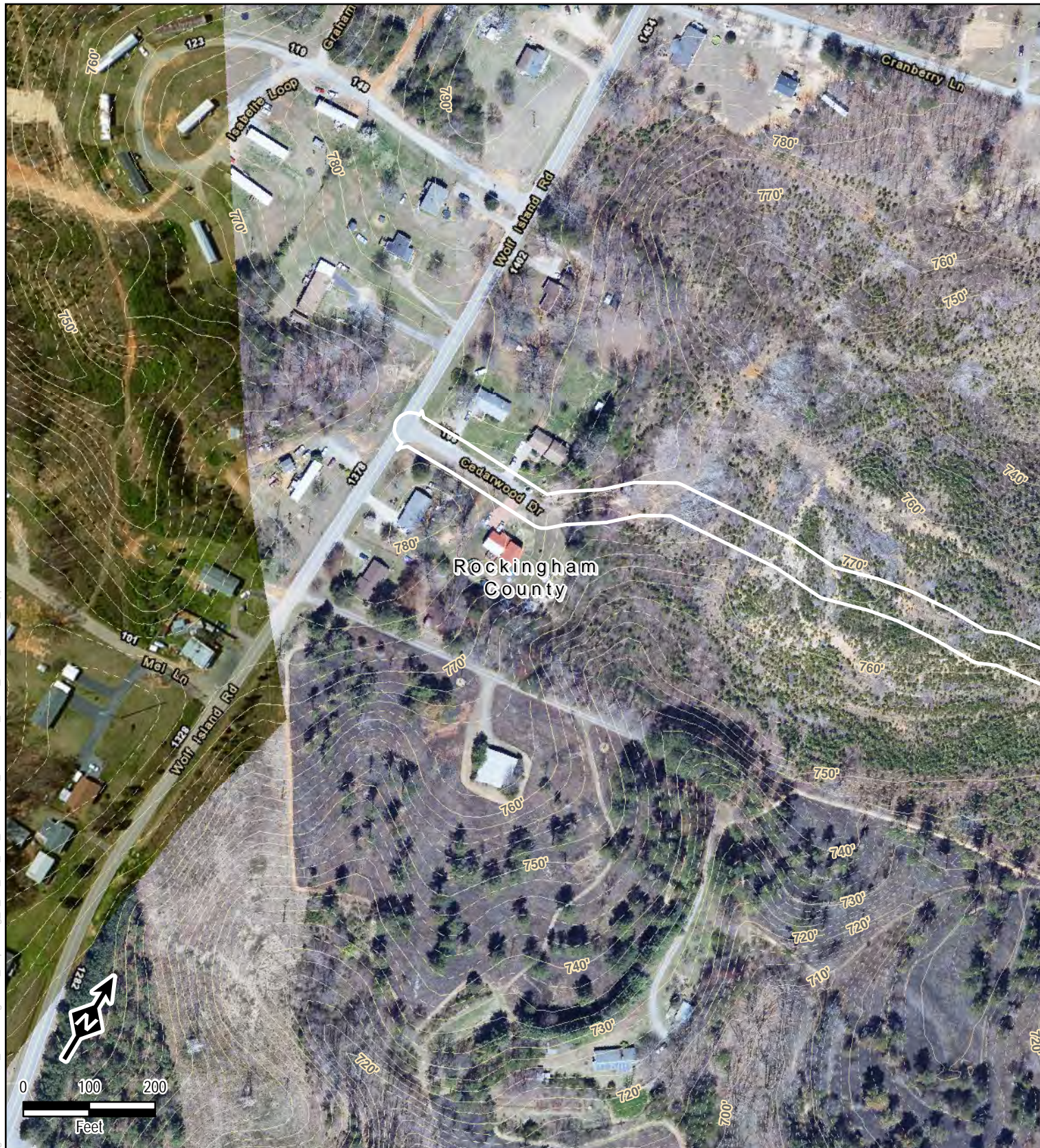
Rockingham County, NC

Sheet 53 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019





Legend

○ Mileposts

▭ Survey Area

Stream Type

— Perennial

- - - Intermittent

· · · Ephemeral

— Approx. Stream Bank/Edge

— Approx. Stream Centerline

■ Surface Water

▨ Approx. Surface Water

— Delineated Wetland Boundary

■ PEM Wetland

■ PFO Wetland

■ PSS Wetland

▨ Approx. Wetland

— Contours

● PEM Data Plot

● PFO Data Plot

● PSS Data Plot

● Upland Data Plot

Modified Based On USACE Or State Review

— Stream

— Wetland Boundary

■ Surface Water

■ Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

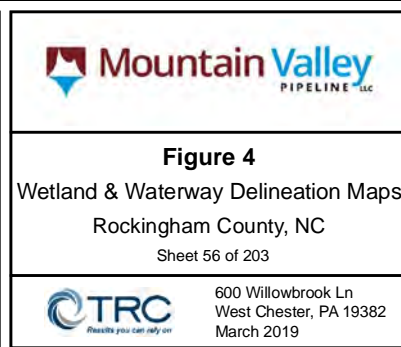
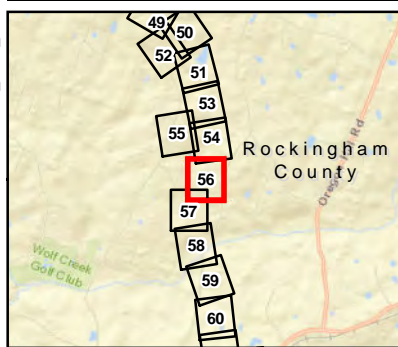
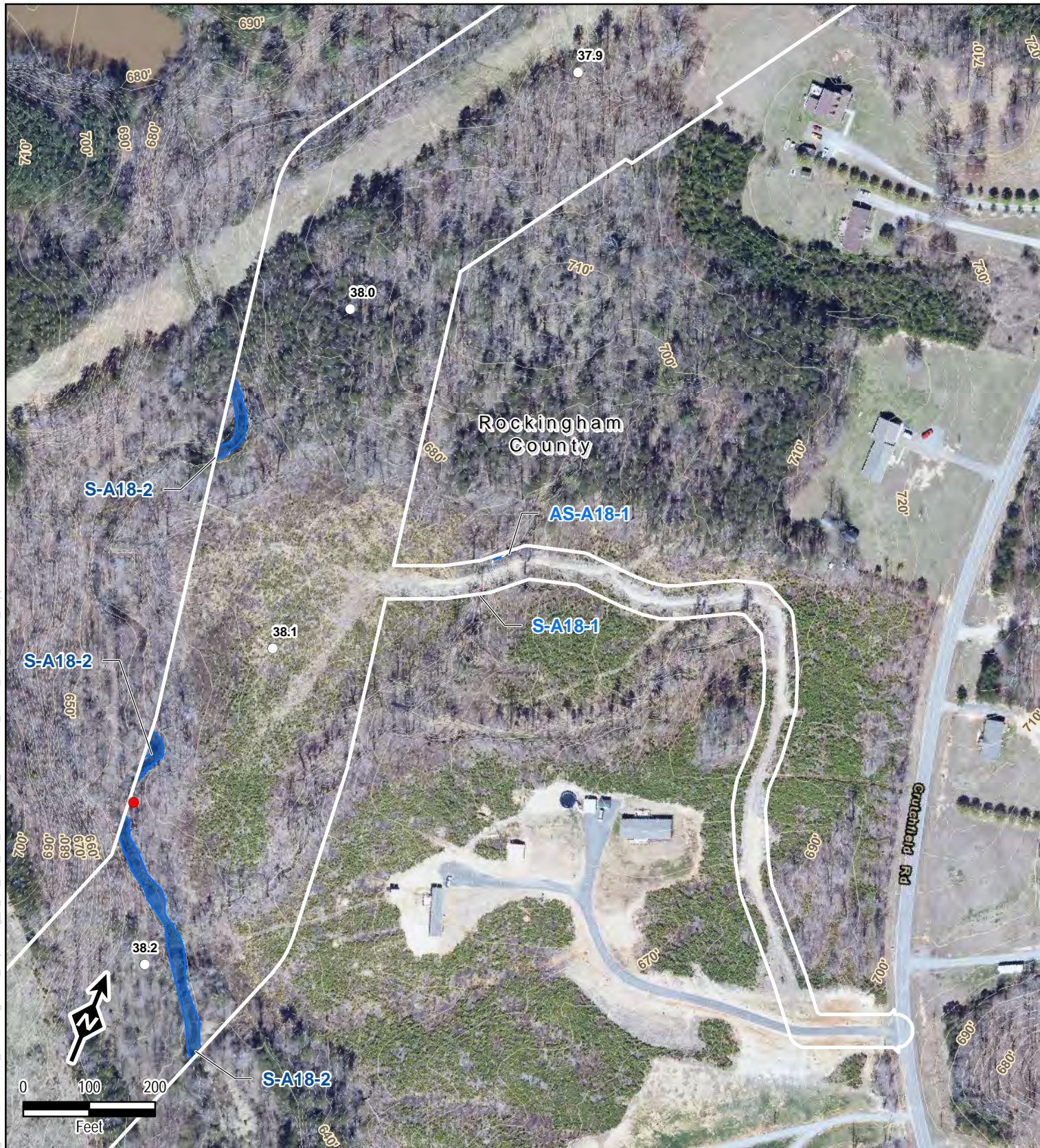
Wetland & Waterway Delineation Maps

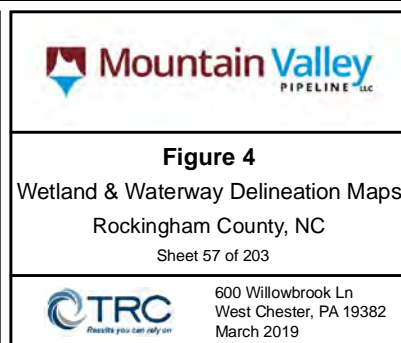
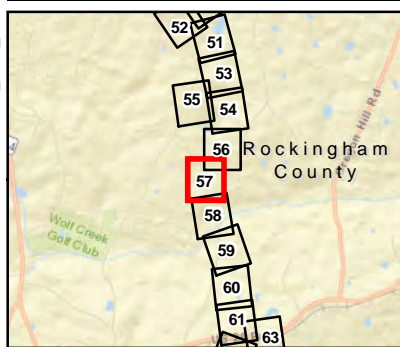
Rockingham County, NC

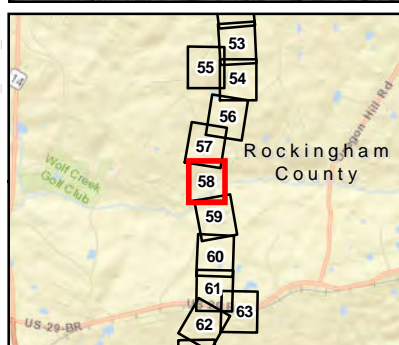
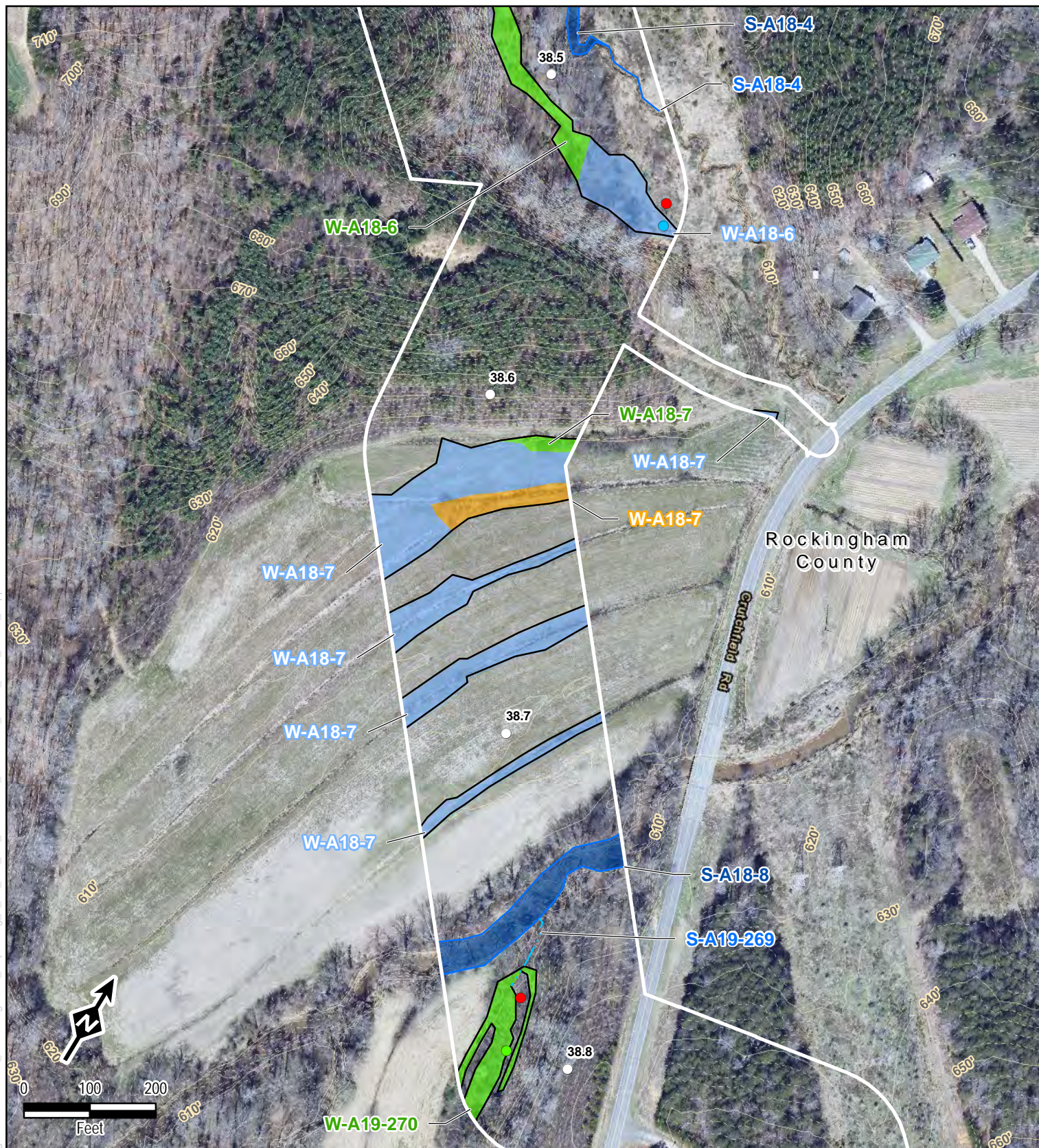
Sheet 55 of 203


























600 Willowbrook Ln
West Chester, PA 19382
March 2019








Legend

 Mileposts	 Approx. Surface Water	 PSS Data Plot
 Survey Area	 Delineated Wetland Boundary	 Upland Data Plot
Stream Type		
 Perennial	 PEM Wetland	Modified Based On USACE Or State Review
 Intermittent	 PFO Wetland	
 Ephemeral	 PSS Wetland	
 Approx. Stream Bank/Edge	 Approx. Wetland	
 Approx. Stream Centerline	 Contours	
 Surface Water	 PEM Data Plot	 Stream
	 PFO Data Plot	 Wetland Boundary
		 Surface Water
		 Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Mountain Valley
PIPELINE LLC

Figure 4

Wetland & Waterway Delineation Maps

Rockingham County, NC

Sheet 58 of 203

600 Willowbrook Ln
West Chester, PA 19382
March 2019

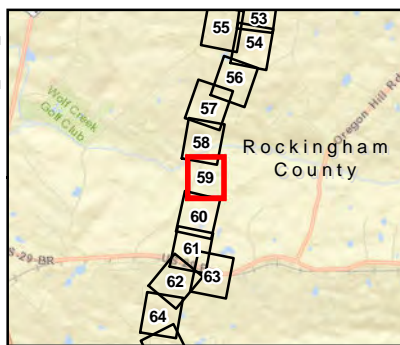
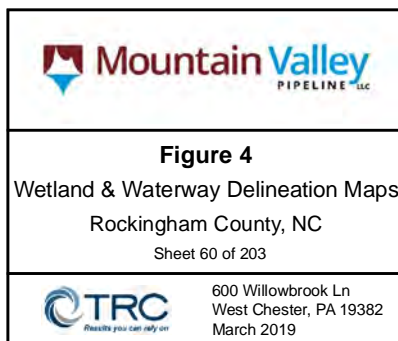
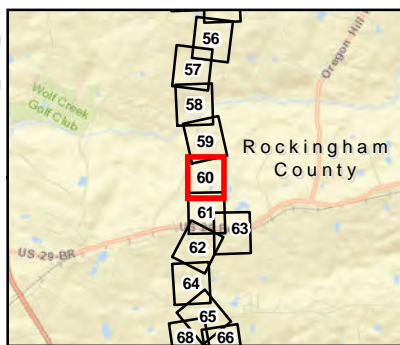


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 59 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



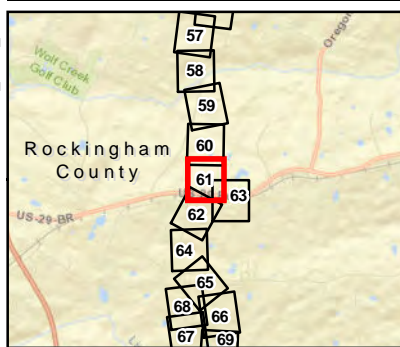
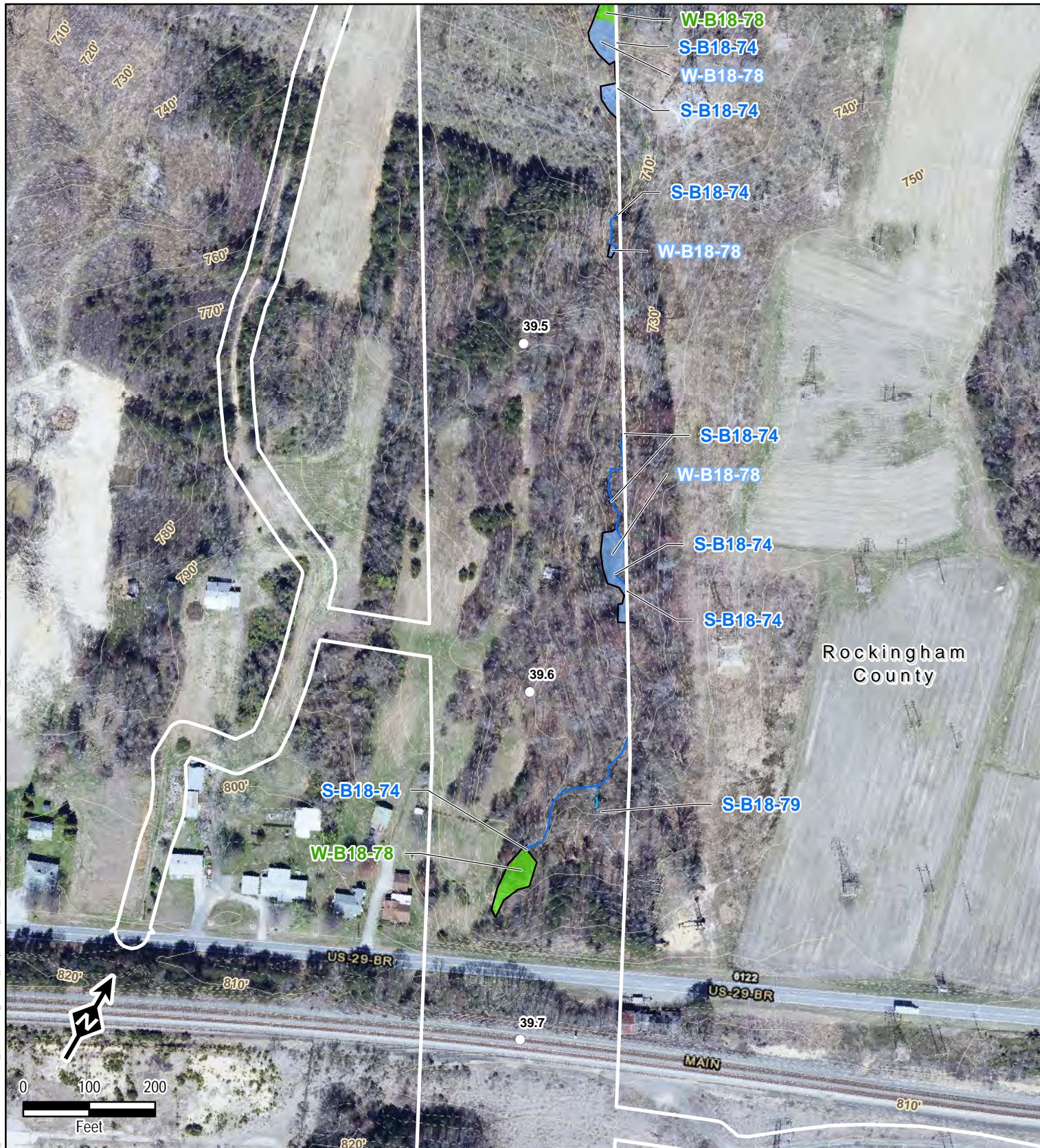
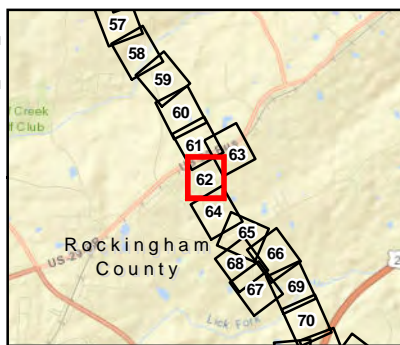


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- ▭ Survey Area

Stream Type

- Perennial
- - - Intermittent
- · - · Ephemeral
- - - Approx. Stream Bank/Edge
- - - Approx. Stream Centerline
- Surface Water

- ▨ Approx. Surface Water
- ▬ Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- ▨ Approx. Wetland
- - - Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

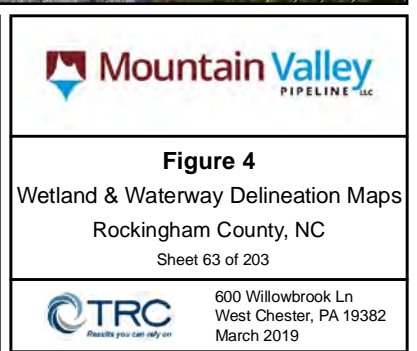
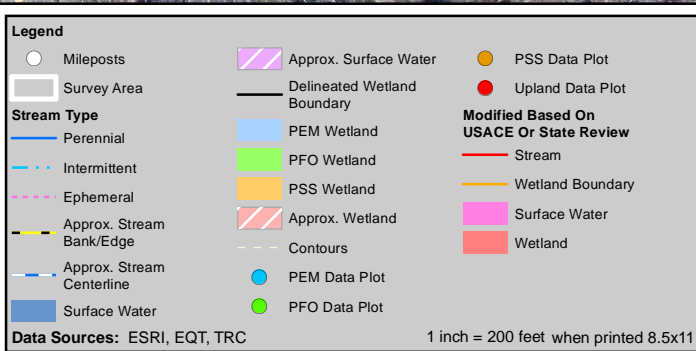
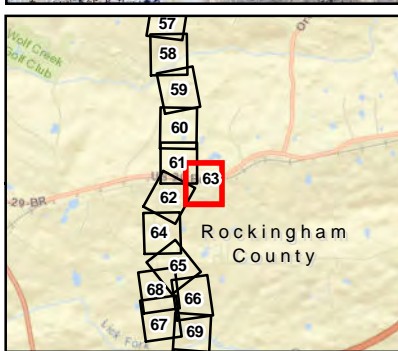
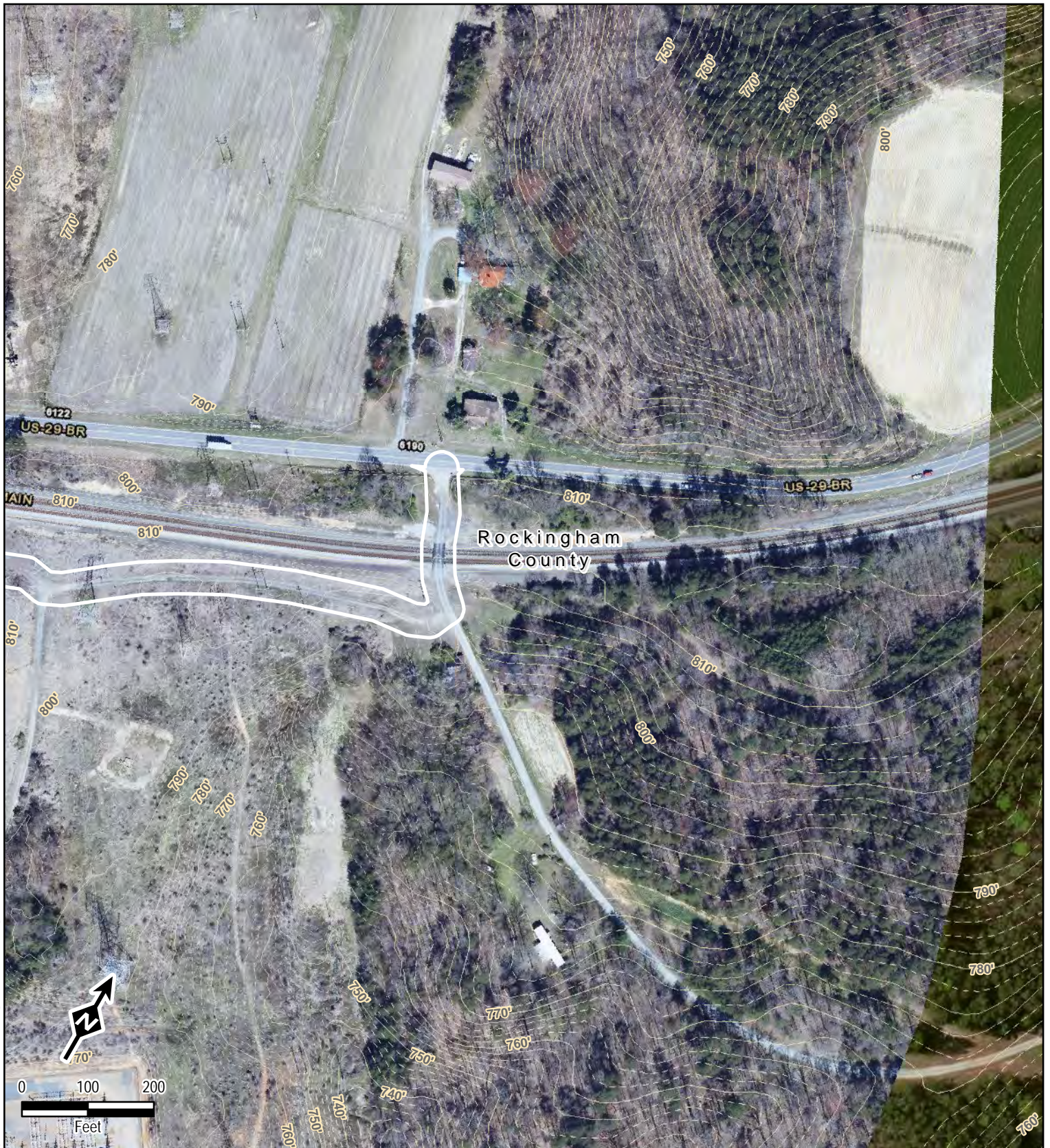
Wetland & Waterway Delineation Maps

Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019



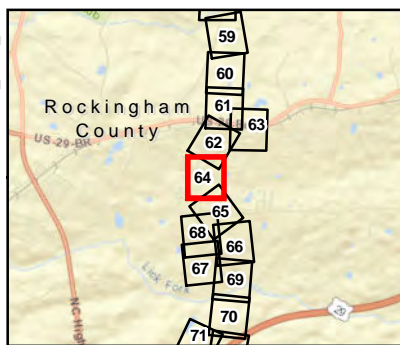
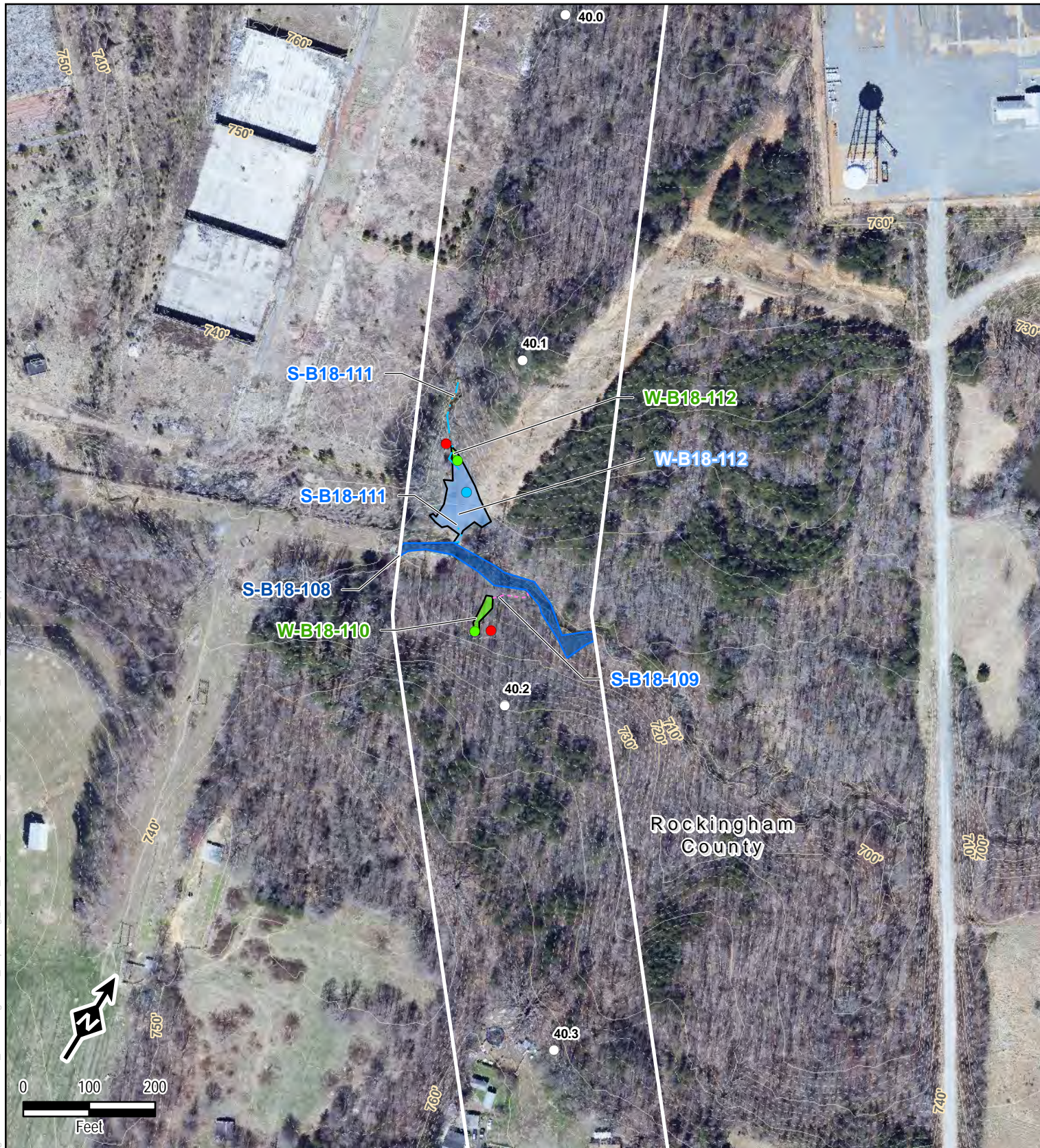
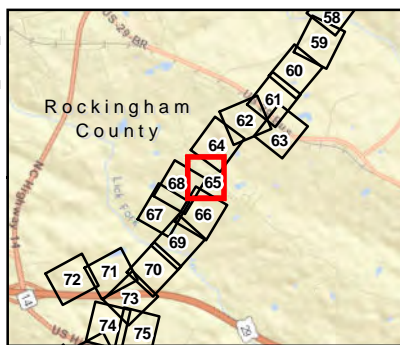


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 64 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

○ Mileposts

▭ Survey Area

Stream Type

— Perennial

- - - Intermittent

· · · Ephemeral

— Approx. Stream Bank/Edge

— Approx. Stream Centerline

■ Surface Water

▨ Approx. Surface Water

— Delineated Wetland Boundary

■ PEM Wetland

■ PFO Wetland

■ PSS Wetland

▨ Approx. Wetland

— Contours

● PEM Data Plot

● PFO Data Plot

● PSS Data Plot

● Upland Data Plot

Modified Based On USACE Or State Review

— Stream

— Wetland Boundary

■ Surface Water

■ Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps

Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

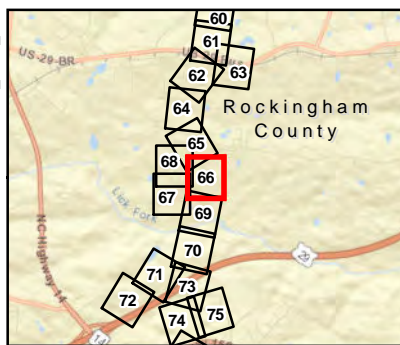
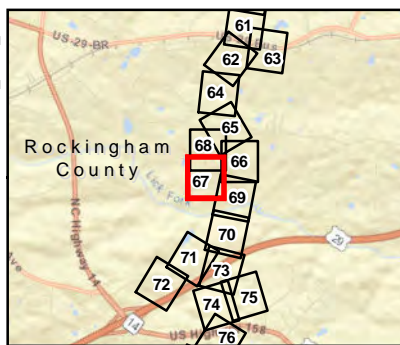
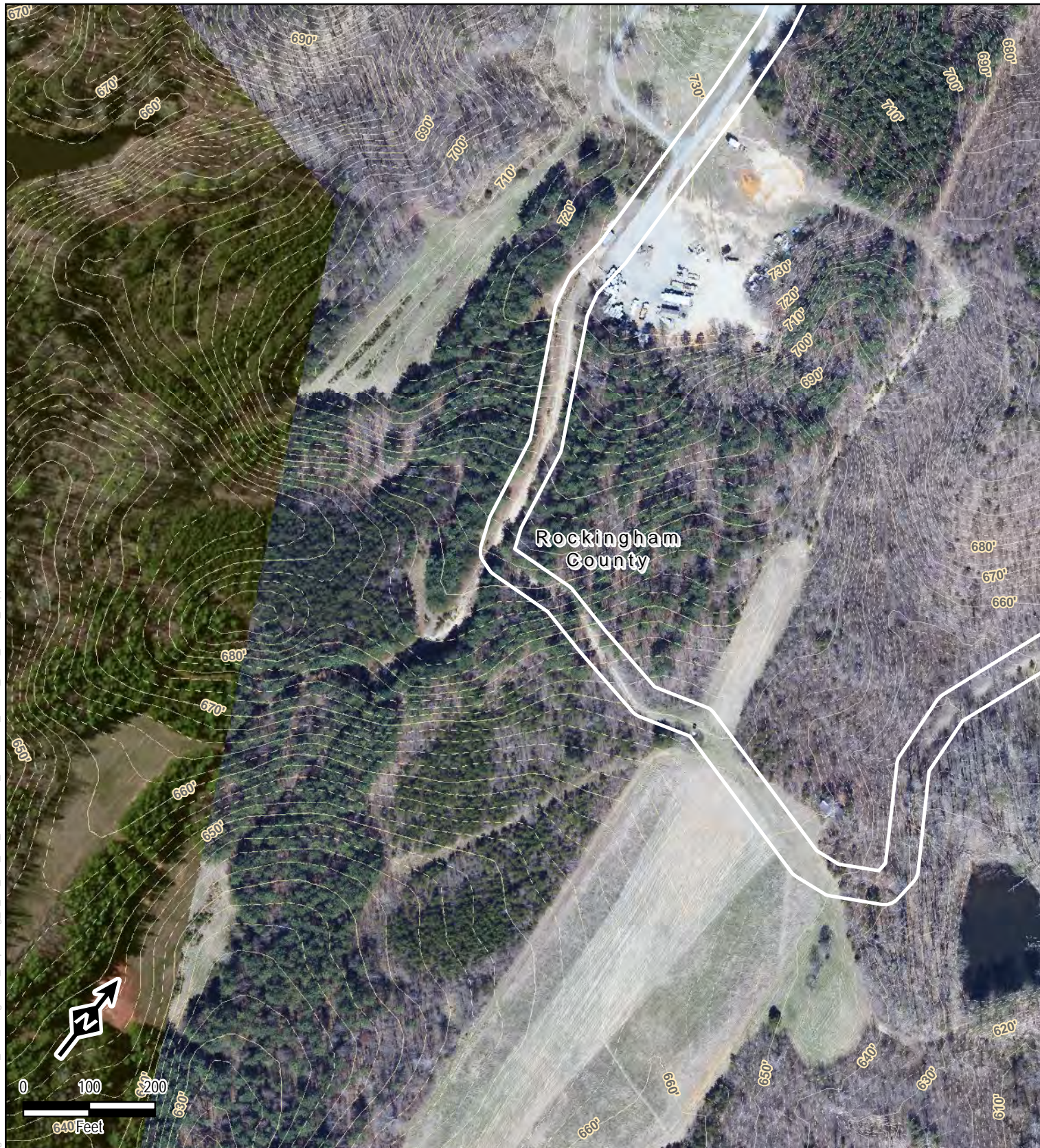


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- | | | |
|-----------------------------|-----------------------------|------------------------------|
| ○ Mileposts | Approx. Surface Water | ● PSS Data Plot |
| Survey Area | Delineated Wetland Boundary | ● Upland Data Plot |
| Stream Type | PEM Wetland | Modified Based On |
| — Perennial | PFO Wetland | USACE Or State Review |
| - - - Intermittent | PSS Wetland | — Stream |
| - · - Ephemeral | Approx. Wetland | — Wetland Boundary |
| — Approx. Stream Bank/Edge | Contours | — Surface Water |
| — Approx. Stream Centerline | PEM Data Plot | — Wetland |
| — Surface Water | PFO Data Plot | |

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps

Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

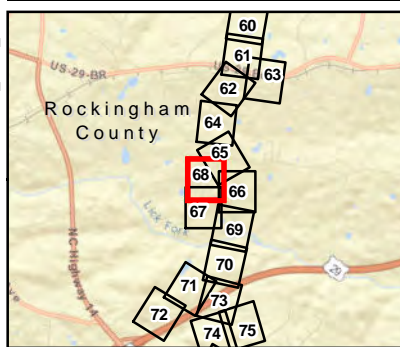
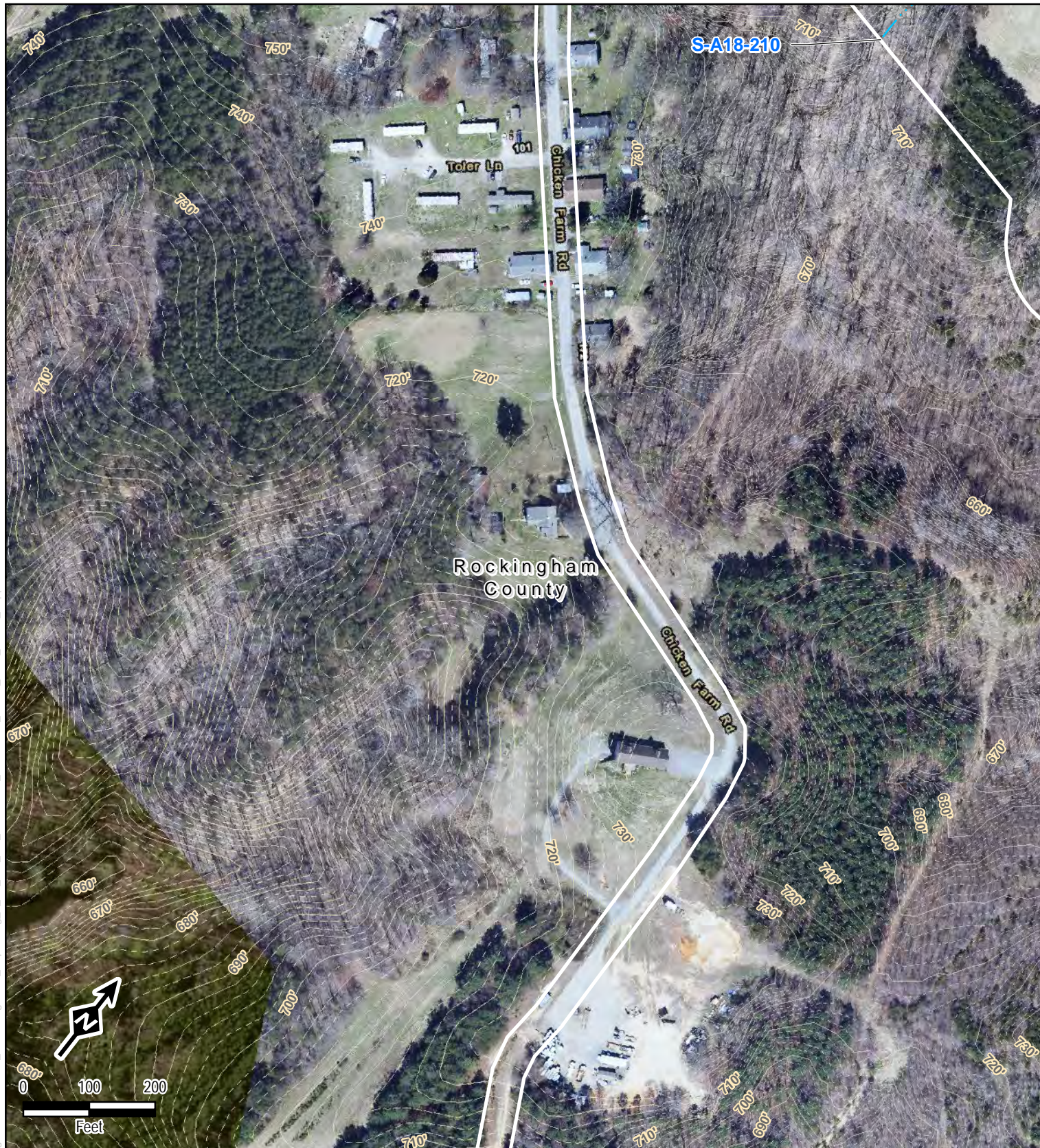


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 68 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019

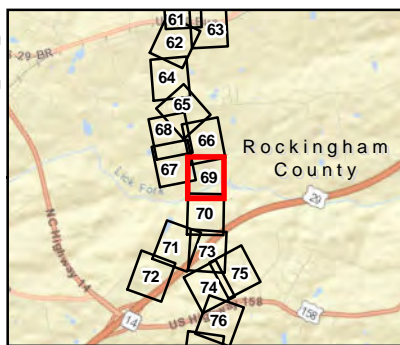
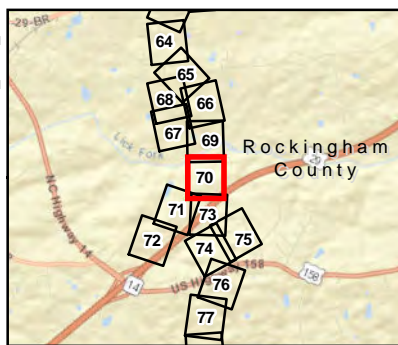


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 69 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- ▭ Survey Area

Stream Type

- Perennial
- - - Intermittent
- · - · - Ephemeral
- - - Approx. Stream Bank/Edge
- - - Approx. Stream Centerline
- Surface Water

- ▨ Approx. Surface Water
- ▬ Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- ▨ Approx. Wetland
- - - Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps
Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

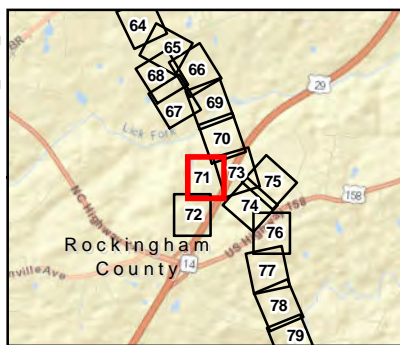
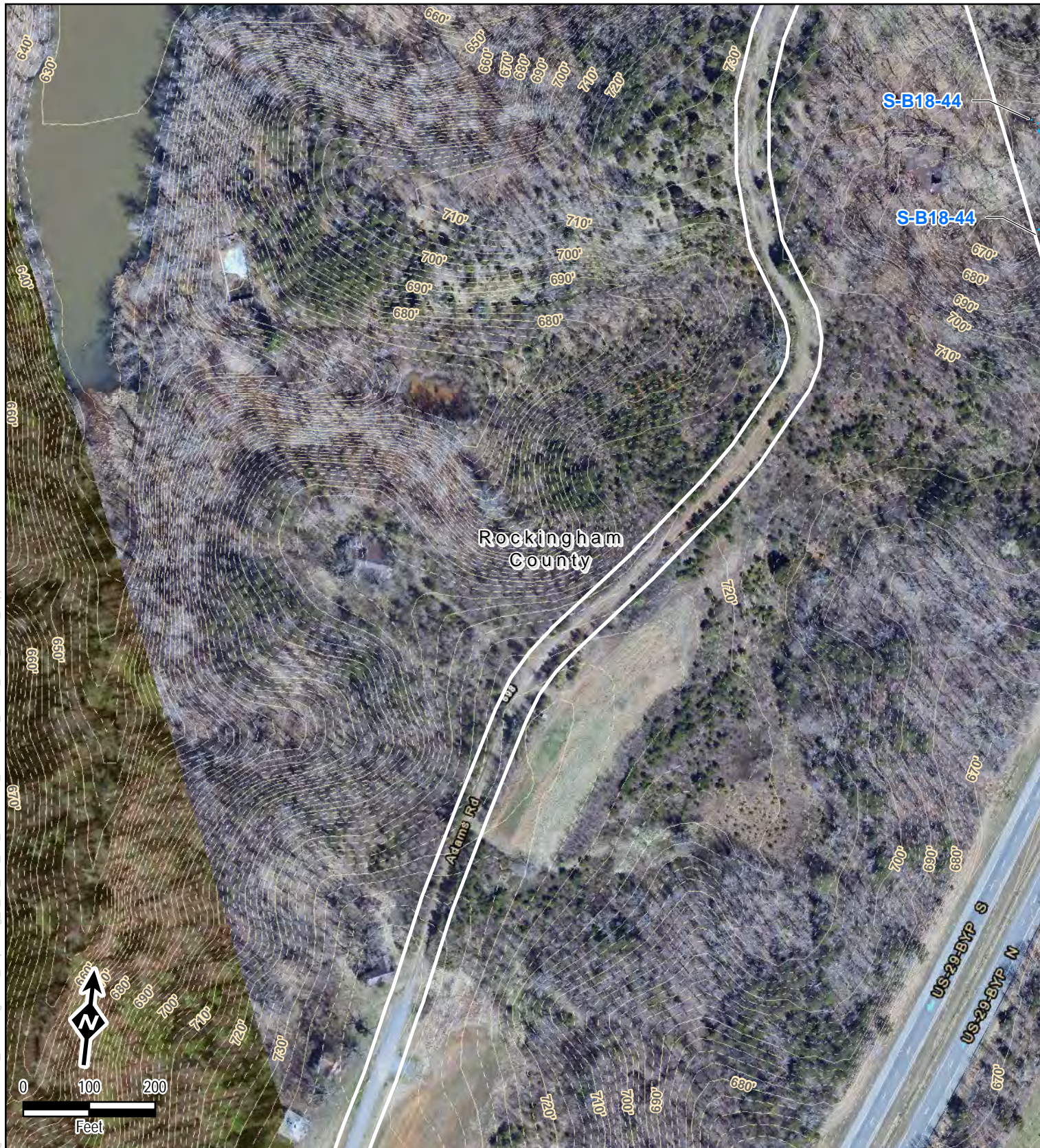
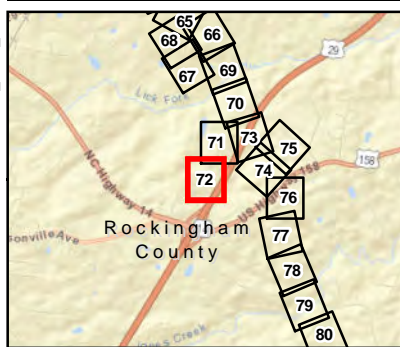


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 71 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- | | | |
|-----------------------------|-----------------------------|--------------------------|
| ○ Mileposts | Approx. Surface Water | ● PSS Data Plot |
| Survey Area | Delineated Wetland Boundary | ● Upland Data Plot |
| Stream Type | PEM Wetland | Modified Based On |
| — Perennial | PFO Wetland | USACE Or State Review |
| - - - Intermittent | PSS Wetland | — Stream |
| - · - · - Ephemeral | Approx. Wetland | — Wetland Boundary |
| — Approx. Stream Bank/Edge | Contours | — Surface Water |
| — Approx. Stream Centerline | ● PEM Data Plot | — Wetland |
| — Surface Water | ● PFO Data Plot | |

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps

Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

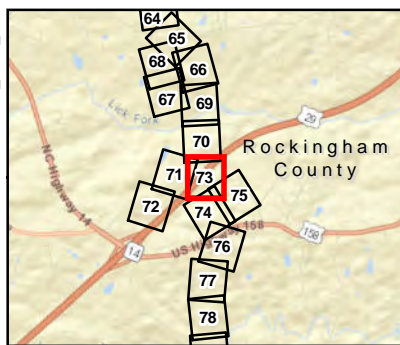
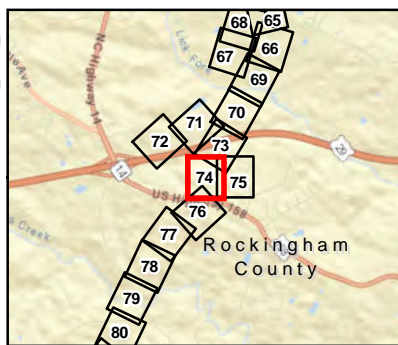


Figure 4
Wetland & Waterway Delineation Maps
Rockingham County, NC
Sheet 73 of 203



600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- Survey Area

Stream Type

- Perennial
- - - Intermittent
- · · Ephemeral
- - - Approx. Stream Bank/Edge
- - - Approx. Stream Centerline
- Surface Water

- Approx. Surface Water
- Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Approx. Wetland
- Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps
Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

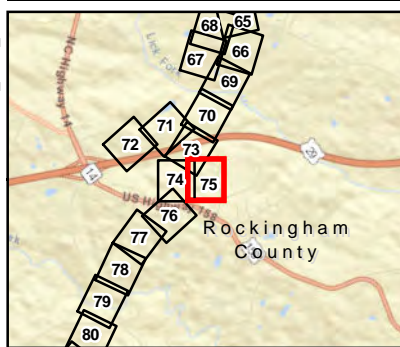


Figure 4
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Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

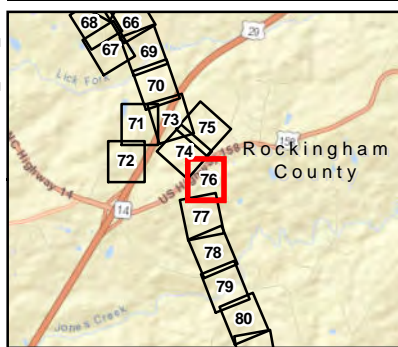
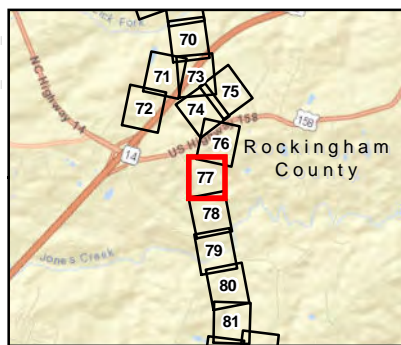


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Rockingham County, NC
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600 Willowbrook Ln
West Chester, PA 19382
March 2019



Legend

- Mileposts
- ▭ Survey Area

Stream Type

- Perennial
- - - Intermittent
- · - · - Ephemeral
- - - Approx. Stream Bank/Edge
- - - Approx. Stream Centerline
- Surface Water

- ▨ Approx. Surface Water
- Delineated Wetland Boundary
- PEM Wetland
- PFO Wetland
- PSS Wetland
- ▨ Approx. Wetland
- - - Contours
- PEM Data Plot
- PFO Data Plot

- PSS Data Plot
- Upland Data Plot

Modified Based On USACE Or State Review

- Stream
- Wetland Boundary
- Surface Water
- Wetland

Data Sources: ESRI, EQT, TRC

1 inch = 200 feet when printed 8.5x11



Figure 4

Wetland & Waterway Delineation Maps

Rockingham County, NC

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600 Willowbrook Ln
West Chester, PA 19382
March 2019

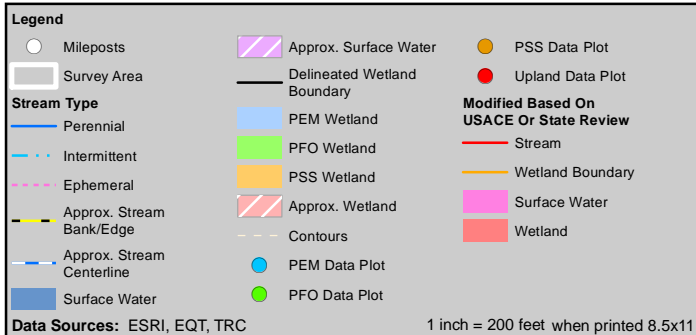
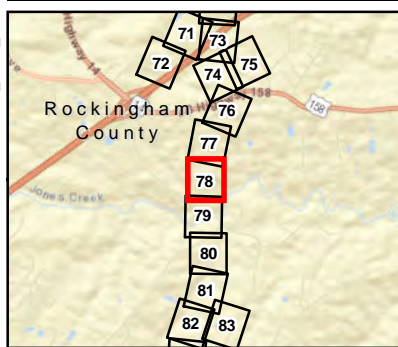


Figure 4
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600 Willowbrook Ln
West Chester, PA 19382
March 2019

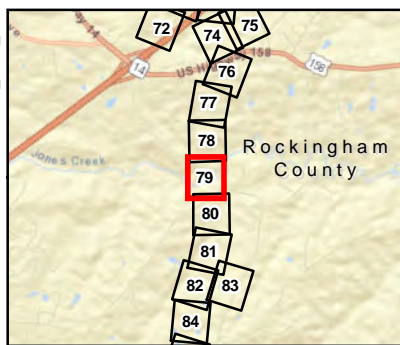


Figure 4
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600 Willowbrook Ln
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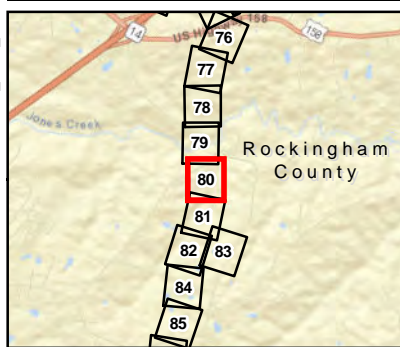


Figure 4
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600 Willowbrook Ln
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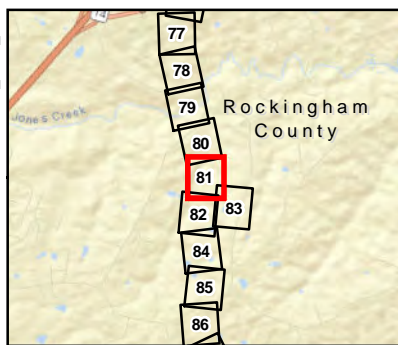


Figure 4
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600 Willowbrook Ln
West Chester, PA 19382
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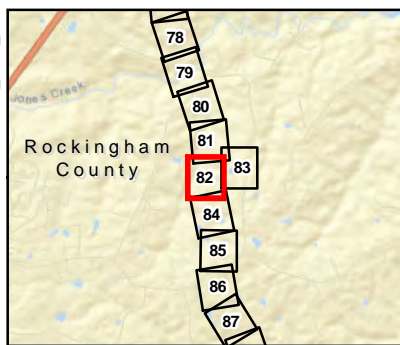
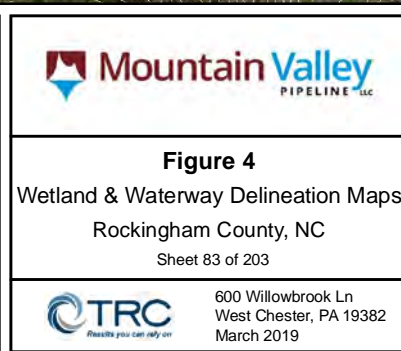
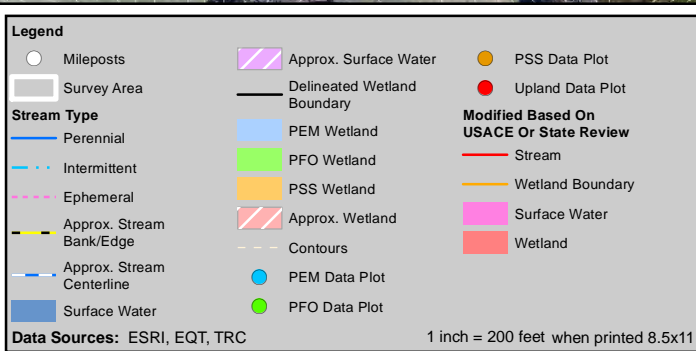
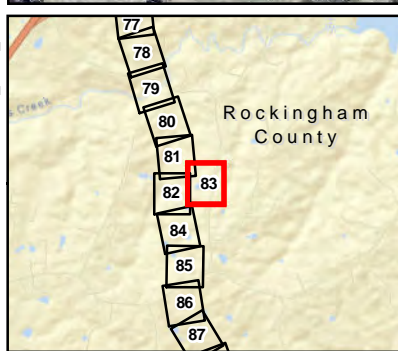
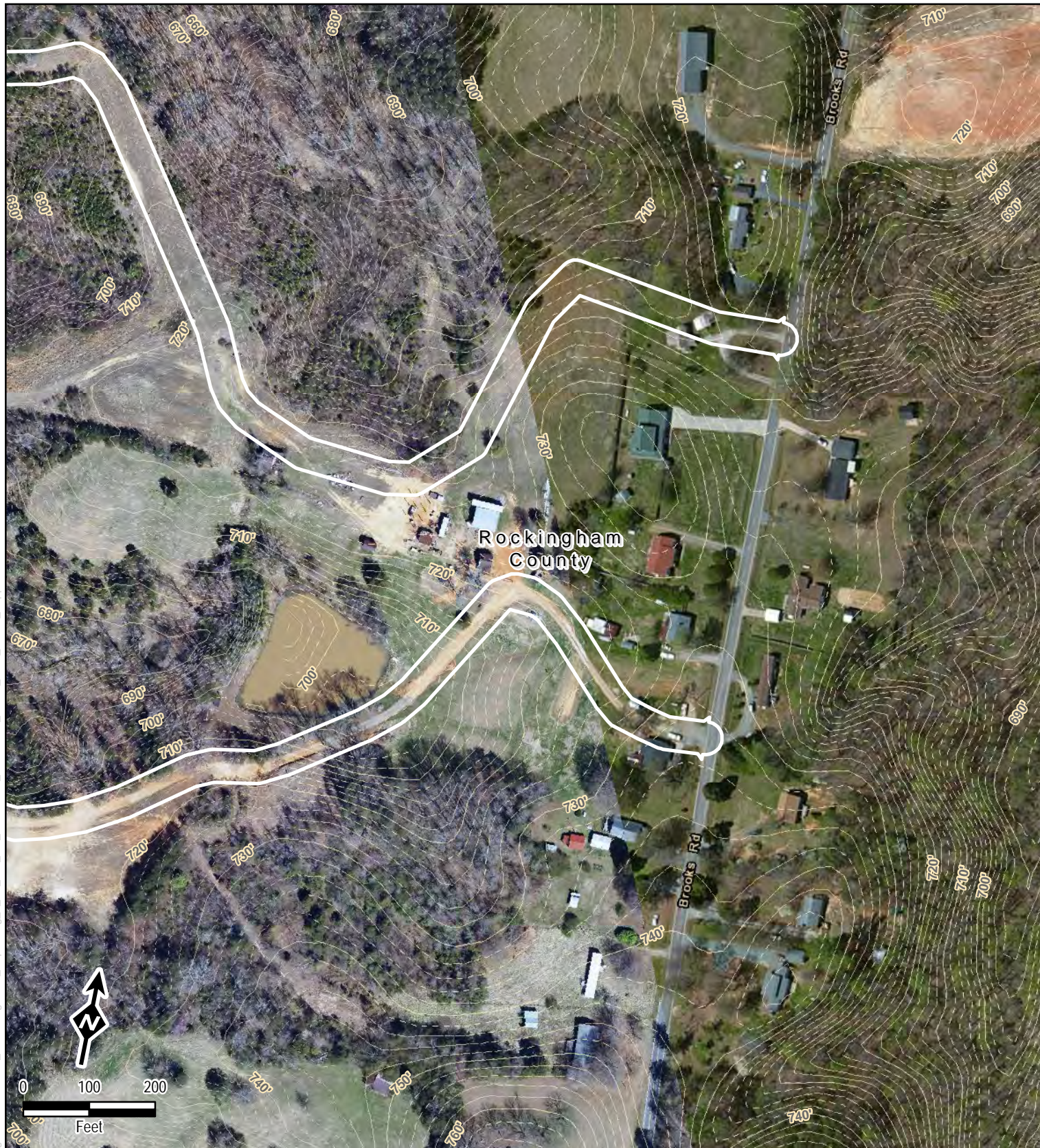
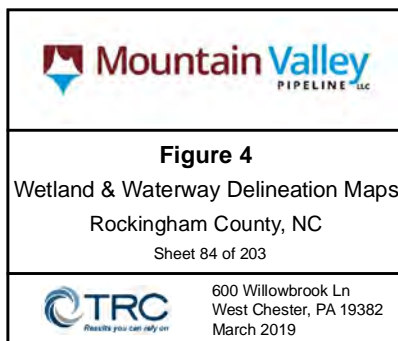
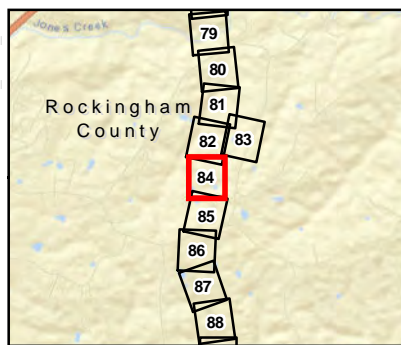


Figure 4
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600 Willowbrook Ln
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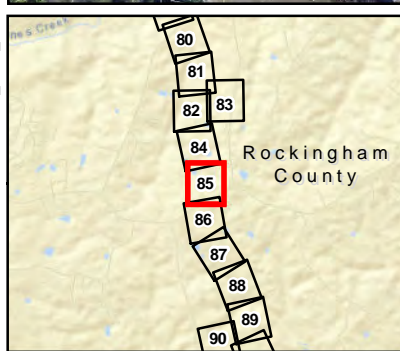


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600 Willowbrook Ln
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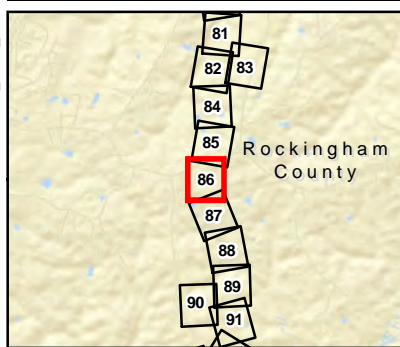
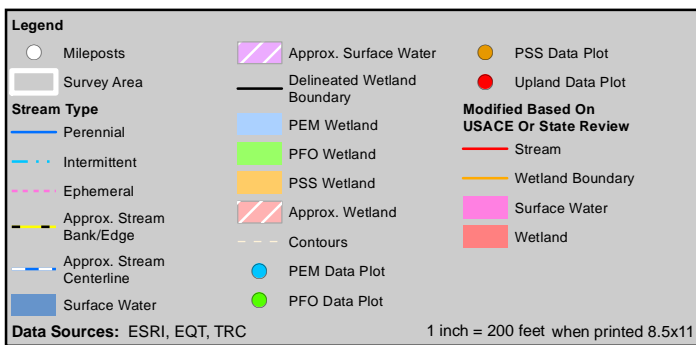
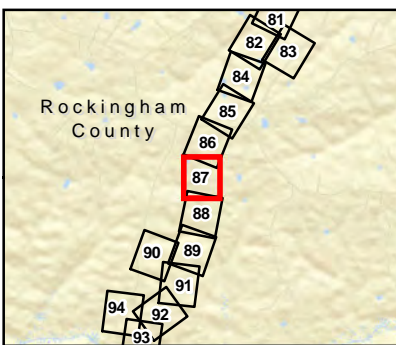


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600 Willowbrook Ln
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Figure 4

Wetland & Waterway Delineation Maps

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600 Willowbrook Ln
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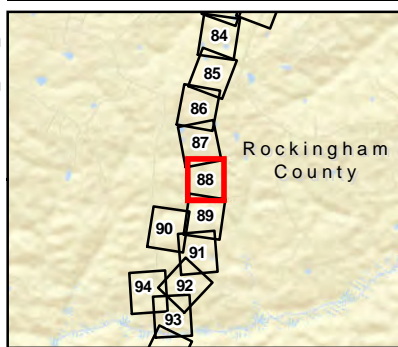
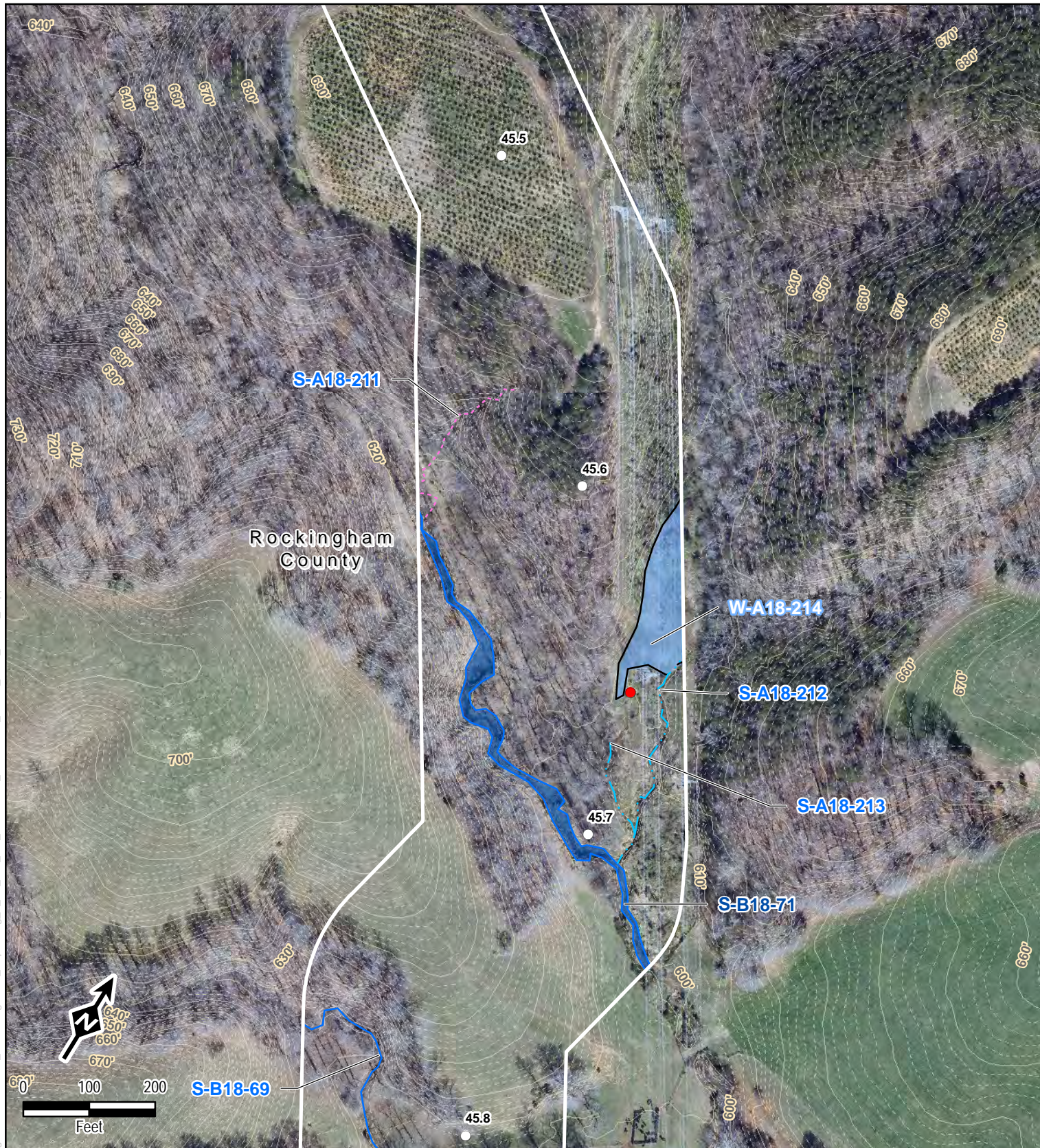


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600 Willowbrook Ln
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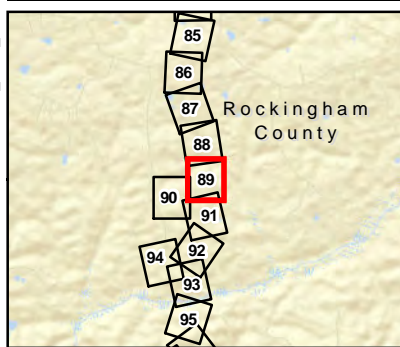
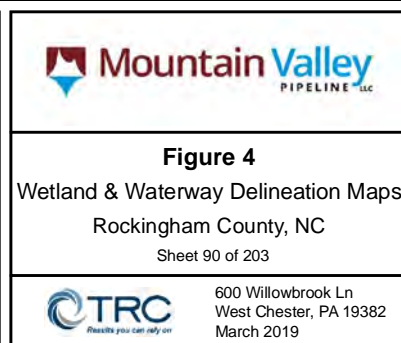
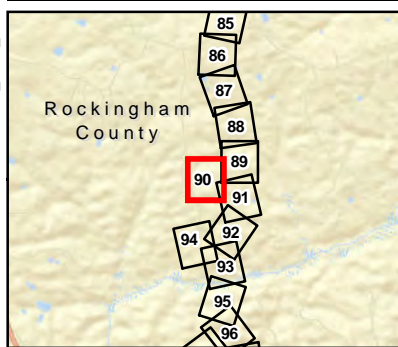
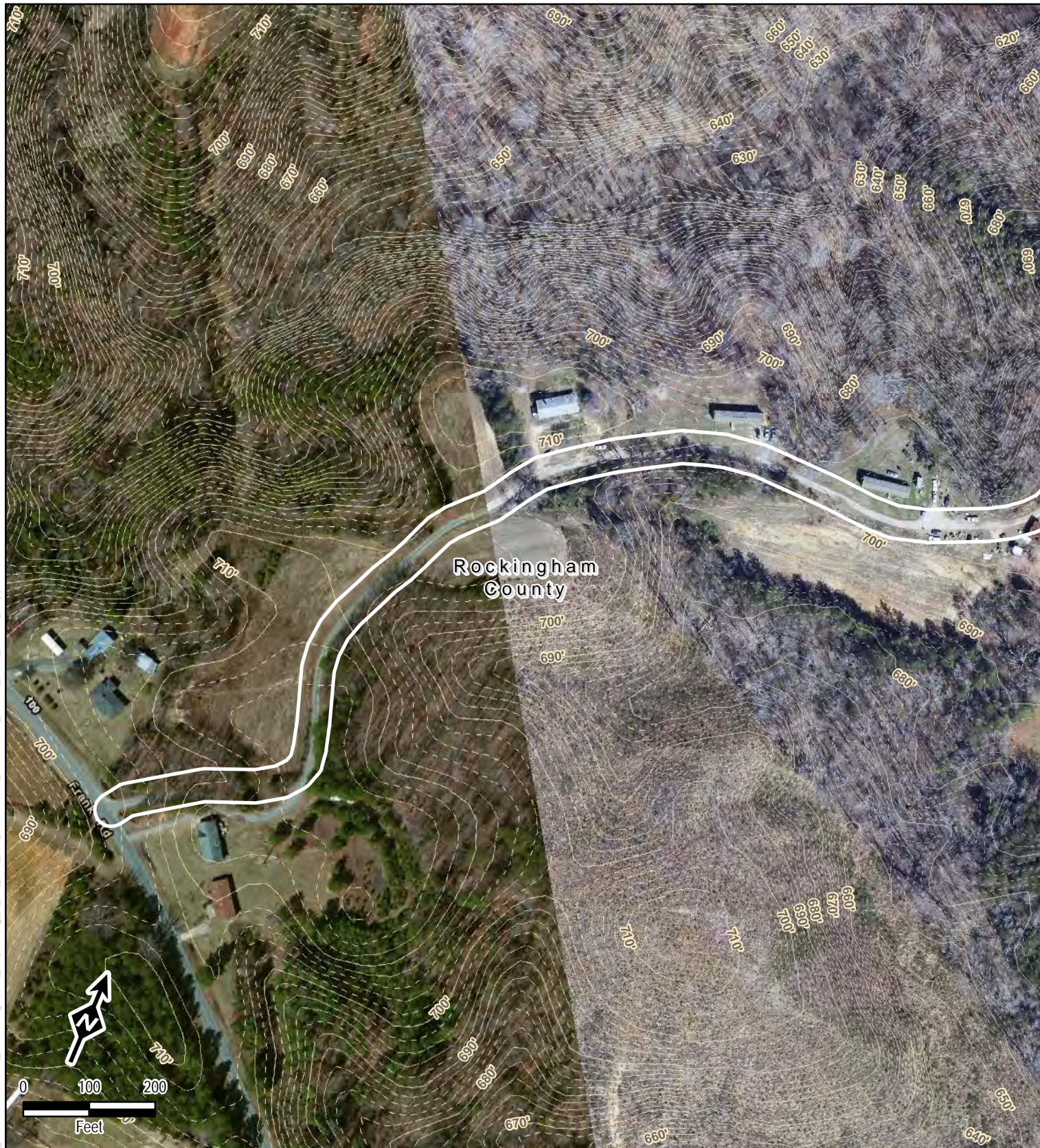


Figure 4
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600 Willowbrook Ln
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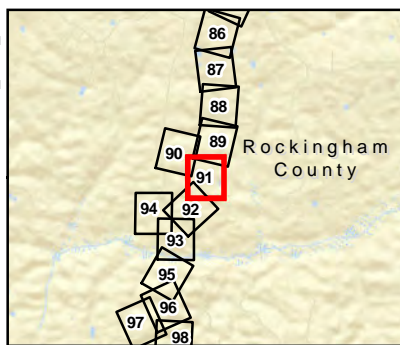
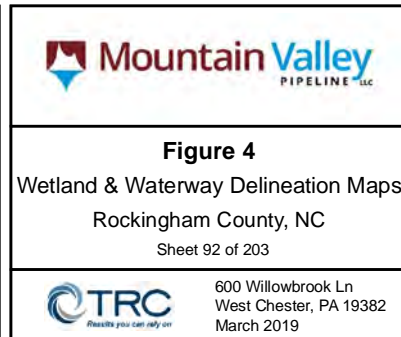
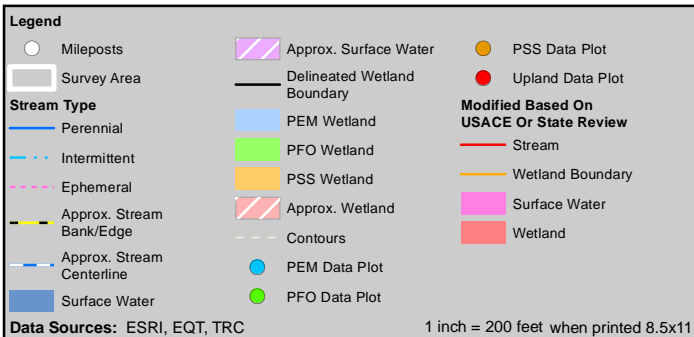
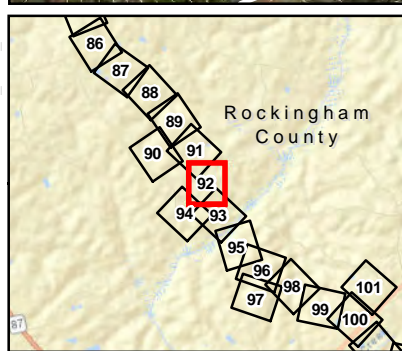


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600 Willowbrook Ln
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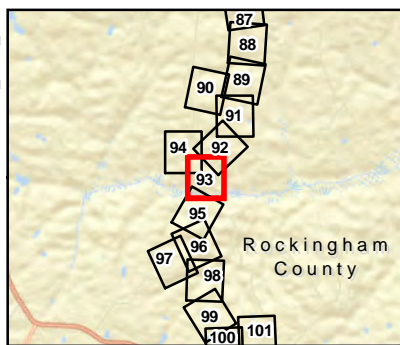


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600 Willowbrook Ln
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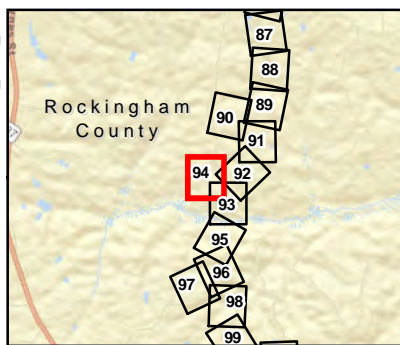


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600 Willowbrook Ln
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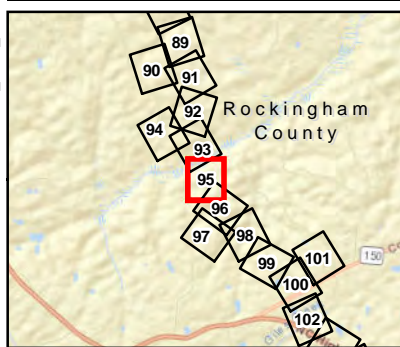


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600 Willowbrook Ln
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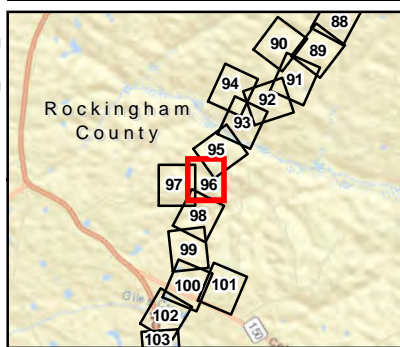
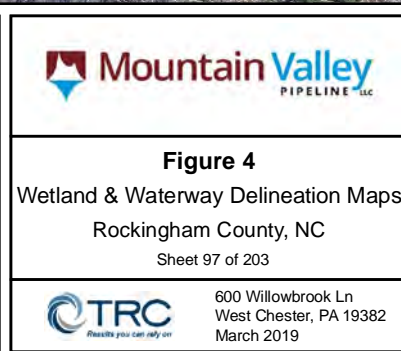
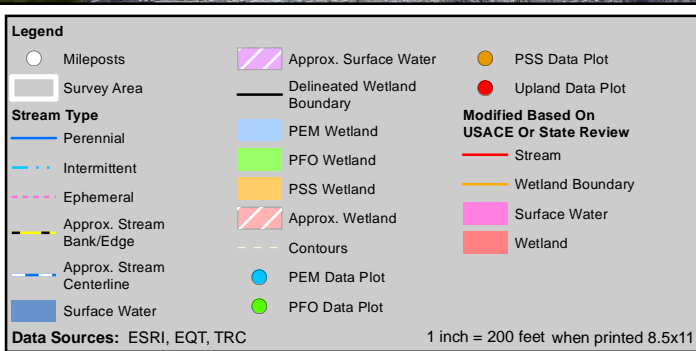
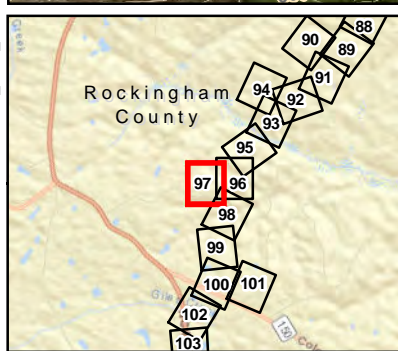
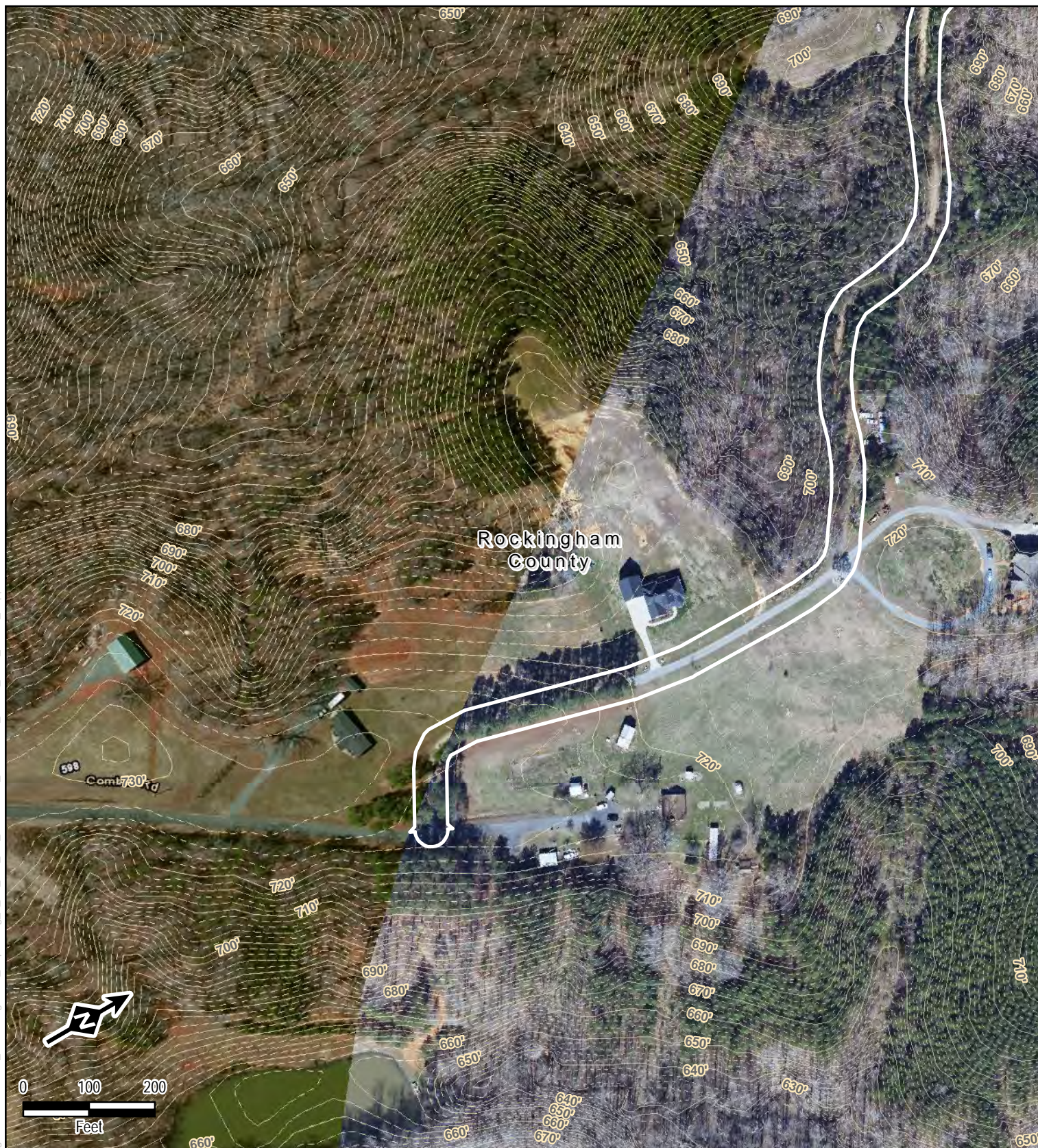


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600 Willowbrook Ln
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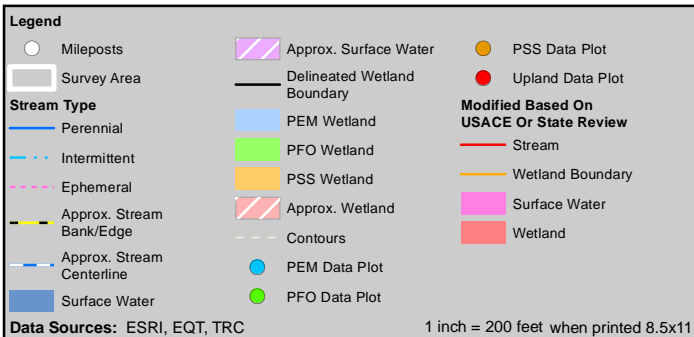
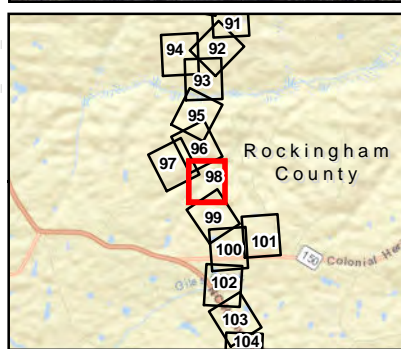


Figure 4
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600 Willowbrook Ln
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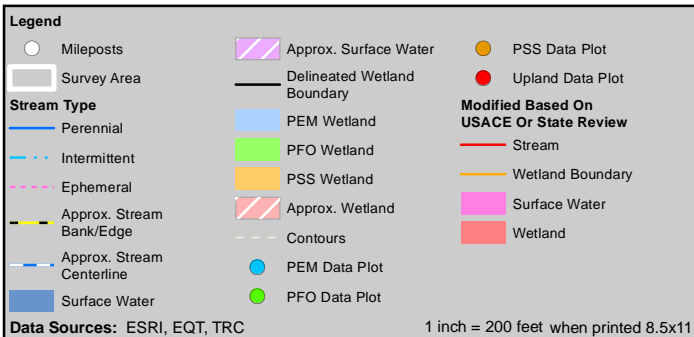
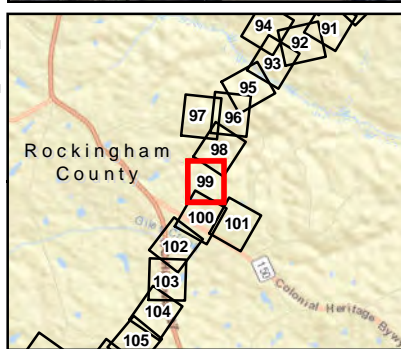


Figure 4
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600 Willowbrook Ln
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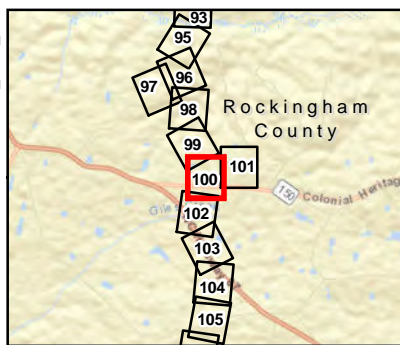


Figure 4
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Appendix D

Waterbody Data Forms and Photographs – January 2019