Requirement M

Erosion and Sediment Control Plan and Approval Letter

(The Joint Permit and ESGP-2 applications are being submitted concurrently)

Please see the Requirement M PDF for drawings

Requirement N

Hydrologic and Hydraulic Analysis

Hydrologic and Hydraulic Analysis

There are no above-ground watercourse channel fills on the Project in Washington County; therefore, a hydrologic and hydraulic analysis is unnecessary.

Requirement O

Stormwater Management Analysis and Consistency Letter

STORMWATER MANAGEMENT PLAN ANALYSIS

A Stormwater Management Analysis may be required if the proposed water obstruction or encroachment is within a county that has an approved Act 167 Plan. The proposed project is located within Chartiers, Mount Pleasant, and Robinson townships, Washington County, Pennsylvania. The proposed meter station will be located within the existing MarkWest facility boundary in Houston, Pennsylvania. Therefore, Stormwater Management Plan Analysis and an Act 167 Consistency Letter are not required.

January, 2018 update: AECOM has requested stormwater consistency letters from Chartiers, Mount Pleasant, and Robinson townships stating that a stormwater managment plan analysis is not required. To date, no letters have been received. AECOM continues to work with these townships to obtain the letters.

Requirement P

Floodplain Management Analysis and Consistency Letter

Floodplain Management Analysis and Consistency Letter

There are no permanent impacts located within any floodways delineated on a FEMA map; therefore a floodplain management analysis and consistency letter is not required.

Requirement Q

Risk Assessment

Risk Assessment

Proper Best Management Practices will be followed during construction to reduce or eliminate issues associated with flooding and sedimentation. The floodplain management analysis did not indicate any degree of increased risk to life, property, or the environment. As a result, the engineers determined that a risk assessment was not necessary for this Project.

Requirement R

Professional Engineer's Seal and Certification

PROFESSIONAL ENGINEER'S SEAL AND CERTIFICATION

I, Joseph W. Ryan, do hereby certify pursuant to the penalties of 18 Pa. C.S.A., Section 4904 to the best of my knowledge, information and belief, that the information contained in the accompanying plans, specifications and reports has been prepared in accordance with accepted engineering practice, is true and correct, and is in conformance with Chapter 105 of the rules and regulations of the Department of Environmental Protection.

The proposed Falcon Ethane Pipeline System within Washington County, Pennsylvania involves one permanent floodway impact. The remaining impacts will be temporary impacts and are to be limited to watercourse and wetland crossings of duration only long enough to allow pipeline construction. These wetlands and watercourses are to be restored to original contours and land cover to the extent feasible.

Engineer Name (typed): Joseph W. Ryan
Registration Number: PE 081218

Signature: Joseph W. Ryan

Date: 9/14/2017

Requirement S

Alternative Analysis

(Please see Module 3S.F in Requirement L)

Requirement T

Mitigation Plan

MITIGATION CREDIT COMMITMENT LETTER

PENNSYLVANIA STATEWIDE UMBRELLA MITIGATION BANKING INSTRUMENT
Enlow Fork Mitigation Bank

TO: PENNSYLVANIA INTERAGENCY REVIEW TEAM
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
U.S ARMY CORPS OF ENGINEERS

Credit Provider: First Pennsylvania Resource, LLC, (FPR)
State and Federal Umbrella Operation Permits:

- Pennsylvania Statewide Umbrella Mitigation Banking Instrument (PSUMBI)
  - WO&E Permit Number: MB9915-0001
  - USACE: CENAB-OP-RPA-2012-00567-PO2

Bank Providing Credits

- Enlow Fork Mitigation Bank (EFMB or Bank)
  - PADEP Permit Number: MB990563-001
  - USACE Permit Number: LRP 2013-1108

FPR is in compliance with all requirement of their WO&E Operations Permit (MB9915-0001), and hereby does accept responsibility for the mitigation obligations of Shell Pipeline Company LP for their unavoidable wetland impacts associated with the Falcon Ethane Pipeline Project (Impact Project), as specified below:

1. Shell Pipeline Company LP has committed monies with the Sponsor sufficient to acquire 0.06 acres of wetland credits and 53.58 linear feet of stream credits from the EFMB for use on the Falcon Ethane Pipeline Project (Impact Project).

2. The Mitigation Bank is within HUC-8: 05030106, the Upper Ohio-Wheeling Watershed. The impact site is within Sub-basin #20.

3. The Project requires 0.06 acres of Wetland credits and 53.58 linear feet of stream credits as mitigation. Impact project permit numbers have yet to be determined.

4. The Sponsor has committed 0.06 acres of Wetland credits and 53.58 linear feet of stream credits from the Bank's credit ledger for the Upper Ohio-Wheeling Watershed, Sub-basin #20, of the PA State Water Plan. This credit commitment does not have an expiration timeframe.

Attached below is an updated Credit Ledger showing the credits as committed and contact information for the credit provider. A Credit Transfer Letter will be provided to the agencies prior to project impacts being implemented.

FPR. LLC

By: _____
Amber Snavley
Resource Environmental Solutions LLC
33 Terminal Way 431A
Pittsburgh, PA 15219

Date: 9/14/17

Copies:
Joe Snyder, PA Department of Environmental Protection (electronic)
Josh Schaffer, U.S. Army Corps of Engineers (electronic)

Attachments

Attachment 1: EFMB Credit Ledger

Attachment 1: EFMB Credit Ledger

Enlow Fork Mitigation Bank Wetland Credit Ledger

Date	Event	Permitee	Permit Number (PADEP)	Permit Number (USACE)	Subbasin	Project Credits Committed / Withdrawn	Project Credits Utilized	Released Credits Remaining	Credits Released	Expected Future Credits Released
PA DEP - IRT* - 2/28/15	Bank Approval - Pending	FPR	MB990563-0001	LRP 2013-1108	20	-	-	-	-	2.26
PADEP - IRT -	15% Administrative Credit Release	FPR	MB990563-0001	LRP 2013-1108	20	-	-	0.39	0.39	2.23
6/9/17	Committed	The Buncher Company - Jackson Point: Phase 3 & 4	E10-507	TBD	20	0.12	0.12	0.27	-	2.23
7/6/17	Committed	PA Turnpike Commission- MP 28-31 Widening	TBD	TBD	20	0.11	0.23	0.16	-	2.23
9/14/17	Committed	Shell Pipeline Company LP - Falcon Ethane Pipeline Project	TBD	TBD	20	0.06	0.29	0.10	-	2.23
						-	-	0.10	-	2.23
						-	-	0.10	-	2.23
						-	-	0.10	-	2.23

Enlow Fork Mitigation Bank Stream Credit Ledger

Date	Event	Permitee	Permit Number (PADEP)	Permit Number (USACE)	Subbasin	Project Credits Committed / Withdrawn	Project Credits Utilized	Released Credits Remaining	Credits Released	Expected Future Credits Released
PA DEP - IRT* - 2/28/15	Bank Approval	FPR	MB990563-0001		20	-	-	-	-	4,150.20
PADEP - IRT -	15% Administrative Credit Release	FPR	MB990563-0001		20	-	-	-	622.53	3,527.67
9/14/17	Committed	Shell Pipeline Company LP - Falcon Ethane Pipeline Project	TBD	TBD	20	53.58	53.58	568.95	-	3,527.67
					20	-	-	568.95	-	-
					20	-	-	568.95	-	-

Permittee-Responsible Mitigation Plan for the Falcon Ethane Pipeline Project Neshannock Creek Restoration Site

Delaware Township, Mercer County, Pennsylvania
Shell Pipeline Company LP

Prepared By:
First Pennsylvania Resource, LLC.
a wholly-owned subsidiary of
Resource Environmental Solutions, LLC.
33 Terminal Way, Suite 431A
Pittsburgh, PA 15219

September 2017

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1.0 Introduction

First Pennsylvania Resource, LLC. (FPR), a wholly-owned subsidiary of Resource Environmental Solutions (RES), is proposing this Permittee-Responsible Mitigation (PRM) Plan on behalf of Shell Pipeline Company LP (SPLC or Permittee) to compensate for unavoidable impacts to waters of the United States (U.S.) associated with the Falcon Ethane Pipeline Project (Project). FPR has prepared this PRM Plan in accordance with the *Compensatory Mitigation for Losses of Aquatic Resources Final Rule* issued on April 10, 2008 as detailed in 33 CFR §332.4(c) of the Federal Register (Volume 73, Number 70). This document addresses the required mitigation that will be provided at FPR's Neshannock Creek Restoration Site (NCRS). The proposed mitigation will offset temporary and permanent conversion impacts to Palustrine Scrub-Shrub (PSS) and Palustrine Forested (PFO) wetlands occurring in Allegheny, Beaver and Washington Counties, Pennsylvania (PA).

The NCRS, located in Delaware Township, Mercer County, PA is approximately 7.5 miles Northwest of Mercer, PA. A site location map that shows the location of the NCRS in addition to the proposed PRM area that will be dedicated to the Project offset needs (PRM Site or PRM Project), is provided as Figure 1: Site Location Map (Appendix A: Figures). Figure 1: Site Location Map also depicts the approximate distance of the proposed PRM Site in relation to the Project. Figure 2: PRM Area Map, shows the location of the PRM Site within the NCRS. Areas within the NCRS already allocated as PRM sites are also shown on Figure 2: PRM Area Map (Appendix A: Figures).

The physical address and approximate center coordinates of the PRM Site are provided below.

Table 1: PRM Site Location Information	
Physical Address:	358 St. John's Road Fredonia, PA 16124
Coordinates:	41º 19' 57.83" North 80º 17' 4.83" West

Driving directions from Mercer, PA are as follows:

1. Head north on Erie St toward N Diamond St (0.2 mile).
2. Take a slight left onto PA-58 W/Greenville Ave (5.9 miles).
3. Turn right onto Delaware Rd (0.7 mile).
4. Turn left onto Folk Rd. In approximate 1.6 miles, the PRM Site will be on the right.

FPR and the Permittee request to be contacted prior to visiting the PRM Site, as landowner coordination is required.

FPR will act as the mitigation services agent (Agent) on behalf of the Permittee. On behalf of the Permittee, FPR will be responsible for implementation of the PRM plan in addition to meeting performance standards, monitoring, and long-term management of the property as described in 33 CFR §332.3(l). The Permittee will remain responsible for legal duties and responsibilities associated with wetland mitigation as necessary in accordance with PA Department of Environmental Protection (DEP) Chapter 105 Rules and Regulations regarding wetland replacement criteria guidelines and 33 CFR § 332.3.

2.0 Objectives

Construction of the Project will result in temporary and permanent conversion impacts to PSS and PFO wetlands. Mitigation will be required for the wetland impacts occurring in Beaver, Allegheny, and Washington Counties, PA. Table 2: Objectives Summary Table provides a summary of pre-and post-restoration resources for the PRM Site in addition to the mitigation requirements.

Table 2: Objectives Summary Table								
PRM Site Pre- and Post-Resources				**Mitigation Needs Summary**				
Resource		**Existing Acres**	**Proposed Acres**	**Resource**	**Impact Type**	**Impact Area (Acres)**	**Mitigation Ratio**	**Mitigation Need (Acres)**
Total Acres		1.33	1.33	PSS	Perm	0.07	2:1	0.14
Wetlands (Acres)	PEM	0.67	0.00		Temp	0.54	1:1	0.54
	PSS	0.26	0.00	PFO	Perm	0.10	3:1	0.31
	PFO	0.40	1.33		Temp	0.11		0.33
Totals		**1.33**	**1.33**			**0.83[1]**	**-**	**1.33[1]**

Note:
1. Please note that the total wetland acreage impacts are correct. Due to aggregation per wetland type and rounding of each wetland acreage to the nearest tenth, a rounding discrepancies of 0.01-acre occurs.

To ensure that an overall loss of wetland functionality does not occur, and to address potential temporal losses of the impacted wetland functions, a 2:1 mitigation ratio for permanent impacts to PSS wetland and 1:1 mitigation ratio for temporary impacted PSS wetlands will be used. A 3:1 mitigation ratio for temporary and permanent impacted PFO wetlands is proposed. Calculations are shown in Table 2: Objectives Summary Table, above.

Existing PEM wetlands onsite are proposed for enhancement as part of the mitigation requirements. Native wetland herbaceous and woody plantings coupled with invasive species control will re-establish a healthy vegetative community that will contribute to the restorative success of the PRM Site. The proposed restoration activities will enhance the functions and values that the PRM Site wetlands already perform, while also meeting the mitigation needs for the impacted functions and values as a result of the proposed Project. Permanent protection of the PRM Site will maximize the long-term potential for successful and sustainable mitigation.

3.0 Site Selection

3.1 Mitigation Banking

Consistent with the *Compensatory Mitigation Final Rule* ("Final Rule"), which establishes mitigation credits as the preferred method of compensatory mitigation for impacts to aquatic resources of the U.S. (332.3(b)(2)), the Permittee first sought to purchase approved mitigation credits from a mitigation bank within the Ohio River Subbasin (Watershed 20) to compensate for the anticipated PSS and PFO wetland conversion impacts resulting from the Project. While FPR has permitted an approved mitigation bank within this watershed, available credits have been committed and are not available for the Project.

3.2 In-Lieu Fee

In-Lieu fee crediting was not an option for the Project because no active In-Lieu fee programs were or are available.

3.3 On-Site Mitigation

To minimize impacts to aquatic features and habitat areas, the Permittee limited the width of the proposed construction limits of disturbance (LOD) and permanent easements to the greatest extent practicable. The narrowed easement does not allow room for on-site restoration, and not all property owners are interested in providing larger easements that would provide space for effective on-site restoration. Even with larger easements which could allow for on-site restoration, not all the sites have land suitable for restoration. Restoration could be done outside of an area with a permanent easement, however this would not be acceptable mitigation as there is no guarantee this area would be preserved into perpetuity. The avoidance measure of using a narrow LOD thereby narrows the potential area available for resource restoration. Even if possible, small on-site restorations would provide minimal benefit to the local watersheds relative to the impacts proposed within the LOD.

Completing on-site mitigation would also create multiple, small, spatially separate PRM projects. These smaller isolated projects have been shown to be less ecologically beneficial, have a lower likelihood for long-term success and are more susceptible to invasive species due to increased edge effect. They also create an increased number of maintenance plans to be reviewed, increasing the long-term regulatory burden on the agencies by requiring reviews and field visits to multiple small restoration sites.

The Permittee therefore has determined that the on-site mitigation opportunities are less conducive to complying with the "no net loss" and/or "watershed approach" policy(s) commensurate with the Final Rule.

3.4 Local Watershed Restoration

Alternatives within the local watershed were considered, however many of these alternatives were eliminated as a result of unwillingness on the part of the property owner to permanently restrict property use. Furthermore, FPR and the Permittee acknowledged that by selecting a restoration site based solely on the small mitigation needs of the Project may lead to a randomly selected site that would have a very small likelihood of success due to lack of protection of the surrounding area. Larger restoration sites provide additional protection and increased likelihood of long-term mitigation viability. Restoration of a smaller site based solely on the mitigation needs of one small project may create a significant challenge to ensuring the success of each restoration site while systematically reducing the overall benefit to the greater watershed.

3.5 Selected Mitigation Site

The selected PRM Site was carefully chosen for multiple reasons. The Permittee and FPR recognized that by placing the PRM Site within the larger NCRS, and adjacent to already existing PRM sites (Appendix A: Figures, Figure 2: PRM Area Map) the likelihood for success, ecological integrity and functional uplift greatly increases. Furthermore, this strategic PRM Site placement enhances the ecological value of the restoration by creating a contiguous restored area, thereby creating a long-lasting and documentable positive effect on the watershed. The PRM Site will be placed under a perpetual site protection instrument (SPI), either in the form of a conservation easement or deed of restrictive covenant, further increasing the long-term chance for success. As detailed in Section 4.0 Site Protection Instrument, the SPI restricts activities that are incompatible with objectives of the PRM.

Moreover, the selected PRM Site, upon restoration, will replace the functions and values impacted as a result of the Project, and will further accomplish an ecologically self-sustaining aquatic resource through the proposed enhancement and conservation restoration measures.

The existing conditions of the PRM Site wetland area make this an attractive site from a mitigation perspective. The PRM Site has been degraded through anthropogenic alterations including historic and on-going agricultural activities including pasture use. Surrounding land uses consist of residential homes, with large tracts of agricultural land and supporting infrastructure (livestock buildings such as farms and sheds).

Currently, the PRM Site and the surrounding NCRS, are characteristic of a PEM/PSS/PFO wetland complex. Although the larger NCRS is interspersed with upland forested buffer areas, no uplands are located within the PRM Site. The PRM Site, like the rest of the larger NCRS, is subject to active livestock grazing, resulting in a heavily degraded wetland ecological system. Much of the area is dominated by invasive and non-native plant species, including multi-flora rose (*Rosa multiflora*) and reed-canary grass (*Phalaris arundinacea*).

The PRM Site will build upon many of the critical components of the Final Rule including the likelihood for success and sustainability, potential to maximize ecological uplift, the significance of the restored resources within the watershed, and the proximity of the impact and mitigation sites from a watershed perspective (both sites are in the Ohio River Subbasin (Watershed 20)). Providing functional benefits such as improvements to wildlife habitat, flood flow conveyance and alteration, nutrient removal/retention, invasive species removal, and long-term land protection will support healthy flora and fauna and aquatic resources within the watershed. The likelihood of success and long-term ecological uplift were the most important factors that the Permittee considered.

The Permittee concluded that due to the ecological demands of the Project, entrusting the logistical and environmental aspects of compensatory mitigation to FPR would ensure the greatest chance of success and most effectively address watershed needs through off-site mitigation.

3.6 Congruence with Watershed Needs

The Mercer County Conservation District (MCCD) recognizes that the challenges faced by waters and wetlands impairments including decreased flow, pollution from historic industrial or mining activities, increased nutrients and sedimentation, and invasive species, threatens the social, physical and economic well-being of the county and surrounding landscape. The MCCD supports the establishment of local watershed groups whose efforts results in positive changes within the watershed. Some of the active watershed organizations in and surrounding the PRM Site include the Neshannock Chapter of Trout Unlimited, Shenango River Watchers, Wolf Creek Watershed Association, Slippery Rock Watershed Coalition, French Creek Project, and the Sandy Creek Conservancy. Activities and land uses that are acknowledged to threaten and stress the sensitive resources include mis-managed or poorly-managed agricultural practices. The restoration goals of the PRM Site will provide support in addressing environmental resource degradation faced throughout Mercer County and the local and surrounding watersheds.

The PRM Site is in the Otter Creek Watershed (12-digit Hydrologic Unit Code (HUC) 050301020503), a sub-watershed of the Shenango Watershed (8-digit HUC 05030102). Otter Creek watershed is classified as a Tier 2 Enhancement Watershed by the PA Natural Heritage Program (PNHP) Aquatic Community Classification (ACC) (PNHP). Watersheds classified under this category reflect conditions that are likely not pristine, and are prime candidates for restoration action because they are not as severely degraded as those listed as 'Restoration' watersheds.

While no USGS blue-line streams are mapped within the PRM Site, or within the larger NCRS, multiple man-made drainage ditches do traverse the NCRS around the PRM Site. The drainage features surrounding the PRM Site drain to Mill Run, designated as a trout stocked fishery (TSF) according to Section 93.9: Designated Water Uses and Water Quality Criteria of the PA Code Chapter 93: Water Quality Standards. Mill Run drains to Neshannock Creek, also a TSF. Both Mill Run and Neshannock Creek are listed as attaining for their designated uses of aquatic life.

As shown in Figure 3: Ecological Inventory Map (Appendix A: Figures), multiple PA Natural Heritage Program (PNHP) County Natural Heritage Inventory (CNHI) identified Core Habitats are located within the vicinity of the PRM Site.

The CNHI, which consists of habitat areas that contain critical biological resources of the state on a county-by-county level was reviewed to determine if any special habitat areas are within or surround the PRM Site. The primary focus of CNHIs has been on species of concern: those plants, animals, natural communities, and habitats most at risk of extinction at the global or local level. The purpose of the CNHI is to identify, map and discuss areas that support species of concern, exemplary natural communities and broad expanses of intact natural ecosystems that support components of Pennsylvania's native species biodiversity. These areas are prioritized based upon their ecological qualities and provided with recommendations regarding their management and protection.

The protection of the ecologically sensitive and important resource within the county is directly supported by the restoration activities of the PRM Project as well as the surrounding Neshannock Creek Restoration Site.

Positioned about three miles north of the PRM Site is the core habitat identified as Kashner Corners Swamp Biodiversity Area (BDA). This BDA is located in the headwaters of Otter Creek and holds wet meadow and bottomland oak-hardwood palustrine forest natural communities. Situated about two miles to the east and southeast of the PRM Site is the PNHP Shenango River core habitat. The Shenango River provides aquatic habitat important to numerous species of concern (SOC).

Just over four miles to the southeast is the Otter Creek Swamp core habitat. This swamp features a complex of swamps and marshes through which Otter Creek meanders. Otter Creek is filled with dense patches of

yellow pond lily (*Nuphar lutea*). The wetlands on both sides of the creek provide habitat for the marsh wren (*Cistothorus palustris*) and a SOC not named at the request of the agency overseeing its protection. Included in this area is a good example of a wet meadow natural community. Specific threats and stressors that affect this natural area include hydrology manipulation, upland disturbance, and heavy silt and sedimentation in Otter Creek. Less than eight miles to the east is the Sandy Lake core habitat. As one of eight major glacial lakes in western PA and the only glacial lake in Mercer County, significant upland forest and wetlands sit adjacent to and beyond the lake's perimeter. The lake and adjacent terrestrial habitats are home to numerous plant species of special concern (SOSC) as well as a natural community of concern.

An SPI on the PRM Site will provide protection in perpetuity from development and/or other potentially degradative land use activities. Additionally, the PRM Site, while containing some invasive species within the boundary, is pressured by the overgrowth of invasive species, including multiflora rose with pockets of reed canarygrass, in the surrounding landscape. The PRM Site restoration will employ an intensive invasive species management plan to halt the spread of invasive species. Non-native vegetation will be removed from the PRM Site through chemical and mechanical control methods. Invasive species treatment areas will then be replanted with additional native trees and shrubs and a native wetland herbaceous seed mix.

The enhancement of the degraded wetlands on-site represents an opportunity to improve and protect this resource and its larger watershed. Conservation measures in this area are more important now than ever as ownership fragmentation, potential future development, and continued intensive agricultural land use makes the conservation process more difficult.

4.0 Site Protection Instrument(s)

The PRM Site will be protected by an SPI (in the form of a deed of restrictive covenant) in advance of the proposed activities outlined in this mitigation plan, ensuring the long-term protection of the site. The SPI will be recorded with the county courthouse after USACE/PADEP permit approval and with subsequent approval from the Permittee to move forward with mitigation. A sample of an SPI that would be filed upon permit approval is included as Appendix B: Site Protection Instrument. The SPI restricts activities that are incompatible with the objectives of the PRM Plan.

FPR will act as the initial long-term steward unless another qualified, watershed-focused, entity is willing to assume long-term stewardship responsibilities. FPR's heirs, assigns, or purchasers will be responsible for protecting lands contained within the PRM Site in perpetuity in accordance with the terms of the PRM plan, unless the lands are transferred or sold to a local, state, or federal resource agency or non-profit conservation organization.

Entrusting the PRM to a third-party SPI holder may commence only when FPR, the Permittee, and the agencies have mutually concluded that the PRM Site has achieved all its objectives and sufficiently satisfied performance standards, as described in Section 9: Performance Standards.

5.0 Baseline Data

Baseline site investigations were conducted to develop an appropriate functional mitigation plan for the PRM Project. These baseline site investigations yielded a significant amount of existing condition project information including, but not limited to the following:

- Waters of the U.S. delineation and GPS location of the preliminary boundary;
- Flora community composition data;
- Topographic survey throughout the proposed conservation area;
- Land-owner interviews relative to historical and present site conditions including land use practices;
- PHMC no-findings concurrence;
- Pennsylvania Natural Diversity Inventory (PNDI) review (no hits);
- Extensive photo and field note documentation; and
- General documentation of site conditions

5.1 Land Use

Since 1939, the PRM Site has been maintained as an open emergent dominated pasture. As depicted in Figure 4A: 1939 Historic Aerial (Appendix A, Figures) the PRM Site and surrounding land is characterized as a wetland complex system including forested, scrub-shrub and emergent vegetation as well as ephemeral drainage patterns. In order to utilize the land more efficiently, by 1955 (Appendix A: Figures, Figure 4B: 1955 Historic Aerial), land owners ditched the surrounding landscape to drain the fields and increase the agricultural productivity of the land. By 1968 (Appendix A: Figures, Figure 4C: 1968 Historic Aerial), while the area remained as an emergent wetland, the surrounding lands were utilized as crop fields and for cattle grazing. Upland islands exist within the NCRS, but no upland acreage is present within the PRM Site. Existing habitat at the PRM Site has been actively altered, preventing succession to a forested wetland system.

Cattle are allowed to roam unrestricted across the PRM Site. Cattle grazing and trampling has resulted in a degraded wetland characterized by lack of vegetative diversity and presence of invasive and non-native vegetation.

The ecological resources have been and continue to be degraded through anthropogenic alterations including historic and on-going agricultural activities (i.e., direct livestock access, drainage swale installation, and grazing and hay production) and the planting and maintenance of non-native pasture grasses.

5.2 Soils

Based on the United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) Web Soil Survey, the PRM Site is underlain by the Frenchtown and Luray (Fr) silt loams. These soil types are found on 0 to 3 percent slopes landscapes. Fr soils are not prime farmland soils and are poorly and very poorly drained. Figure 5: Hydric Soils Map is provided in Appendix A: Figures. These soils are typically documented in areas of depressions on till plains and are classified as hydric per the USDA-NRCS. Additional details are provided below.

- Frenchtown and Luray Silt Loams (Fr) (48 percent Frenchtown and 47 percent Luray, till substratus): Slopes are 0 to 3 percent.
    - The Frenchtown component is found within depressional landscapes at the toeslope or base slope. The parent material consists of till. Depth to a root restrictive layer is 18 to 38 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is very low to moderately low. Depth to water table is about 0 to 10 inches. Frenchtown is not a prime farmland. This soil is not frequently flooded nor ponded. Available water storage is high. The soil has a non-irrigated land capability classification is 4w, and is in the D hydrologic soil group. This soil meets hydric criteria.
    - The Luray, Till Substratum component is found terraces within a concave setting. The parent material is composed of Glaciolacustrine deposits over till. Depth to a restrictive feature is more than 80 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Depth to water table is about 0 to 6 inches. Frenchtown is not a prime farmland. This soil is not frequently flooded but is frequently ponded. Available water storage is high. The soil has a non-irrigated land capability classification is 5w, and is in the C/D hydrologic soil group. This soil meets hydric criteria.

Field analysis indicated that hydric soils are dominant within the limits of the PRM Site and are found exclusively within the wetland areas identified onsite. The soils documented across the PRM Site are generally comprised of a silt loam and/or clay loam texture and consistently met the criteria for hydric soil indicator Depleted Matrix (F12).

5.3 Wetlands & Waterways

The NCRS was delineated by Timmons Group (Timmons) in July 2013. Due to easement boundary changes, follow up delineations were completed by FPR in April 2017. The Wetland and Waterbody Delineation

Report depicting the identified resources is provided as Appendix C: Wetland Report. Appendix A, Figure 6: Topographic Map shows the topographic contours and elevations at the PRM Site. The PRM Site, which has a contributing drainage of approximately 22.5 acres, drains to Mill Run, a trout stock fishery (TSF) per Section 93.9: Designated Water Uses and Water Quality Criteria of the PA Code Chapter 93: Water Quality Standards. Mill Run is listed as attaining its designated use for aquatic life. A drainage area map is provided in Appendix A: Figures, as Figure 7: Drainage Area Map.

No part of the site occurs within a Federal Emergency Management Agency (FEMA) 100-year floodplain. No National Wetland Inventory (NWI) wetlands are documented within the PRM Site. Natural Hydrography Dataset (NHD) data indicates that no blue-line streams are located within the PRM Site.

5.4 Wetlands

The PRM Site consists of PEM wetland, surrounded by a PEM/PSS/PFO wetland complex system. (Appendix A: Figures, Figure 8: Existing Conditions Map). No flowing water features are identified within the PRM Site. Cattle trails traverse the PRM Site and surrounding NCRS, resulting in emergent communities that have been trampled, lack diversity, and have an excess of nutrient inputs and bacterial contamination as a result of fecal matter and urine entering the system.

Emergent communities that almost entirely make up the PRM Site are comprised of sedge communities and are often inundated, with pockets of standing water, especially during the spring season. The emergent wetlands are also highly degraded due to unrestricted cattle grazing. Enhancement efforts will involve discontinuing cattle access, removing invasive and non-native species and planting wetland herbaceous vegetation with tolerant shrub and tree plantings.

Adjacent forested communities exhibit American elm (*Ulmus Americana*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), and cockspur hawthorne (*Crataegus crus-galli*) tree species and have an understory comprised of skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*) in addition to some non-native and invasive species such as multi-flora rose.

The PRM Site is semi- to permanently inundated or saturated. The PRM Site's hydrology is derived predominantly from a high groundwater table and groundwater seeps. Ephemeral drainage patterns are noted throughout the surrounding NCRS. Perennial and intermittent surface waters surround the PRM Site in the form of two man-made ditches, both of which were created to drain the surrounding lands to increase agriculturally productive land.

5.5 PA Wetland Level 2 Rapid Assessment

The PA Wetland Condition Level 2 Rapid Assessment Protocol (PADEP, 2017) was used to evaluate the existing and post-restoration wetland conditions at the PRM Site. The results from the data were then used to ensure that the wetlands being impacted as a result of the proposed Project are adequately offset via the restoration of the PRM Site. The existing and post-restoration worksheets for the PRM Site are provided as Appendix D: PA Wetland Condition Level 2 Rapid Assessment Forms. A discussion of the results of the data are provided in Section 6.1 Functional Impacts and Proposed Functional Uplift below.

5.6 Jurisdictional Agency Consultation

5.6.1 Rare, Threatened and/or Endangered Species

A Pennsylvania Natural Diversity Index (PNDI) Environmental Review was completed on November 11, 2014. The PNDI review indicated that no known impacts to threatened and endangered and/or special concern species and resources are anticipated within the Neshannock Creek Restoration Site. Due to recent updates to the PNDI environmental review and the recently released Conservation Planning tool, an updated PNDI receipt was obtained on October 10, 2016. PNDI records indicate that no known impacts to threatened and endangered species and/or special concern species and resources are within the project area. Therefore, no further coordination is required with the jurisdictional agencies. The most recent PNDI receipt is provided in Appendix E: Jurisdictional Agency Coordination.

5.6.2 Cultural Resources

On July 11, 2013, the Pennsylvania Historical and Museum Commission (PHMC) State Historic Preservation Office (SHPO) determined that the Project will have no effect on historic properties. The signed Project Review Form indicating PHMC clearance for the NCRS is provided in Appendix E: Jurisdictional Agency Coordination.

6.0 Determination of Mitigation Needs

6.1 Functional Impacts and Proposed Functional Uplift

As previously mentioned, the PA Wetland Condition Level 2 Rapid Assessment Protocol (PADEP, 2017) was used to evaluate the existing and post-restoration wetland conditions at the PRM Site. The results from the data was then used to ensure that the wetlands being impacted as a result of the proposed Project are adequately offset via the restoration of the PRM Site. The existing and post-restoration worksheets for the PRM Site are provided as Appendix D: PA Wetland Condition Level 2 Rapid Assessment Forms.

The PRM Site post-restoration overall condition score was compared to a weighted average overall condition score of the Project impacted wetlands to ensure that the restoration site and activities adequately compensate for the Project impacts. As shown in Table 3: Summary of Project and PRM Site Wetland Condition Level 2 Rapid Assessment Overall Condition Indix (CI) Scores below, the PRM Site provides mitigation above and beyond the needs of the Project.

Table 3: Summary of Project and PRM Site Wetland Condition Level 2 Rapid Assessment Overall Condition Index (CI) Scores	
Project Weighted Average CI	**0.75**
Neshannock PRM Pre-Restoration CI	**0.68**
Neshannock PRM Post-Restoration CI	**0.87**

The impacted wetlands most dominantly exhibit existing stressors from vegetative alterations including presence of invasive species, ROW clearing, clear cutting or brush cutting (mechanized removal of shrubs and saplings) and selective tree harvesting as well as hydrologic modifications in the form of ditching, draining, filling/grading, stormwater inputs, microtopographic alterations and adjacent stream alterations. Sedimentation stressors were also identified within some of the impacted wetlands, including sediment deposits, eroding banks, and active selective forestry harvesting within one year.

As demonstrated in the PRM Site post-restoration forms, removing invasive and non-native vegetation and re-planting the PRM Site with a native-community will increase the community structure as well as the vegetative diversity and density of the PRM Site. Restoration of the PRM Site will improve the overall wetland zone of influence, as well as the vegetation condition indices. Plantings and seedings proposed across the PRM Site will improve the effectiveness of the wetland in reducing flood damage by increasing water retentions for prolonged periods following precipitations events and the gradual release of floodwaters. This improved functionality will help deal with any sediment stressors that may be present within the immediate surrounding landscape. Furthermore, because sources of excess sediment exist within the surrounding landscape, the restored PRM Site wetland will be better capable of reducing or preventing degradation of water quality as it will act as a trap for sediments, toxicants and/or pathogens in runoff water. Increased vegetative diversity, including plant community structure, and density will be able to retain higher volumes of water than under normal or average rainfall conditions, supporting additional stability of the wetland ecological system and its buffering characteristics, and thereby providing social and economic value related to erosion and flood prone areas. Restoration activities proposed for the PRM Site will also enhance the quality and quantity of wildlife habitat available within the PRM Site.

The post-restoration wetland system will exhibit a diverse plant community structure and will offer a greater and wider range of usable products for wildlife, improving production export functionality. The PRM Site therefore plays an important role in the larger ecological system and encompassing watershed.

Current functionality is expected to improve considerably as a result of restoration efforts. The expected functional ecological uplift the wetland will exhibit as a result of restoration efforts, in additional to the

acreage calculations as described in Section 7.0 Determination of Mitigation Needs, will both meet the required mitigation ratio and offset the functions and values that will be lost at the impact site.

6.2 Project Impacts

Construction of the Project will result in temporary and permanent conversion impacts to PSS and PFO wetlands in Allegheny, Beaver and Washington Counties, PA. Table 4: Mitigation Summary Table provided below presents the impacts and mitigation needs of the Project. A ratio-based method is employed to ensure that the PRM Site provides a sufficient acreage of mitigation to meet the functional replacement needs of the Project. Additionally, Section 5.5 PA Wetland Level 2 Rapid Assessments provides a discussion of the how the conditions at the PRM Site will be improved and will provide offset for those lost as a result of the Project.

As shown in Table 4: Mitigation Summary Table below, mitigation ratios based on impact type (temporary or permanent) and by wetland Cowardian classification type (PSS or PFO) are being used to determine final mitigation requirements.

Table 4: Mitigation Summary Table

Resource	Impact Type	Impact Area (Acres)	Mitigation Ratio (X:X)	Mitigation Need (Acres)
PSS	Perm	0.07	2:1	0.14
	Temp	0.54	1:1	0.54
PFO	Perm	0.10	3:1	0.31
	Temp	0.11		0.33
	Totals	**0.83**	**-**	**1.33**

Note:
1. Please note that the total wetland acreage impacts are correct. Due to aggregation per wetland type and rounding of each wetland acreage to the nearest tenth, a rounding discrepancies of 0.01-acre occurs.

6.3 Proposed Mitigation

Proposed mitigation of the PRM Site will involve vegetative enhancement and permanent protection. As shown in Figure 9: Resource Development Map (Appendix A: Figures), the PRM Site will be enhanced to PFO conditions as part of the restoration approach.

7.0 Mitigation Work Plan

7.1 Wetland Enhancement Approach

Restoration activities will include vegetative enhancement and protection of the wetland resources within the bounds of the PRM Site. Appendix A: Figures, Figure 9: Resource Development Map, shows the proposed restoration activities for the PRM Site. Appendix F: Planting Plan, contains the planting plans for the PRM Site. Ecological lift will be achieved by protecting the area from anthropogenic activities including cattle grazing, restoring historic habitat conditions, planting and seeding of native plant species to restore the native plant community, and controlling invasive species. Barbed-wire fencing or similar will be installed around the bounds of the PRM Site to ensure that pasturing uses cease upon mitigation commencement.

Based upon the noted hydrology on-site, the restoration work will focus on the establishment of a forested wetland complex throughout the enhancement area. Trees and shrubs will be planted per their hydrologic needs and adaptability, with trees and shrubs that are able to tolerate wetter conditions installed in and around inundated and/or fully saturated areas.

7.2 Wetland Enhancement Sequence

The wetland enhancement process will involve diligent invasive species management and replanting efforts. Initial restoration work, specifically during Year 1, will involve the application of an aquatic approved chemical herbicide to the invasive species within the PRM Site. The PRM Site will be controlled either early

or late in the growing season while native species are dormant to avoid adverse impacts to native vegetation present within the PRM Site. Upon initial weed control completion, and depending on the time of year and season, the initial seeding and planting will be conducted. If the time of year is late summer or fall, planting will be postponed until the appropriate planting window. During the appropriate planting window, native herbaceous plants will be installed following a weed control event. Weed control activities will require follow-up monitoring to ensure effectiveness of the control method(s).

Existing native woody vegetation including shrubs and trees, particularly within the PSS and PFO portions of the PRM Site, will be maintained and will not be adversely affected by the proposed restoration activities. These areas do contain a notable invasive species presence and therefore require restorative action. Additionally, existing restored PRM sites within the NCRS and surrounding the proposed PRM Site, as shown in Figure 2: PRM Area Map (Attachment A: Figures) will support the invasive control and replanting and reseeding activities at the site.

After the initial weed control efforts, the site will be prepared for planting, which may include some selective mowing to allow for the installation of native plant seed. A variety of native trees and shrubs will be planted at the PRM Site, as shown in the attached Appendix F: Planting Plan.

FPR will plant the PRM Site at a rate 550 woody stems per acre, of which 20 percent will be larger woody plant material (#7 tree stock, which ranges from 4 to 6 feet in height), and 80 percent will be smaller woody plant material (bare root and one-gallon tree stock, generally 2 to 4 feet in height). This combination will benefit the PFO wetland restorative success of the PRM Site.

A detailed planting list is provided on Sheet 3 of 4 of Appendix F: Planting Plan. Please note that the specific list may change slightly based on time of year that planting occurs and stock availability.

All planted woody vegetation is subject to an 80 percent survivorship performance standard for the monitoring period, as detailed in Section 9.0 Performance Standards. If at any time during the 5 Year monitoring period of the PRM Site, the planted woody plant survivorship falls below 80 percent, supplemental plantings will be required to bring the PRM Site back into compliance with that success criterion.

In open areas, the initial tree installation effort will occur in a gridded matrix with specific species planted in areas best suited for their hydrologic needs. In areas where it is deemed applicable, smaller tree material may be installed at the center of a cluster of shrubby species. As the shrubs establish, they will protect the smaller tree material from browse.

The initial planting will be conducted in a manner that will allow for continued mechanical weed control of the newly seeded enhancement area during the first three years of establishment. This is to prevent weedy species from becoming established within the PRM Site while the native seeds germinate and grow, and to ensure enough light gets through to the establishing seeds, trees, and shrubs. Selective trimming may be used as needed to ensure enough light is getting through to developing tree seedlings.

It is anticipated that some of the smaller sized tree material will be lost to herbivory from local deer and other natural causes. This will be documented during the yearly monitoring periods. After the first year, the mortality from smaller trees and shrubs that have been installed will be used to determine replanting needs for the PRM Site's second year of establishment. The replanting will occur in a random pattern within the original gridded matrix to eliminate the appearance of planted "rows" and return the area to its natural condition.

A facultative wetland seed mix and a mix of native wetland forest tree and shrub species will be used across the PRM Site. The specific locations for all plantings to be used throughout the PRM Site are shown on the planting plans (Appendix F: Planting Plan).

8.0 Maintenance Plan

The PRM Site will be monitored and maintained by FPR, as described in Section 10: Monitoring Requirements. FPR will act as the willing agent to perform all duties associated with satisfying compensatory mitigation requirements. Through contractual agreement with the Permittee, FPR will commit to restoring,

enhancing, and preserving wetland functions and maintain wetland habitats in accordance with the provisions in the PRM.

Yearly maintenance will be documented in the annual monitoring reports along with a discussion of any anticipated maintenance events that will be needed the following year. In general, two to three site visits will be conducted annually during the first 3 years to monitor the PRM Site for invasive species and adapt the yearly maintenance plan as needed based upon these observations.

In general, maintenance will be heaviest during the first 3 years of establishment, and will entail mechanical weed control events, along with two or three chemical control events, all targeting invasive species. Maintenance will focus on controlling any pockets of invasive species that might still be present on-site and monitoring for the establishment of any new stands of invasive species. Control methods will be targeted to deal with the individual species as they are found and will include both mechanical and chemical control. The Agent projects that by the 4th and 5th years, the intensity of management efforts required will drop off significantly as the native plant community will be relatively well established and resilient against the establishment and encroachment of invasive species.

In locations where wetland areas are too wet to allow mechanical access manual chemical and mechanical weed control will be necessitated. These areas although tend to have less problems with annual weedy species, can be threatened by more persistent perennial invasive species, specifically reed canary grass. Target weed control applied through spot application, coupled with mechanical weed control to stop any re-seeding will be the primary weed control techniques used in the wetter wetland areas.

9.0 Performance Standards

The PADEP and USACE will use the best professional judgment, visual observations, and monitoring reports to evaluate attainment of performance standards and to determine whether part or the entire PRM Site has successfully met the conditions of the permit. The following criteria will be used to assess project success:

1. In the vegetated wetland enhancement area, success will be evaluated by:
    a. Invasive herbaceous plant coverage will not exceed 20 percent during Year 1 monitoring and 10 percent each year thereafter. Any seeds used for plant establishment should and will be free of tall fescue, bermuda grass, and other allelopathic turf grass species, as well as plant species on the PA Department of Conservation and Natural Resources (DCNR) Invasive Plant list (PADCNR, 2014).
    b. Native herbaceous plant coverage will be at least 60 percent by the end of the first full monitoring year, 80 percent by the end of the second full monitoring year, and at least 85 percent each monitoring year thereafter. Any seeds used for plant establishment should and will be free of tall fescue, Bermuda grass, and other allelopathic turf grass species, as well as plant species on the PADCNR Invasive Plant List.
    c. All planted woody plant survivorship will be 80 percent following Year 1 monitoring. All plant survivorship will be determined from data collected through sampling at post-restoration monitoring locations.
    d. Each year during the monitoring period of the PRM Site, all planted woody vegetation shall exhibit an average increase in height from the previous year.
    e. By the fifth monitoring year (Year 5 following construction), trees will exhibit an average height of 8 feet and planted woody shrubs exhibit an average height of 5 feet. A density of 200 healthy stems per acre including volunteers, will be achieved by the end of the 5-year monitoring period.

10.0 Monitoring Requirements

On behalf of the Permittee, FPR will monitor the PRM Site to demonstrate compliance with the Performance Standards detailed in Section 9: Performance Standards. Monitoring will follow the guidelines established below:

1. Visual Description. Visual descriptions will be provided for the entire site. Visual observations will also be used to evaluate the percentage of invasive species present. Photos will be taken at the wetland monitoring plot and included with each monitoring report. Photos will be taken at ground level, facing north, south, east and west. The same photo location points at the monitoring plot will be used to allow for pre and post restoration comparisons.
2. Vegetation. Immediately following initial planting, FPR will establish permanent monitoring plots for wetlands within the mitigation area. Plots will be marked using 8-foot PVC pipe anchored with a metal T-post at plot center and GPS coordinates will be recorded. At each monitoring plot, herbaceous vegetation will be monitored in a 5-foot-by-5-foot plot and woody vegetation will be monitored in a 20-foot-by-20-foot plot. Monitoring plots may be adjusted as necessary to accommodate PRM Site boundary limits, whereby adjustments will occur such that the same square footage is accounted for. One monitoring plot will be stationed for this PRM Site. Permanent monitoring plot will provide data to evaluate the survival rate of planted vegetation including number, species, and survivorship. Reports will also reflect information regarding herbaceous plant species including the facultative wetland plant status [obligate (OBL) to upland (UPL)] per the USACE regional plant list (Lichvar 2016) of each plant, the percent of each species, and whether the species is native, introduced, or invasive.

Monitoring activities will occur over a five-year period. During the first two years, monitoring will occur two times per year, once during the spring growing season (typically between April and May) and once during the fall growing season, typically between September and October. Monitoring will occur once annually during the fall growing season for the remaining three years for which monitoring is required. If all Performance Standards (Section 9: Performance Standards) have not been met in the fifth year, then a monitoring report will be required for each consecutive year until all standards have been successfully satisfied. Submittal of a final monitoring report (typically prepared the fifth growing season following completion of restoration activities, including planting) will be required.

Please note that additional site visits will occur as part of the maintenance activities at the PRM Site. Maintenance activities, as discussed in Section 8.0 Maintenance Plan, involve invasive species control, deer deterrent planting, mowing and supplemental planting if necessary. These site visits serve as monitoring assessment opportunities that aid in determining both the effectiveness of earlier management activities, and determine management techniques to be employed throughout the future establishment of the PRM Site.

10.1 Monitoring Reports

On behalf of the Permittee, FPR will submit monitoring reports to the PADEP and USACE following each formal monitoring event during the five-year monitoring period. As such, two monitoring reports will be submitted for the first two years monitoring occurs, and one monitoring report will be submitted for the remaining three years for which monitoring is required. Monitoring reports following a spring monitoring event will be submitted within 90 days of when monitoring occurs. Monitoring reports following a fall monitoring event will be submitted by December 31st of that year.

Monitoring reports will include all data collected from the year's monitoring events, which will be used for comparison to the PRM Site's progress towards the performance standards found in Section 9: Performance Standards. If the PRM Site achieves all its performance standards prior to year 5, an early release may be requested from the USACE and PADEP. Additionally, reports will include the following discussions: success to date; maintenance and management activities conducted during that year; the proposed maintenance schedule for the following year based upon the results of the yearly monitoring; and any problems which have been or are being encountered. At a minimum, monitoring reports should also include the following:

- Photos taken from ground level at the monitoring plot to document overall conditions;
- A description of the general condition of the seedlings, including survival and mortality, and if applicable, a discussion of likely causes for mortality;
- A description of vegetative communities developing at each monitoring plot;
- A description of the generalized degree and distribution of exotic/invasive species and whether they are seed bearing trees or seedlings;
- Identification of measures used to eradicate exotic/invasive species and document results of these efforts;
- A corrective action or redial action plan to address deficiencies in Performance Standards, if applicable.

10.2 As-Built Planting Plan

Following initial restoration activities, FPR will complete an as-built planting plan to show the general locations and quantities of the vegetative material that was planted. On behalf of the Permittee, FPR will submit the as-built planting plan as part of the first monitoring report to the regulating agencies following completion of the planting and first monitoring event for the PRM Site.

11.0 Long-Term Management Plan

To ensure the long-term sustainability of the PRM Site, FPR will initially perform maintenance and long-term management. The Permittee anticipates that these activities will be minimal as the project is designed to be self-sustaining with limited management activities. Maintenance will be heaviest during the first 3 years of establishment, and will entail mechanical weed control events, along with two or three chemical control events, all targeting invasive species.

Inspections will be conducted bi-annually to identify any need for invasive species control, additional signage, or boundary maintenance. Specific items required as part of a Long-Term Management Plan are listed below.

Woody Plant Survivorship

If at any time during the 5-year monitoring period of the PRM Site, the planted woody plant survivorship or planted tree survivorship falls below 80 percent, supplemental plantings will be required to bring the PRM Site back into compliance with that performance standard.

Patrols

Walk-through surveys will be conducted annually to qualitatively monitor the general condition of the habitats on-site. Notes to be made may include observations of species encountered, water quality, general extent of wetlands and streams, or invasive or non-native species establishment. If there are any noted items that require maintenance, this should be recorded and submitted in a report to the Agencies.

Invasive Species Monitoring

The walk-through survey will include a qualitative assessment (e.g. visual estimate of cover) of invasive species. If there is a continuous area exceeding 1/8 of an acre containing invasive species, the Long-Term steward should note this in a report to the agencies and conduct invasive species control to remove the noted species. Follow up monitoring should be conducted the following year, with follow up maintenance if needed.

Forestry Management Practices

Any practices to reduce diseased or dead vegetation will be allowed if the vegetation compromises the long-term viability of the PRM Site.

Trash and Trespass

If needed, trash should be removed and any necessary measures to prevent or repair damage from vandalism and trespass impacts should be taken.

Enforcement

The Long-term Steward will be responsible for the enforcement of the conservation easement. FPR will be the initial designated Long-term Steward charged with long-term management and maintenance responsibility once long-term success criteria as described in each site-specific PRM Report are attained. FPR may appoint a different Long-term Steward in accordance with 33 CFR 332.7(d)(1). The appointment of such an entity will be approved by the PADEP and/or the USACE.

12.0 Adaptive Management Plan

An adaptive management plan including contingency, and remedial responsibilities will be implemented in the event monitoring reveals that certain performance standards have not been met. In the event of a deficiency, FPR will provide notice to the PADEP and USACE. The notice will include an explanation for the deficiency, potential remedial actions that could be undertaken, an assessment of risks, and an assessment of any adjustments that must be made to the maintenance and monitoring regime.

Ecological restoration is in its essence the practice of adaptive management. Due to the multitude of factors that affect a restoration project in a given year, the practitioner needs to be constantly assessing the site, and reacting to changing conditions as the site develops and matures. Usually, yearly variations are relatively minor and within the parameters of a given project's performance standards. These normal variations are noted through regular site visits, yearly monitoring reports, and yearly maintenance activities. Occasionally, rare instances arise which bring a project far outside of the defined range of its performance standards and more intensive remedial action is required. This adaptive management plan forecasts a few potential situations that could cause the proposed PRM Site to be well outside the range of its defined performance standards and how those instances would be addressed.

Wetland Vegetation

As the PRM Site is currently designed as a wetland enhancement site, all wetland areas have been delineated in accordance with the *1987 USACE Wetlands Delineation Manual (Environmental Laboratory, 1987)* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont (Version 2.0) (USACE, 2012).* Restoration activities at the PRM Site are not anticipated to result in changes that will negatively affect the hydrology; therefore, risk of hydrology changing is not expected. As such, risk of the seeding or planting failing due to hydrology is not anticipated, unless there is an unexpected and extreme drought. In that instance, any failure would be noted in the monitoring report, and replanting or reseeding would be conducted based on the results of the monitoring report.

Also of risk to wetland areas is a large-scale aggressive break out of invasive species. This risk is usually highest if grading is conducted in a restoration, as the exposed soil and lack of vegetative competition allows for easy succession by fast growing and aggressive invasive species such as reed canarygrass. Since this PRM Project is using an enhancement approach, there is little to no risk of this happening. The existing native vegetation will be largely undisturbed and will be enhanced by supplemental plantings and seeding. Invasive species will be controlled on a yearly basis.

Invasive Species and Native Dominance

If at any point there was an intensive colonization of upland or wetland invasive species, which brought the total percent of invasive species well above the allowed performance standards, remedial action will be needed. The management technique used will be dependent on the type of invasive species colonizing the site (i.e. annual, or perennial, primary reproduction through vegetative spread or through seed). If the species are annual they can be managed via maintenance mowing and mechanical weed control methods to stop them from re-seeding into the site. After the seed bank is depleted, they drop out of the vegetative

matrix. If they are perennial in nature, chemical herbicides need to be used; mechanical weed control is still used to stop further spreading through seed if they are a species that has high germination rates.

Once the invasive species control has begun, additional seeding or planting will need to be conducted to re-introduce a native plant community into the area of concern. Depending on the type of invasive species (i.e. broad leaf or monocot), replanting and reseeding strategies can be used to allow for continued chemical control of the invasive species in the area while still allowing the native species to germinate and develop.

The likelihood of this scenario is low; once established, native plant communities are actually quite resilient to invasion by invasive species as long as they are not disturbed or impacted. Invasive species issues on a restoration site tend to be most problematic during the first 2 years, because there is bare soil immediately available for germination and colonization immediately following construction, and there may be invasive species in the existing seed bank to germinate and establish. As previously stated, the primary restoration technique being used on this site is enhancement and therefore, the risk of this happening is extremely low.

In the event that the site is not meeting its performance standards for native herbaceous cover, additional seeding will be conducted. Again, the most important factor for establishing a healthy stand of upland herbaceous species is proper maintenance during the first 2 to 3 years of establishment, specifically mowing in upland areas. This ensures enough light is reaching the developing seedlings, while also eliminating competition from annual weedy species that may be trying to colonize the site. In the wetland areas, mowing cannot be conducted, but mechanical weed control with weed whips can be used.

13.0 References

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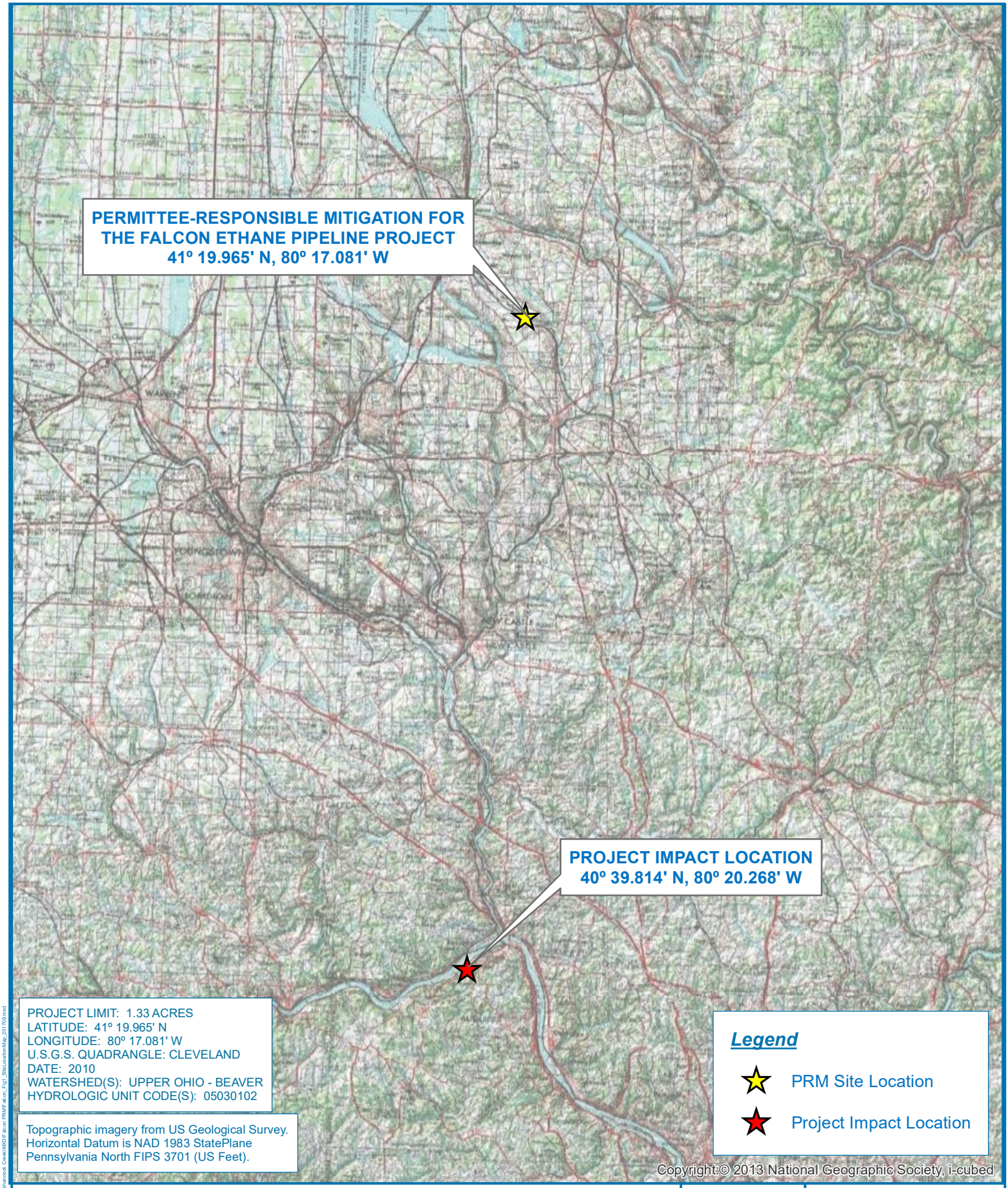
APPENDIX A

FIGURES



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LONGITUDE: 80º 17.081' W
U.S.G.S. QUADRANGLE: CLEVELAND
DATE: 2010
WATERSHED(S): UPPER OHIO - BEAVER
HYDROLOGIC UNIT CODE(S): 05030102

Topographic imagery from US Geological Survey.
Horizontal Datum is NAD 1983 StatePlane
Pennsylvania North FIPS 3701 (US Feet).

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FIGURE 1

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
SITE LOCATION MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017
Drawn by: NGD
Checked by: AS

Document Path: S:\@RES GIS\Projects\PA\008 Neshannock Creek\MXD\Falcon PRM\Falcon_Fig1_SiteLocationMap_20170914.mxd

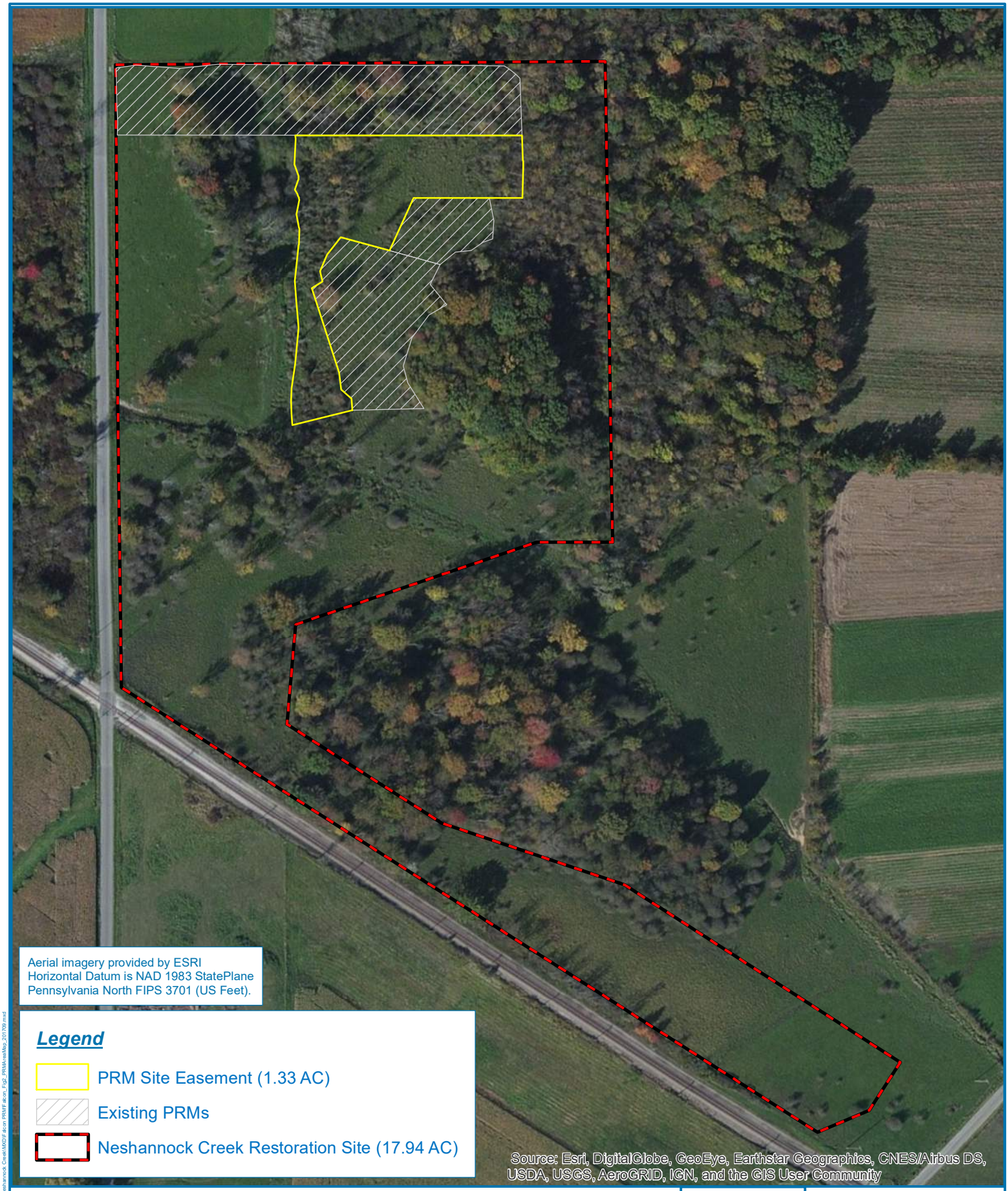

FIGURE 2

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
PRM AREA MAP

MERCER COUNTY, PENNSYLVANIA

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Date: 9/8/2017
Drawn by: NGD
Checked by: AS

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Document Path: S:\@RES GIS\Projects\PA\008 Neshannock Creek\MXD\Falcon PRM\Falcon_Fig2_PRMAreaMap_201709.mxd

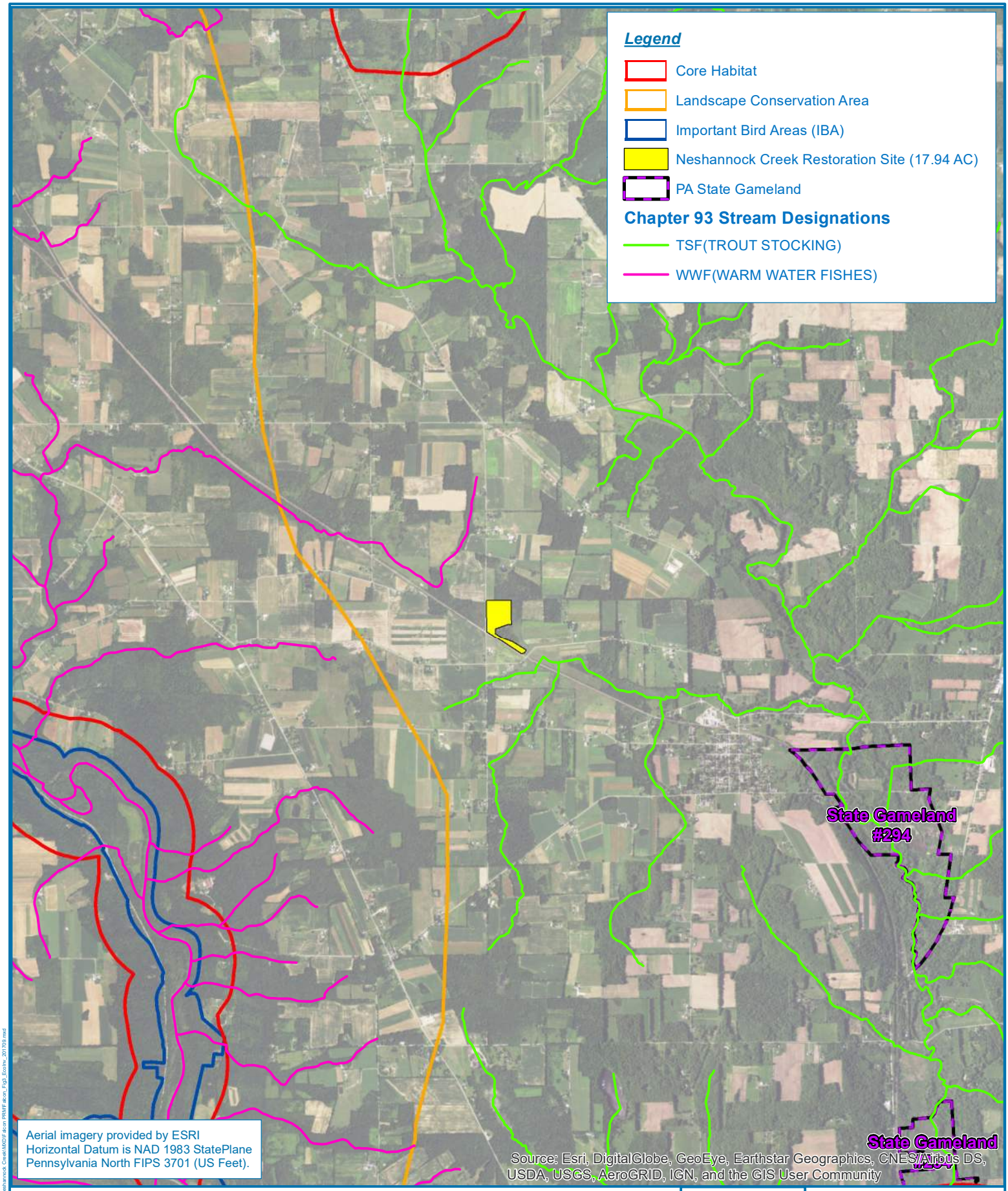

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FIGURE 3

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
ECOLOGICAL INVENTORY MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/6/2017

Drawn by: NGD

Checked by: AS

res

Document Path: S:\@RES GIS\Projects\PA\008 Neshannock Creek\MXD\Falcon PRMF\Falcon_Fig3_Ecoinv_20170905.mxd

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FIGURE 4A

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
1939 HISTORIC AERIAL

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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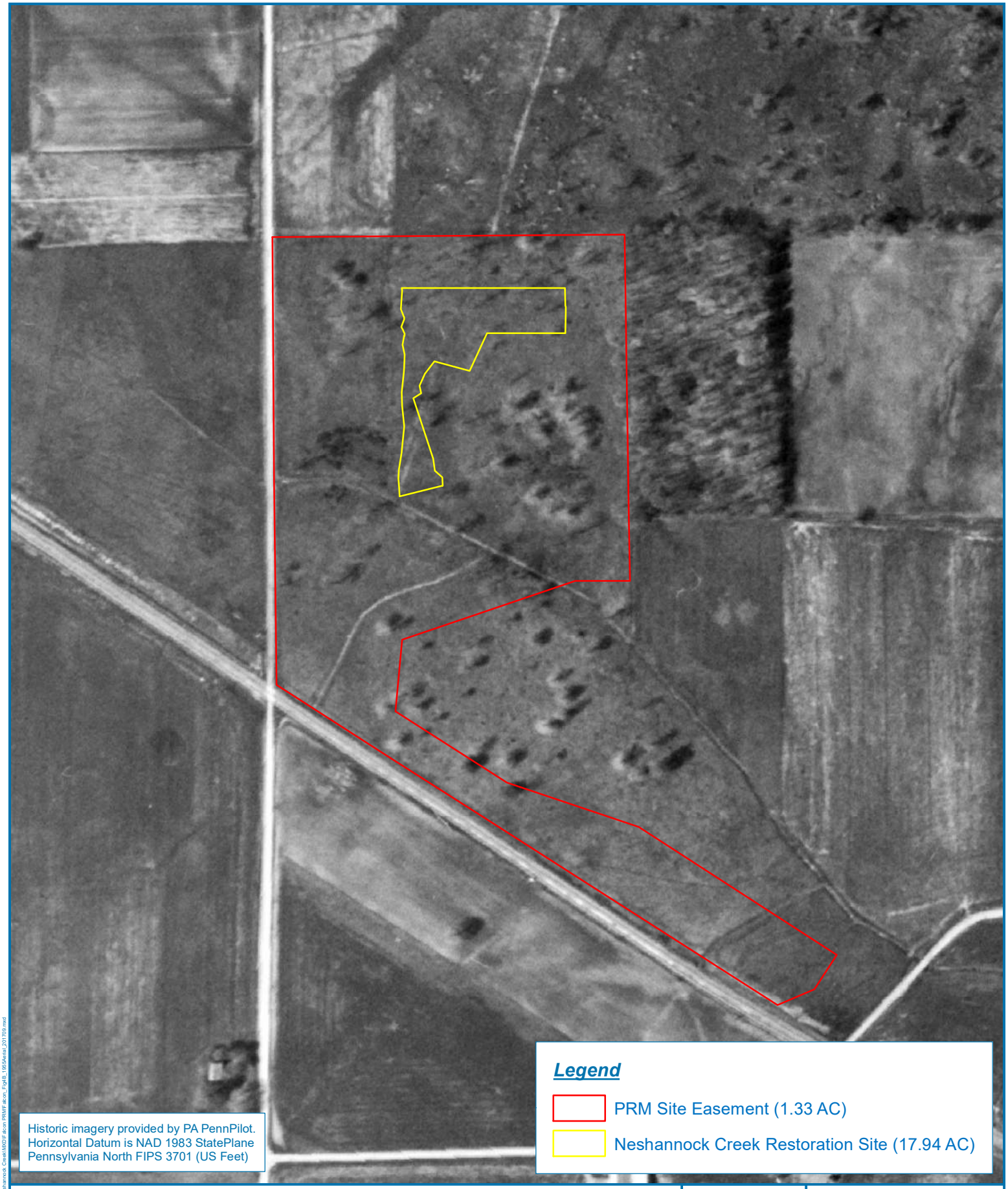

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FIGURE 4B

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
1955 HISTORIC AERIAL

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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FIGURE 4C

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
1968 HISTORIC AERIAL

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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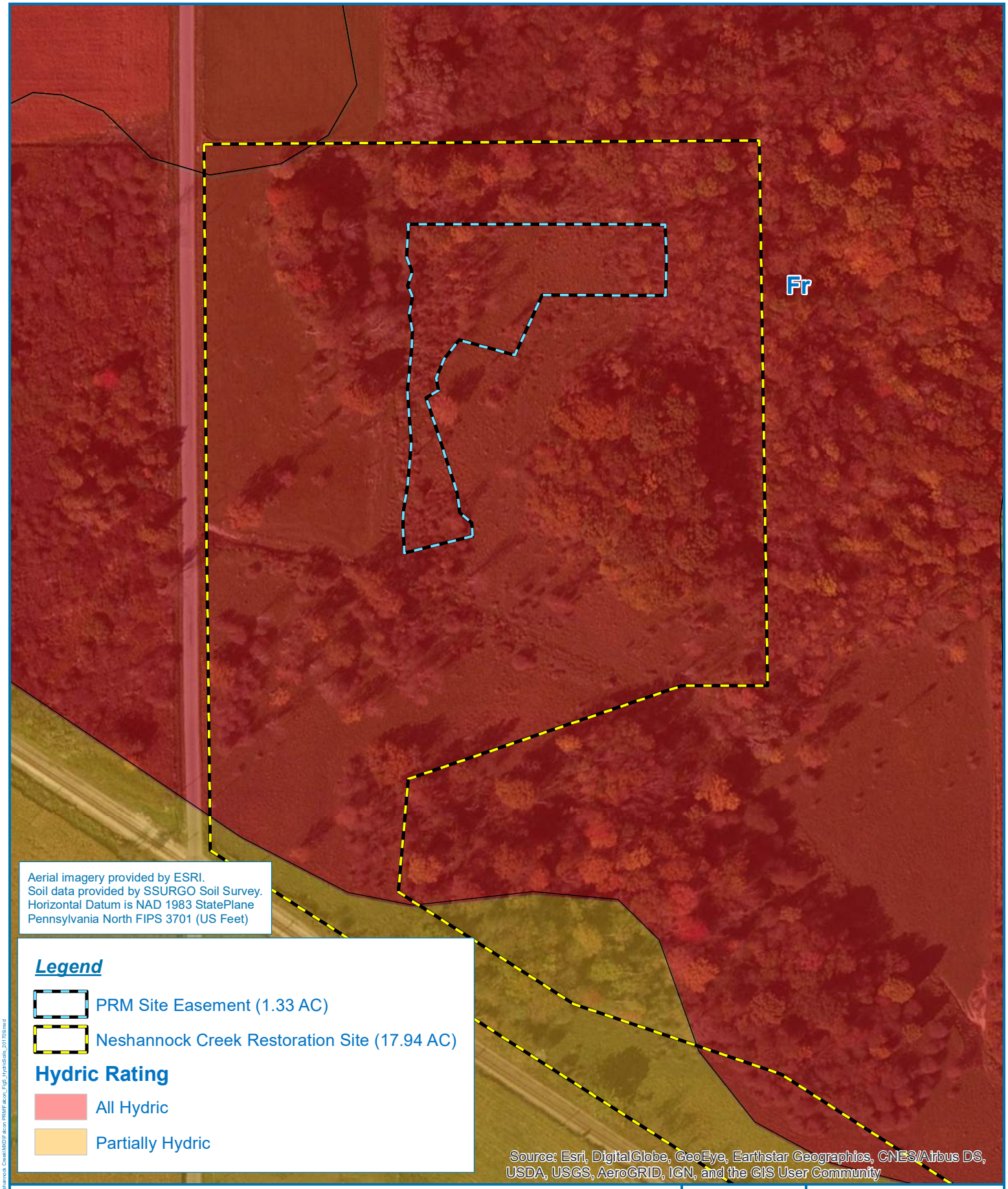

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FIGURE 5

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
HYDRIC SOILS MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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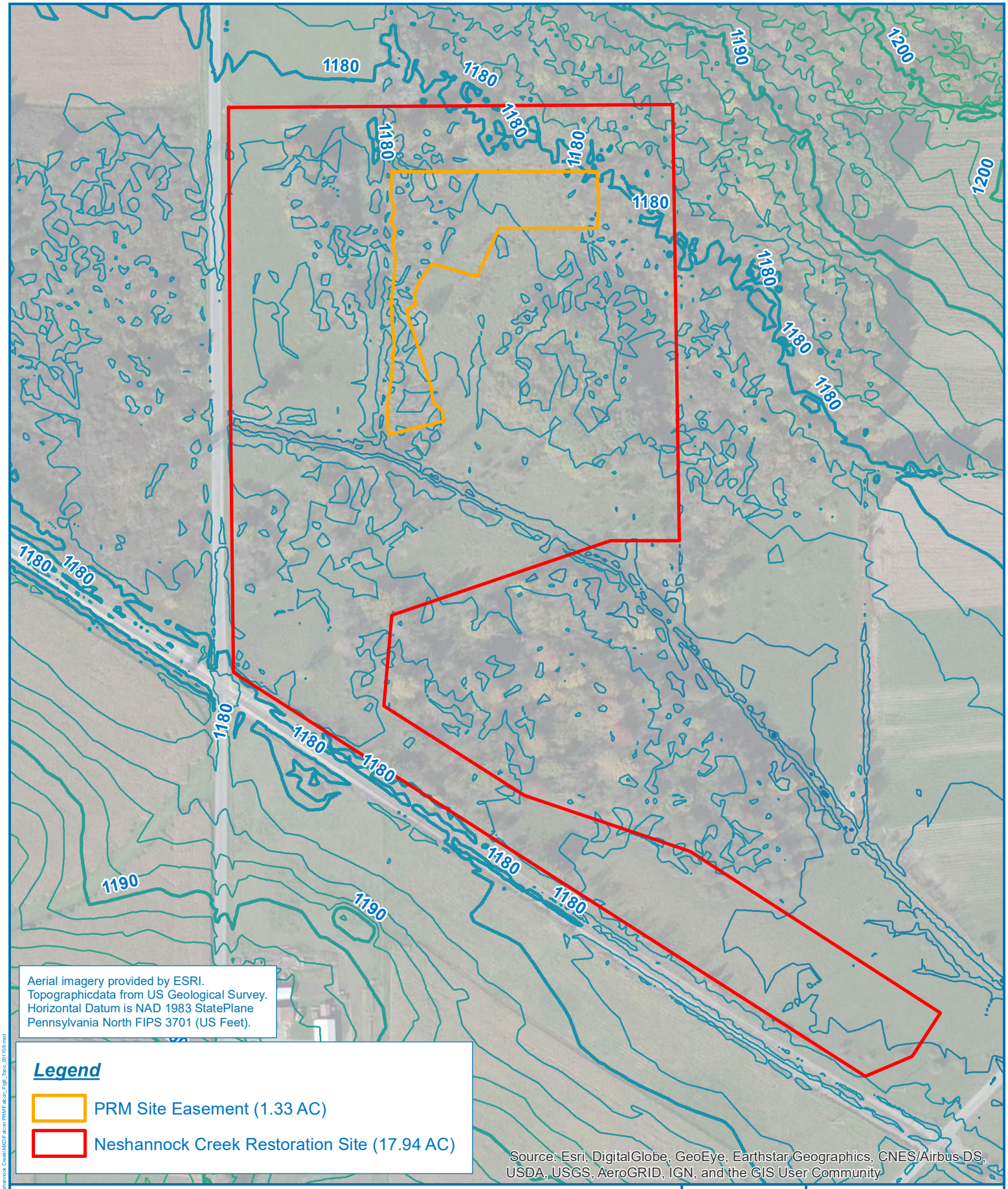

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FIGURE 6

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
TOPOGRAPHIC MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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Document Path: S:\@RES GIS\Projects\PA\0068 Neshannock Creek\MXD\Falcon PRMFalcon_Fig6_Topo_20170918.mxd

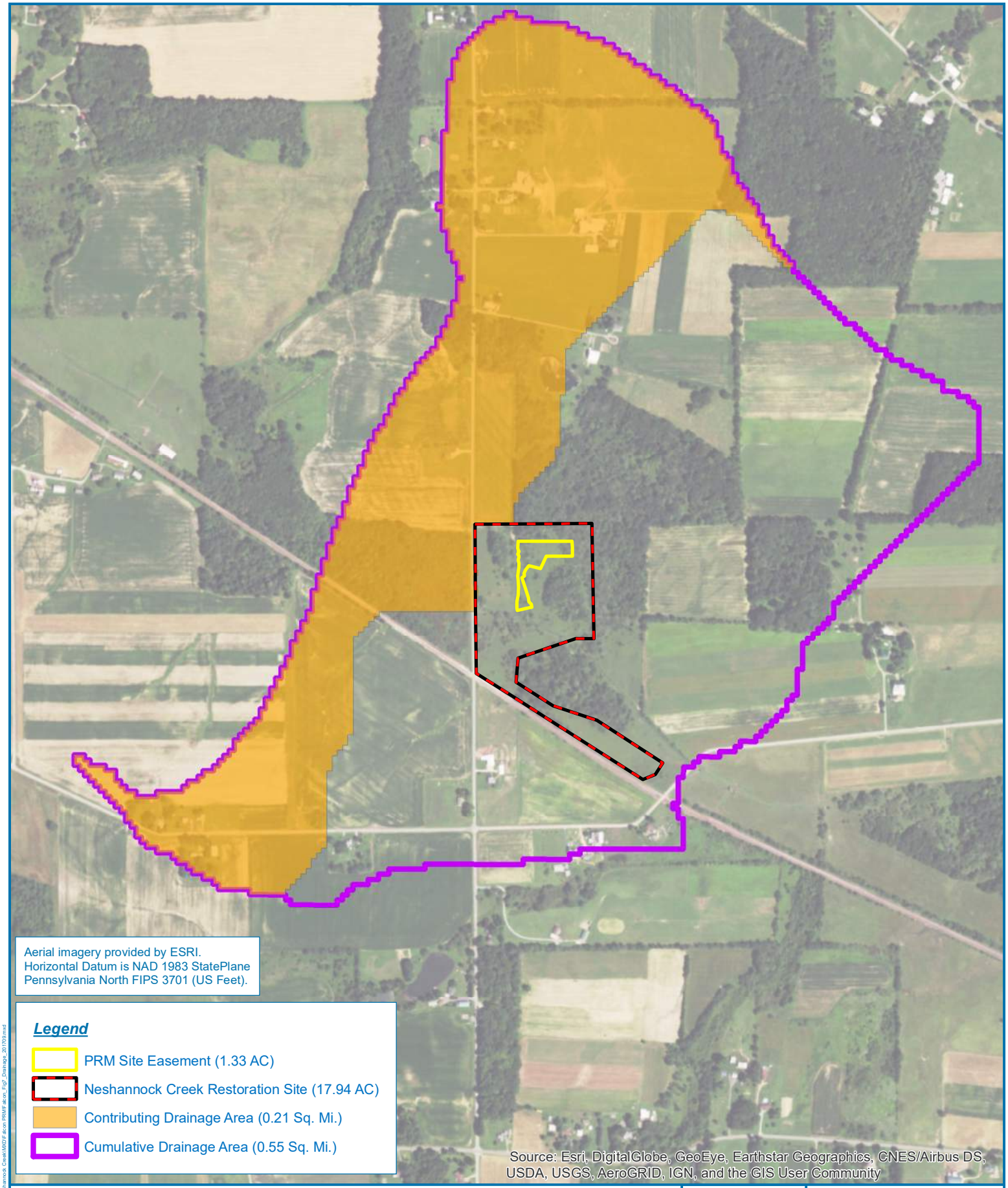

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FIGURE 7

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
DRAINAGE AREA MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

Document Path: S:\@RES GIS\Projects\PA\008 Neshannock Creek\MXD\Falcon PRM\Falcon_Fig7_Drainage_201709.mxd

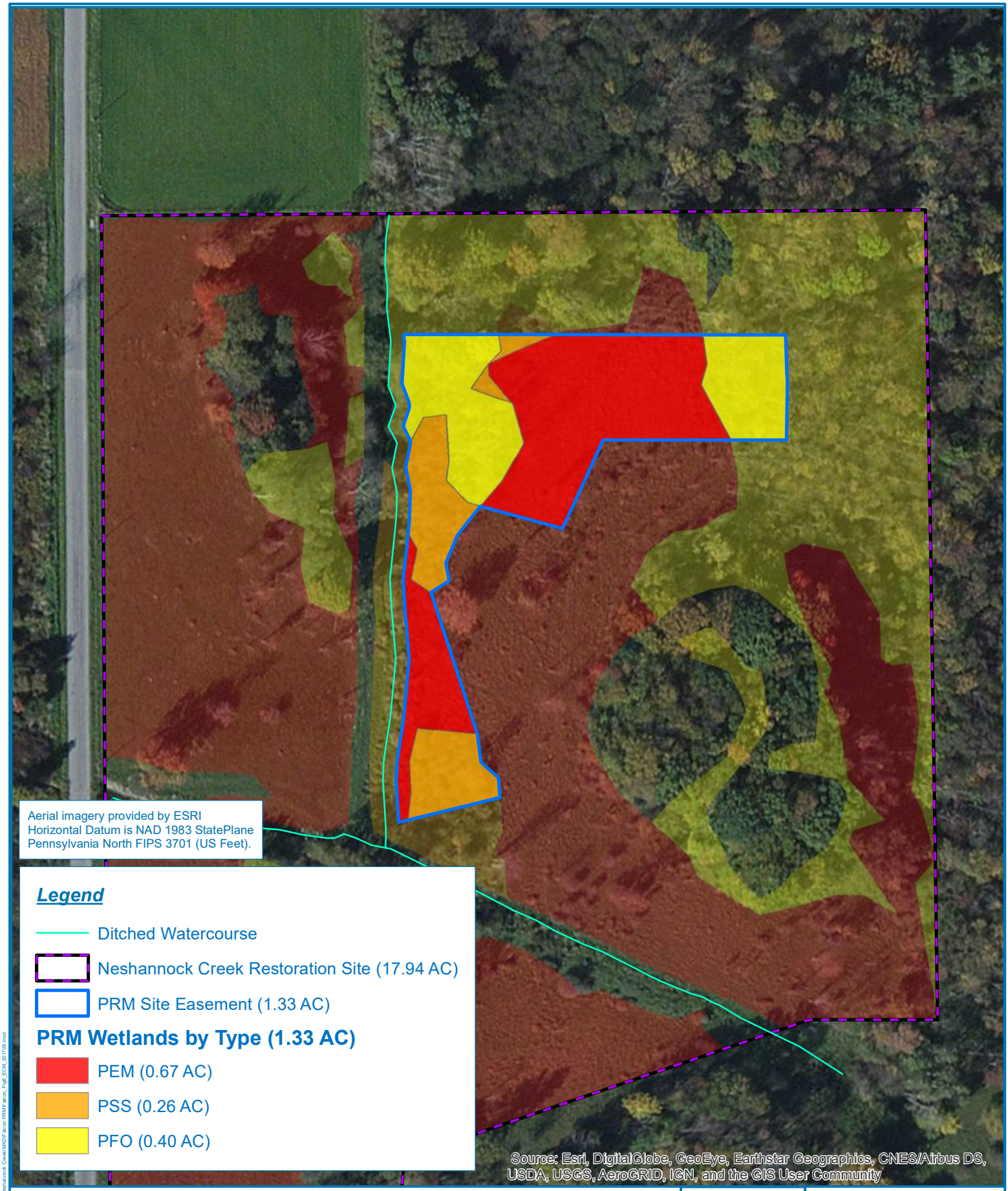

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FIGURE 8

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
EXISTING CONDITIONS MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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FIGURE 9

NESHANNOCK CREEK RESTORATION SITE
PERMITTEE-RESPONSIBLE MITIGATION FOR
THE FALCON ETHANE PIPELINE PROJECT
RESOURCE DEVELOPMENT MAP

MERCER COUNTY, PENNSYLVANIA

Date: 9/8/2017

Drawn by: NGD

Checked by: AS

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APPENDIX B

SITE PROTECTION INSTRUMENT

DECLARATION OF RESTRICTIVE COVENANT FOR CONSERVATION

This DECLARATION OF RESTRICTIVE COVENANTS FOR CONSERVATION ("Declaration") is made and entered into as of [date] by and between FIRST PENNSYLVANIA RESOURCE, L.L.C., a Pennsylvania limited liability company, with a business address at 33 Terminal Way, Pittsburgh, PA 15219 ("Grantee") and_____, an [individual/ corporation/other organization] with a mailing address at [_____] ("Grantor").

RECITALS

WHEREAS, Grantor owns certain real estate located in _____ County(ies), Pennsylvania, consisting of _____ acres, more or less, as described more specifically in **Exhibit A** hereto (the "Property"); and

WHEREAS, Grantee is a Pennsylvania company in the business of stream and wetland mitigation in the Commonwealth of Pennsylvania; and

WHEREAS, the Grantor has agreed to make a _____ acre portion of the Property, delineated in **Exhibit B**, where certain [stream and/or] wetland resources exist or may be created and/or enhanced (the "Conservation Area"), subject to this Declaration; and

WHEREAS, the Grantor agrees to the creation of the Conservation Area described herein and intends that the Conservation Area shall be preserved and maintained in perpetuity in an enhanced or natural condition, which will include functioning [streams and/or] wetlands; and

WHEREAS, the Conservation Area, or a portion thereof, is intended to be used in the future as mitigation for impacts to waters of the United States and/or waters of the Commonwealth of Pennsylvania authorized under U.S. Army Corps of Engineers ("Corps" to include any successor agency) or Pennsylvania Department of Environmental Protection ("PADEP" to include any successor agency) permit(s). Before, or at the time a Corps or PADEP permit or verification or a Mitigation Banking Instrument approves using this Conservation Area as mitigation: (1) the Mitigation Plan approved/required by such permit or Banking Instrument must contain a legal description of the portion of the Conservation Area to be used as mitigation or a Mitigation Bank; and (2) Grantee must record an addendum to this Declaration containing a legal description of the portion of the Conservation Area associated with each permit or Mitigation Bank, which references the applicable Corps and/or PADEP permit/verification number(s) or Mitigation Bank Site Name and any associated Corps/PADEP authorization/approval number(s). A form of the addendum to be used is attached to this Declaration as **Exhibit C**; and

WHEREAS, in recognition of the continuing benefit to the Property, and for the protection of waters of the United States and scenic, resource, environmental, and general property values, the Grantor and Grantee have agreed to place certain restrictive covenants on the Property, in order that the Conservation Area shall remain substantially in its natural condition forever; and

SAMPLE

WHEREAS, the Grantor and Grantee agree and acknowledge that this Declaration, including the rights authorized to Grantee herein, shall be assignable and transferrable to Grantee's subsequent heirs, successors, and assigns, [if Holder known: including the _____]; and

[If Holder known: WHEREAS, the _____, a 501(c)(3) tax-exempt entity registered with the Bureau of Charitable Organizations of the Pennsylvania Department of State, is a holder of this Declaration] and

WHEREAS, this Declaration is constructed and covenanted to meet the requirements for conservation easements under the Pennsylvania Conservation and Preservation Easements Act, Act 29 of 2001, and as amended thereafter; and

NOW, THEREFORE, for good and valuable consideration and in consideration of the mutually held interests in enhancement and preservation of the environment, as well as the terms, conditions, and restrictions contained herein, and pursuant to the laws of the Commonwealth of Pennsylvania, Grantor does agree to the following terms and conditions:

A. **PURPOSE**

The purpose of this Declaration is:

(1) To preserve, protect, and enhance the native flora, fauna, soils, water table, aquifer, drainage patterns, wetland resources and other related environmental functions and values of the Conservation Area;

(2) To maintain the natural view shed of the Conservation Area in its native, enhanced, scenic and open condition;

(3) To assure that the Conservation Area, including its air space, streams and other aquatic resources on or beneath the Conservation Area, and including, but not limited to, subsurface aquifers, springs, and the water table, will be maintained in perpetuity in its natural condition, as that may be enhanced, as provided herein; and

(4) To prevent any use of the Conservation Area that threatens to or will impair, interfere with, or otherwise negatively affect its natural resource functions and values.

Grantor and Grantee [If known: and Holder] intend and agree that this Declaration will confine the use of the Conservation Area to such activities as are consistent with the purposes set forth herein.

B. **ACCESS**

SAMPLE

In order to achieve the purposes of this Declaration, the following rights are created in accordance with Pennsylvania law:

(1) The Grantee shall have the right and Grantor acknowledges the right of [the holder(s) of this Declaration,] the Corps, the PADEP, and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration, to inspect the Conservation Area at reasonable times to monitor compliance with this Declaration. Except in cases of a threat of a physical or public safety emergency, such entry shall, when practicable, be upon reasonable prior notice to Grantor or its successors and assigns, and such entry shall not unreasonably interfere with the Grantor's or its successors' and assigns' use and quiet enjoyment of the Property.

(2) The Grantor, Grantee, [holder(s) of this Conservation Declaration,] the Corps, the PADEP and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration, each shall have the right to enter upon the Property to access the Conservation Area at reasonable times and upon prior notice to the Grantor; and upon notice and written approval by the Corps may take appropriate environmental or conservation management measures within the Conservation Area consistent with the terms and purposes of this Declaration, including, but not limited to:

(a) planting of native vegetation (i.e. trees, shrubs, grasses, and forbs); and
(b) restoring, altering or maintaining the topography, hydrology, drainage, structural integrity, streambed(s), streambank(s), water quantity, water quality, any relevant feature of a stream, wetland, water body, or vegetative buffer within the Conservation Area.

(3) The Grantor and Grantee, [holder(s) of this Declaration], the Corps, PADEP, and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration, shall each have the right to enforce the terms of this Declaration by appropriate legal proceedings in accordance with applicable law so as to prevent any activity on or use of the Property that is inconsistent with the purposes of this Declaration and to require the restoration of such areas or features of the Conservation Area that may be impaired or damaged by an inconsistent activity or use.

C. **DURATION**

This Declaration shall remain in effect in perpetuity, shall run with the land regardless of ownership or use, and is binding upon and shall inure to the benefit of the Grantor and Grantee's [if known – and holder's] heirs, executors, administrators, successors, representatives, devisees, and assigns, as the case may be, as long as said party shall have any interest in any portion(s) of the Conservation Area.

D. **RESTRICTIONS**

SAMPLE

Any activity in or use of the Conservation Area that is inconsistent with the purposes of this Declaration by the Grantor; subsequent property owner(s); and the personal representatives, heirs, successors, and assigns of either the Grantor or subsequent property owner(s), is prohibited. Without limiting the generality of the foregoing, and except when an approved purpose under B.(2) above, or as necessary to accomplish mitigation approved under the any permit(s) reliant upon this Declaration, the following activities and uses are expressly prohibited in, on, over, or under the Conservation Area, subject to the express terms and conditions below:

(1) **Structures**. The construction of man-made structures including, but not limited to, the construction, removal, placement, preservation, maintenance or alteration of any buildings, roads, utility lines, billboards, or other advertising. This restriction does not include deer stands, bat boxes, bird nesting boxes, bird feeders, duck blinds, and the placement of signs for safety purposes or boundary demarcation.

(2) **Demolition**. The demolition of fencing structures constructed by the Grantee for the purpose of demarcation of the Conservation Area or for public safety.

(3) **Soils**. The removal, excavation, disturbance, or dredging of soil, sand, peat, gravel, or aggregate material of any kind; or any change in the topography of the land, including any discharges of dredged or fill material, ditching, extraction, drilling, driving of piles, mining or excavation of any kind.

(4) **Drainage**. The drainage or disturbance of any aquifer, the surface water level or the water table.

(5) **Waste or Debris**. The storage, dumping, depositing, abandoning, discharging, or releasing of any gaseous, liquid, solid, or hazardous waste substance, materials or debris of whatever nature on, in, over, or underground or into surface or ground water.

(6) **Non-Native Species**. The planting or introduction of non-native or invasive species.

(7) **Herbicides, Insecticides, and Pesticides**. The use of herbicides, insecticides, or pesticides, or other chemicals, except for as may be necessary to control invasive species that threaten the natural character of the Conservation Area. State-approved municipal application programs necessary to protect public health and welfare are not included in this prohibition.

(8) **Removal of Vegetation**. The mowing, cutting, pruning, removal; disturbance, destruction, or collection of any trees, shrubs, or other vegetation, except for pruning, cutting or removal for:

a) safety; or
b) control in accordance with accepted scientific forestry management practices for diseased or dead vegetation; or
c) control of non-native species and noxious weeds; or
d) scientific nature study.

SAMPLE

(9) **Agricultural Activities**. Unless currently used for agricultural or similarly related purposes, the conversion of, or expansion into, any portion of the Conservation Area for use of agricultural, horticultural, aquacultural, silvicultural, livestock production or grazing activities. This prohibition also includes conversion from one type of these activities to another (e.g. from agricultural to silvicultural).

(10) **Subdivision of Conservation Area**. Subdivision of real property within the Conservation Area into multiple parcels.

(11) **Other**. Other acts, uses, excavation, or discharges, which adversely affect fish or wildlife habitat or the preservation of lands, waterways, or other aquatic resources mentioned herein and located within the Conservation Area.

E. INSPECTION, ENFORCEMENT AND ACCESS RIGHTS

As set forth in Section B, above, the Grantee, holder(s) of this Declaration, the Corps, PADEP and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration have the right to enter the Property to observe the Conservation Area and to take actions necessary to verify compliance with and to enforce this Declaration. When practicable, such entry shall be upon prior reasonable notice to the property owner. No violation of this Declaration shall result in a forfeiture or reversion of title. In any enforcement action, an enforcing agency shall be entitled to a complete restoration for any violation, as well as other authorized judicial remedies such as civil penalties. Nothing herein shall be interpreted to limit the right of the Corps to modify, suspend, or revoke any permit issued or authorized by Corps.

F. RECORDING AND EXECUTION BY PARTIES

Within thirty (30) calendar days of execution of this Agreement, the Grantee shall record this Declaration in the County office where land records are retained and shall provide proof of recordation to Grantor, the Corps, and PADEP within ten (10) business days of execution. Further, if anticipated activities in the Conservation Area are agreed upon for future phases of the site, as set forth in Section H (Reserved Rights) herein, the Grantee must submit plans to the Corps and PADEP for review and approval prior to any work in the Conservation Area.

G. NOTICE OF TRANSFER OF PROPERTY INTERESTS

No transfer of the rights set forth in this Declaration, or action to void or modify this Declaration, including transfer of title to or establishment of any other legal claims over the Conservation Area or the underlying Property it occupies, shall occur without sixty (60) calendar days' prior written notice to the Corps and the PADEP.

H. RESERVED RIGHTS

SAMPLE

(1) This Declaration will not prevent the Grantor, or any subsequent owner of the Property and/or portions of the Property, from making use of the area(s) outside of the Conservation Area or from uses that are consistent with the purposes of this Declaration, including, but not limited to the following:

(a) **Existing Agreements**. Uses that Grantor is required to allow under valid, existing, recorded agreements are permitted, to the extent they do not interfere with, threaten, or degrade the Conservation Area and only to the extent they are consistent with the purposes of this Declaration. The Grantor[, holder(s) hereof,] and any holders of easements or other property rights for the operation and maintenance of pre-existing or project-related structures or infrastructure, such as roads, utilities, drainage ditches, or stormwater facilities that are present on, over, or under the Conservation Area, reserve the right, within the terms and conditions of their permits, agreements, and the law, to continue with such operation and maintenance. All pre-existing or approved project-related structures or infrastructure, if any, shall be shown on the accompanying plat map or approved plan and attached to this Declaration as **Exhibit D**.

(b) **Subsequent Agreements Allowing Subsurface Activity**. Subject to review by Grantee [if holder known – and holder of this Declaration], and only to the extent they are consistent with the purposes of this Declaration, agreements for the extraction of natural gas (regardless of source) or oil, and injection or release of water and other substances to facilitate such extraction, but excluding injection wells subject to state or federal underground injection control programs. The activities subject to such agreement may only occur at subterranean depths at which there can be no impairment of or detectable impact to water quality or quantity, native flora, fauna, soils, water table, aquifer, drainage patterns, and other related environmental functions and values of the Property, or on other resources described in this Declaration. No surface activities or uses, incident to such extraction are permitted in the Conservation Area. Grantor and Grantee shall provide the Corps and PADEP notice of Grantor's intent to enter into an agreement allowing subsurface activities at least sixty (60) days prior to executing the agreement.

(2) If the success of a compensatory mitigation project required or authorized by the Corps and PADEP requires any related or unanticipated infrastructure modifications, utility relocation, drainage ditches, or stormwater controls within the identified Conservation Area, or if a situation requires measures to remove threat to life or property within the identified Conservation Area, said activities must be approved in writing by the Corps and PADEP subject to terms and conditions set forth in the written approval. Approval is subject to the Corps's and PADEP's discretion. If approved, said activities must be identified on an amended **Exhibit D** and must be recorded and specifically noted as an "amendment" and copies of the recorded **Amended Exhibit D** must be provided to the Corps and PADEP within sixty (60) days of Corps approval. Approval of said activity by the Corps is in addition to any Clean Water Act, Section 404 permit, or other authorization, which may be required in order to legally implement said activity. The Grantor and Grantee accept the obligation to place any other and/or subsequent responsible party on reasonable prior notice of their need to request such Corps approval.

(3) **Enhancements, Maintenance and Repair**. This Declaration is not intended to prohibit future necessary or desired maintenance, repair, or enhancements to the

SAMPLE

Property, where such actions are approved by the Corps and PADEP as appropriate, either through an approved mitigation plan (Section K below) or by a separate permit.

[I. The Grantor has mortgaged the Property subject to this Declaration. The lender has executed Subordination of Mortgage instruments related to the parcels subject of this Declaration for the sole purpose of subordinating their respective liens, dignity and priority interests to this Declaration. The executed Subordination of Mortgage instruments are attached hereto as **Exhibit E**: Mortgage Subordination Documents, and incorporated fully herein.]

J. **SEVERABILITY**

If any portion of this Declaration, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

K. **MITIGATION**

If the work required by a mitigation plan approved by the Corps and PADEP, including maintenance or remedial work, occurs within the Conservation Area, then the Grantee is allowed to construct and undertake the mitigation work in accordance with an authorized mitigation plan.

L. **ASSIGNMENT**

The Grantee [If Holder exists: and/or Holder each] is authorized to assign or transfer its rights and obligations under this Declaration to an organization that is a qualified organization under Section 170(h) of the Internal Revenue Code at the time of transfer.

M. **COAL RIGHTS NOTICE**

The following notice is given to and accepted by Grantor for the purpose and with the intention of compliance with the requirements of the Pennsylvania Conservation and Preservation Easements Act. Nothing herein shall imply the presence or absence of workable coal seams or the severance of coal interests from the Property.

NOTICE:

THIS DECLARATION may impair the development of coal interests including workable coal seams or coal interests which have been severed from the Property.

SAMPLE

SAMPLE

IN WITNESS WHEREOF, intending to be legally bound, the Parties have executed this Declaration the day and year first above written.

GRANTOR:

_____
David L. Specht

WITNESS:

_____

GRANTEE:

First Pennsylvania Resource, L.L.C.
a Pennsylvania limited liability company

By: Resource Environmental Solutions, LLC, its sole manager

By: _____
Name: _____
Title: _____

WITNESS:

_____

HOLDER:
_____

By: _____

WITNESS:

_____

SAMPLE

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF _____ :

On _____, before me, a Notary Public for the Commonwealth aforesaid, personally appeared _____, known to me or satisfactorily proven to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I have set my hand and official seal.

_____
Notary Public
My commission expires:
_____

[SEAL]

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF _____ :

On _____, before me, a Notary Public for the Commonwealth aforesaid, personally appeared _____, who acknowledged himself/herself to be the _____of the _____known to me or satisfactorily proven to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I have set my hand and official seal.

_____
Notary Public
My commission expires:
_____

[SEAL]

SAMPLE

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF _____ :

On _____, before me, a Notary Public for the Commonwealth aforesaid, personally appeared _____, who acknowledged himself/herself to be the _____ of Resource Environmental Solutions, LLC, as manager of First Pennsylvania Resource, L.L.C., a Pennsylvania limited liability company, and that s/he, in the capacity set forth above, on behalf of the Grantee, being authorized to do so, executed, in my presence, the foregoing Declaration for the purposes herein contained.

IN WITNESS WHEREOF, I have set my hand and official seal.

_____
Notary Public
My commission expires:
_____

[SEAL]

SAMPLE

APPENDIX C

WETLAND REPORT

Wetland Delineation and Waterbody Identification Report

Neshannock Creek Restoration Site
Delaware Township, Mercer County, Pennsylvania

July 2013, Revised August 2017

Prepared by:
First Pennsylvania Resource, LLC a wholly owned subsidiary of
Resource Environmental Solutions, LLC
33 Terminal Way, Suite 431A
Pittsburgh, Pennsylvania 15219

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1.0 INTRODUCTION

Wetland delineation and watercourse identification surveys were completed at the Neshannock Creek Restoration Site (NCRS, Project), located in Delaware Township, Mercer County, Pennsylvania (PA). Environmental surveys were first completed by Timmons Group (Timmons) in July 2013. Follow-up surveys completed by First Pennsylvania Resource, LLC (FPR), a wholly-owned subsidiary of Resource Environmental Solutions, LLC (RES), were completed in April 2017 as a result of study area changes. The location of the Project is shown in Figure 1: Project Location Map.

The approximate 18-acre Project area was surveyed to document all wetlands and streams present within the Project area. The following sections of this report describe the methods used to identify and delineate wetlands and streams present, the results of the field survey, and the associated documentation of any streams and wetlands identified within the Project area.

2.0 METHODS

The United States Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual* (Delineation Manual, Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region V. 2.0* (Regional Supplement, USACE, 2012) were used to identify wetlands that may be under the jurisdiction of the USACE. Wetlands were delineated by evaluating three wetland indicators: hydrophytic vegetation, hydric soils, and wetland hydrology. Wetlands were classified using the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979). Plant species in all strata and stream habitats were used to evaluate the location and extend of wetlands, streams and groundwater features that exist within the Project area. Classification of the indicator status of vegetation is based on the *National Wetland Plant List:* 2016 wetland ratings, (Lichvar et al., 2016).

As regulated by Sections 404 of the CWS, and Section 10 of the Rivers and Harbors Ace of 1899, streams were classified as perennial, intermittent, or ephemeral based upon presence of flow, estimated duration of flow, stream bed characteristics, and presence of aquatic biota. The USACE Jurisdictional Determination Form Instructional Guidebook (USACE, 2007) was used to determine stream classification and flow status.

The growing season in the Project area is generally between April and October (USDA-NRCS-NWCC, 2002). Field observations were supplemented with a review of United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, United States Department of Agriculture, Natural Resource Conservation Service (USDA-NRCS) soils mapping, and local landscape topography/morphology to provide a conservative determination of wetlands present within the study area. Professional judgment was used to determine whether hydrophytic vegetation and hydric soils existed within the identified wetlands if on-site data was ambiguous. It is understood that USACE and state agencies have the final say in acceptance of this delineation.

As per the PA Department of Environmental Protection's (PaDEP's) Wetland Delineation Policy (PA Code Title 25 Chapter 105, Statement of Policy 105.451), the PaDEP has adopted the same methodology for identifying and delineating wetlands as used by the USACE. Since the Project area as the potential to include wetlands, all items required under Chapter 105.13(d)(1)(x) have been addressed in this report.

Each wetland and waterbody feature identified within the Project area was given a unique map designation. The locations of wetland boundaries and stream channels were recorded using a Trimble GEO XH model global positioning system (GPS) mapping grade unit with the capability of sub-meter accuracy.

3.0 RESULTS

3.1 Site Location & Description

The NCRS is approximately 18 acres and is located 1.4 miles northwest of Fredonia in Mercer County, PA (Figure 1: Project Location Map). The NCRS is primarily comprised of active livestock pasture and is bound to the west by Folk Road, to the south by the Canadian National Railroad, and to the north and east by forested and agricultural land.

The NCRS is situated along the floodplains of unnamed tributaries (UNTs) to Mill Run, which have been altered through channelization to maximize useable pasture for livestock grazing. Most of the NCRS consists of degraded wetlands that have been historically altered and heavily impacted by livestock access and grazing. Historic alterations consisted of the removal of native vegetation, channelization of stream channels resulting in poor stream function attributes, and side casting of spoils excavated from within stream channels. The Project study area drains to Mill Run which is a direct tributary of Neshannock Creek, flowing south toward New Castle, PA where it meets the Shenango River.

3.2 Offsite Investigation & Data Review

The Project is located within the Ohio River Subbasin (State Water Plan Watershed Subbasin 20), Shenango Watershed, 8-Digit Hydrologic Unit Code (HUC) #050301202). A review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Panel 210 of 560 reveals that the Project is not located within a Special Flood Hazard Zone (FEMA, 2011). The Project is not located within a FEMA 100-year floodplain (Figure 2).

A review of available United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI, 2011) digital data indicated that no NWI wetlands are located within the Project. An examination of United States Geological Society (USGS) mapping for the Project depicts the NCRS as a relatively flat floodplain found between two small gently sloping ridges that are located to the northeast and southwest of the property. Based on the USGS topographic mapping, no UNT blue-line streams are located across the Project.

Waters that flows across the Project are not submerged lands of the Commonwealth; they are not located within a PA coastal zone nor are they designated or nominated for designation as a national or state wild or scenic river. No reservoirs or federal or state parks, forests, or recreation areas are identified within the study area.

The NCRS and contributing drainage area are in the Northwestern Glaciated Plateau section of the larger Appalachian Plateau physiographic province. The contributing drainage area is predominantly a mix of agriculture and forest cover with broad floodplains, and gently rolling topography.

The soils depicted by the NRCS soils map within the Project boundary are typical to the Northwestern Glaciated Plateau section of the Appalachian Plateau physiographic province with very poorly, poorly, and somewhat poorly drained silt loam soils dominating the landscape. All the soils within the NCRS are mapped as hydric soil types and consist of Frenchtown (FeA), Frenchtown and Luray (Fr), Ravenna (RaB2), and Wayland (Wa) silt loam soils. The predominant soil series in the western portion of the NCRS are Frenchtown and Luray silt loams. The eastern portion of the NCRS is mostly mapped as Ravenna silt loam. The mapped locations of the soils are shown in Figure 3: Soils & NWI Map. Appendix C: Soils Found within the Project Area provides a table that lists the soils within the NCRS. The identified soils and summary of their attributes are included below.

- Frenchtown silt loam (FeA): Poorly drained, 0-3% slopes, water restrictive feature present at depth of 15 to 32 inches, located in depressions on glacial till plains;
- Frenchtown and Luray silt loams (Fr): Mixture of Frenchtown (65%) and Luray (25%) soil series

with other soil components (5%). Poorly drained and very poorly drained, water restrictive feature present at depth of 15 to 80 inches, located in depressions on glacial till plains;

- Ravenna silt loam (RaB2): Somewhat poorly drained, 3-8% slopes, water restrictive feature present at depth of 14 to 30 inches, located in glacial till plains;
- Wayland silt loam (Wa): Poorly drained, 0-5% slopes, water restrictive feature present at depth of greater than 80 inches, located in floodplains.

3.3 Onsite Determinations and Findings

The field identified wetlands and streams are described in the section below and are summarized in Tables 1 and 2. Color photographs are provided in the Photograph section. Wetland data forms are included in Appendix A: Wetland Data Forms, and upland data forms are included in Appendix B: Upland Data Forms. A summary of the delineated resources is provided in the *Delineated Resources Summary Table* below.

Delineated Resources Summary Table		
Total Site Acreage		**17.94**
Upland Acreage		**3.17**
Resource	**Type**	**Size (AC/LF)**
Wetlands	PEM	11.01
	PSS	0.43
	PFO	3.32
	Total	**14.77**
Watercourses	Perennial	1,219.28
	Ditch	172.72
	Total	**1,392.00**

3.3.1 Wetlands

A complex of Palustrine Emergent (PEM), Palustrine Scrub Shrub (PSS) and Palustrine forested (PFO) wetlands are found within the Project area (Figure 2: Resource Location Map). The wetland delineation identified the presence of approximately 11.01 acres of PEM wetlands, 0.43 acres of PSS wetlands, and 3.32 acres of PFO wetlands. Most of the wetlands onsite are currently and historically used for agricultural purposes, primarily cattle grazing. Delineated wetlands are shown on Figure 2: Resource Location Map and are summarized in Table 1: Wetlands Identified Within the Project Study Area.

3.3.2 Waterbodies

Environmental surveys identified approximately 1,392.00 linear feet of waters onsite. Approximately 173 linear feet of man-made ditches were identified onsite which had been constructed in the past to improve soil drainage. The streams identified onsite consist of perennial systems that have been ditched to manipulate hydrology and increase agriculturally productive land. Waters identified onsite are shown on Figure 2: Resource Location Map and are summarized in Table 2: Streams Identified Within the Project Study Area.

The watercourses identified onsite drain to Mill Run, which is designated as a Cold-Water Trout Stock Fishery (TSF) stream per PA Code; Title 25; Chapter 93 Designated Use. No existing use has been designated for Mill Run and its tributaries. The watercourses onsite are not Approved Trout Waters, are not stocked by the PA Fish and Boat Commission (PFBC), and are not Wilderness Trout or Naturally

Reproducing Trout Streams. Waterbodies that have not been classified or assigned designated uses are classified by their receiving waters' classification.

3.3.3 Vegetation

Most wetlands identified onsite consist of degraded PEM wetlands. Dominant herbaceous vegetation found within the wetland areas include shallow sedge (*Carex lurida*), fox sedge (*Carex vulpinoida*), boneset (*Eupatorium perfoliatum*), skunk cabbage (*Symplocarpus foetidus*), and sensitive fern (*Onoclea sensibilis*). The dominant shrub found within the wetland areas is multiflora rose (*Rosa multiflora*). Dominant trees found within the wetland areas include American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), and cockspur hawthorne (*Crataegus crus-galli*). Field data sheets that provide additional detail regarding the representative vegetative communities present within wetlands throughout the NCRS are included in Appendix A: Wetland Data Forms.

3.3.4 Soils

Most of the soils observed within the wetland areas onsite consisted of a restrictive clay loam lens. The presence of the restrictive loam lens in conjunction with groundwater seeps, high groundwater table, and frequent flooding provide sufficient hydrology for hydric soil formation. The soils found within the wetlands of the Project area exhibit low chroma matrix colors with bright concentrations which are characteristic of reducing anaerobic conditions associated with the formation of hydric soils. The field data stations (FDS) exhibit either a 'Depleted Matrix (F3)' and/or 'Redox Dark Surface (F6)' hydric soil indicators. Soil textures include clay loam, sandy clay loam, mucky clay, and clay. Field data sheets are included in Appendix A: Wetland Data Forms and provide additional detail regarding the representative soils present within the wetlands.

3.3.5 Hydrology

Indicators of wetland hydrology within the wetlands identified onsite include soil saturation within the upper 12 inches of the soil surface, a high water table, surface water, and oxidized rhizospheres on living roots. Hydrology within the wetlands throughout the NCRS is derived from the presence of a high groundwater table, frequent flooding due to over widening and poorly defined stream channels, and perching of surface water resulting from shallow loam and clay restrictive soil layers. Field data sheets that provide additional detail regarding the representative hydrologic indicators present within wetlands throughout the NCRS are included in Appendix A: Wetland Data Forms.

3.3.6 Uplands

During the field investigation of the NCRS, upland areas were identified onsite. The dominant vegetation found in the upland areas include black cherry (*Prunus serotina*), cockspur hawthorne (*Crataegus crus-galli*), American beech (*Fagus grandifolia*), shagbark hickory (*Carya ovate*), multiflora rose, and may apple (*Podophyllum peltatum*). Indicators of wetland hydrology were not observed within the upland areas onsite. Soils were typically bright reddish brown (7.5YR4/6) to reddish brown (10YR6/6) within the upper 14 inches. Soil textures included loam, silt loam, and fine sandy loam.

4.0 CONCLUSIONS

Wetland delineation and watercourse identification surveys were conducted for the Project by Timmons in July 2013 and then by FPR in July 2017. A large wetland complex consisting of PEM, PSS and PFO wetlands was identified. Two streams and one ditch were also identified within the Project area.

All statements in this document pertaining to the jurisdictional status of watercourses and wetlands about USACE and state regulations represent the opinion of FPR and are based on present USACE guidance. The jurisdictional status of these features may be confirmed by a USACE Jurisdictional Determination and/or by state agencies.

Respectfully submitted,

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33 Terminal Way, Suite 431A | Pittsburgh, PA 15227
Direct: **412.249.2443** Mobile: **814.730.0627**

5.0 REFERENCES

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Table 1 Wetlands Identified Within the Project Area

Feature Designation[1]	Cowardian Classification[2]	NWI Wetland[3]	Status[4]	Area within Project (acres)[5]	Latitude[6]	Longitude[6]
W-01	PEM	No	Jurisdictional	0.65	41° 19' 45.31" N	80° 16' 55.61" W
W-02	PEM	No	Jurisdictional	1.77	41° 19' 47.09" N	80° 16' 59.76" W
W-03	PEM	No	Jurisdictional	2.89	41° 19' 52.36" N	80° 17' 7.26" W
W-04	PEM	No	Jurisdictional	3.32	41° 19' 56.06" N	80° 17' 3.48" W
W-06	PEM	No	Jurisdictional	2.27	41° 19' 57.37" N	80° 17' 8.54" W
W-05	PEM	No	Jurisdictional	0.12	41° 19' 56.26" N	80° 17' 6.61" W
W-08	PSS	No	Jurisdictional	0.05	41° 19' 59.04" N	80° 17' 5.15" W
W-07	PSS	No	Jurisdictional	0.15	41° 19' 57.61" N	80° 17' 6.10" W
W-09	PSS	No	Jurisdictional	0.23	41° 19' 54.86" N	80° 17' 5.71" W
W-10	PFO	No	Jurisdictional	0.02	41° 19' 52.65" N	80° 17' 7.09" W
W-11	PFO	No	Jurisdictional	0.02	41° 19' 52.85" N	80° 17' 7.54" W
W-12	PFO	No	Jurisdictional	0.04	41° 19' 53.10" N	80° 17' 6.11" W
W-13	PFO	No	Jurisdictional	0.02	41° 19' 53.42" N	80° 17' 8.24" W
W-14	PFO	No	Jurisdictional	0.03	41° 19' 54.20" N	80° 17' 7.93" W
W-15	PFO	No	Jurisdictional	0.18	41° 19' 57.42" N	80° 17' 7.53" W
W-16	PFO	No	Jurisdictional	0.04	41° 19' 59.69" N	80° 17' 7.36" W
W-17	PFO	No	Jurisdictional	0.02	41° 19' 59.03" N	80° 17' 7.03" W
W-18	PFO	No	Jurisdictional	0.02	41° 19' 58.21" N	80° 17' 7.01" W
W-19	PFO	No	Jurisdictional	2.94	41° 19' 58.19" N	80° 17' 2.64" W
Total Size of Wetlands within Project Study Area				**14.77**		

Notes:

1 RES map designation.

2 Palustrine system wetlands were classified as emergent (PEM), forested (PFO), scrub-shrub (PSS), or unconsolidated Bottom (PUB).

3 National Wetlands Inventory wetland as mapped by the United States Fish and Wildlife Service, 2011.

4 Jurisdictional wetlands are regulated under USACE CWA Section 404 authority.

5 Extent of wetland within the Project area. Wetland may extend beyond these limits if noted as open ended.

6 North American Datum, 1983.

Table 2 Waterbodies Identified Within the Project Area

Feature Designation[1]	Waterbody	Stream Type	Designated Water Uses and Water Quality Criteria[2]	Statewide Existing Use Classification[3]	Wild Trout Waters[4]	Average Channel Width (feet)[5]	Channel Length within Project Area	Within a FEMA Floodplain[6]
S-01	UNT to Mill Run	Perennial	TSF	None	No	5 to 10	640.73	No
S-02	UNT to Mill Run	Perennial	TSF	None	No	1 to 5	578.55	No
Ditch	Ditch	Ditch	-	-	-	-	172.72	
Total Length of Waters within Project Area							**1,392.00**	

Notes:

1 RES map designation.

2 As classified by PA Code Title 25 Chapter 93.9. WWF - Warm Water Fishes; CWF - Cold Water Fishes; TSF - Trout Stocking; HQ - High Quality; MF – Migratory Fishes; N - Navigable.

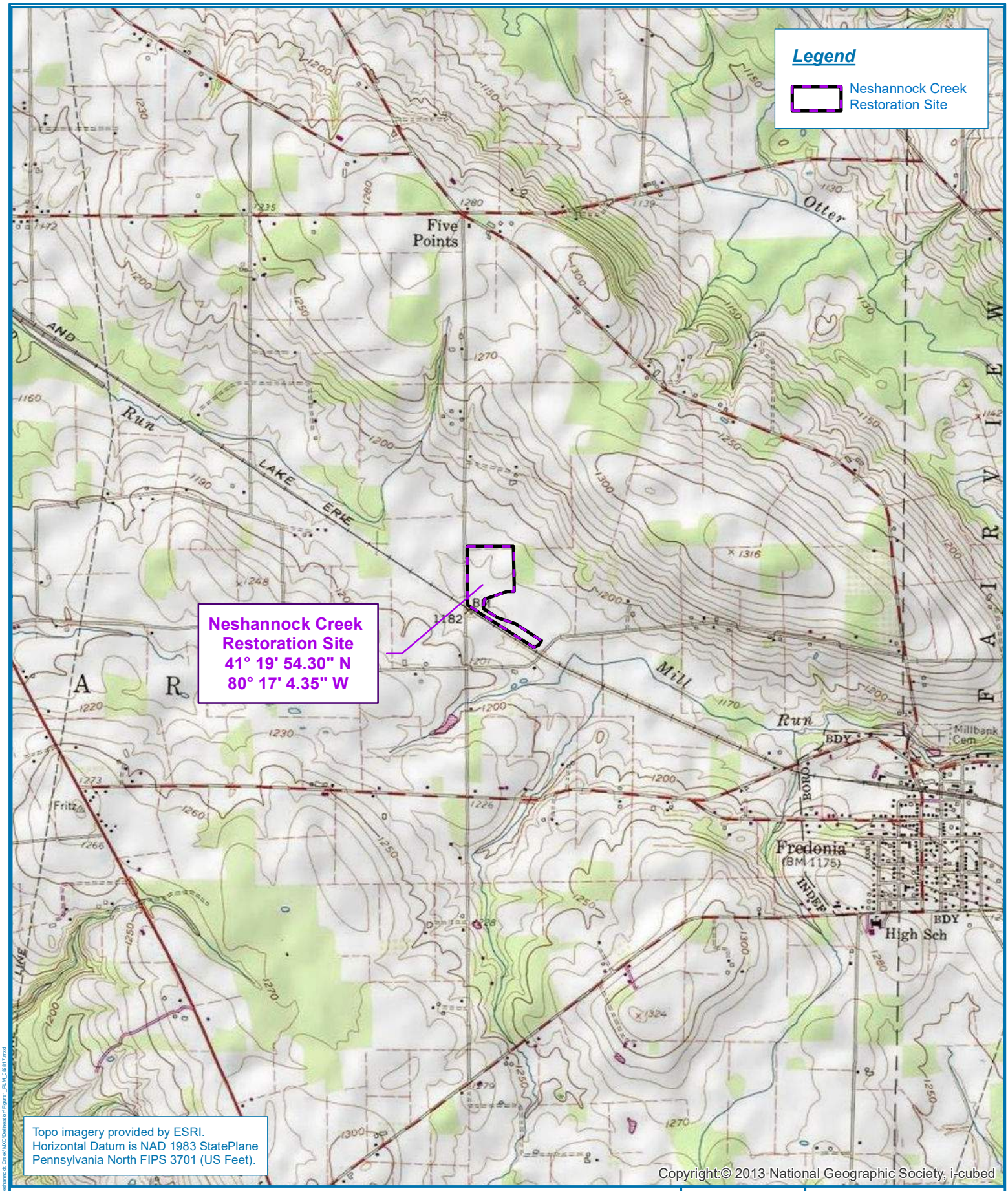
3 As classified by the PA Department of Environmental Protection (July 18, 2017). Available at: http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Existing%20Use/EU%20table%20list.pdf. Accessed August 2017.

4 As classified under PA Code Title 58, Chapter 57.11 by the PA Fish and Boat Commission (PFBC) as a Class A Wild Trout Water, dated July 24, 2017, Available at: http://www.fishandboat.com/Fish/PennsylvaniaFishes/Trout/Documents/classa.pdf; or as a Stream Section that Supports Natural Reproduction of Trout, dated July 2017, Available at: http://www.fishandboat.com/Fish/PennsylvaniaFishes/Trout/Documents/trout_repro.pdf. Accessed August 2017.

5 Average stream width as measured between tops of banks.

6 Waterbodies residing within the limits of a designated Federal Emergency Management Agency (FEMA) 100-year floodplain.

FIGURES



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Feet

NESHANNOCK CREEK RESTORATION SITE

PROJECT LOCATION MAP

MERCER COUNTY, PENNSYLVANIA

FIGURE 1

Date: 8/28/2017

Drawn by: NGD

Checked by: AS

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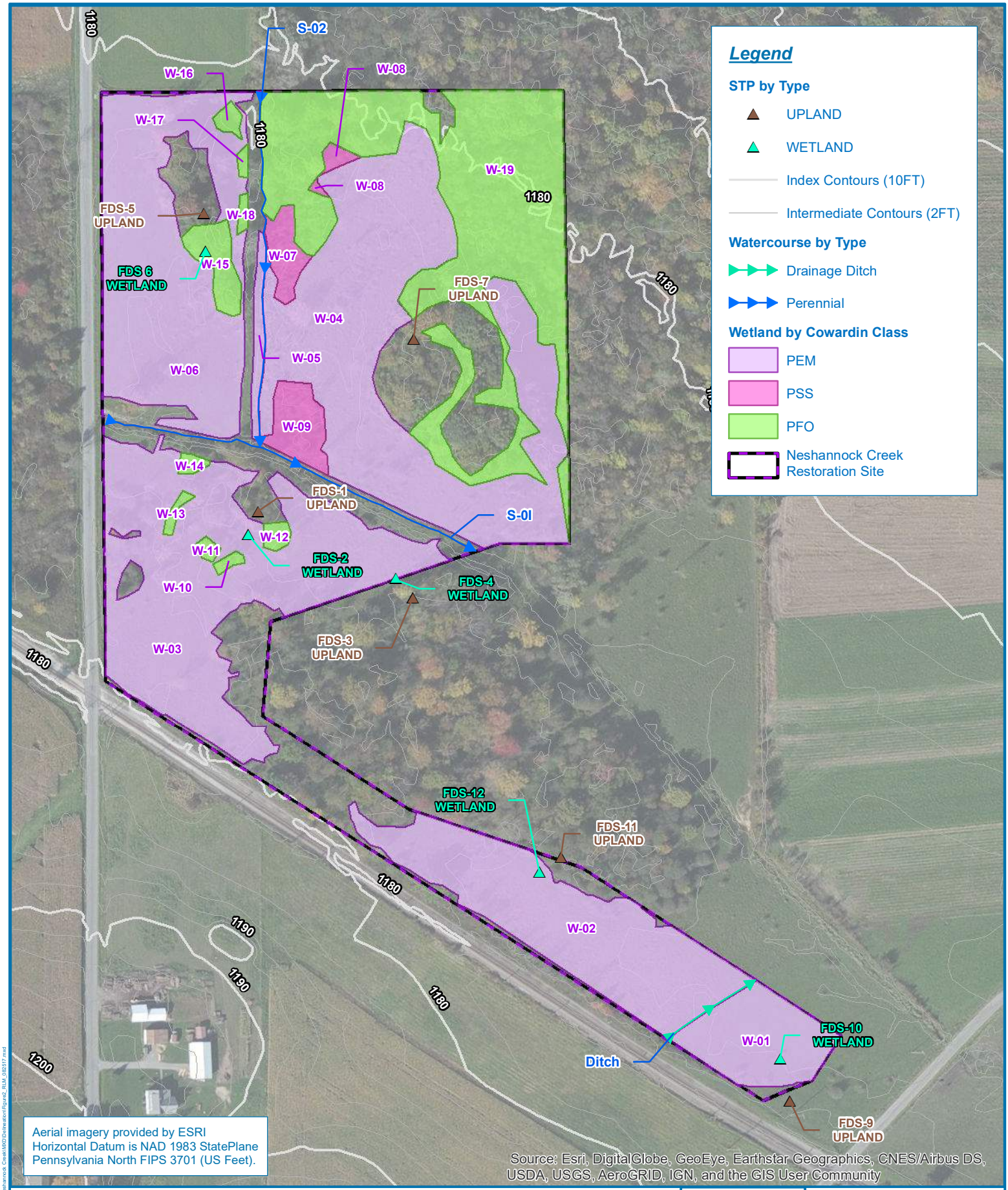

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NESHANNOCK CREEK RESTORATION SITE

RESOURCE LOCATION MAP

MERCER COUNTY, PENNSYLVANIA

FIGURE 2

Date: 8/31/2017

Drawn by: NGD

Checked by: AS

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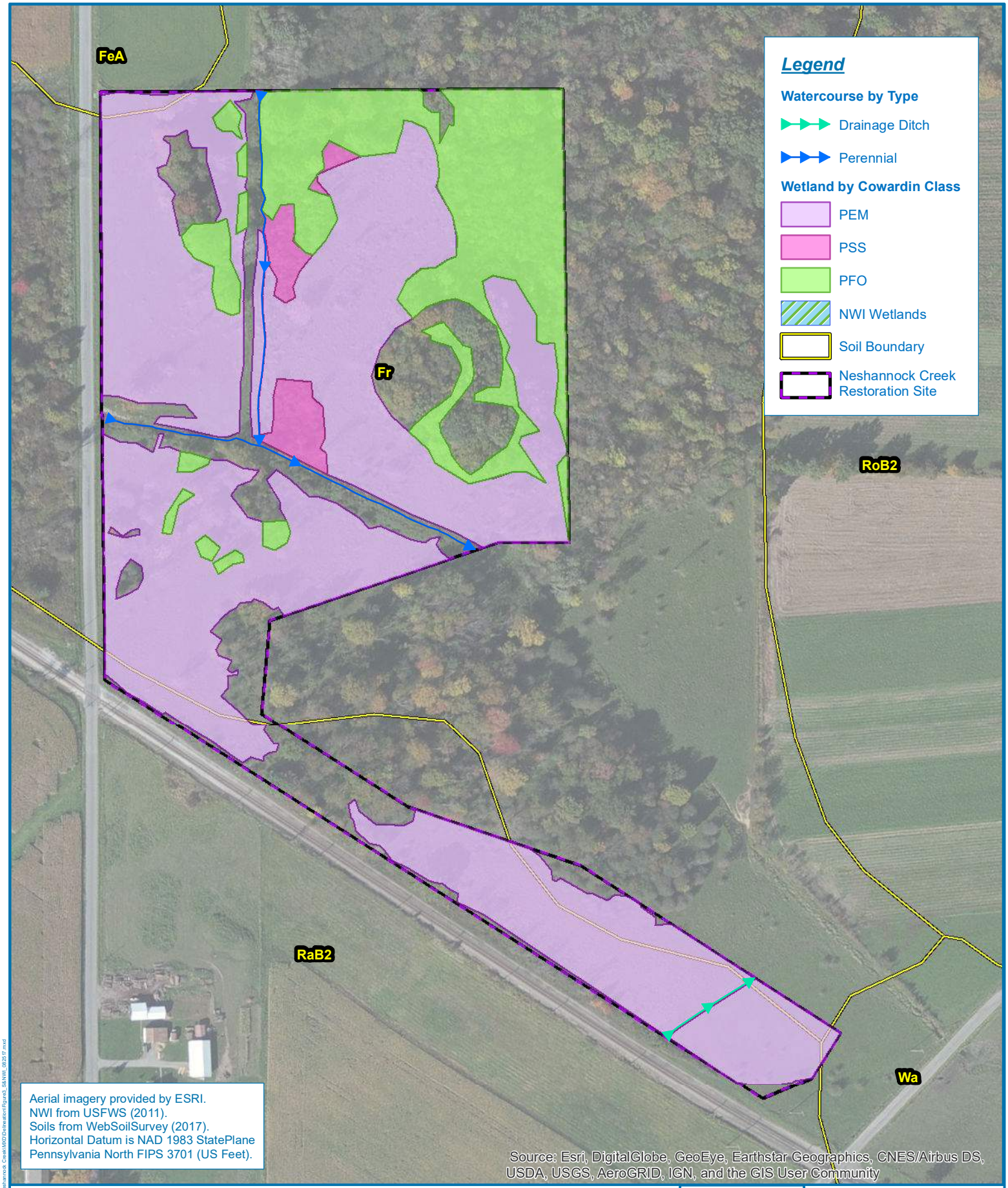

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NESHANNOCK CREEK RESTORATION SITE

SOILS & NWI MAP

MERCER COUNTY, PENNSYLVANIA

FIGURE 3

Date: 8/31/2017

Drawn by: NGD

Checked by: AS

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PHOTOGRAPHS

Photo 1: View of upland area at FDS-1 dominated by noxious cockspur hawthorn trees.

Photo 2: View of degraded "palustrine emergent" ("PEM") wetland at FDS-2 dominated by sedges.

Photo 3: View of mid successional upland forest at FDS-3.

Photo 4: View of degraded PEM wetland at FDS-4 dominated by fescue and fox sedge.

Photo 5: View of upland area at FDS-5 dominated by noxious cockspur hawthorn trees. There is little herbaceous ground cover present at this location due to dense tree canopy shade and cattle access.

Photo 6: View of "palustrine forested" ("PFO") wetland at FDS-6 dominated by noxious cockspur hawthorn trees.

Photo 7: View of mature upland forest at FDS-7 dominated by American beech and black cherry trees.

Photo 8: View of degraded PEM wetland at FDS-8.

Photo 9: View of upland at FDS-9 dominated by fescue and cockspur hawthorn trees.

Photo 10: View of degraded PEM wetland at FDS-10.

Photo 11: View of upland area at FDS-11 dominated by noxious cockspur Hawthorn trees.

Photo 12. View of degraded PEM wetland at FDS-12.

Photo 13: View of PFO wetland dominated by American elm and green ash trees.

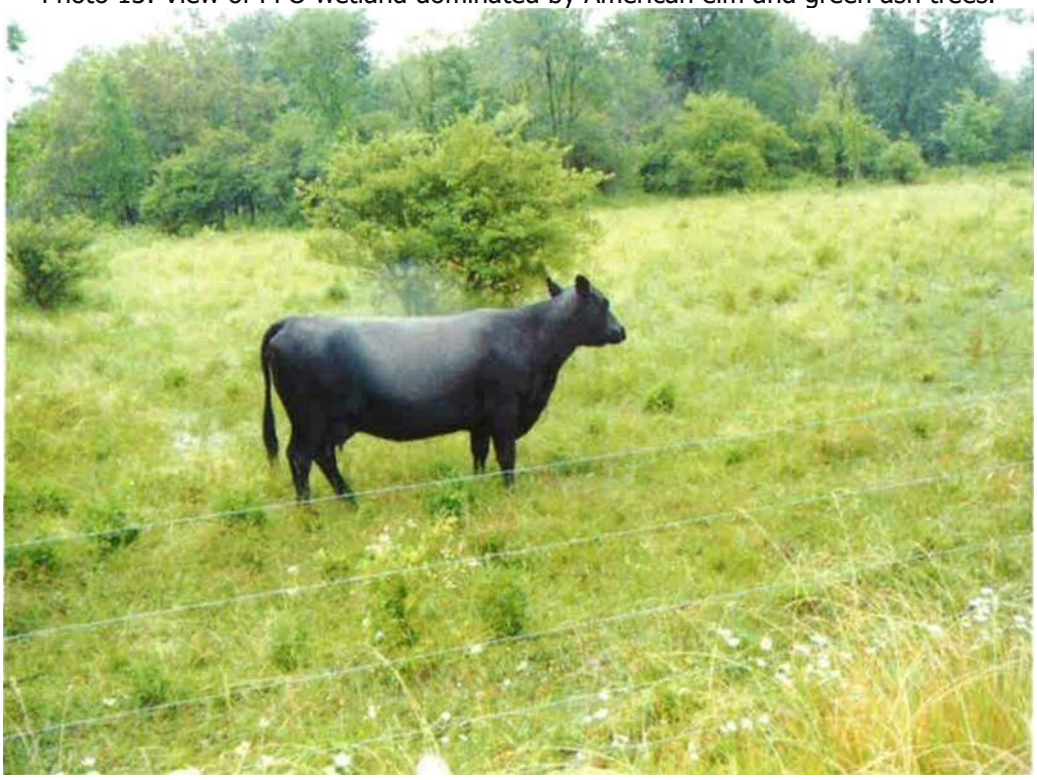


Photo 14: View of actively grazed PEM wetland that is representative of all PEM wetlands onsite.

Photo 15: View of an unnamed tributary that has been channelized (straightened) and heavily impacted by unrestricted cattle access.

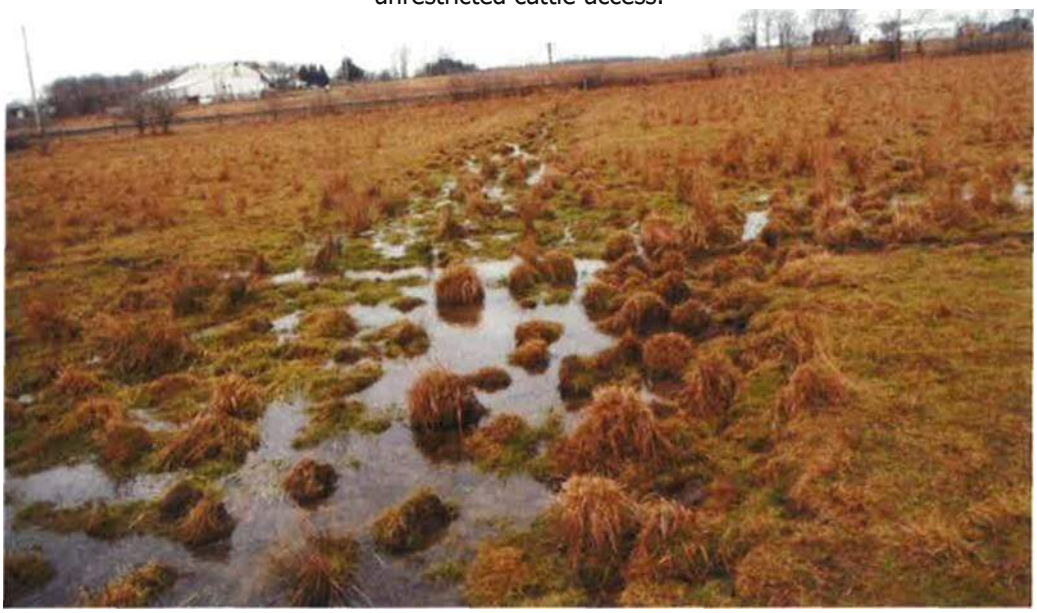


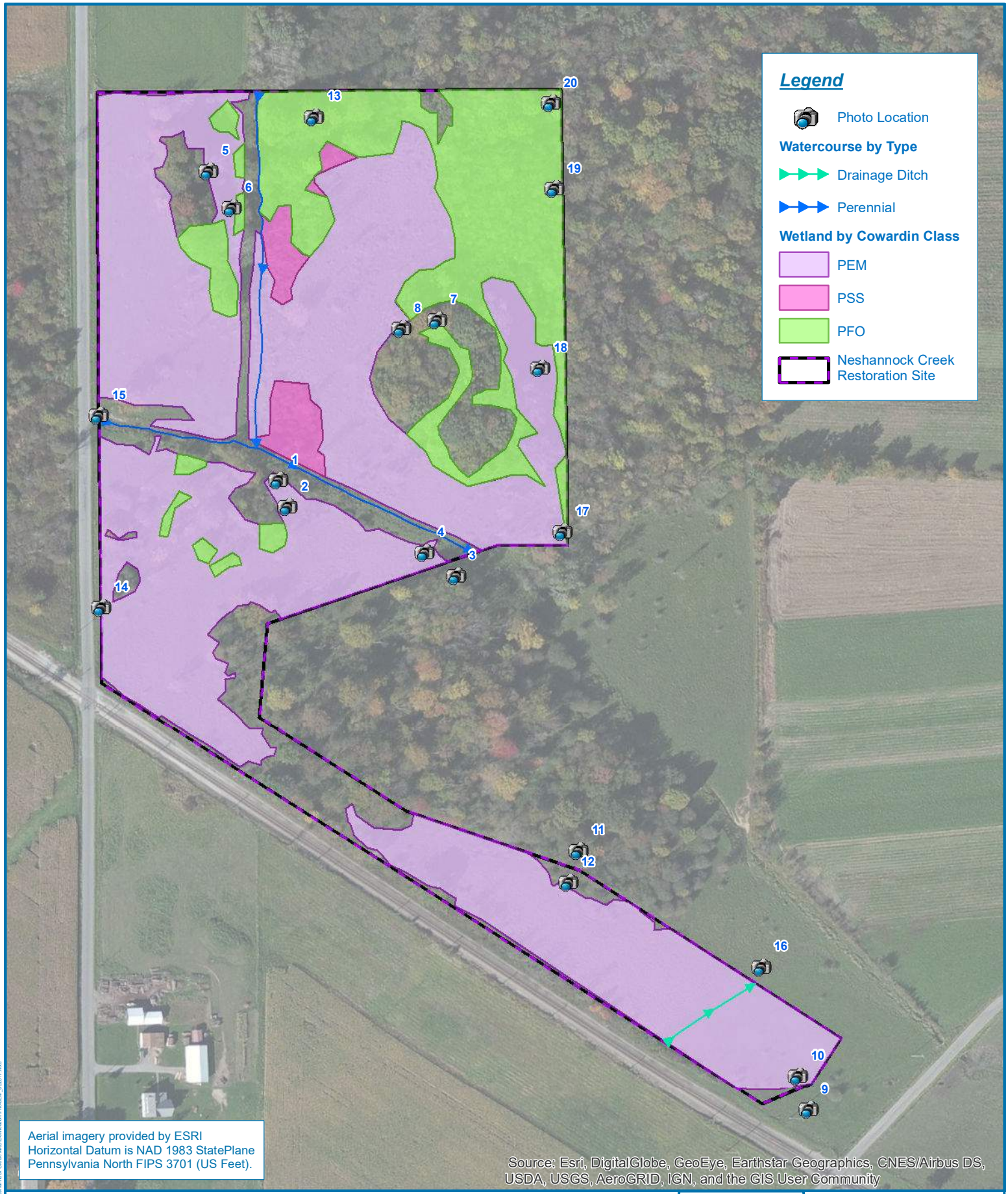
Photo 16: View of another unnamed tributary that has been channelized and heavily impacted by unrestricted cattle access.

Photo 17. View of wetland from corner of project boundary, facing Northwest.

Photo 18. View of PEM wetland surrounded by PFO wetland, facing Northwest.

Photo 19. View of PFO wetland from eastern edge of project boundary, facing Southwest.

Photo 20. View of PFO wetland from northeast corner of project boundary, facing South.



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NESHANNOCK CREEK RESTORATION SITE

PHOTO LOCATION MAP

MERCER COUNTY, PENNSYLVANIA

Date: 8/31/2017

Drawn by: NGD

Checked by: AS

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APPENDIX A
WETLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/26/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-2

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 0-3% Lat: N 41.331417 Long: W 80.285194 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes ✓	No _____	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	10	Yes	FACU
2. Fraxinus pennsylvanica	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	20 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Rosa multiflora	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Carex vulpinoidea	60	Yes	OBL
2. Schedonorus pratensis	10	No	FACU
3. Carex lurida	10	No	OBL
4. Eupatorium perfolatium	2	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	82 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	12	x 2 =	24
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	107 (A)		194 (B)

Prevalence Index = B/A = 1.81

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic
2-5	10YR4/1	90	7.5YR4/6	10	C	PL	clay loam	
6-14	10YR6/1	75	7.5YR4/6	25	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/26/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-4

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 0-3% Lat: N 41.331244 Long: W 80.284319 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): 0
Water Table Present?	Yes ✓	No ____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rosa multiflora	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex vulpinoidea	50	Yes	OBL
2. Schedonorus pratensis	40	Yes	FACU
3. Eupatorium perfoliatum	5	No	FACW
4. Rosa multiflora	2	No	FACU
5. Fraxinus pennsylvanica	2	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	99 = Total Cover		

Woody Vine Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	7	x 2 =	14
FAC species	0	x 3 =	0
FACU species	47	x 4 =	188
UPL species	0	x 5 =	0
Column Totals:	104 (A)		252 (B)

Prevalence Index = B/A = 2.42

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								organic
3-14	10YR 4/1	90	10YR 5/8	10	C	PL&M	sandy cl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/27/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-6

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 0-3% Lat: N 41.332664 Long: W 80.285492 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): 0
Water Table Present?	Yes ✓	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-6

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	90	Yes	FACU
2. Ulmus americana	10	No	FACW
3.			
4.			
5.			
6.			
7.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	2	Yes	FACU
2. Rosa multiflora	2	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	4 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	94	x 4 =	16
UPL species	0	x 5 =	0
Column Totals:	104 (A)		376 (B)

Prevalence Index = B/A = 3.61

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ✓ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

The tree stratum at this vegetation plot is dominated by Crataegus crus-galli, a FACU species. This species functions as a noxious species throughout this site and has a shallow root system in wetland areas indicating that this species is functioning as a hydrophyte in a wetland areas. The shallow root system is a morphological adaptation that helps this FACU species to survive prolonged periods of saturation in the root zone. The dense Crataegus crus-galli tree canopy and frequent cattle access at FDS-6 have prevented other successional wetland species from competing with Crataegus crus-galli.

SOIL

Sampling Point: FDS-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								organic
3-7	10YR 3/2	70	10YR 4/1	20	C	M	clay loam	
			10YR 4/6	10	C	M	clay loam	
7-14	10YR 5/2	80	10YR 4/6	20	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/27/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-8

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 0-3% Lat: N 41.332373 Long: W 80.284375 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 2
Water Table Present?	Yes ✓	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-8

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americana	20	Yes	FACW
2. Fagus grandifolia	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	30 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Rosa multiflora	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Carex vulpinoidea	15	Yes	OBL
2. Carex lurida	10	Yes	OBL
3. Symplocarpus foetidus	5	No	OBL
4. Onoclea sensibilis	2	No	FACW
5. Polygonum pensylvanicum	2	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	34 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	95	10YR 5/8	5	C	M	mucky clay	
5-12	10YR 3/1	85	10YR 4/2	15	C	M	mucky clay	
12-14	10YR 3/1	80	10YR 5/8	20	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 7/1/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-10

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 0-3% Lat: N 41.329170 Long: W 80.281984 Datum: NAD83

Soil Map Unit Name: Ravenna silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes ✓	No _____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 6

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-10

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Crataegus crus-galli	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	30	No	FACU
2. Trifolium repens	12	Yes	FACU
3. Carex vulpinoidea	7	Yes	OBL
4. Juncus canadensis	7	Yes	OBL
5. Juncus effusus	5	No	FACW
6. Rosa multiflora	2	No	FACU
7. Ranunculus acris	1	No	FAC
8.			
9.			
10.			
11.			
12.			
	65 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	14	x 1 =	14
FACW species	5	x 2 =	10
FAC species	1	x 3 =	3
FACU species	29	x 4 =	116
UPL species	0	x 5 =	0
Column Totals:	49 (A)		143 (B)

Prevalence Index = B/A = 2.91

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Fescue species have allelopathic properties espceially in an active livestock pasture. Festuca pratensis is functioning as an invasive species in this plant community by out competing the native hydrophytic vegetation. Therefore, Festuca pratensis was not included in the vegetation calculations.

SOIL

Sampling Point: FDS-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic
2-9	10YR3/1	95	7.5YR4/6	5	C	PL	Silt loam	
9-14	10YR5/2	80	10YR4/6	10	C	M	Silt loam	
			10YR3/1	10	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 7/1/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-12

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 0.3% Lat: N 41.32996299 Long: W 80.283427 Datum: NAD83

Soil Map Unit Name: Ravenna Silt Loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): 0
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-12

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Carex vulpinoidea	15	Yes	OBL
2. Carex lurida	15	Yes	OBL
3. Schedonorus pratensis	10	No	FACU
4. Juncus Cadensis	5	No	OBL
5. Juncus tenuis	2	No	FAC
6. Eupatorium perfoliatum	2	No	FACW
7. Onoclea sensitiva	1	No	FACW
8.			
9.			
10.			
11.			
12.			
	48 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								organic
3-14	10YR3/1	95	10YR6/8	5	C	PL	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

APPENDIX B
UPLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/26/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-1

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Convex

Slope (%): 0-3% Lat: N 41.331520 Long: W 80.285141 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes _____	No ✓	Depth (inches): >14
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): >14

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	60	Yes	FACU
2. Prunus serotina	15	No	FACU
3. Ulmus americana	10	No	FACW
4. Malus angustifolia	5	No	NI
5. Fraxinus pennsylvanica	2	No	FACW
6.			
7.			
	92 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Crataegus crus-galli	30	Yes	FACU
2. Rosa multiflora	5	No	FACU
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	70	Yes	FACU
2. Podophyllum peltatum	5	No	FACU
3. Rosa multiflora	2	No	FACU
4. Taraxacum officinale	2	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	12	x 2 =	24
FAC species	0	x 3 =	0
FACU species	189	x 4 =	756
UPL species	0	x 5 =	0
Column Totals:	201 (A)		780 (B)

Prevalence Index = B/A = 3.88

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3								organic
3-6	10YR4/3	90	7.5YR5/8	10	C	M	loam	
6-14	7.5YR4/6	85	10YR3/2	15	C	M	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/26/13

Applicant/Owner: First Pennsylvania Resource, LLC State: PA Sampling Point: FDS-3

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Convex

Slope (%): 0-3% Lat: N 41.331157 Long: W 80.284216 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes _____	No ✓	Depth (inches): >14
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): >14

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	35	Yes	FACW
2. Carya ovata	30	Yes	FACU
3. Prunus serotina	15	No	FACU
4. Crataegus crus-galli	5	No	FACU
5.			
6.			
7.			
	85 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Crataegus crus-galli	5	Yes	FACU
2. Rosa multiflora	2	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	7 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	10	Yes	FACU
2. Podophyllum peltatum	5	Yes	FACU
3. Fraxinus pennsylvanica	2	No	FACW
4. Rosa multiflora	2	No	FACU
5. Crataegus monogyna	2	No	NA
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	21 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.17 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	37	x 2 = 74
FAC species	0	x 3 = 0
FACU species	74	x 4 = 296
UPL species	0	x 5 = 0
Column Totals:	101 (A)	370 (B)

Prevalence Index = B/A = 3.66

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic
2-14	7.5YR 4/6	100					fine sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/27/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-5

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Convex

Slope (%): 0-3% Lat: N 41.332831 Long: W 80.285509 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0
Water Table Present?	Yes _____	No ✓	Depth (inches): >14
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): >14

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The Representative Site Photographs included in Appendix B show ponded water at FDS-5 due to heavy rains on 6/27/13. However, there were no primary or secondary indicators of wetland hydrology at FDS-5.

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-5

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	60	Yes	FACU
2. Carpinus caroliniana	20	Yes	FAC
3. Tillia americana	15	No	FACU
4. Acer rubrum	5	No	FAC
5.			
6.			
7.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	80	x 4 =	320
UPL species	0	x 5 =	0
Column Totals:	105 (A)		395 (B)

Prevalence Index = B/A = 3.76

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

Very little herbaceous vegetation was present at this location due to frequent cattle access and dense canopy cover.

SOIL

Sampling Point: FDS-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic
2-14	10YR 5/3	85	10YR 4/6	15	C	M	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 6/27/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-7

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Convex

Slope (%): 0-3% Lat: N 41.332301 Long: W 80.284257 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes _____	No ✓	Depth (inches): >14
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): >14

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-7

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fagus grandifolia	70	Yes	FACU
2. Prunus serotina	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	90 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Fagus grandifolia	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	40 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Podophyllum peltatum	2	Yes	FACU
2. Fagus grandifolia	2	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	4 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	134	x 4 =	536
UPL species	0	x 5 =	0
Column Totals:	134 (A)		536 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic
2-6	10YR 3/3	95	10YR 5/6	5	C	M	loam	
6-14	10YR 5/8	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 7/1/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-9

Investigator(s): Ethan Virts Section, Township, Range: Delaware Township

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex

Slope (%): 3-8% Lat: N 41.328984 Long: W 80.281920 Datum: NAD83

Soil Map Unit Name: Ravenna Silt Loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes _____	No ✓	Depth (inches): >14
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): >14

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-9

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	40	Yes	FACU
2. Trifolium repens	2	No	FACU
3. Taraxacum officinale	2	No	FACU
4. Juncus effusus	2	No	FACW
5. Carex vulpinoidea	1	No	OBL
6. Rananculus acris	1	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	48 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	2	x 2 =	4
FAC species	1	x 3 =	3
FACU species	49	x 4 =	196
UPL species	0	x 5 =	0
Column Totals:	53 (A)		204 (B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1								organic
1-3								coal deposits from nearby roa[redacted]
3-5	10YR 3/2	95	10YR 5/6	5	C	M	loam	
5-14	10YR 6/6	85	10YR 5/8	15	C	M	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Neshannock Creek Mitigation Bank City/County: Mercer Sampling Date: 7/1/13

Applicant/Owner: First Pennsylvania Resource, LLC. State: PA Sampling Point: FDS-11

Investigator(s): Ethan Virts Section, Township, Range: Fredona Borough

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Convex

Slope (%): 0-3% Lat: N 41.330032 Long: W 80.283304 Datum: NAD83

Soil Map Unit Name: Frenchtown and Luray silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0
Water Table Present?	Yes _____	No ✓	Depth (inches): >14
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): >14

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: FDS-11

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	50	Yes	NA
2. Prunus serotina	30	No	FACU
3. Malus angustifolia	15	No	NI
4.			
5.			
6.			
7.			
	80 = Total Cover		

Sapling/Shrub Stratum (Plot size: 30)			
1. Rosa multiflora	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 30)			
1. Schedonorus pratensis	70	Yes	FACU
2. Trifolium repens	2	No	FACU
3. Rosa multiflora	2	No	FACU
4. Podophyllum peltatum	1	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75 = Total Cover		

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	110	x 4 =	440
UPL species		x 5 =	
Column Totals:	110 (A)		440 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: FDS-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2								organic
2-14	10YR5/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

APPENDIX C
SOILS FOUND WITHIN THE PROJECT AREA

Four soil types are intersected by the Project boundary (Figure 3: Soils & NWI Map). Below is a table that provides a summary of the soils crossed by the Project.

Soils that Intersect the Easement Boundary of the Project				
Map Unit Symbol	**Map Unit Name**	**Hydric Rating**	**Drainage Class**	**Landform Setting**
FeA	Frenchtown silt loam, 0 to 3 percent slopes	Hydric	Poorly drained	Depressions
Fr	Frenchtown and Luray silt loams, 0 to 3 percent slopes	Hydric	Poorly drained	Depressions
RaB2	Ravenna silt loam, 3 to 8 percent slopes	Non-hydric	Somewhat poorly drained	Till Plains
Wa	Wayland silt loam, coarse variant	Hydric	Poorly drained	Floodplains

APPENDIX D

PA WETLAND CONDITION LEVEL 2 RAPID ASSESSMENT FORMS

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

Project #	Project Name	Date	Proposed Impact Size (acres)	AA #	AA Size (acres)
0068-4	PRM for Shell-Falcon	9/1/2017	0	1	1.33

Name(s) of Evaluator(s)	Lat (dd)	Long (dd)	Notes:
Amber Snavley	41.332603	80.284644	Existing Site Conditions

General Comments: Wetland resides in a pasture field subject to grazing and trampling by cattle. The wetland is adjacent to existing mitigation sites which have been restored and are in the maintenance and monitoring phases of the mitigation lifecycle.
Reed canary grass and multiflora rose are two invasive species that are most proliferent throughout the site.

1. Wetland Zone of Influence Condition Index

	Condition Category				
	Optimal	Suboptimal	Marginal		Poor
Wetland Zone of Influence (300 foot area around AA perimeter)	ZOI area vegetation consists of a tree stratum present (diameter at breast height (dbh) > 3 inches) with greater than or equal to 60% tree canopy cover. Areas comprised of stream channels, wetlands (regardless of classification or condition) and lacustrine resources ≥ 10 acres are scored as optimal.	**High Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. **Low Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover with a maintained understory.	**High Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation with either a shrub layer or a tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover.	**Low Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, areas of hay production, and ponds or open water areas (< 10 acres). If trees are present, tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover with maintained understory.	**High Poor:** ZOI area vegetation consists of lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, pervious trails, recently seeded and stabilized, or other comparable condition. **Low Poor:** ZOI area vegetation consists of impervious surfaces; mine spoil lands, denuded surfaces, row crops, active feed lots, impervious trails, or other comparable conditions.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6		5 4 3 2 1

CI = Total Score/20

1. Identify all applicable Condition Category areas within the wetland zone of influence using the descriptors above.
2. Estimate the % area within each condition category. Calculators are provided for you below.
3. Enter the % ZOI Area in decimal form (0.00) and Score for each category in the blocks below.

Total Score = SUM(%Areas*Scores)

	Condition Category:	Optimal	Low Suboptimal	High Marginal	Low Marginal	High Poor	Low Poor	Total Score:
Scoring:	% ZOI Area:	34%	6%	2%	12%	39%	7%	
	Score:	16	12	9	8	4	1	
	Total Sub-score:	5.44	0.72	0.18	0.96	1.56	0.07	8.93

0.45

Comments:

2. Roadbed Presence Index

	Condition Categories				
	Optimal	Suboptimal	Marginal		Poor
a. Roadbed Presence (within 0 - 100 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 feet of the AA boundary **Low Optimal:** Roadbed presence score within 0-100 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 2 but equal to or less than 4. **Low Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 6 but less than or equal to 8.	**Low Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 10 but less than or equal to 12. **Low Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 12.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6		5 4 3 2 1

Comments:

	Condition Categories				
	Optimal	Suboptimal	Marginal		Poor
b. Roadbed Presence (within 100 - 300 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 - 300 feet of the AA boundary **Low Optimal:** Roadbed presence score within 100 - 300 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 2 but equal to or less than 4. **Low Suboptimal:** Roadbed presence score within 100 - 300 feet AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 6 but less than or equal to 8.	**Low Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 10 but less than or equal to 12. **Low Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than 12.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6		5 4 3 2 1

CI = Total Score/20

	Condition Score	Weighting	Sub-Scores
a. Roadbed 0-100:	20	* (0.67)	13
b. Roadbed 100-300:	18	* (0.33)	6
		Total Score:	19

0.97

Comments:

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

3. Vegetation Condition Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
a. Invasive Species Presence	**High Optimal:** No invasives present. **Low Optimal:** <5% of the total AA contains invasive species.	**High Suboptimal:** >5% but less than 10% of the total AA contains invasive species. **Low Suboptimal:** >10% but less than 20% of the total AA contains invasive species.	**High Marginal:** >20% but less than 30% of the total AA contains invasive species. **Low Marginal:** >30% but less than 50% of the total AA contains invasive species.	> 50% of the total AA contains invasive species.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
b. Vegetation Stressor Presence	**High Optimal:** No vegetation stressors present within the AA boundary. **Low Optimal:** One vegetation stressor present within the AA boundary.	**High Suboptimal:** Two vegetation stressors present within the AA boundary. **Low Suboptimal:** Three vegetation stressors present within the AA boundary.	**High Marginal:** Four vegetation stressors present within the AA boundary. **Low Marginal:** Five vegetation stressors present within the AA boundary.	Greater than five vegetation stressors present within the AA boundary.	CI = Total Score/40
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

a. Invasive Sub-Score:	4	**Total Score**	**0.40**
b. Vegetation Sub-Score:	12	**16**	

4. Hydrologic Modification Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
Hydrologic Modification Stressor Presence	**High Optimal:** No hydrologic stressors present within the AA boundary. **Low Optimal:** One hydrologic stressor present within the AA boundary.	**High Suboptimal:** Two hydrologic stressors present within the AA boundary. **Low Suboptimal:** Three hydrologic stressors present within the AA boundary.	**High Marginal:** Four hydrologic stressors present within the AA boundary. **Low Marginal:** Five hydrologic stressors present within the AA boundary.	Greater than five hydrologic stressors present within the AA boundary.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:Cattle grazing soil compaction.

Score:	12	**0.60**

5. Sediment Stressor Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
Sediment Stressor Presence	**High Optimal:** No sediment stressors present within the AA boundary. **Low Optimal:** One sediment stressor present within the AA boundary.	**High Suboptimal:** Two sediment stressors present within the AA boundary. **Low Suboptimal:** Three sediment stressors present within the AA boundary.	**High Marginal:** Four sediment stressors present within the AA boundary. **Low Marginal:** Five sediment stressors present within the AA boundary.	Greater than five sediment stressors present within the AA boundary.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:Cattle grazing, manure, soil alteration from cattle

Score:	17	**0.85**

6. Water Quality Stressor Index

	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
a. Eutro-phication Stressor Presence	No eutrophication stressors present within the AA boundary.	One eutrophication stressors present within the AA boundary.	Two eutrophication stressors present within the AA boundary.	Three eutrophication stressors present within the AA boundary.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Comments: Cattle grazing, manure

	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
b. Contaminant / Toxicity Stressor Presence	No contaminant / toxicity stressors present within the AA boundary.	One contaminant / toxicitystressors present within the AA boundary.	Two contaminant / toxicity stressors present within the AA boundary.	Three contaminant / toxicity stressors present within the AA boundary.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Comments:

a. Eutrophication Score	13	**Total Score:**	**0.80**
b. Contaminant Score	19	**32**	

Overall Wetland Level 2 Condition Score: Sum all six of the Condition Indexes and divide by 6 to calculate the overall condition score.	**Overall Condition Index:**	**0.68**

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

Project #	Project Name	Date	Proposed Impact Size (acres)	AA #	AA Size (acres)
0068-4	PRM for Shell-Falcon	9/1/2017	0	1	1.33

Name(s) of Evaluator(s)	Lat (dd)	Long (dd)	Notes:
Amber Snavley	41.332603	80.284644	Post Restoration Conditions

General Comments: Fencing along perimeter of wetland will keep livestock out. Wetland will be treated for invasive plant presence. Native vegetatin including seeds, shrubs and trees will be planted to enhance the plant community and structure.

1. Wetland Zone of Influence Condition Index

	Condition Category				
	Optimal	Suboptimal		Marginal		Poor	
Wetland Zone of Influence (300 foot area around AA perimeter)	ZOI area vegetation consists of a tree stratum present (diameter at breast height (dbh) > 3 inches) with greater than or equal to 60% tree canopy cover. Areas comprised of stream channels, wetlands (regardless of classification or condition) and lacustrine resources ≥ 10 acres are scored as optimal.	**High Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover with a maintained understory.	**High Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation with either a shrub layer or a tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover.	**Low Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, areas of hay production, and ponds or open water areas (< 10 acres). If trees are present, tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover with maintained understory.	**High Poor:** ZOI area vegetation consists of lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, pervious trails, recently seeded and stabilized, or other comparable condition.	**Low Poor:** ZOI area vegetation consists of impervious surfaces; mine spoil lands, denuded surfaces, row crops, active feed lots, impervious trails, or other comparable conditions.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 3 2 1	

1. Identify all applicable Condition Category areas within the wetland zone of influence using the descriptors above.
2. Estimate the % area within each condition category. Calculators are provided for you below.
3. Enter the % ZOI Area in decimal form (0.00) and Score for each category in the blocks below.

Total Score = SUM(%Areas*Scores)

	Condition Category:	Optimal	Low Suboptimal	High Marginal	Low Marginal	High Poor	Low Poor	Total Score:
Scoring:	% ZOI Area:	56%	2%	35%	7%	0%	0%	
	Score:	16	9	4	1	0	0	
	Total Sub-score:	8.96	0.18	1.40	0.07	0.00	0.00	10.61

0.53

Comments:

2. Roadbed Presence Index

	Condition Categories				
	Optimal	Suboptimal		Marginal		Poor	
a. Roadbed Presence (within 0 - 100 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 feet of the AA boundary	**Low Optimal:** Roadbed presence score within 0-100 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 2 but equal to or less than 4.	**Low Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 6 but less than or equal to 8.	**Low Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 10 but less than or equal to 12.	**Low Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 12.	
SCORE	20 19 18 17 16		15 14 13 12 11		10 9 8 7 6		5 4 3 2 1		

Comments:

	Condition Categories				
	Optimal	Suboptimal		Marginal		Poor	
b. Roadbed Presence (within 100 - 300 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 - 300 feet of the AA boundary	**Low Optimal:** Roadbed presence score within 100 - 300 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 2 but equal to or less than 4.	**Low Suboptimal:** Roadbed presence score within 100 - 300 feet AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 6 but less than or equal to 8.	**Low Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 10 but less than or equal to 12.	**Low Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than 12.	CI = Total Score/20
SCORE	20 19 18 17 16		15 14 13 12 11		10 9 8 7 6		5 4 3 2 1		

	Condition Score	Weighting	Sub-Scores
a. Roadbed 0-100:	20	* (0.67)	13
b. Roadbed 100-300:	18	* (0.33)	6
		Total Score:	**19**

0.97

Comments:

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

3. Vegetation Condition Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
a. Invasive Species Presence	**High Optimal:** No invasives present. **Low Optimal:** <5% of the total AA contains invasive species.	**High Suboptimal:** >5% but less than 10% of the total AA contains invasive species. **Low Suboptimal:** >10% but less than 20% of the total AA contains invasive species.	**High Marginal:** >20% but less than 30% of the total AA contains invasive species. **Low Marginal:** >30% but less than 50% of the total AA contains invasive species.	> 50% of the total AA contains invasive species.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
b. Vegetation Stressor Presence	**High Optimal:** No vegetation stressors present within the AA boundary. **Low Optimal:** One vegetation stressor present within the AA boundary.	**High Suboptimal:** Two vegetation stressors present within the AA boundary. **Low Suboptimal:** Three vegetation stressors present within the AA boundary.	**High Marginal:** Four vegetation stressors present within the AA boundary. **Low Marginal:** Five vegetation stressors present within the AA boundary.	Greater than five vegetation stressors present within the AA boundary.	CI = Total Score/40
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

a. Invasive Sub-Score:	20	**Total Score**
b. Vegetation Sub-Score:	20	**40**

1.00

4. Hydrologic Modification Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
Hydrologic Modification Stressor Presence	**High Optimal:** No hydrologic stressors present within the AA boundary. **Low Optimal:** One hydrologic stressor present within the AA boundary.	**High Suboptimal:** Two hydrologic stressors present within the AA boundary. **Low Suboptimal:** Three hydrologic stressors present within the AA boundary.	**High Marginal:** Four hydrologic stressors present within the AA boundary. **Low Marginal:** Five hydrologic stressors present within the AA boundary.	Greater than five hydrologic stressors present within the AA boundary.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

Score:	**15**

0.75

5. Sediment Stressor Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
Sediment Stressor Presence	**High Optimal:** No sediment stressors present within the AA boundary. **Low Optimal:** One sediment stressor present within the AA boundary.	**High Suboptimal:** Two sediment stressors present within the AA boundary. **Low Suboptimal:** Three sediment stressors present within the AA boundary.	**High Marginal:** Four sediment stressors present within the AA boundary. **Low Marginal:** Five sediment stressors present within the AA boundary.	Greater than five sediment stressors present within the AA boundary.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

Score:	**20**

1.00

6. Water Quality Stressor Index

	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
a. Eutro-phication Stressor Presence	No eutrophication stressors present within the AA boundary.	One eutrophication stressors present within the AA boundary.	Two eutrophication stressors present within the AA boundary.	Three eutrophication stressors present within the AA boundary.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Comments:

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
b. Contaminant / Toxicity Stressor Presence	No contaminant / toxicity stressors present within the AA boundary.	One contaminant / toxicitystressors present within the AA boundary.	Two contaminant / toxicity stressors present within the AA boundary.	Three contaminant / toxicity stressors present within the AA boundary.	CI = Total Score/40
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments:

a. Eutrophication Score	20	**Total Score:**
b. Contaminant Score	20	**40**

1.00

Overall Wetland Level 2 Condition Score: Sum all six of the Condition Indexes and divide by 6 to calculate the overall condition score.	**Overall Condition Index:**	**0.87**

APPENDIX E

JURISDICTIONAL AGENCY COORDINATION

1. PROJECT INFORMATION

Project Name: **Neshannock Creek Restoration Site**
Date of Review: **10/10/2016 08:14:52 AM**
Project Category: **Habitat Conservation and Restoration, Wetland Restoration, Wetland Creation, or Wetland Enhancement**
Project Area: **54.53 acres**
County(s): **Mercer**
Township/Municipality(s): **DELAWARE**
ZIP Code: **16124**
Quadrangle Name(s): **FREDONIA**
Watersheds HUC 8: **Shenango**
Watersheds HUC 12: **Otter Creek**
Decimal Degrees: **41.331550, -80.283334**
Degrees Minutes Seconds: **41° 19' 53.5785" N, 80° 17' 0.26" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

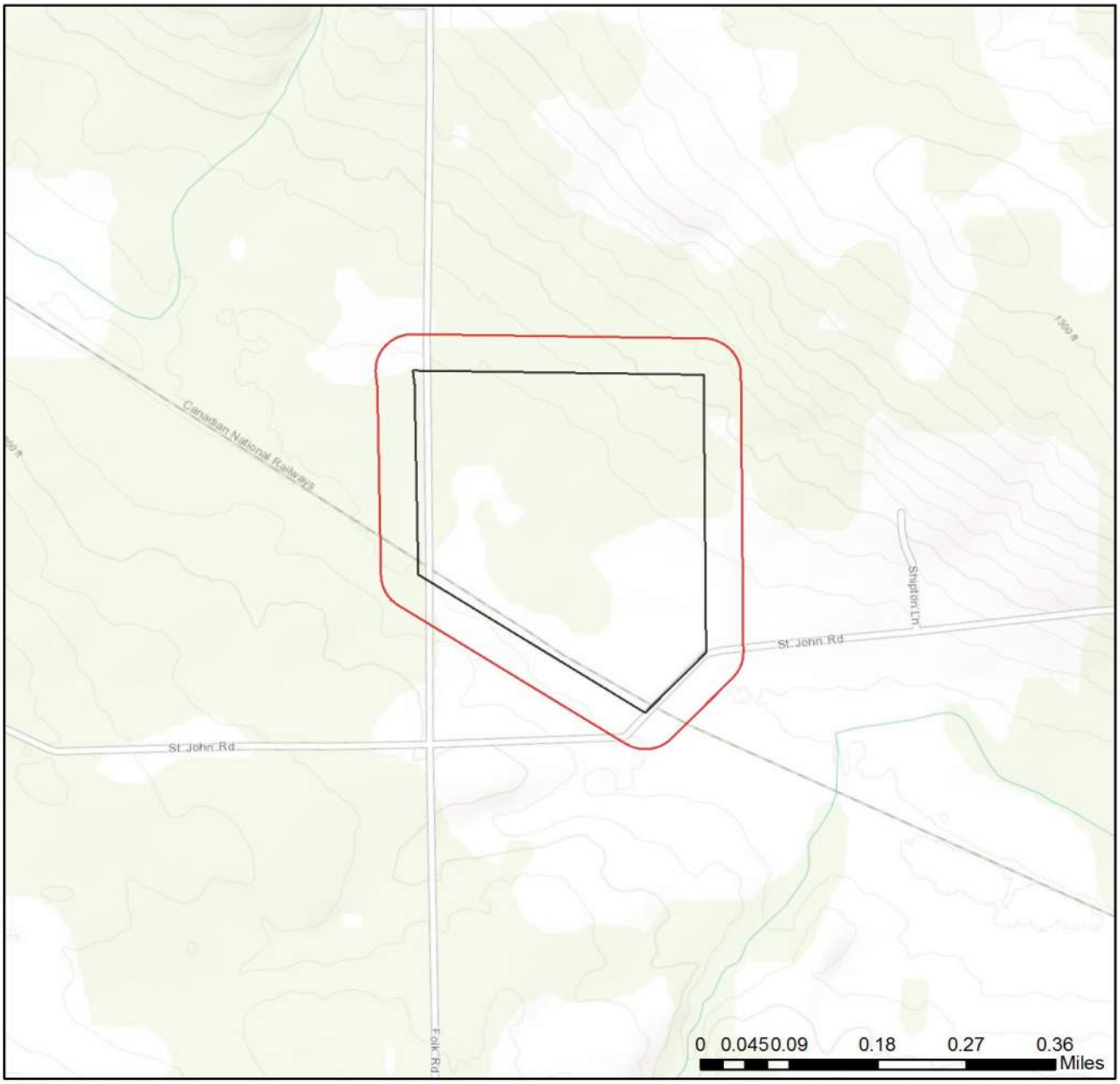
Neshannock Creek Restoration Site

Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

Neshannock Creek Restoration Site



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov
Fax:(717) 772-0271

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane, Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Amber Snavley
Company/Business Name: RES
Address: 33 Terminal Way, Suite 431A
City, State, Zip: Pittsburgh, PA 15219
Phone:(412) 249-2443 Fax:( )
Email: asnavley@res.us

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

10-10-16
date

Pennsylvania Historical & Museum Commission

PROJECT REVIEW FORM

Request to Initiate SHPO Consultation on State and Federal Undertakings

SHPO USE ONLY	
DATE RECEIVED:	7/5/13
ER NUMBER:	13-1784-085-A

REV: 5/2012

SECTION A: GENERAL PROJECT INFORMATION

Is this a new submittal? (•) YES ( ) NO **OR** ( ) **This is additional information for ER Number:**

Project Name	Neshannock Creek Mitigation Bank	County	Mercer
Project Address	358 Saint Johns Rd		
City/State/ Zip	Fredonia PA 16124	Municipality	Delaware Township

SECTION B: PRIMARY CONTACT INFORMATION

Name	Mark Hepner	Phone	(804) 200-6382
Company	Timmons Group	Fax	(804) 560-1648
Street/P.O. Box	1001 Boulders Parkway, Suite 300	Email	mark.hepner@timmons.com
City/State/Zip	Richmond VA 23225		

SECTION C: PROJECT DESCRIPTION

This project is located on: (check all that apply) ☐ Federal property ☐ State property ☐ Municipal property ☑ Private property

List all Federal and State agencies and programs (funding, permits, licenses) involved in this project

Agency Type	Agency/Program/Permit Name	Project/Permit/Tracking Number (if applicable)
State	CWA 401 / Chapter 105 / NPDES	
Federal	CWA 404	

Proposed Work – Attach project description, scope of work, site plans, and/or drawings

Project includes (check all that apply): ☑ Construction ☐ Demolition ☑ Rehabilitation ☐ Disposition

Total acres of project area: 14.8 Total acres of earth disturbance: 13.2

Are there any buildings or structures within the project area? ( ) Yes (•) No Approximate age:

This project involves properties listed in or eligible for listing in the National Register of Historic Places, or designated as historic by a local government	Yes	No	Unsure	Name of historic property or historic districts	Unknown
	( )	( )	(•)		

Please print and mail completed form and all attachments to:

PHMC
State Historic Preservation Office
400 North St.
Commonwealth Keystone Building, 2nd Floor
Harrisburg, PA 17120-0093

Attachments – Please include the following information with this form

- ☑ **Map** – 7.5' USGS quad showing project boundary and Area of Potential Effect
- ☑ **Description/Scope** – Describe the project, including any ground disturbance and previous land use
- ☑ **Site Plans/Drawings** – Indicate the location and age, if known, of all buildings in the project area
- ☑ **Photographs** – Attach prints or digital photographs showing the project site, including images of all buildings and structures keyed to a site plan

SHPO DETERMINATION (SHPO USE ONLY) SHPO REVIEWER: Mark Shaffer 7/11/13

- ☐ There are **NO HISTORIC PROPERTIES** in the Area of Potential Effect
- ☒ The project will have **NO EFFECT** on historic properties
- ☐ The project will have **NO ADVERSE EFFECTS** on historic properties:
- ☐ The project will have **NO ADVERSE EFFECTS WITH CONDITIONS** (see attached)
- ☐ **SHPO REQUESTS ADDITIONAL INFORMATION** (see attached)

APPENDIX F

PLANTING PLAN

PERMITTEE-RESPONSIBLE MITIGATION FOR THE FALCON ETHANE PIPELINE PROJECT DESIGN PLANS

DELAWARE TOWNSHIP, MERCER COUNTY, PENNSYLVANIA

1. PROJECT DESCRIPTION:
FIRST PENNSYLVANIA RESOURCE, LLC. (FPR), A WHOLLY-OWNED SUBSIDIARY OF RESOURCE ENVIRONMENTAL SOLUTIONS (RES), IS PROPOSING A PERMITTEE-RESPONSIBLE MITIGATION (PRM) PLAN ON BEHALF OF SHELL PIPELINE COMPANY LP (SPLC OR PERMITTEE) TO COMPENSATE FOR UNAVOIDABLE IMPACTS TO WATERS, INCLUDING WETLANDS, OF THE UNITED STATES (U.S.) ASSOCIATED WITH THE FALCON ETHANE PIPELINE PROJECT (PROJECT). FPR HAS PREPARED THIS PRM PLAN IN ACCORDANCE WITH THE COMPENSATORY MITIGATION FOR LOSSES OF AQUATIC RESOURCES FINAL RULE ISSUED ON APRIL 10, 2008 AS DETAILED IN 33 CFR §332.4(C) OF THE FEDERAL REGISTER (VOLUME 73, NUMBER 70). THIS DOCUMENT ADDRESSES THE REQUIRED MITIGATION THAT WILL BE PROVIDED AT FPR'S NESHANNOCK CREEK RESTORATION SITE (NRCS). THE PROPOSED MITIGATION WILL OFFSET TEMPORARY AND PERMANENT PALUSTRINE SCRUB-SHRUB (PSS) AND PALUSTRINE FORESTED (PFO) WETLAND CONVERSION IMPACTS OCCURRING IN ALLEGHENY, BEAVER AND WASHINGTON COUNTIES, PENNSYLVANIA (PA) THROUGH VEGETATIVE ENHANCEMENT OF EXISTING WETLANDS.

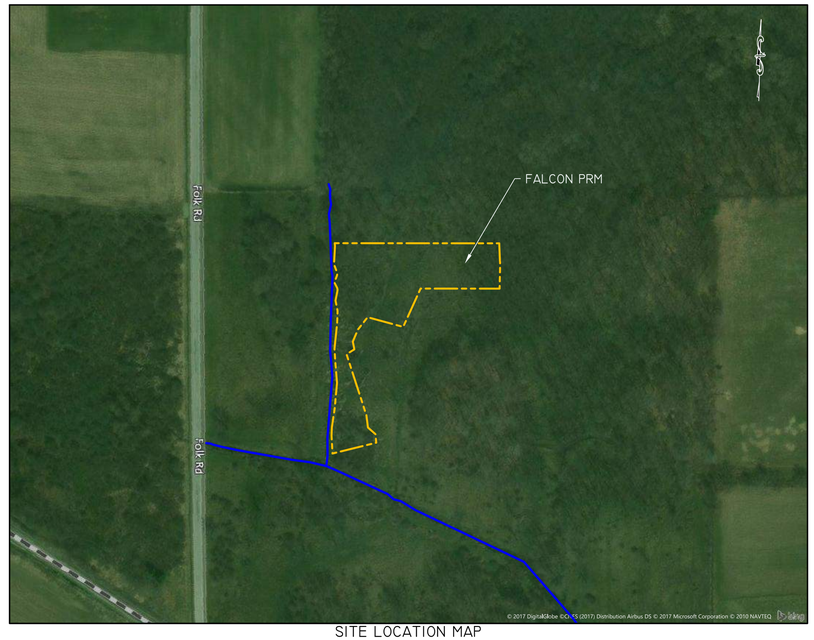
2. SITE ADDRESS:
358 ST. JOHN'S ROAD
FREDONIA, PA 16124

3. SITE COORDINATES:
41° 19' 57.60" NORTH
80° 17' 2.85" WEST

4. MITIGATION BANK SPONSOR:
FIRST PENNSYLVANIA RESOURCE, LLC.
33 TERMINAL WAY, SUITE 431
PITTSBURGH, PA 15219
ATTN: AMBER SNAVLEY
EMAIL: ASNAVLEY@RES.US
PHONE: (412) 293-2443

5. LANDOWNERS:
SCOTT AND BRENDA IRWIN

7. WETLAND PRM INFORMATION:
1.33 ACRES OF EXISTING WETLANDS

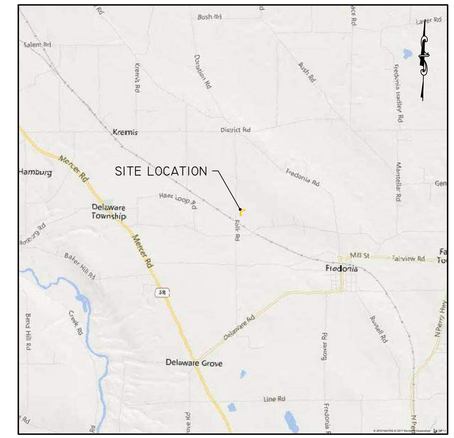


SITE LOCATION MAP

0 150 300 600 Feet

SCALE: 1" = 150'

MAP LEGEND	
PRM BOUNDARY	
EXISTING DRAINAGE DITCH	



PROJECT LOCATION MAP

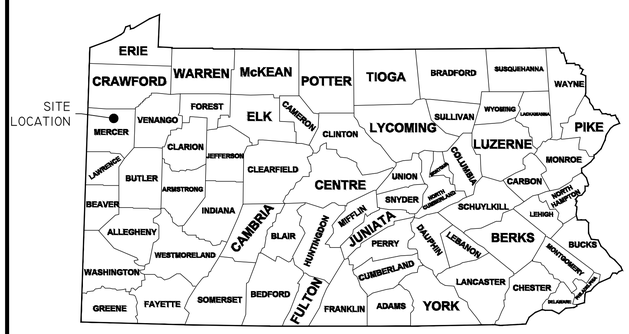
0 5000 10000 20000 Feet

SCALE: 1" = 2000'

SHEET INDEX	
SHEET #	SHEET TITLE
C000	TITLE SHEET
C100	EXISTING CONDITIONS
C700	PLANTING PLAN
C701	DETAILS

FIRST PENNSYLVANIA RESOURCE, LLC.

ATTN: AMBER SNAVLEY
33 TERMINAL WAY, SUITE 431
PITTSBURGH, PA 15219
EMAIL: ASNAVLEY@RES.US
PHONE: (412) 293-2443



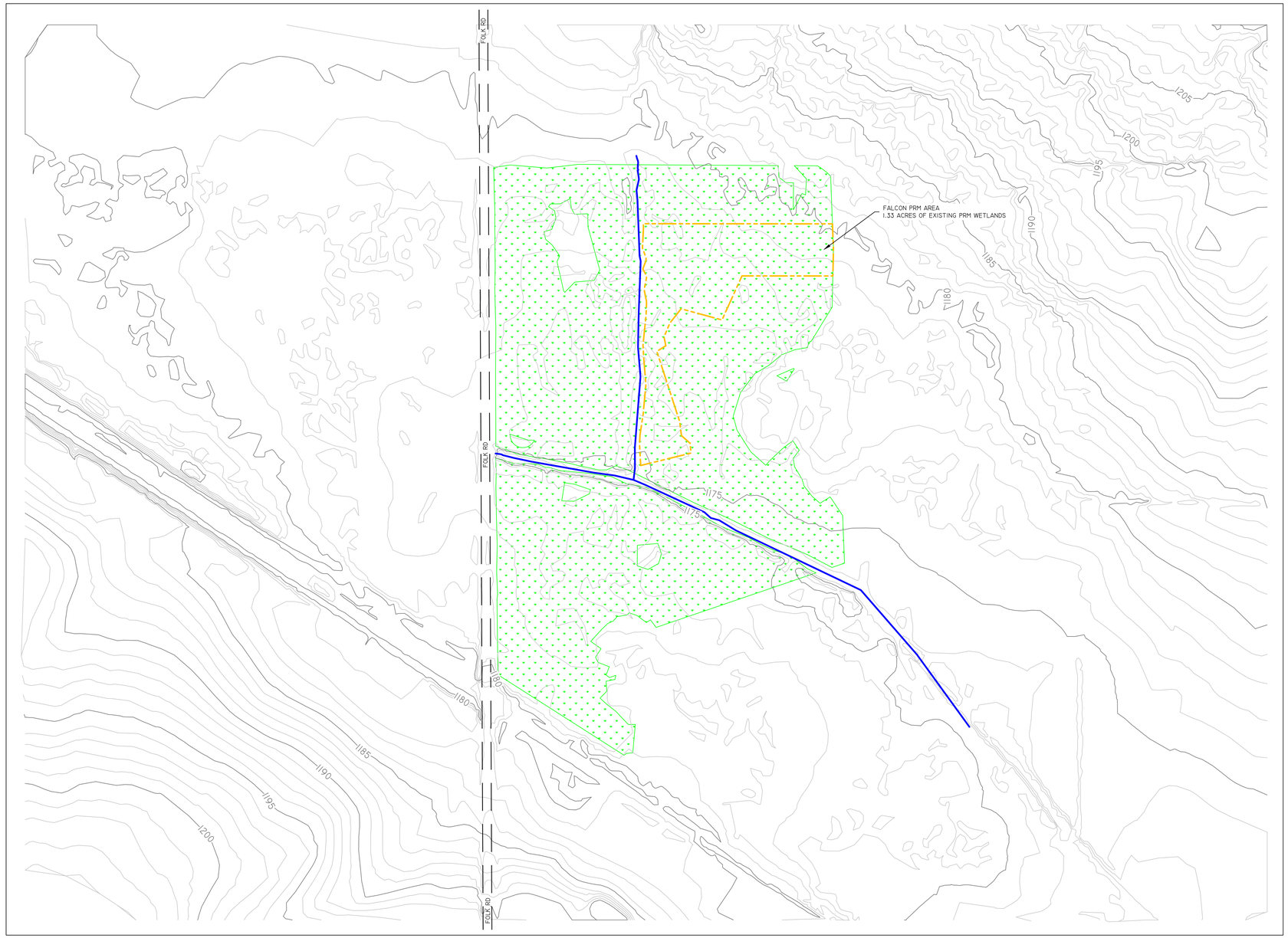
REVISIONS			
NO.	DESCRIPTION	DATE	BY

NESHANNOCK CREEK RESTORATION SITE
FALCON ETHANE PIPELINE PRM PROJECT

PENNSYLVANIA
MERCER COUNTY
DELAWARE TOWNSHIP

DRAWN BY: NH
CHECKED BY: AG
APPROVED BY: AG
DATE: SEPTEMBER 13, 2021
SHEET: C000
FILE NO: 0068

S:\BIRRES CAD\CAD WORKING\0068_NESHANNOCK\PLANTING PLANS\FALCON PRM\DWG\PLANSETS
ARCH FULL BLEED D (24.00 X 36.00 INCHES)



REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PRM BOUNDARY
- EXISTING DRAINAGE DITCH
- ROAD
- EXISTING WETLANDS
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

NOTES

SEAL

SCALE

0 100 200 400 Feet

SCALE: 1" = 100'

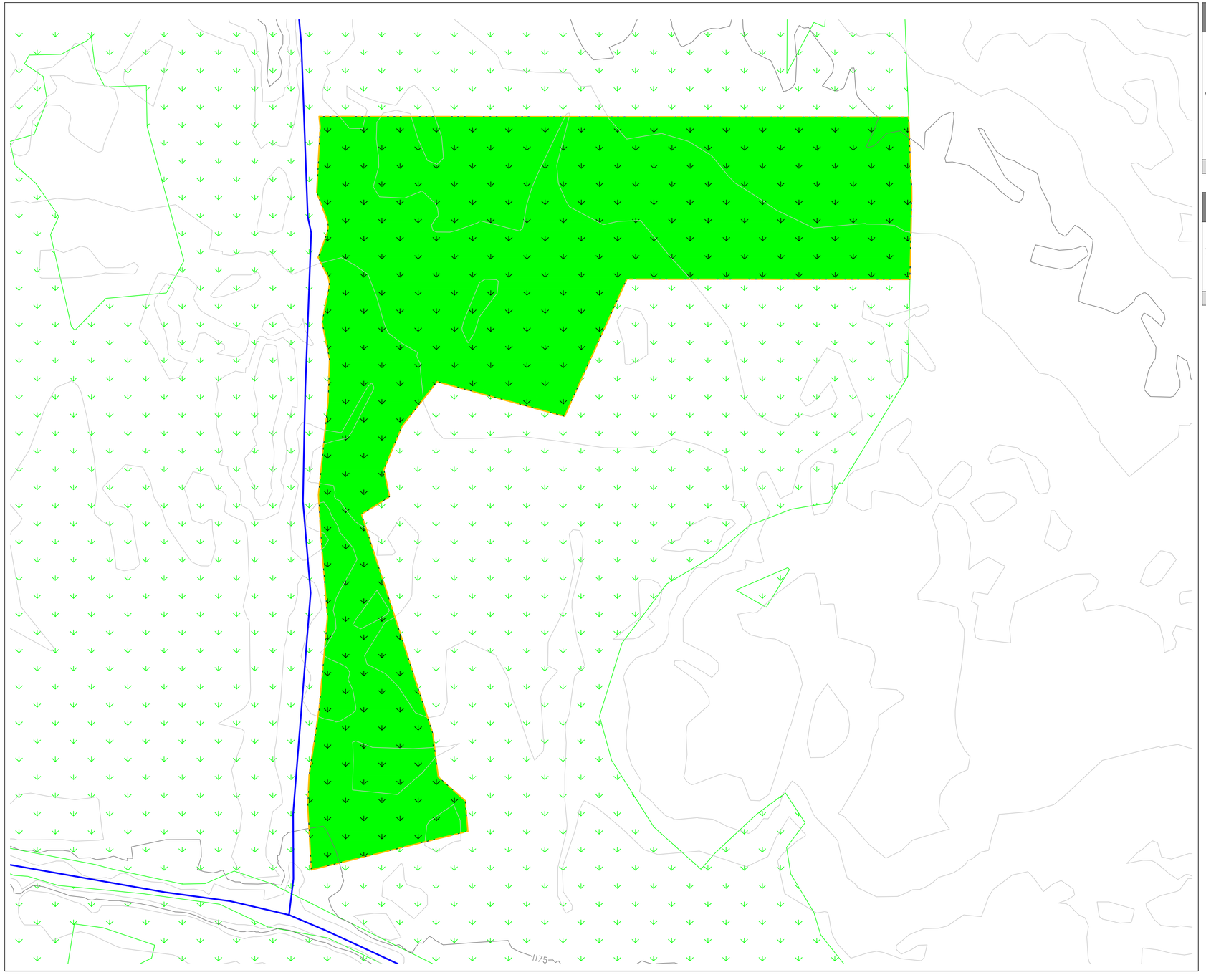
RESOURCE ENVIRONMENTAL SOLUTIONS
33 TERMINAL WAY, SUITE 431
PITTSBURGH PA 15219
www.RES.US
TELEPHONE: (412) 293-2443
EMAIL: ASNAVLEY@RES.US

NESHANNOCK CREEK RESTORATION SITE
FALCON ETHANE PIPELINE PRM PROJECT

EXISTING CONDITIONS

DRAWN BY:	NH	PENNSYLVANIA	
CHECKED BY:	AS	MERCER COUNTY	DELAWARE TOWNSHIP
APPROVED BY:	AS	SHEET: C100	FILE NO: 0068
DATE:	SEPTEMBER 13, 2017		

S:\RRES CAD\CAD WORKING\0068-NESHANNOCK\PLANTING PLANS\FALCON PRM\DWG\PLANSETS
ARCH FULL BLEED D (24.00 X 36.00 INCHES)



ZONE	SPECIES		NUMBER PER ACRE	TOTAL PLANTS (1.33 ACRES)
	SCIENTIFIC NAME	COMMON NAME		
WETLAND PLANTING SCHEDULE	Salix nigra	Black Willow	70	93
	Cornus amomum	Silky Dogwood	60	80
	Acer negundo	Boxelder	60	80
	Sambucus canadensis	Common Elderberry	50	67
	Cephalanthus occidentalis	Buttonbush	50	67
	Ilex verticillata	Winterberry	50	67
	Physocarpus opulifolius	Ninebark	40	53
	Platanus occidentalis	Sycamore	50	67
	Quercus bicolor	Swamp White Oak	30	40
	Acer saccharinum	Silver Maple	60	80
	Ulmus rubra	Red Elm	30	40
		TOTAL	550	732

ZONE	SPECIES		INDICATOR STATUS	MIX DENSITY	SEEDING RATE (LBS / ACRE)
	SCIENTIFIC NAME	COMMON NAME			
WETLAND ENHANCEMENT SEED MIX	Carex stricta	Tussock Sedge	OBL	0.03	0.12
	Matteuccia struthiopteris	Ostrich Fern	FACW	Plugs	100 plugs/acre
	Caltha palustris	Marsh Marigold	OBL	0.03	0.12
	Physostegia virginiana	Obedient Plant	FACW	0.3	1.2
	Asclepias incarnata	Swamp Milkweed	OBL	0.34	1.36
	Solidago graminifolia	Grass-Leaved Goldenrod	FACW	0.3	1.2
			TOTAL	1	4

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PRM BOUNDARY
- EXISTING DRAINAGE DITCH
- ROAD
- EXISTING WETLANDS
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED WETLAND PLATING
- PROPOSED WETLAND SEEDING

NOTES

SEAL

SCALE

0 30 60 120 Feet

SCALE: 1" = 30'

RESOURCE ENVIRONMENTAL SOLUTIONS
33 TERMINAL WAY, SUITE 431
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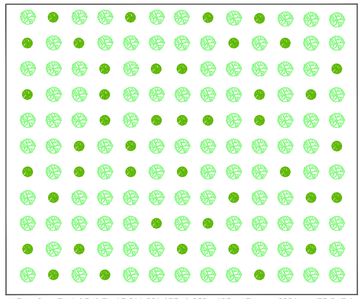
NESHANNOCK CREEK RESTORATION SITE
FALCON ETHANE PIPELINE PRM PROJECT

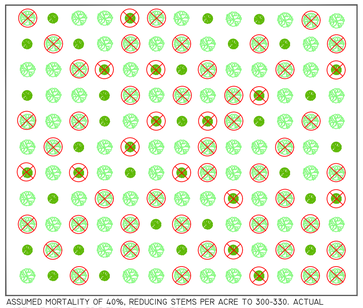
PLANTING PLAN

DRAWN BY:	NH	PENNSYLVANIA	
CHECKED BY:	AS	MERCER COUNTY	DELAWARE TOWNSHIP
APPROVED BY:	AS	SHEET: C700	FILE NO: 0068
DATE:	SEPTEMBER 13, 2017		

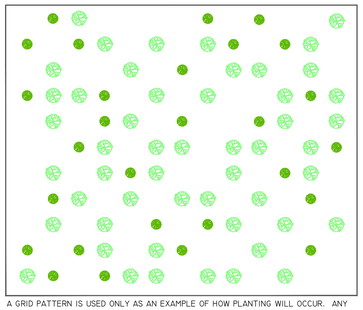
S:\RES_CAD\CAD Working\1068_NESHANNOCK\PLANTING PLANS\FALCON PRM\DWG\PLANSETS
ARCH FULL BLEED D (24.00 X 36.00 INCHES)



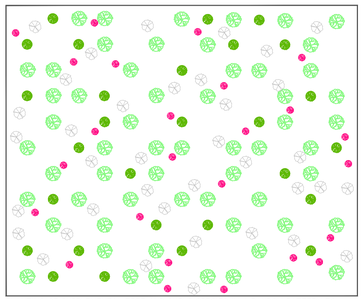
INITIAL PLANTING DENSITY OF 500-550 STEMS PER ACRE; WITH AN APPROXIMATE RATIO OF 70% CANOPY AND 30% SHRUBS SPECIES. PLANTING LOCATIONS ARE APPROXIMATE, THE ACTUAL LOCATION OF PLANTS ON THE PRM SITE WILL BE SUBJECT TO SITE CONDITIONS AT THE TIME OF PLANTING.



ASSUMED MORTALITY OF 40%, REDUCING STEMS PER ACRE TO 300-330. ACTUAL MORTALITY TO BE VERIFIED DURING MONITORING.



A GRID PATTERN IS USED ONLY AS AN EXAMPLE OF HOW PLANTING WILL OCCUR. ANY REPLANTING WILL BE RANDOMIZED REGARDLESS OF WHICH ZONE IT WILL OCCUR WITHIN.

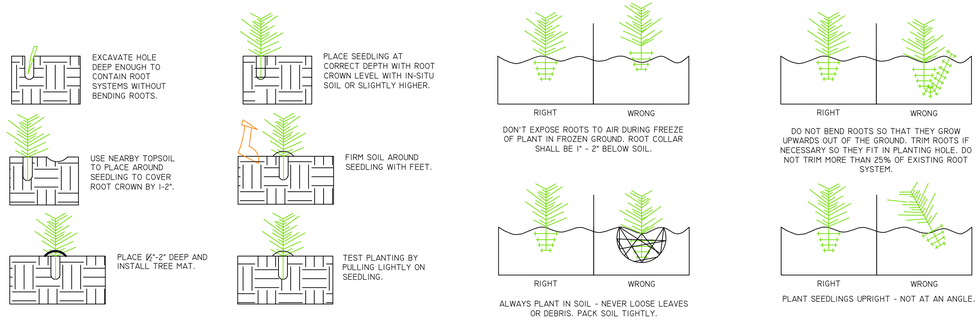


PLANTING OF SUPPLEMENTAL TREE AND SHRUB SPECIES IN A RANDOM PATTERN TO RETURN THE SITE TO THE REQUIRED DENSITIES PER ACRE. ALL REPLANTING TO OCCUR ON A RANDOM BASIS. ANY ADDITIONAL REPLANTING TO BE DONE AS NEEDED.

PL-1
701

MATRIX PLANTING PLAN DETAIL

NOT TO SCALE



PL-2
701

TUBELING PLANTING DETAIL

NOT TO SCALE

CARE OF SEEDLING UNTIL PLANTED

SEEDLINGS SHOULD BE PLANTED IMMEDIATELY. IF IT IS NECESSARY TO STORE MOSS-PACKED SEEDLINGS FOR MORE THAN 2 WEEKS, ONE PINT OF WATER PER PKG. SHOULD BE ADDED. IF CLAY-TREATED, DO NOT ADD WATER TO PKG. PACKAGES MUST BE SEPARATED TO PROVIDE VENTILATION TO PREVENT "HEATING". SEPARATING PACKAGES WITH WOOD STRIPS AND STORE OUT OF THE WIND IN A SHADED, COOL, (NOT FREEZING) LOCATION.

CARE OF SEEDLING DURING PLANTING

WHEN PLANTING, ROOTS MUST BE KEPT MOIST UNTIL TREES ARE IN THE GROUND. DO NOT CARRY SEEDLINGS IN YOUR HAND EXPOSED TO THE AIR AND SUN. KEEP MOSS-PACKED SEEDLINGS IN A CONTAINER PACKED WITH WET MOSS OR FILLED WITH THICK MUDDY WATER. COVER CLAY-TREATED SEEDLINGS WITH WET BURLAP ONLY.

PLANTING DETAIL NOTES:

A. GENERAL:

1. PLANT DETAILS ARE INCORPORATED INTO THIS SPECIFICATION BY REFERENCE.

2. QUALITY ASSURANCE
   - 2.1. SUPPLIER CERTIFICATION: THE SUPPLIER OF ALL SEEDS AND/OR VEGETATION SHALL CERTIFY THAT ORIGIN OF THE SEEDS FROM WHICH THE PLANTS OR SEEDS WERE PRODUCED IS FROM THE EASTERN OR CENTRAL PORTIONS OF THE U.S. PRIOR TO PLANTING.
   - 2.2. INSTALLER QUALIFICATIONS: ENGAGE AN EXPERIENCED INSTALLER, WHO HAS SUCCESSFULLY COMPLETED RESTORATION PLANTING PROJECTS SIMILAR IN SIZE AND COMPLEXITY TO THIS PROJECT.
   - 2.3. INSTALLER'S FIELD SUPERVISION: INSTALLER TO MAINTAIN AN EXPERIENCED FULL-TIME SUPERVISOR ON THE PROJECT SITE WHEN PLANTING IS IN PROGRESS.

3. PLANT MATERIALS
   - 3.1. PROVIDE PLANT MATERIALS OF QUANTITY, SIZE, GENUS AND SPECIES INDICATED ON THE CONSTRUCTION DRAWINGS.

4. ALL PLANT MATERIALS AND WORK SHALL COMPLY WITH RECOMMENDATIONS AND REQUIREMENTS OF ANSI Z60.1 2004 AMERICAN STANDARD FOR NURSERY STOCK. ALL SEEDS MUST MEET APPLICABLE PENNSYLVANIA AND FEDERAL REGULATIONS AND MUST INCLUDE LABELING INDICATING SUPPLIER, FORMULATION, GERMINATION RATES AND SEED DATE. LABELS FROM ALL SEED INSTALLED ARE TO BE KEPT AND SUPPLIED TO OWNER AT COMPLETION OF PROJECT.

DO NOT MAKE SUBSTITUTIONS UNLESS APPROVED BY THE PROJECT MANAGER. REQUESTS FOR SUBSTITUTIONS MUST BE MADE IN WRITING TO THE PROJECT MANAGER AND APPROVED TO INSTALLATION. INCLUDE REASONS WHY THE SUBSTITUTIONS ATE BEING REQUESTED.

6. PROJECT ENGINEER MAY INSPECT PLANT MATERIALS EITHER AT PLACE OF GROWTH OR ON SITE DURING PLANTING ACTIVITIES, FOR COMPLIANCE WITH REQUIREMENTS FOR GENUS, SPECIES, VARIETY, SIZE, AND QUALITY. MATERIAL FOUND TO BE UNACCEPTABLE WILL BE REJECTED AND THE CONTRACTOR WILL BE REQUIRED TO SUPPLY REPLACEMENT MATERIAL WITHIN TIME FRAME (I.E., 1 WEEK). REJECTED MATERIAL SHALL BE IMMEDIATELY REMOVED FROM PROJECT SITE. UNACCEPTABLE MATERIAL IS DEFINED AS THE FOLLOWING:
   - 6.1. PLANTS WITH BENT TRUNKS OR MULTIPLE LEADERS, UNLESS CHARACTERISTIC FOR THE SPECIES;
   - 6.2. PLANTS WITH DISEASED TRUNKS, STEMS, OR LEAVES;
   - 6.3. PLANTS WITH PEST-INFESTED TRUNKS, STEMS, OR LEAVES;
   - 6.4. PLANTS OF INSUFFICIENT SIZE;
   - 6.5. PLANTS WITH WRONG SPECIES/SUB-SPECIES; AND
   - 6.6. PLANTS HAVING ROOT GIRDLING IN THE CONTAINER.

7. DELIVERY, STORAGE, AND HANDLING
   - 7.1. PROTECT BARK, BRANCHES, AND ROOT SYSTEMS FROM SUN SCALD, DRYING, SWEATING, WHIPPING, AND OTHER HANDLING AND TYING DAMAGE. DO NOT BEND OR BIND-TIE TREES OR SHRUBS IN SUCH A MANNER AS TO DESTROY THEIR NATURAL SHAPE. PROVIDE PROTECTIVE COVERING OF PLANTS DURING DELIVERY. DO NOT DROP PLANTS DURING DELIVERY.
   - 7.2. DELIVER PLANT MATERIALS AFTER PREPARATIONS FOR PLANTING HAVE BEEN COMPLETED AND PLANT IMMEDIATELY. IF PLANTING IS DELAYED MORE THAN 6 HOURS AFTER DELIVERY, FOLLOW STORAGE INSTRUCTIONS AS SHOWN IN TUBELING TREE PLANTING DETAIL.
   - 7.3. DO NOT REMOVE CONTAINER-GROWN STOCK FROM CONTAINERS UNTIL PLANTING TIME.
   - 7.4. SEED: SEED SHOULD BE CLEAN AND DRY. DO NOT USE SEED THAT HAS BECOME MOIST DURING DELIVERY OR STORAGE. IF SEED NEEDS TO BE TEMPORALLY STORED IT SHOULD BE STORED IN A COOL, DRY PLACE.

8. PROJECT CONDITIONS
   - 8.1. EXAMINE THE SUB-GRADE AND TOPSOIL, AND VERIFY THE ELEVATIONS PRIOR TO INSTALLING PLANT ON SEED MATERIAL. ALL SOIL AMENDMENTS AND CONDITIONING SHALL BE COMPLETED PRIOR TO SEEDING AND PLANT MATERIAL INSTALLATION. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN A MANNER ACCEPTABLE TO THE INSTALLER.
   - 8.2. CALL PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776, 72 HOURS PRIOR TO ANY EXCAVATION. DETERMINE LOCATION OF UNDERGROUND UTILITIES AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE. HAND EXCAVATE AS REQUIRED.

9. PLANTING AND SEEDING RESTRICTIONS
   - 9.1. PLANTS SHALL BE PLANTED DURING UNFROZEN SOIL CONDITIONS SEPTEMBER 15TH - MAY 15TH. PLANT INSTALLATION OUTSIDE OF THIS TIME PERIOD SHALL NOT OCCUR UNLESS APPROVED BY THE PROJECT CONSTRUCTION MANAGER AND MAY REQUIRE ADDITIONS TO THE SCOPE OF WORK, SUCH AS WATERING REGIMES, AND ADDITIONAL PLANT QUANTITIES.
   - 9.2. SEEDING SHALL BE COMPLETED DURING SEPTEMBER 15-MAY 15 TO THE GREATEST EXTENT POSSIBLE. DORMANT WINTER SEEDING SHALL NOT BE CONDUCTED WITH MORE THAN 2" OF SNOW ON THE GROUND AT THE TIME OF SEEDING. DUE TO THE SCHEDULE OF THE PROJECT, SOME PERMANENT SEEDING OUTSIDE THIS TIME PERIOD WILL BE NECESSARY. THE CONTRACTOR WILL BE RESPONSIBLE FOR REMEDIAL SEEDING IN UNDER-PERFORMING AREAS DUE TO SEEDING OUTSIDE OF THIS TIME PERIOD. A COVER CROP SHALL BE SOWN AT THE TIME OF PERMANENT SEEDING TO PROVIDE QUICKER GERMINATION AND STABILIZATION PER THE PLAN SHEETS.
   - 9.3. THESE LIMITS MAY NOT BE MODIFIED UNLESS APPROVED BY THE PROJECT ENGINEER IN ADVANCE, WITH THE RISK OF SURVIVAL BORNE SOLELY BY THE CONTRACTOR.

10. WARRANTY
   - 10.1. WARRANTY PERIOD IS FOR ONE (1) YEAR AFTER DATE OF FINAL ACCEPTANCE AND COVERS DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH, EXCEPT FOR DEFECTS RESULTING FROM NEGLECT BY OWNER, ABUSE OR DAMAGE BY OTHERS, OR UNUSUAL PHENOMENA OR INCIDENTS WHICH ARE BEYOND CONTRACTOR'S CONTROL.
   - 10.2. CONTRACTOR SHALL GUARANTEE A MINIMUM SURVIVAL RATE FOR THE WARRANTY PERIOD OF 85% FOR BALLED AND BURLAPPED, CONTAINER GROWN, AND TUBELINGS, AND 75% FOR BARE ROOT AND LIVE STAKES.
   - 10.3. IF SURVIVAL RATES ARE LESS THAN THE ABOVE WARRANTY RATES, THE CONTRACTOR SHALL REPLACE THE QUANTITY OF DEFECTIVE OR DEAD PLANTS UP TO THE ORIGINAL CONSTRUCTION DRAWING SPECIFIED PLANT QUANTITY. WARRANTY PLANTINGS SHALL OCCUR WITHIN THE NEXT PLANTING WINDOW (SEPTEMBER 15TH -JUNE 15TH, EXCLUDING FROZEN SOIL CONDITIONS) FOLLOWING THE END OF THE APPLICABLE WARRANTY PERIOD.
   - 10.4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY DURING THE WARRANTY PERIOD TO PROVIDE WRITTEN NOTICE OF ANY MAINTENANCE PRACTICE TO THE OWNER, WHICH IN THEIR OPINION WILL AFFECT THE GUARANTEE IF NOT REMEDIED PROMPTLY. THE PROJECT ENGINEER WILL RENDER AN OPINION OF ANY CONFLICT IF NECESSARY.

11. MAINTENANCE
   - 11.1. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL PLANT MATERIAL THROUGH FINAL ACCEPTANCE AND WARRANTY PERIOD.

B. EXECUTION:

INSTALL PLANT MATERIALS IN ACCORDANCE WITH THE SPECIFICATIONS AND DETAILS OF THE CONSTRUCTION DRAWINGS FOLLOWING THE ADDITION OF SOIL AMENDMENTS, SEEDING, AND INSTALLATION OF APPLICABLE EROSION CONTROL FABRIC.

1. CONTAINER GROWTH MATERIAL
   - 1.1. PLANTING OF CONTAINER GROWN MATERIAL SHALL OCCUR IN ACCORDANCE WITH LOCATIONS AND/OR PATTERNS SPECIFIC TO THE CONSTRUCTION DRAWINGS.
   - 1.2. PLANTING HOLES SHALL BE AT LEAST TWICE THE DIAMETER AND DUG TO THE SAME DEPTH AS THE CONTAINER IN WHICH THEY ARE GROWN. DO NOT REMOVE PLANT MATERIAL FROM CONTAINER UNTIL IMMEDIATELY BEFORE INSTALLATION. EXAMINE THE ROOTS TO SEE IF THEY ARE POT BOUND. CAREFULLY SEPARATE ANY POT BOUND OR CRAMPED ROOTS AND SPREAD THEM OUT WHEN PLACING THE PLANT WITHIN THE HOLE SO THAT THE ROOTS CAN GROW WITHOUT FURTHER CONSTRICTION OF THE ROOT BALL.
   - 1.3. SET PLANT MATERIALS PLUMB AND CENTERED WITHIN HOLE, ENSURING THAT THE TOP OF THE ROOT BALL IS SLIGHTLY ELEVATED ABOVE THE SURROUNDING SOIL ELEVATIONS. BACKFILL AROUND ROOT BALL WITH SUITABLE NATIVE SOIL, MAINTAINING PLUMB, AND GENTLY TAMPING BACKFILL LAYERS TO ELIMINATE VOIDS. WATER IS BACKFILL LAYERS TO THE POINT OF SOIL SATURATION.
   - 1.4. FOLLOWING THE BACKFILLING, ADD EXISTING SOIL TO BRING THE FINAL GRADE IN THE PLANTING HOLE TO THE SURROUNDING SOIL SURFACE. RAKE THE UNUSED EXISTING SOIL OUTSIDE THE PLANTING HOUSE, TAKING CARE NOT TO MOUND THE SOIL OR TO SIGNIFICANTLY ALTER THE EXISTING GRADES.

2. BAREROOT AND TUBELING MATERIAL
   - 2.1. IT SHOULD BE ANTICIPATED THAT THE SOIL MAY BE COMPACTED MORE THAN OPTIMAL FOR PLANTING AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO RIP SOIL TO ASSURE OPTIMAL PLANTING CONDITION. SOIL SHALL BE RIPPED TO A DEPTH OF 9-12".
   - 2.2. BAREROOT MATERIAL SHALL BE TREATED WITH ROOT DIP ACCORDING TO THE MANUFACTURERS RECOMMENDATION PRIOR TO PLANTING. MATERIALS SHALL BE PLANTED IMMEDIATELY OR OTHERWISE STORED PER THE MANUFACTURER'S RECOMMENDATIONS.

3. LIVE STAKE MATERIAL
   - 3.1. LIVE STAKE MATERIAL SHALL BE SOAKED WITH GROWTH HORMONE 48 HOURS PRIOR TO INSTALLATION AND SHALL BE KEPT MOIST ACCORDING TO MANUFACTURES RECOMMENDATIONS. DO NOT ALLOW THE LIVE STAKES TO DRY OUT PRIOR TO INSTALLATION.
   - 3.2. MATERIAL SHALL BE PLANTED ACCORDING TO THE DETAIL PROVIDED. THE USE OF A PUNCH/PLANTING BAR, AUGER, REBAR, OR WATER-JET MAY BE USED TO PRE-DRILL HOLE IF NECESSARY.TAMP SOIL AROUND STAKE FOLLOWING INSTALL.

4. SEEDING
   - 4.1. SEEDING SHALL OCCUR AS SHOWN ON THE PLANTING PLAN. IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL SEED SHALL BE APPLIED PRIOR TO INSTALLATION OF ANY EROSION CONTROL FABRIC. AREAS APPLIED WITH HERBICIDE MAY BE SEEDED 7 DAYS AFTER APPLICATION.
   - 4.2. SOW SEED WITH A SPREADER OR A HYDROSEED MACHINE WITH MANUFACTURER RECOMMENDED BINDING AGENT. IN AREAS WITH DENSE EXISTING VEGETATION, INSTALL SEED WITH A NATIVE NO-TILL DRILL SEEDER. DO NOT BROADCAST DROP SEED WHEN WIND VELOCITY EXCEEDS 5 MPH. EVENLY DISTRIBUTE SEED BY SOWING EQUAL QUANTITIES IN TWO DIRECTIONS AT RIGHT ANGLES TO EACH OTHER.
   - 4.3. DO NOT USE WET SEED OR SEED THAT IS MOLDY OR OTHERWISE DAMAGED IN TRANSIT OR STORAGE.
   - 4.4. SOW SEED PRIOR TO INSTALLATION OF EROSION CONTROL FABRIC WHERE APPLICABLE.
   - 4.5. IF BROADCAST, ROLL SEEDED AREAS LIGHTLY, AND WATER WITH A FINE SPRAY.
   - 4.6. PROTECT SEEDED AREAS AGAINST EROSION BY SPREADING STRAW MULCH IMMEDIATELY FOLLOWING COMPLETION OF SEEING OPERATIONS IF OTHER EROSION CONTROL MEASURES ARE NOT OTHERWISE SPECIFIED. SPREAD UNIFORMLY AT A RATE OF 2 TONS PER ACRE (90 LB. PER1,000 S.F.) TO FORM A CONTINUOUS BLANKET OVER SEEDED AREAS. SPREAD BY HAND, BLOWER, OR OTHER SUITABLE EQUIPMENT. ANCHOR STRAW MULCH BY CRIMPING INTO TOPSOIL BY SUITABLE MECHANICAL EQUIPMENT.
   - 4.7 STRAW EROSION CONTROL BLANKET IS A SUITABLE ALTERNATIVE TO BE USED INSTEAD OF BLOWN OR CRIMPED STRAW.

5. LOCATION
   - 5.1. ALL PLANT MATERIAL IS TO BE INSTALLED AS SHOWN ON THE PLANTING PLANS FOR THE PROTOTYPE.
   - 5.2. UPLAND TREE PLANTINGS ARE TO BE INSTALLED IN A 9X9 GRID PATTERN.
   - 5.3. FLOODPLAIN PLANTINGS ARE TO BE INSTALLED IN A CLUMPED FASHION WITH A MINIMUM OF 3' SPACING BETWEEN PLANTS. PLANTS ARE TO BE INSTALLED BASED UPON THE HYDROLOGIC TOLERANCES AND SITE CONDITIONS AFTER CONSTRUCTION IS COMPLETED.
   - 5.4. ALL LIVE STAKES ARE TO BE INSTALLED ALONG STREAM BANKS, POOLS, AND FLOODPLAIN POOLS BASED UPON SPACING INDICATED IN THE PLANTING PLAN SPECIES LIST.

REVISIONS			
NO.	DESCRIPTION	DATE	BY

LEGEND

- TUBELING
- SHRUB
- REPLANTED TUBELING
- REPLANTED SHRUB

NOTES

SEAL

SCALE

RESOURCE ENVIRONMENTAL SOLUTIONS
33 TERMINAL WAY, SUITE 431
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NESHANNOCK CREEK RESTORATION SITE
FALCON ETHANE PIPELINE PRM PROJECT

DETAILS

DRAWN BY:	NH	PENNSYLVANIA	
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S:\RES CAD\CAD Working\0068-NESHANNOCK\PLANTING PLANS\FALCON PRM\DWG\PLANSETS
ARCH FULL BLEED D (24.00 X 36.00 INCHES)

Requirement U

USACE Linear Project Upload Spreadsheet

Falcon Ethane Pipeline System
United States Army Corps of Engineers Waters Upload Table: AqResources
Washington County, Pennsylvania

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
S-PA-151012-MRK-001	Pennsylvania	R5		Linear	667	FOOT	DELINEATE	40.359561	-80.270649	
S-PA-151022-MRK-001	Pennsylvania	R4		Linear	689	FOOT	DELINEATE	40.345388	-80.273177	
S-PA-151026-MRK-001	Pennsylvania	R5		Linear	976	FOOT	DELINEATE	40.302438	-80.265622	
S-PA-151026-MRK-002	Pennsylvania	R5		Linear	238	FOOT	DELINEATE	40.294482	-80.265535	
S-PA-151026-MRK-003	Pennsylvania	R6		Linear	30	FOOT	DELINEATE	40.410699	-80.284463	
S-PA-151029-MRK-001	Pennsylvania	R5		Linear	1,028	FOOT	DELINEATE	40.318669	-80.261844	
S-PA-151029-MRK-002	Pennsylvania	R5		Linear	535	FOOT	DELINEATE	40.312426	-80.262756	
S-PA-151029-MRK-003	Pennsylvania	R4		Linear	629	FOOT	DELINEATE	40.310084	-80.267229	
S-PA-151029-MRK-004	Pennsylvania	R6		Linear	112	FOOT	DELINEATE	40.310215	-80.267546	
S-PA-151029-MRK-005	Pennsylvania	R6		Linear	85	FOOT	DELINEATE	40.309979	-80.267849	
S-PA-151105-MRK-005	Pennsylvania	R6		Linear	423	FOOT	DELINEATE	40.393858	-80.286207	
S-PA-151109-MRK-001	Pennsylvania	R5		Linear	1,057	FOOT	DELINEATE	40.401229	-80.286607	
S-PA-151109-MRK-002	Pennsylvania	R4		Linear	28	FOOT	DELINEATE	40.397275	-80.286926	
S-PA-151109-MRK-003	Pennsylvania	R5		Linear	497	FOOT	DELINEATE	40.352058	-80.274471	
S-PA-151203-MRK-001	Pennsylvania	R4		Linear	634	FOOT	DELINEATE	40.379985	-80.274567	
S-PA-151208-MRK-001	Pennsylvania	R4		Linear	530	FOOT	DELINEATE	40.347843	-80.267442	
S-PA-151208-MRK-002	Pennsylvania	R4		Linear	212	FOOT	DELINEATE	40.343364	-80.264905	
S-PA-151208-MRK-003	Pennsylvania	R5		Linear	895	FOOT	DELINEATE	40.342929	-80.264066	
S-PA-151210-MRK-001	Pennsylvania	R5		Linear	592	FOOT	DELINEATE	40.326595	-80.26154	
S-PA-151210-MRK-002	Pennsylvania	R4		Linear	56	FOOT	DELINEATE	40.320244	-80.260062	
S-PA-151210-MRK-003	Pennsylvania	R4		Linear	101	FOOT	DELINEATE	40.321702	-80.259152	
S-PA-151215-MRK-002	Pennsylvania	R6		Linear	100	FOOT	DELINEATE	40.339527	-80.263602	
S-PA-151215-MRK-003	Pennsylvania	R5		Linear	256	FOOT	DELINEATE	40.339671	-80.263276	
S-PA-151215-MRK-004	Pennsylvania	R4		Linear	1,699	FOOT	DELINEATE	40.331473	-80.260977	
S-PA-151215-MRK-005	Pennsylvania	R4		Linear	121	FOOT	DELINEATE	40.330699	-80.260952	
S-PA-160229-MRK-001	Pennsylvania	R6		Linear	242	FOOT	DELINEATE	40.273718	-80.264966	
S-PA-160229-MRK-002	Pennsylvania	R4		Linear	490	FOOT	DELINEATE	40.273529	-80.26519	
S-PA-160229-MRK-003	Pennsylvania	R6		Linear	401	FOOT	DELINEATE	40.277891	-80.260156	
S-PA-160229-MRK-004	Pennsylvania	R5		Linear	445	FOOT	DELINEATE	40.279425	-80.260181	
S-PA-160229-MRK-005	Pennsylvania	R5		Linear	29	FOOT	DELINEATE	40.27957	-80.259938	
S-PA-160301-MRK-001	Pennsylvania	R6		Linear	209	FOOT	DELINEATE	40.286972	-80.260282	
S-PA-160301-MRK-002	Pennsylvania	R6		Linear	152	FOOT	DELINEATE	40.287514	-80.260002	
S-PA-160301-MRK-003	Pennsylvania	R5		Linear	889	FOOT	DELINEATE	40.291011	-80.262241	
S-PA-160301-MRK-004	Pennsylvania	R5		Linear	40	FOOT	DELINEATE	40.294925	-80.267351	
S-PA-160301-MRK-005	Pennsylvania	R4		Linear	76	FOOT	DELINEATE	40.318348	-80.266047	
S-PA-160302-MRK-001	Pennsylvania	R4		Linear	105	FOOT	DELINEATE	40.301649	-80.265963	
S-PA-160302-MRK-002	Pennsylvania	R4		Linear	76	FOOT	DELINEATE	40.302952	-80.265295	
S-PA-160302-MRK-003	Pennsylvania	R4		Linear	76	FOOT	DELINEATE	40.303433	-80.265479	
S-PA-160314-NLS-001	Pennsylvania	R4		Linear	22	FOOT	DELINEATE	40.339833	-80.261448	
S-PA-160314-NLS-002A	Pennsylvania	R5		Linear	100	FOOT	DELINEATE	40.339965	-80.260742	
S-PA-160314-NLS-002B	Pennsylvania	R5		Linear	595	FOOT	DELINEATE	40.338114	-80.258989	
S-PA-160314-NLS-003	Pennsylvania	R6		Linear	58	FOOT	DELINEATE	40.335076	-80.260437	
S-PA-160321-MRK-001	Pennsylvania	R4		Linear	86	FOOT	DELINEATE	40.405898	-80.285945	
S-PA-160323-NLS-001	Pennsylvania	R4		Linear	497	FOOT	DELINEATE	40.3549	-80.272132	

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
S-PA-160323-NLS-002	Pennsylvania	R5		Linear	77	FOOT	DELINEATE	40.361568	-80.274834	
S-PA-160323-NLS-003	Pennsylvania	R4		Linear	105	FOOT	DELINEATE	40.361751	-80.274836	
S-PA-160323-NLS-004	Pennsylvania	R6		Linear	87	FOOT	DELINEATE	40.374523	-80.283136	
S-PA-160324-NLS-001	Pennsylvania	R4		Linear	270	FOOT	DELINEATE	40.374614	-80.284761	
S-PA-160324-NLS-002	Pennsylvania	R4		Linear	30	FOOT	DELINEATE	40.37462	-80.283245	
S-PA-160328-MRK-001	Pennsylvania	R4		Linear	260	FOOT	DELINEATE	40.39869	-80.28919	
S-PA-160328-MRK-002	Pennsylvania	R4		Linear	70	FOOT	DELINEATE	40.398861	-80.289403	
S-PA-160329-MRK-001	Pennsylvania	R4		Linear	102	FOOT	DELINEATE	40.392925	-80.286567	
S-PA-160329-MRK-002	Pennsylvania	R6		Linear	81	FOOT	DELINEATE	40.392761	-80.286622	
S-PA-160404-CBA-001	Pennsylvania	R4		Linear	497	FOOT	DELINEATE	40.34303	-80.262302	
S-PA-160406-MRK-001	Pennsylvania	R4		Linear	53	FOOT	DELINEATE	40.271606	-80.268169	
S-PA-160406-MRK-002	Pennsylvania	R5		Linear	4,227	FOOT	DELINEATE	40.268366	-80.265669	
S-PA-160406-MRK-003	Pennsylvania	R4		Linear	90	FOOT	DELINEATE	40.265184	-80.266015	
S-PA-160407-JLK-001	Pennsylvania	R6		Linear	109	FOOT	DELINEATE	40.264303	-80.265036	
S-PA-160407-JLK-002	Pennsylvania	R6		Linear	455	FOOT	DELINEATE	40.26454	-80.264733	
S-PA-160421-MRK-001	Pennsylvania	R6		Linear	12	FOOT	DELINEATE	40.38267	-80.285648	
S-PA-160421-MRK-002	Pennsylvania	R5		Linear	81	FOOT	DELINEATE	40.382831	-80.286199	
S-PA-160421-MRK-003	Pennsylvania	R4		Linear	86	FOOT	DELINEATE	40.38281	-80.286399	
S-PA-161108-CBA-001	Pennsylvania	R6		Linear	116	FOOT	DELINEATE	40.271002	-80.270617	
S-PA-161108-CBA-002	Pennsylvania	R6		Linear	205	FOOT	DELINEATE	40.270825	-80.271269	
S-PA-161109-CBA-001	Pennsylvania	R6		Linear	66	FOOT	DELINEATE	40.280487	-80.281644	
S-PA-161109-CBA-002	Pennsylvania	R6		Linear	344	FOOT	DELINEATE	40.281435	-80.283571	
S-PA-161110-CBA-001	Pennsylvania	R4		Linear	1,259	FOOT	DELINEATE	40.280047	-80.281221	
S-PA-161115-CBA-001	Pennsylvania	R4		Linear	856	FOOT	DELINEATE	40.303582	-80.273997	
S-PA-161115-CBA-002	Pennsylvania	R6		Linear	93	FOOT	DELINEATE	40.303765	-80.274475	
S-PA-161115-CBA-003	Pennsylvania	R6		Linear	297	FOOT	DELINEATE	40.303375	-80.274303	
S-PA-161115-CBA-004	Pennsylvania	R4		Linear	369	FOOT	DELINEATE	40.303322	-80.274501	
S-PA-161115-CBA-005	Pennsylvania	R4		Linear	250	FOOT	DELINEATE	40.303294	-80.274588	
S-PA-161115-CBA-006	Pennsylvania	R6		Linear	290	FOOT	DELINEATE	40.303278	-80.274681	
S-PA-161115-CBA-007	Pennsylvania	R4		Linear	202	FOOT	DELINEATE	40.303254	-80.273886	
S-PA-161115-CBA-008	Pennsylvania	R4		Linear	97	FOOT	DELINEATE	40.303003	-80.273737	
S-PA-161115-CBA-009	Pennsylvania	R6		Linear	165	FOOT	DELINEATE	40.303051	-80.273696	
S-PA-161115-CBA-010	Pennsylvania	R6		Linear	202	FOOT	DELINEATE	40.303144	-80.27364	
S-PA-161115-CBA-011	Pennsylvania	R4		Linear	185	FOOT	DELINEATE	40.303418	-80.273621	
S-PA-161115-CBA-012	Pennsylvania	R6		Linear	118	FOOT	DELINEATE	40.303349	-80.273422	
S-PA-161115-CBA-013	Pennsylvania	R6		Linear	80	FOOT	DELINEATE	40.30366	-80.27389	
S-PA-161115-CBA-014	Pennsylvania	R6		Linear	52	FOOT	DELINEATE	40.303746	-80.274193	
S-PA-161115-CBA-015	Pennsylvania	R5		Linear	629	FOOT	DELINEATE	40.290541	-80.285147	
S-PA-161115-CBA-015A	Pennsylvania	R5		Linear	55	FOOT	DELINEATE	40.290443	-80.28429	
S-PA-161116-MRK-001	Pennsylvania	R5		Linear	5,573	FOOT	DELINEATE	40.297713	-80.278909	
S-PA-161116-MRK-002	Pennsylvania	R4		Linear	66	FOOT	DELINEATE	40.303841	-80.276725	
S-PA-161116-MRK-003	Pennsylvania	R6		Linear	231	FOOT	DELINEATE	40.303624	-80.276399	
S-PA-161116-MRK-004	Pennsylvania	R5		Linear	235	FOOT	DELINEATE	40.299321	-80.279249	
S-PA-161116-MRK-005	Pennsylvania	R4		Linear	149	FOOT	DELINEATE	40.298551	-80.27857	
S-PA-161116-MRK-006	Pennsylvania	R5		Linear	97	FOOT	DELINEATE	40.294649	-80.282418	
S-PA-161118-WRA-001	Pennsylvania	R5		Linear	445	FOOT	DELINEATE	40.287618	-80.286699	
S-PA-161118-WRA-002	Pennsylvania	R4		Linear	86	FOOT	DELINEATE	40.287444	-80.286125	
S-PA-161130-CBA-001	Pennsylvania	R6		Linear	550	FOOT	DELINEATE	40.404135	-80.279411	

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
S-PA-161130-CBA-002	Pennsylvania	R6		Linear	166	FOOT	DELINEATE	40.392551	-80.280299	
S-PA-161205-CBA-001	Pennsylvania	R4		Linear	132	FOOT	DELINEATE	40.31817	-80.260437	
S-PA-161205-CBA-002	Pennsylvania	R4		Linear	183	FOOT	DELINEATE	40.318095	-80.260769	
S-PA-161205-CBA-003	Pennsylvania	R4		Linear	73	FOOT	DELINEATE	40.316977	-80.261257	
S-PA-161205-CBA-004	Pennsylvania	R6		Linear	96	FOOT	DELINEATE	40.316787	-80.26125	
S-PA-170105-MRK-001	Pennsylvania	R6		Linear	101	FOOT	DELINEATE	40.398253	-80.278574	
S-PA-170105-MRK-002	Pennsylvania	R6		Linear	124	FOOT	DELINEATE	40.408153	-80.281272	
S-PA-170112-MRK-001	Pennsylvania	R6		Linear	47	FOOT	DELINEATE	40.273003	-80.266273	
S-PA-170112-MRK-002	Pennsylvania	R6		Linear	13	FOOT	DELINEATE	40.273537	-80.264688	
S-PA-170113-MRK-004	Pennsylvania	R5		Linear	530	FOOT	DELINEATE	40.416605	-80.287755	
S-PA-170113-MRK-005	Pennsylvania	R5		Linear	501	FOOT	DELINEATE	40.416959	-80.287294	
S-PA-170113-MRK-006	Pennsylvania	R4		Linear	727	FOOT	DELINEATE	40.418577	-80.288272	
S-PA-170207-MRK-005	Pennsylvania	R4		Linear	104	FOOT	DELINEATE	40.416857	-80.287878	
S-PA-170213-JLK-003	Pennsylvania	R6		Linear	245	FOOT	DELINEATE	40.396924	-80.275119	
S-PA-170213-JLK-004	Pennsylvania	R4		Linear	41	FOOT	DELINEATE	40.396725	-80.275129	
S-PA-170213-JLK-005	Pennsylvania	R6		Linear	50	FOOT	DELINEATE	40.396752	-80.275013	
S-PA-170214-CBA-001	Pennsylvania	R6		Linear	149	FOOT	DELINEATE	40.337949	-80.259186	
S-PA-170214-CBA-002	Pennsylvania	R4		Linear	993	FOOT	DELINEATE	40.342855	-80.259532	
S-PA-170214-CBA-003	Pennsylvania	R4		Linear	81	FOOT	DELINEATE	40.347912	-80.2671	
S-PA-170214-CBA-004	Pennsylvania	R4		Linear	45	FOOT	DELINEATE	40.347986	-80.266998	
S-PA-170214-CBA-005	Pennsylvania	R4		Linear	213	FOOT	DELINEATE	40.349269	-80.265701	
S-PA-170214-CBA-006	Pennsylvania	R4		Linear	59	FOOT	DELINEATE	40.34909	-80.265759	
S-PA-170214-CBA-007	Pennsylvania	R4		Linear	61	FOOT	DELINEATE	40.349606	-80.265452	
S-PA-170214-CBA-008	Pennsylvania	R4		Linear	60	FOOT	DELINEATE	40.349434	-80.265164	
S-PA-170215-CBA-001	Pennsylvania	R5		Linear	454	FOOT	DELINEATE	40.349383	-80.265374	
S-PA-170215-CBA-002	Pennsylvania	R4		Linear	441	FOOT	DELINEATE	40.347522	-80.266611	
S-PA-170215-CBA-003	Pennsylvania	R6		Linear	140	FOOT	DELINEATE	40.35064	-80.271587	
S-PA-170215-CBA-004	Pennsylvania	R6		Linear	140	FOOT	DELINEATE	40.350597	-80.271428	
S-PA-170215-CBA-005	Pennsylvania	R6		Linear	89	FOOT	DELINEATE	40.350508	-80.271712	
S-PA-170412-RCL-001	Pennsylvania	R6		Linear	34	FOOT	DELINEATE	40.38748	-80.28602	
S-PA-170412-RCL-002	Pennsylvania	R6		Linear	51	FOOT	DELINEATE	40.387528	-80.2861	
W-PA-151012-MRK-001	Pennsylvania	PSS		Area	64,445	SQ_FT	DELINEATE	40.360992	-80.273221	
W-PA-151012-MRK-002	Pennsylvania	PEM		Area	748	SQ_FT	DELINEATE	40.360139	-80.269049	
W-PA-151012-MRK-003	Pennsylvania	PEM		Area	1,856	SQ_FT	DELINEATE	40.368248	-80.271805	
W-PA-151012-MRK-004	Pennsylvania	PEM		Area	14,346	SQ_FT	DELINEATE	40.36901	-80.272974	
W-PA-151022-MRK-001	Pennsylvania	PUB		Area	3,058	SQ_FT	DELINEATE	40.346201	-80.273803	
W-PA-151022-MRK-002	Pennsylvania	PUB		Area	17,505	SQ_FT	DELINEATE	40.345716	-80.273553	
W-PA-151022-MRK-003	Pennsylvania	PEM		Area	5,479	SQ_FT	DELINEATE	40.344682	-80.272354	
W-PA-151022-MRK-004	Pennsylvania	PEM		Area	652	SQ_FT	DELINEATE	40.404629	-80.28421	
W-PA-151022-MRK-005	Pennsylvania	PEM		Area	812	SQ_FT	DELINEATE	40.404156	-80.284285	
W-PA-151026-MRK-001	Pennsylvania	PEM		Area	2,343	SQ_FT	DELINEATE	40.30179	-80.265984	
W-PA-151026-MRK-003	Pennsylvania	PEM		Area	372	SQ_FT	DELINEATE	40.294341	-80.265873	
W-PA-151029-MRK-001	Pennsylvania	PEM		Area	9,208	SQ_FT	DELINEATE	40.312601	-80.263137	
W-PA-151109-MRK-001	Pennsylvania	PEM		Area	1,739	SQ_FT	DELINEATE	40.35186	-80.274012	
W-PA-151118-JLK-002	Pennsylvania	PFO		Area	10,665	SQ_FT	DELINEATE	40.360417	-80.27354	
W-PA-151203-MRK-001	Pennsylvania	PEM		Area	2,324	SQ_FT	DELINEATE	40.374167	-80.274998	
W-PA-151203-MRK-002	Pennsylvania	PEM		Area	1,675	SQ_FT	DELINEATE	40.380896	-80.274916	
W-PA-151203-MRK-003	Pennsylvania	PEM		Area	9,145	SQ_FT	DELINEATE	40.381351	-80.274992	

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
W-PA-151203-MRK-004	Pennsylvania	PEM		Area	8,507	SQ_FT	DELINEATE	40.385585	-80.277321	
W-PA-151203-MRK-005	Pennsylvania	PEM		Area	4,337	SQ_FT	DELINEATE	40.38602	-80.276983	
W-PA-151203-MRK-006	Pennsylvania	PUB		Area	39,757	SQ_FT	DELINEATE	40.386741	-80.277308	
W-PA-151208-MRK-001	Pennsylvania	PEM		Area	1,056	SQ_FT	DELINEATE	40.348051	-80.267805	
W-PA-151208-MRK-002	Pennsylvania	PEM		Area	1,149	SQ_FT	DELINEATE	40.343904	-80.265694	
W-PA-151208-MRK-003	Pennsylvania	PSS		Area	4,717	SQ_FT	DELINEATE	40.343545	-80.265413	
W-PA-151208-MRK-004	Pennsylvania	PUB		Area	34,713	SQ_FT	DELINEATE	40.343473	-80.26594	
W-PA-151208-MRK-005	Pennsylvania	PEM		Area	566	SQ_FT	DELINEATE	40.342985	-80.264614	
W-PA-151208-MRK-006	Pennsylvania	PEM		Area	24,495	SQ_FT	DELINEATE	40.351568	-80.271337	
W-PA-151208-MRK-007	Pennsylvania	PUB		Area	21,752	SQ_FT	DELINEATE	40.354978	-80.27362	
W-PA-151210-MRK-001	Pennsylvania	PEM		Area	20,585	SQ_FT	DELINEATE	40.318211	-80.260788	
W-PA-151210-MRK-002	Pennsylvania	PEM		Area	375	SQ_FT	DELINEATE	40.320481	-80.260209	
W-PA-151215-MRK-002	Pennsylvania	PEM		Area	710	SQ_FT	DELINEATE	40.33966	-80.263414	
W-PA-151215-MRK-003	Pennsylvania	PEM		Area	3,088	SQ_FT	DELINEATE	40.336367	-80.261618	
W-PA-160229-MRK-001	Pennsylvania	PUB		Area	2,205	SQ_FT	DELINEATE	40.273168	-80.266018	
W-PA-160302-MRK-001	Pennsylvania	PEM		Area	3,070	SQ_FT	DELINEATE	40.303576	-80.265259	
W-PA-160311-MRK-001	Pennsylvania	PEM		Area	1,651	SQ_FT	DELINEATE	40.33369	-80.26215	
W-PA-160323-NLS-001A	Pennsylvania	PEM		Area	6,348	SQ_FT	DELINEATE	40.374417	-80.282947	
W-PA-160323-NLS-001B	Pennsylvania	PEM		Area	881	SQ_FT	DELINEATE	40.374608	-80.283003	
W-PA-160323-NLS-001C-PSS	Pennsylvania	PSS		Area	90	SQ_FT	DELINEATE	40.374651	-80.283342	
W-PA-160323-NLS-001C-PEM	Pennsylvania	PEM		Area	1,767	SQ_FT	DELINEATE	40.374654	-80.283833	
W-PA-160323-NLS-001D	Pennsylvania	PEM		Area	1,340	SQ_FT	DELINEATE	40.374641	-80.284613	
W-PA-160323-NLS-001E	Pennsylvania	PEM		Area	2,400	SQ_FT	DELINEATE	40.374654	-80.285114	
W-PA-160328-MRK-001	Pennsylvania	PEM		Area	11,909	SQ_FT	DELINEATE	40.39831	-80.288979	
W-PA-160328-MRK-002	Pennsylvania	PUB		Area	21,796	SQ_FT	DELINEATE	40.398051	-80.289661	
W-PA-160328-MRK-003	Pennsylvania	PEM		Area	874	SQ_FT	DELINEATE	40.398684	-80.289351	
W-PA-160328-MRK-004	Pennsylvania	PFO		Area	3,221	SQ_FT	DELINEATE	40.398861	-80.289338	
W-PA-160328-MRK-005	Pennsylvania	PEM		Area	847	SQ_FT	DELINEATE	40.396015	-80.290916	
W-PA-160328-MRK-006	Pennsylvania	PEM		Area	1,981	SQ_FT	DELINEATE	40.396143	-80.29108	
W-PA-160328-MRK-007	Pennsylvania	PEM		Area	759	SQ_FT	DELINEATE	40.396797	-80.289573	
W-PA-160329-MRK-001	Pennsylvania	PSS		Area	2,159	SQ_FT	DELINEATE	40.393167	-80.286479	
W-PA-160404-CBA-001A	Pennsylvania	PEM		Area	2,098	SQ_FT	DELINEATE	40.395968	-80.289276	
W-PA-160404-CBA-001B	Pennsylvania	PEM		Area	223	SQ_FT	DELINEATE	40.396179	-80.289212	
W-PA-160404-CBA-001C	Pennsylvania	PEM		Area	550	SQ_FT	DELINEATE	40.396305	-80.289049	
W-PA-160405-JLK-003	Pennsylvania	PEM		Area	6,444	SQ_FT	DELINEATE	40.265885	-80.261612	
W-PA-160406-MRK-001	Pennsylvania	PSS		Area	1,248	SQ_FT	DELINEATE	40.272439	-80.269089	
W-PA-160406-MRK-002	Pennsylvania	PEM		Area	238	SQ_FT	DELINEATE	40.272096	-80.268672	
W-PA-160406-MRK-003	Pennsylvania	PUB		Area	310	SQ_FT	DELINEATE	40.263949	-80.266829	
W-PA-160406-MRK-004	Pennsylvania	PUB		Area	726	SQ_FT	DELINEATE	40.264271	-80.266812	
W-PA-160406-MRK-005	Pennsylvania	PEM		Area	1,764	SQ_FT	DELINEATE	40.264502	-80.266222	
W-PA-160406-MRK-006	Pennsylvania	PEM		Area	12,419	SQ_FT	DELINEATE	40.265469	-80.266595	
W-PA-160406-MRK-007	Pennsylvania	PEM		Area	34,649	SQ_FT	DELINEATE	40.266477	-80.266221	
W-PA-160407-JLK-001	Pennsylvania	PEM		Area	2,773	SQ_FT	DELINEATE	40.263652	-80.264734	
W-PA-160407-JLK-002	Pennsylvania	PEM		Area	5,396	SQ_FT	DELINEATE	40.263528	-80.264458	
W-PA-160407-JLK-003	Pennsylvania	PEM		Area	863	SQ_FT	DELINEATE	40.26352	-80.264046	
W-PA-160421-MRK-001	Pennsylvania	PSS		Area	12,614	SQ_FT	DELINEATE	40.362148	-80.271888	
W-PA-160421-MRK-002	Pennsylvania	PSS		Area	1,077	SQ_FT	DELINEATE	40.361842	-80.27139	
W-PA-160421-MRK-003	Pennsylvania	PEM		Area	3,028	SQ_FT	DELINEATE	40.362092	-80.272715	

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
W-PA-160421-MRK-004	Pennsylvania	PEM		Area	1,645	SQ_FT	DELINEATE	40.369423	-80.274178	
W-PA-160829-MRK-001	Pennsylvania	PEM		Area	655	SQ_FT	DELINEATE	40.360097	-80.268914	
W-PA-160829-MRK-002	Pennsylvania	PEM		Area	1,372	SQ_FT	DELINEATE	40.359943	-80.269255	
W-PA-161019-MRK-001	Pennsylvania	PEM		Area	1,568	SQ_FT	DELINEATE	40.362096	-80.269125	
W-PA-161019-MRK-002	Pennsylvania	PEM		Area	446	SQ_FT	DELINEATE	40.363463	-80.267956	
W-PA-161019-MRK-003	Pennsylvania	PEM		Area	472	SQ_FT	DELINEATE	40.360511	-80.270501	
W-PA-161108-CBA-001	Pennsylvania	PEM		Area	380	SQ_FT	DELINEATE	40.271035	-80.270962	
W-PA-161109-CBA-001	Pennsylvania	PEM		Area	294	SQ_FT	DELINEATE	40.28065	-80.282663	
W-PA-161109-CBA-002	Pennsylvania	PEM		Area	1,879	SQ_FT	DELINEATE	40.278947	-80.27926	
W-PA-161109-CBA-003	Pennsylvania	PEM		Area	1,037	SQ_FT	DELINEATE	40.279446	-80.279672	
W-PA-161109-CBA-004	Pennsylvania	PEM		Area	286	SQ_FT	DELINEATE	40.279914	-80.27987	
W-PA-161110-CBA-001-PEM	Pennsylvania	PEM		Area	728	SQ_FT	DELINEATE	40.2804	-80.27981	
W-PA-161110-CBA-001-PSS	Pennsylvania	PSS		Area	6,102	SQ_FT	DELINEATE	40.280369	-80.279898	
W-PA-161110-CBA-002	Pennsylvania	PEM		Area	516	SQ_FT	DELINEATE	40.303744	-80.275116	
W-PA-161115-CBA-001	Pennsylvania	PSS		Area	1,408	SQ_FT	DELINEATE	40.303757	-80.275482	
W-PA-161115-CBA-002	Pennsylvania	PFO		Area	12,546	SQ_FT	DELINEATE	40.290873	-80.285695	
W-PA-161116-MRK-001	Pennsylvania	PEM		Area	20,889	SQ_FT	DELINEATE	40.303571	-80.2771	
W-PA-161116-MRK-002	Pennsylvania	PEM		Area	4,327	SQ_FT	DELINEATE	40.303114	-80.276975	
W-PA-161116-MRK-003	Pennsylvania	PEM		Area	6,346	SQ_FT	DELINEATE	40.302507	-80.2772	
W-PA-161116-MRK-004-PFO	Pennsylvania	PFO		Area	1,759	SQ_FT	DELINEATE	40.301027	-80.277942	
W-PA-161116-MRK-004-PEM	Pennsylvania	PEM		Area	6,379	SQ_FT	DELINEATE	40.30099	-80.278087	
W-PA-161116-MRK-005	Pennsylvania	PEM		Area	10,379	SQ_FT	DELINEATE	40.300586	-80.279115	
W-PA-161116-MRK-006	Pennsylvania	PEM		Area	17,837	SQ_FT	DELINEATE	40.299531	-80.279195	
W-PA-161116-MRK-007	Pennsylvania	PEM		Area	9,250	SQ_FT	DELINEATE	40.29924	-80.278537	
W-PA-161116-MRK-008	Pennsylvania	PEM		Area	17,153	SQ_FT	DELINEATE	40.298639	-80.278664	
W-PA-161116-MRK-009	Pennsylvania	PEM		Area	25,534	SQ_FT	DELINEATE	40.297794	-80.279425	
W-PA-161117-CBA-001-PSS	Pennsylvania	PSS		Area	2,216	SQ_FT	DELINEATE	40.293328	-80.282383	
W-PA-161117-CBA-001-PEM	Pennsylvania	PEM		Area	54,445	SQ_FT	DELINEATE	40.293184	-80.282567	
W-PA-161117-CBA-002-PEM	Pennsylvania	PEM		Area	7,305	SQ_FT	DELINEATE	40.292058	-80.283381	
W-PA-161117-CBA-002-PSS	Pennsylvania	PSS		Area	16,570	SQ_FT	DELINEATE	40.291887	-80.283023	
W-PA-161118-WRA-001	Pennsylvania	PEM		Area	1,275	SQ_FT	DELINEATE	40.287411	-80.28665	
W-PA-161130-CBA-001	Pennsylvania	PFO		Area	15,345	SQ_FT	DELINEATE	40.404657	-80.281852	
W-PA-161130-CBA-002	Pennsylvania	PEM		Area	384	SQ_FT	DELINEATE	40.403379	-80.27923	
W-PA-161130-CBA-003	Pennsylvania	PEM		Area	16,019	SQ_FT	DELINEATE	40.403353	-80.278243	
W-PA-161130-CBA-004	Pennsylvania	PEM		Area	2,993	SQ_FT	DELINEATE	40.391154	-80.281975	
W-PA-161205-CBA-001	Pennsylvania	PEM		Area	6,043	SQ_FT	DELINEATE	40.318679	-80.260222	
W-PA-161205-CBA-002	Pennsylvania	PEM		Area	2,040	SQ_FT	DELINEATE	40.316966	-80.261299	
W-PA-170105-MRK-001	Pennsylvania	PEM		Area	995	SQ_FT	DELINEATE	40.404777	-80.279989	
W-PA-170112-MRK-001	Pennsylvania	PUB		Area	3,075	SQ_FT	DELINEATE	40.268522	-80.268195	
W-PA-170112-MRK-002	Pennsylvania	PEM		Area	840	SQ_FT	DELINEATE	40.268141	-80.267618	
W-PA-170112-MRK-003	Pennsylvania	PEM		Area	507	SQ_FT	DELINEATE	40.267153	-80.267019	
W-PA-170112-MRK-004	Pennsylvania	PSS		Area	71	SQ_FT	DELINEATE	40.263259	-80.266764	
W-PA-170113-MRK-007	Pennsylvania	PEM		Area	24,485	SQ_FT	DELINEATE	40.416255	-80.288022	
W-PA-170113-MRK-008-PEM	Pennsylvania	PEM		Area	48,363	SQ_FT	DELINEATE	40.418056	-80.287387	
W-PA-170113-MRK-008-PUB	Pennsylvania	PUB		Area	50,457	SQ_FT	DELINEATE	40.417432	-80.287273	
W-PA-170113-MRK-009	Pennsylvania	PSS		Area	7,873	SQ_FT	DELINEATE	40.418876	-80.288466	
W-PA-170213-JLK-007	Pennsylvania	PEM		Area	2,343	SQ_FT	DELINEATE	40.396417	-80.275418	
W-PA-170214-CBA-001	Pennsylvania	PEM		Area	870	SQ_FT	DELINEATE	40.334416	-80.257825	

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
W-PA-170214-CBA-002	Pennsylvania	PEM		Area	3,484	SQ_FT	DELINEATE	40.339982	-80.258009	
W-PA-170214-CBA-003	Pennsylvania	PEM		Area	4,306	SQ_FT	DELINEATE	40.340708	-80.257444	
W-PA-170214-CBA-004	Pennsylvania	PUB		Area	45,925	SQ_FT	DELINEATE	40.348426	-80.266224	
W-PA-170214-CBA-005-PEM	Pennsylvania	PEM		Area	6,405	SQ_FT	DELINEATE	40.349046	-80.265663	
W-PA-170214-CBA-005-PFO	Pennsylvania	PFO		Area	31,140	SQ_FT	DELINEATE	40.349399	-80.265562	
W-PA-170215-CBA-001	Pennsylvania	PUB		Area	1,884	SQ_FT	DELINEATE	40.347505	-80.266288	
W-PA-170215-CBA-002	Pennsylvania	PEM		Area	4,712	SQ_FT	DELINEATE	40.347024	-80.264168	
W-PA-170412 RCL-003	Pennsylvania	PEM		Area	515	SQ_FT	DELINEATE	40.387639	-80.287702	
W-PA-170412-RCL-001	Pennsylvania	PSS		Area	792	SQ_FT	DELINEATE	40.387307	-80.286387	
W-PA-170412-RCL-002	Pennsylvania	PEM		Area	77	SQ_FT	DELINEATE	40.387424	-80.287652	
W-PA-170413-RCL-001	Pennsylvania	PEM		Area	32,377	SQ_FT	DELINEATE	40.342108	-80.261791	
W-PA-170413-RCL-002	Pennsylvania	PEM		Area	12,139	SQ_FT	DELINEATE	40.342476	-80.262671	
W-PA-170413-RCL-005	Pennsylvania	PSS		Area	14,835	SQ_FT	DELINEATE	40.342777	-80.263216	

Falcon Ethane Pipeline System
United States Army Corps of Engineers Waters Upload Table: Impacts
Washington County, Pennsylvania

Waters_Name	Name	Activity	Resource_Type	Permanent _Loss	Impact_ Duration	Amount_ Type	Amount_ Units	Initially_ Proposed _Length	Initially_ Proposed _Width	Initially_ Proposed _Amount	Proposed _Length	Proposed _Width	Proposed _Amount	Authorized _ Length	Authorized _ Width	Authorized _ Amount
W-PA-160407-JLK-003	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			863.44			863.44			863.44
W-PA-160407-JLK-002	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			317.84			317.84			317.84
S-PA-160406-MRK-002 (1)	Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			1600.96			1600.96			1600.96
W-PA-160406-MRK-003	-	Discharge of dredged material	Pond	NO	Temporary	Fill Area	Square Feet			309.8			309.8			309.8
W-PA-160406-MRK-004	-	Discharge of dredged material	Pond	NO	Temporary	Fill Area	Square Feet			726.26			726.26			726.26
W-PA-160406-MRK-006	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			7278.73			7278.73			7278.73
W-PA-170112-MRK-003	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			506.89			506.89			506.89
W-PA-170112-MRK-002	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			829.64			829.64			829.64
S-PA-160406-MRK-002 (2)	Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			1851.14			1851.14			1851.14
W-PA-160406-MRK-001	-	Conversion of waters type (forested wetland to emergent wetland, stream to lake)	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			395.83			395.83			395.83
W-PA-160406-MRK-002	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			29.98			29.98			29.98
S-PA-160229-MRK-001	UNT to Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			461.06			461.06			461.06
S-PA-160229-MRK-003	UNT to Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			294.37			294.37			294.37
S-PA-160229-MRK-004	UNT to Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			402.6			402.6			402.6
S-PA-160301-MRK-001	UNT to Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			254.17			254.17			254.17
S-PA-160301-MRK-002	UNT to Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			80.34			80.34			80.34
S-PA-160301-MRK-003	UNT to Westland Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			435.25			435.25			435.25
S-PA-151029-MRK-003	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			680.96			680.96			680.96
S-PA-151029-MRK-002	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			372.01			372.01			372.01
W-PA-151029-MRK-001	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			4208.65			4208.65			4208.65
S-PA-161205-CBA-002	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			118.8			118.8			118.8
W-PA-151210-MRK-001	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			5700.6			5700.6			5700.6
S-PA-151029-MRK-001	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			232.87			232.87			232.87
S-PA-151215-MRK-004	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			375.12			375.12			375.12
W-PA-151215-MRK-003	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			951.01			951.01			951.01
S-PA-170214-CBA-001	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			622.92			622.92			622.92
S-PA-160314-NLS-002Bext	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			1404.99			1404.99			1404.99
W-PA-170214-CBA-003	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			900.46			900.46			900.46
S-PA-170214-CBA-002	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			2136.09			2136.09			2136.09
W-PA-170413-RCL-001	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			19109.78			19109.78			19109.78
S-PA-160404-CBA-001	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			460.75			460.75			460.75
S-PA-151208-MRK-003	UNT to Millers Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			823.54			823.54			823.54
W-PA-170413-RCL-005	-	Conversion of waters type (forested wetland to emergent wetland, stream to lake)	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			2346.76			2346.76			2346.76
W-PA-170215-CBA-002	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			1729.06			1729.06			1729.06
W-PA-170214-CBA-005 (1)	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			2887			2887			2887
S-PA-170214-CBA-006	UNT to Robinson Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			232.92			232.92			232.92
S-PA-170214-CBA-005	UNT to Robinson Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			321.92			321.92			321.92
W-PA-170214-CBA-005 (2)	-	Conversion of waters type (forested wetland to emergent wetland, stream to lake)	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			2228.12			2228.12			2228.12

Waters_Name	Name	Activity	Resource_Type	Permanent _Loss	Impact_ Duration	Amount_ Type	Amount_ Units	Initially_ Proposed _Length	Initially_ Proposed _Width	Initially_ Proposed _Amount	Proposed _Length	Proposed _Width	Proposed _Amount	Authorized _ Length	Authorized _ Width	Authorized _ Amount
W-PA-151208-MRK-006	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			10476.77			10476.77			10476.77
S-PA-151109-MRK-003	UNT to Robinson Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			623.75			623.75			623.75
W-PA-151012-MRK-002	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			3287.81			3287.81			3287.81
W-PA-151012-MRK-003	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			1067.64			1067.64			1067.64
W-PA-151203-MRK-001	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			643.7			643.7			643.7
S-PA-151203-MRK-001	UNT to Robinson Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			756.64			756.64			756.64
W-PA-151203-MRK-005	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			2212.78			2212.78			2212.78
W-PA-151203-MRK-006	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			460.71			460.71			460.71
S-PA-161130-CBA-001	UNT to Little Raccoon Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			539.87			539.87			539.87
S-PA-170113-MRK-005	UNT to Little Raccoon Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			148.91			148.91			148.91
S-PA-170113-MRK-004	UNT to Little Raccoon Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			755.04			755.04			755.04
W-PA-170113-MRK-007	-	Discharge of dredged material	Non-Tidal Wetland	NO	Temporary	Fill Area	Square Feet			6740.83			6740.83			6740.83
S-PA-170207-MRK-005	UNT to Little Raccoon Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			137.93			137.93			137.93
S-PA-170113-MRK-006	UNT to Little Raccoon Run	Discharge of dredged material	River/Stream	NO	Temporary	Fill Area	Square Feet			257.24			257.24			257.24

Requirement V

Shell Pipeline HDD Procedure

Shell Pipeline HDD Procedure

Shell Pipeline Company LP
Falcon Ethane Pipeline System
Allegheny, Beaver, and Washington counties, Pennsylvania

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September 2017

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INTRODUCTION

The proposed drilling program is expected to be initiated in 2018/2019 and will be completed in 2019.

- There are 18 HDDs on the project. They range from 900 feet to 7200 feet
- There are 3 HDDs including the Ohio River in Ohio
- There are 15 HDDs in Pennsylvania and West Virginia

The construction of the Project will involve the use of the horizontal directional drilling ("HDD") installation technique for avoiding environmentally sensitive resources or obstructions that occur along the Project pipeline route. This Best Drilling Practices Plan ("Plan") has been developed to minimize or quickly resolve possible inadvertent effects by identifying appropriate corrective actions for various potential scenarios that may be encountered during HDD operations. The purpose of this document is to provide a description of proposed HDD work activities, the HDD working procedures, monitoring of inadvertent returns of drilling fluid (including training and reporting), response to HDD operations, and proposed cleanup techniques if inadvertent returns occur during HDD activities on the Project. The following sections of this Plan provide the processes and procedures to be implemented in the case of inadvertent returns or returns of drilling fluid during HDD activities.

List of HDDs:

Ohio	SCIO-01 SCIO-02 SCIO-03 Ohio River
West Virginia	SCIO-03 Ohio River
Pennsylvania	SCIO-04 SCIO-05 HOU-01 HOU-02 HOU-03 HOU-04 HOU-05 HOU-06 HOU-07 HOU-08 HOU-09 HOU-10 HOU-11 HOU-12 HOU-13

Description of the Work

The HDD method requires establishing staging areas at both ends of the proposed crossing, typically known as the entry and exit points, or workspaces. The process commences with the drilling of a pilot hole along a predetermined path beneath the obstruction, wetland or waterbody. Once the pilot hole has been completed, the drilled hole is enlarged with one or more passes of a reamer until the diameter of the hole is adequate to complete the pull-back (installation) of the pipeline. Once the reaming pass(s) are completed, prefabricated pipe segments are then pulled through the hole to complete the installation. Additional welding to join the prefabricated segments may be required during the pullback process. While the HDD method is a commonly used, proven technology, there is the potential for unintended effects that could occur as a result of the drilling.

Drilling Fluids

The HDD process uses engineered drilling fluids to facilitate many of the HDD operations. Drilling fluid is a slurry composed primarily of water and bentonite clay (typically 95 percent water). Bentonite (sodium montmorillonite) is naturally occurring clay, usually mined in Wyoming, which is extremely hydrophilic and can absorb up to ten times its weight in water. Bentonite is not considered a hazardous material, as defined by the Environmental Protection Agency. It is non-toxic to the aquatic environment. The composition of the drilling fluids and its engineering properties tested to ensure their suitability for the given subsurface conditions encountered along the alignment and at each individual HDD location

The slurry is designed to:

- Stabilize the hole against collapse;
- Lubricate, cool, and clean the cutters;
- Transport cuttings by suspension and flow to entry and exit points; and reduce soil friction and required pull loads during pilot hole, reaming, and carrier pipe installation.

Depending on subsurface conditions encountered, certain lost circulation materials (LCMs) and special polymers may also be introduced in the drilling fluid mixture. Lost circulation materials may be used during inadvertent return events and/or in certain cases when drilling fluid circulation seems to be diminishing. In the event that existing flow paths (faults, fractures, voids, etc.) intersect the HDD path, LCMs may be used in an attempt to seal around the borehole and prevent drilling fluid from escaping into the formation and allow for the reestablishment of drilling fluid returns to the entry and/or exit pits. Many types of LCMs are available for use during HDD operations that are inert and environmentally benign.

Shell is in the early phases of selecting pipeline and HDD construction contractors. Therefore, at this time, Shell is unable to identify the specific LCMs and polymers that may be used on the Project. For example, drilling fluid additives that may be used in clay will not likely be beneficial in rock. Consideration is also given to the varying geological formations the Project traverse.

After HDD contractor selection is completed and prior to the start of construction, the HDD contractors will be required to submit a list of drilling fluid additives (e.g., polymers, LCM, etc.) proposed for use on the Project to Shell for review and approval. Shell will evaluate the contactor's list of proposed polymers, determine which of the proposed products will be authorized for Project use and provide that list to REGULATORY AUTHORITIES staff. Shell will initially determine the products will be authorized for Project use based on compliance with NSF 60 standards. NSF 60 is a standard that establishes health and safety criteria for the chemical treatment of drinking water and consequently, drinking water well development ("NSF/ANSI Standard 60"). In addition to NSF 60 criteria, any other applicable federal or state requirements

will also be considered during the review process. After this process has been completed, Shell will submit to REGULATORY AUTHORITIES a list of specific additives planned to be used on the Project.

In lieu of specific polymer identification, at this time, Shell offers the following information on categories of polymers that may be used during HDD operations:

- Borehole stabilizers/viscosifiers: polymers used to increase viscosity and gel strength of water/bentonite drilling fluids.
- Lost circulation materials: can be polymers but sometimes other bio-degradable materials are used as LCMs (i.e. walnut shells, paper etc.).

Most drilling fluids, drilling fluid additives and polymers used in the HDD industry are NSF 60 compliant, as these products are also used in other rotary drilling applications such as water well drilling and completion. Therefore, if NSF 60 complaint products are used there will be no effects on water quality. Information on typical drilling fluid additives is found in Appendix A. Please note these or other similar products may be used on the Project.

HDD Working Procedures

Prior to starting any HDD drilling the HI and EI will verify that all Environmental Controls are in place. There will be the potential for inadvertent returns or loss of drilling fluids from the bored hole. However, drilling fluids that are returned will likely contain a lower concentration of bentonite when they surface because the mixture may be filtered and somewhat diluted as it passes through existing sediments of various types.

Inadvertent returns may occur as a result of rock fractures, low density/low strength soils, and unconsolidated geology, which were not foreseen during the design phase. Inadvertent returns are readily detected at the surface as seepage (pooling of drilling mud at the surface) or a loss of circulation of the drilling fluid. When the operator observes a loss of drilling fluid returning, it is an indicator that seepage may be occurring outside of the hole. Loss of drilling fluid returns is only an indicator as some loss of drilling fluid is expected, such as where loose sediments are encountered and more drilling fluid is required to be added to fill the voids.

Prior to the start of drilling operations, site-specific HDD Procedures will be reviewed with the HDD contractor. At a minimum, the HDD Procedures will address the following:

<u>Monitoring Annular Pressure</u>
Inadvertent returns may occur when the pressure of the drilling fluid in the bored hole exceeds the limiting strength of the soils. Each pilot hole will incorporate "Pressure While Drilling" (PWD) instrumentation. The PWD tool measure the fluid pressure near the drill bit. Pressures may increase when there is an obstruction to annular flow somewhere between the bit and the entry at ground surface. If pressures rise or spike, the driller can initiate remedial actions (see below) prior to seeing any inadvertent return at the surface.

<u>Return Circulation</u>
Once it is indicated to the driller that drilling fluid circulation is dissipating or that a return has occurred, the driller has the following options (or any combination of these options):

- Decrease pump pressure;
- Decrease penetration rate;
- Retract the drill string a distance to restore circulation ("swab" the hole);

- Introduce additional drilling fluid flow along the hole using "weeper" subs; and
- Introduce lost circulation additives to the drilled hole.

Inadvertent Returns at Accessible Locations

If inadvertent returns are observed on the ground surface along portions of the alignment that are accessible, containment and recovery operations will be completed in accordance with the procedures discussed in Section XX. Once the inadvertent return is contained, drilling operations will resume.

Inadvertent Returns at In-accessible Locations

If inadvertent returns are observed on the ground surface along portions of the alignment that are inaccessible; the following procedures will be followed:

- Contractor will ensure all reasonable measures within the limitations of current technology have been taken to re-establish circulation; and
- Continue drilling utilizing a minimal amount of drilling fluid as required to penetrate the formation or to maintain a successful carrier pipe pull back.

MONITORING & REPORTING OF INADVERTENT RETURNS

Personnel and Responsibilities

The actions in this Plan are to be implemented by the following personnel:

HDD Inspector

Shell will designate a HDD (HI) Inspector for the Project. The HI will have overall authority for construction activities that occur on their designated HDD of the Project. The HDD Inspectors will report to a Chief Inspector (CI) that is in charge of the overall project.

The HI has the total responsibility to verify that all HDD procedures are followed. If any HDD procedure is not being followed the HDD will be stopped and the CI will be notified. The procedure will be reviewed again with the HDD Contractors Management team to make sure that all procedures are being followed.

Environmental Inspector

Two Environmental Inspector ("EI") will be designated by Shell to each spread this includes the HDD activities. The EI will have peer status with all other craft inspectors and will report directly to the CI who has overall authority. The EI, along with all other inspectors and inspection personnel, will have the authority to stop activities that violate the environmental conditions of the REGULATORY AUTHORITIES certificate (if applicable), other federal and state permits, or landowner requirements, and to order corrective action.

HDD Superintendent

The HDD Superintendent is the senior on-site representative of the HDD contractor. The HDD Superintendent has overall responsibility for implementing this Plan on behalf of the HDD contractor. The HDD Superintendent will be familiar with the aspects of the drilling activity, the contents of the Plan and the conditions of approval under which the activity is permitted to take place. The HDD Superintendent will make available a copy of this Plan to the appropriate construction personnel. The HDD Superintendent will ensure that workers are properly trained and familiar with the necessary procedures for response to an inadvertent return.

HDD Operator

The HDD Operator is the HDD contractor's driller operating the drilling rig and mud pumps. The HDD Operator is responsible for monitoring circulation back to the entry and exit locations. In the event of loss of circulation, the HDD Operator must communicate the event to the HDD Superintendent and HDD contractor field crews. The HDD Operator is responsible for stoppage or changes to the drilling program in the event of observed inadvertent returns.

HDD Contractor Personnel

During HDD installation, field crews will be responsible for monitoring the HDD alignment along with Shell's field representatives'. Field crews, in coordination with the EI, are responsible for timely notifications and responses to observed returns to the CI and appropriate agencies, in accordance with this Plan. The EI and CI ultimately must approve the action plan for mitigating the return.

The HDD contractor will have personal that is assigned to monitor the HDD path. Their responsibility is to monitor the HDD path during the HDD process until the pipe is pulled into the HDD hole. There will be good radio communication with the HDD and the ground personal on the HDD path.

If any inadvertent releases is discover the HDD will be stopped until the release is contained and Shell give the HDD contractor permission to start the HDD process work again.

HDD Checklist Procedure:

HDD Check List 7-25-17 (003).xlsx

Falcon HDD Check List

HDD#: Inspector name: Inspector Initials

Date	Time	Annular Pressure	Drilling Fluid Returns Y/N	Drilling Path Evaluated Y/N	Drilling Path Evaluated Area Comments	Environmental Controls in Place Y/N	Path On Profile of HDD Y/N	Inadvertent Returns Y/N	Environmental Controls Checked Time	Comments	

Training

Prior to drilling, the HDD Superintendent, HI, and the EI will verify that the HDD Operator and field crew receive the following site-specific training, but not limited to:

- Prior to the start of each HDD each person involved with the HDD will be required to go through training. This training will discuss the HDD procedures including any inadvertent returns reporting.
- Project specific safety and environmental training;
- Review provisions of this Plan and site-specific permit requirements;
- Review location of sensitive environmental resources at the site;
- Review drilling procedures for return prevention;
- Review the site-specific monitoring requirements;
- Review the location and operation of return control equipment and materials; and
- Review protocols for reporting observed inadvertent returns.

Monitoring & Reporting

The HDD alignment will be "walked" and observed for inadvertent returns at least four times per shift. Each inspection will be noted in the HDD Contractor's Daily Report and the SPLC Check List. This process will be evaluated for each drill. Some HDD will require more walked and observed process. The timing for the inspection walks will be agreed to by the HDD contractor and SPLC HI before the HDD starts. The timing will be recorded in both the daily logs for both HDD contractor and SPLC HI.

If the HDD Operator observes a loss of circulation, the Operator will notify the HDD Superintendent, HI and field crews of the event and approximate position of the cutting head. Where practical, a member of the field crew will visually inspect the ground surface near the position of the cutting head. Surface waters, wells, and mapped springs within 2,000 feet of the HDD site will also be visually inspected.

Typically, inadvertent returns are most often detected in the area near the entry or exit points (approximately 200-feet) of the drill alignment where the HDD path is at shallow depths, above bedrock, and in permeable/porous soils. In these occurrences the HDD Superintendent, EI, and CI will determine an estimated volume and the best methods for containment.

If an inadvertent return is observed somewhere beyond:

- Field crew will notify (via hand-held radio or cell phone) the HDD Operator and CI.
- The HDD Operator will temporarily cease pumping of the drilling fluid and notify the HDD Superintendent and CI. The HDD Superintendent will assess the drilling parameters (depth, type of formation, fluid flow rate, and drilling fluid characteristics) and propose appropriate changes.
- The HI will notify and coordinate a response with the EI. They will also assess the potential of the return to reach adjacent waterbodies, wetlands, or other types of infrastructure (e.g., wells).
- The EI, in coordination with the HDD Superintendent and HI will determine when drilling operations can resume. The Drilling process will not be allowed to resume until a Shell Representative approves the HDD drilling to resume. SPLC Construction Manager will have to approve the HDD drilling to resume the drilling before the HDD drilling can proceed.

- The Shell Representative will notify REGULATORY AUTHORITIES and the appropriate permitting authorities as necessary of the event and proposed response and provide required documentation within 24 hours.
- The CI will prepare a report that summarizes the incident.

RESPONSE TO INADVERTENT RETURNS

The HDD Superintendent, EI, and HI will coordinate installation of appropriate containment structures. Site topography in conjunction with access for personnel and equipment to the return site are major factors in determining the methods used for containment and disposal. Typically, containment is achieved by excavating a small sump pit (approximately 5-cubic yards) at the site of the return and/or surrounding the return with filter sock and/or sand bags. Once contained, the drilling fluid is either collected by vacuum trucks or pumped to a location where vacuum trucks can be accessed. The fluids are then transported either back to the HDD Drilling Rig or to a disposal site.

The HDD Contractor will have on-site, prior to drilling, an appropriate inventory of materials and equipment to contain inadvertent returns. This equipment will be on stand by for the entirety of the drilling process. The materials and equipment will include, but not be limited to:

- Compost Filter Sock (12-inch to 36-inch in addition to the perimeter controls shown on the drawings)
- Sand bags
- Hand tools (shovels, rakes, etc.)
- Pumps and hoses (three, 3-inch trash pumps with 300 feet of discharge hoses at each HDD location)
- Pumped water filter bags
- Vacuum truck(s) (60 bbl or greater capacity)
- Backhoe
- Equipment mats
- Aqua barriers/turbidity curtains
- Permanent Seeding Restoration (per E&S plan)

The site-specific response will follow the guidelines provided in the following sections.

Upland Locations

- Evaluate the amount of returns to determine if containment structures are warranted and if they will effectively contain the return.
- Promptly implement appropriate containment measures as needed to contain and recover the slurry.
- If the return is within 100-feet of a wetland or waterbody, compost filter sock will be installed between the return site and the wetland or waterbody.
- If the return cannot be contained, then the operator must suspend drilling operations until appropriate containment is in place.
- Remove the fluids using either a vacuum truck or by pumping to a location where a vacuum truck is accessible.
- Restore upland area with permanent seeding, mulch and soil supplements per the approved E&SCP.

Wetland and Minor Waterbody Locations

- Evaluate the amount of return to determine if containment structures are warranted and if they will effectively contain the return.
- Promptly implement appropriate containment measures to contain and recover the slurry. Efforts to contain and recover slurry in wetlands or stream may result in further disturbance by equipment and personnel, and possibly offset the benefit gained in removing the slurry.
- If the return cannot be controlled or contained, immediately suspend drilling operations until appropriate controls can be implemented and the assessment of the impact to the wetland is completed by the EI and the governing agency. Drilling may commence when approved measures are in place and inspected by the EI. The SPLC Construction Manager MUST approve the HDD drilling to resume.

Major Waterbody Locations

Shell's proposed HDDs are being designed to minimize the potential for inadvertent returns. Shell's Contractor(s) may also employ the techniques described below to reduce the possibility of inadvertent returns.

Surface Casing

If deemed necessary, surface casing may be installed in certain instances. Surface casing provides a conduit to allow drilling fluids to return from the drill path back to the surface. Additionally, surface casing helps isolate the drill path from regions of unstable overburden material.

Intersect Method

Shell's Contractor(s) may drill some of the pilot holes from both sides of the crossing and perform and intersect near a predetermined point, usually near the middle of the crossing. The intersect method is widely used in long, large diameter HDDs. The intersect method reduces the length that must be drilled from each end and thereby decreases the distance that drilling fluids need to be pumped in order to return to surface at the entry/exit points. Utilization of this method is particularly advantageous in longer crossings because the reduced distance that drilling fluid must be pumped subsequently decreases the fluid pressure required for the drilling fluid to travel back to the entry/exit points.

In the event of an inadvertent return in a flowing waterbody, the following approach will generally be followed after the inadvertent return has been isolated and the flow has stopped. Due to the unpredictable nature of the locations and environment in which inadvertent returns may appear, this description cannot encompass all possible approaches to clean-up under all conditions. Agency staff and other experts will be consulted to the extent practicable in the development of remedial clean up techniques, as required.

The following are standard response techniques that may be applied:

- If the bentonite material flows overland prior to entering the waterbody, installation of compost filter sock or sandbag dams at the point of entry will be used to reduce or stop the flow; if the vent is directly into the waterbody, other means to isolate the vent site from the flowing waterbody will be used.
- Using a vacuum truck or pump(s), with a sufficient hose, personnel will remove the bentonite, working from downstream to upstream, to allow maximum visibility. Hand tools may be used to scarify the sediments and ensure removal to the maximum extent practicable. If pumps are used, discharged

water shall be to an impermeable structure or to filtering devices such as a compost filter sock sump or pumped water filter bags.

- If necessary, water may be diverted using temporary barriers to isolate the impact area. Only a portion of the stream will be diverted to minimize dewatering impacts. Water will be able to pass through the site in its natural condition.
- If it is impracticable to remove the drill fluid from the surface water, a clear written explanation will be submitted to the applicable regulatory agencies.
- Any disturbed soils will be stabilized immediately with erosion control matting, seeding and soil supplements, or riprap, depending on the site conditions.
- Exposed soils will have temporary erosion control measures established as soon as practical with permanent erosion controls established as soon as possible as described in the Project E&SCP.
- Disturbance of vegetation will be kept to a minimum and all disturbed vegetation will be restored.

CLEAN-UP

After completion of the HDD installation, the CI and the HDD Superintendent will develop site-specific clean-up measures for approval by the EI. Potential for secondary impact from the clean-up process will be evaluated, as well as the benefits of clean-up activities.

The following measures may be used:

- Drilling mud will be cleaned up by hand using hand shovels, buckets and soft bristled brooms minimizing damage to existing vegetation.
- Fresh water washes may be employed if deemed beneficial and feasible.
- Containment structures will be pumped out and the ground surface scraped to bare topsoil minimizing loss of topsoil or damage to adjacent vegetation.
- The recovered drilling fluid will be recycled or disposed of at an approved upland location or disposal facility. Recovered drilling fluid will not be disposed of in streams or storm drains.
- All containment structures will be removed.
- Recovered materials will be collected in containers for temporary storage prior to removal from the site.

HDD CONTINGENCY PLANS

In the unlikely event the HDD crossing cannot be completed on the first attempt, the approved construction workspace and rights of way are sufficient to allow multiple attempts to install the HDD. Any abandoned HDD bore holes will be filled with grout in their entirety. In most cases, several attempts can be made within the permitted workspace by slightly modifying the HDD geometry to adjust either the depth of the drill profile and/or the horizontal alignment. Adjustments in the alignment and profile depth can, often times, minimize contact with or completely avoid localized problematic formational zones.

If problems persist along the original drill alignment, including at alternate depths from the first attempt, the HDD rig can be offset left or right and a second pilot hole can be initiated along a new alignment designed with data collected during the first attempt. The drilling data collected along the first alignment will be utilized to create a new design that will, to the extent practical, minimize contact with problematic formational zones encountered during the initial attempt. If a first attempt along the new alignment is not successful, as described above, several attempts can be made at various depths along the new alignment.

If all attempts fail along this new alignment, the HDD rig and equipment can again be moved left or right within the workspace and a third new pilot hole initiated along a new design alignment that minimizes contact with problematic formational zones encountered along both the initial and secondary attempts. If a first attempt at this location also proves unsuccessful, as described above, several attempts can be made at various depths along this alignment. In summary, the construction workspace contains sufficient room to allow numerous HDD attempts; therefore these techniques can be utilized until either the HDD is successfully installed or all possibilities of a successful HDD installation have been exhausted.

In the very unlikely event that an HDD cannot be successfully installed, the methods presented below and the associated required activities can be considered as potential options:

Reroute Pipeline to Attempt HDD at an alternate location outside of the proposed pipeline construction ROW

- Pipeline alignment will be altered and a new HDD crossing will be designed at a location that potentially will pose lesser installation challenges.
- The proposed change in location will be selected via desktop analysis using existing aerial photography and other available data.
- Survey permission will be required before the required civil, environmental and cultural surveys can be performed. Once survey permission has been obtained and the area is determined to be acceptable from a cultural and environmental perspective, geotechnical and geophysical investigations will be initiated to support design of a HDD at the new location.
- Approvals from REGULATORY AUTHORITIES, USACE and state agencies will be required before the HDD is attempted at the new location.

Open cut crossing;

- This method involves the excavation of a trench through the wetland or stream.
- Additional armoring of the pipe in the river bottom could be required to protect the integrity of the pipe.
- Equipment would have to work in the wetland or streams and state mandated turbidity limits would apply.
- Approvals from REGULATORY AUTHORITIES, USACE and state agencies will be required before the construction begins
- This type of crossing would also only be considered as last resort in the case when all other alternatives prove to be unfeasible

NOISE

Shell will employ an independent noise consultant to measure ambient (preconstruction) noise levels at each HDD entry and exit location. The noise consultant will also measure ambient noise levels at nearby Noise Sensitive Areas (NSA). The consultant will recommend noise mitigation measures to meet local codes and ordinances.

The HDD Contractor shall employ mitigation measures to achieve an HDD equipment generated noise level at or below the designated dba set by the independent noise consultant at the nearest noise sensitive area (NSA). A map of the identified NSA's will be provided by the Company.