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PENNEAST PIPELINE COMPANY, LLC.

PENNEAST PIPELINE PROJECT

COMPENSATORY WETLAND MITIGATION PLAN

REVISED JUNE 2020

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1.0 OBJECTIVES

The objective of the compensatory wetland mitigation project is to provide sufficient compensation to offset unavoidable wetland impacts resulting from the PennEast Pipeline Project (Project) being pursued by PennEast Pipeline Company, LLC. Impacts resulting from the Project include the permanent functional conversion of 6.16 acres of Palustrine Forested (PFO) wetlands and 0.94 acres of Palustrine Scrub-Shrub (PSS) wetlands. Also, the Project will result in permanent fill being placed in 0.02 acres of PFO mosaic wetlands and 0.04 acres of PEM wetlands. See Table 4 (Mitigation Summary Table) for more details. The impacts associated with the Project are located in the Central Delaware River Subbasin (Subbasin 5) and the Upper Central Susquehanna River Subbasin (Subbasin 2) which corresponds to the Geographic Service Area of the Pennsylvania State Water Plan.

To mitigate for the permanent wetland functional conversion impacts, three (3) offsite mitigation areas, one (1) within the Upper Central Susquehanna River Subbasin, and two (2) within the Central Delaware River Subbasin have been designated to provide 14.31 acres of wetland enhancement to degraded wetland ecosystems which have been impacted by historical and present agricultural land uses, and to provide 0.08 acres of wetland creation to occur immediately adjacent to an existing wetland.

The Central Delaware and Upper Susquehanna River Subbasins have been influenced by erosion and agricultural runoff. The three (3) proposed wetland mitigation areas abut stream channels and will serve to create a functional wetland / riparian buffer ecosystem along those channels that will address the resource function needs of both the Central Delaware River Subbasin and Upper Central Susquehanna River.

This document has been prepared in accordance with 25 PA Code Chapter 105-20a - Wetland Replacement Criteria, and Federal Register, Department of the Army, Corps of Engineers 33 CFR Parts 325 and 332, Environmental Protection Agency 40 CFR Part 230 – Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, April 10, 2008.

2.0 SITE SELECTION CRITERIA

Potential mitigation sites within the geographic service area of the Upper Central Susquehanna River and Central Delaware Mitigation Subbasins were considered during the site selection process since Project impacts occurred within both watersheds (See Figure 1 – Geographic Service Area). A desktop analysis was completed to determine potential locations that were suitable to offset water resource impacts resultant of the Project. Based on the results of the desktop analysis, site visits were conducted to determine if the water resources on selected properties were degraded as suspected. Landowners with favorable properties were contacted to determine if they were willing to consider enhancing water resources on their property. The overall goal being to place a portion of their property within a form of permanent protection.

An option agreement was secured for properties with willing landowners. Ultimately due to site suitability, landowner cooperation, legal/title issues, and the degraded state of water resources on the property: the Grajewski Farm located in Huntington Township, Luzerne County within the Upper Central Susquehanna River Subbasin, the Kistler Farm located in West Penn Township, Schuylkill County within the Central Delaware River Subbasin, and the Shirk Farm located in Lynn Township, Lehigh County within the Central Delaware River Subbasin were selected as an appropriate sites to conduct wetland mitigation.

3.0 SITE PROTECTION INSTRUMENTS

The proposed mitigation sites are currently under contract and have or will be placed in a Declaration of Restrictive Covenants Agreement (herein referred to as Agreement). Draft Agreements were reviewed by USACE District Counsel (Philadelphia) on October 23, 2017. Modifications were made to the Agreements and language per that correspondence (See Attachment A – Declaration of Restrictive Covenants Agreements). The Agreement states that construction restrictions, as well as any other restrictions, will be imposed upon the mitigation area. This Agreement shall run with the property in perpetuity and shall be binding on the owner, future owners, and their successors and assigns, lessees, easement holders, and any authorized agents, employees, or persons acting under their direction and control. The demarcation of the "Conservation Area" will be achieved with stakes/posts accordingly. The Declaration of Restrictive Covenant will serve as a form of long-term management of the site; which is to remain in a natural state.

4.0 BASELINE INFORMATION

Land use within each mitigation site primarily consists of marginal agricultural lands which have been historically or are currently used for pasture and/or harvesting hay and occasional corn and/or small grain crops. A high water table and frequent flooding or ponding serve as limiting factors that make these lands less productive in terms of agricultural use. Converting these marginal agricultural lands to wetland preservation areas serves a higher function and creates an essential buffer area to sequester nutrients and sediment before entering streams; thereby improving water quality of downstream waters. Reference wetlands for each site are located on portions of each property and adjacent properties.

4.1 GRAJEWSKI MITIGATION SITE (UPPER SUSQUEHANNA RIVER SUBBASIN)

The Grajewski Farm is located approximately two (2) miles from the town of Huntington Mills, Huntington Township, Luzerne County, Pennsylvania. This site is located approximately 20 miles west of the PennEast Pipeline Project. Coordinates of the site are: Latitude: 41.194987 °N / Longitude: -76.206948°W. Agricultural operations at this farm have been recently scaled back to only include operations in the more productive soils to harvesting hay and occasional corn and/or small grain crops. The area proposed for wetland enhancement is still in an emergent state due to the recent change in land use due to scaling down operations and excluding cattle and pasturing operations at the farm. The proposed planting plan is intended to jump start or supplement naturally occurring succession (volunteer species) that will result from the permanent change in the land use type. The deed restriction to be applied to this site will permanently protect these resources from being brought back into agricultural operations by future landowners.

4.1.1 Hydrology

The wetland mitigation site is located within the Huntington Creek watershed which, according to Pa. Code 25, Chapter 93 water quality standards, is classified as: Trout Stocked Fishes, Migratory Fishes (TSF, MF). Huntington Creek is also listed as a naturally reproducing trout stream by the Pennsylvania Fish and Boat Commission. The proposed wetland enhancement area's primary source of hydrology is a shallow groundwater table and overbank flow from a perennial stream channel.

4.1.2 Soil Descriptions

Soil units mapped within the mitigation area include two (2) primary soil classifications: Chenango gravelly loam (ChB) and Holly silt loam (Ho). Holly silt loam (Ho) is listed as being a hydric soil. The following briefly describes soils found within the enhancement area as described by the USDA/NRCS Web Soil Survey:

4.1.2.1 Chenango gravelly loam, 3 to 8% slope (ChB):

This soil mapping unit consists of very deep, well and somewhat excessively drained soils formed in water-sorted material on outwash plains, kames, eskers, terraces, and alluvial fans. The taxonomic class is loamy-skeletal, mixed, superactive, mesic Typic Dystrudepts.

4.1.2.2 Holly silt loam, 3 to 8% slope (Ho):

This soil mapping unit consists of very deep, very poorly and poorly drained soils formed in loamy alluvium on flood plains. Saturated hydraulic conductivity is moderately high through high in the mineral soil. The taxonomic class is fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts.

4.1.3 Waters of the United States

A field investigation was conducted to delineate wetland and water resource boundaries on a portion of the property (See Attachment B – Wetland Delineation Reports, Grajewski Mitigation Site) and to determine if suitable conditions exist for mitigation activities to take place onsite. The property was delineated in July 2013 and re-evaluated on December 8th, 2015.

Two (2) PEM wetlands were delineated and determined to be conducive for wetland enhancement activities. A shallow groundwater table, overland sheet flow, and three (3) perennial channels located within and abutting the enhancement area provide adequate hydrology. Dominant vegetation within the portions of these wetlands proposed for mitigation activities includes: *Scirpus cyperinus* (woolgrass, FACW), *Phalaris arundinacea* (reed canarygrass, FACW), *Bidens frondosa* (Devil's beggartick, FACW), *Carex lurida* (shallow sedge, OBL), *Onoclea sensibilis* (sensitive fern, FACW), *Verbena hastata* (swamp verbena, FACW), and *Euthamia graminifolia* (flat-top goldentop, FAC).

Observed soils in the wetland area from 0-4 inches displayed a matrix of 10YR 4/1 with 5% 7.5YR 5/6 redox concentrations. From 4-10 inches, soils displayed the same characteristics as the layer above, except in some cases where a fragipan was encountered at a depth of 6 inches. Soil from 10 - 14 inches displayed a matrix of 10YR 5/2 with 5% 10YR 5/8 redox concentrations except where the restrictive layer was observed. The size, coordinates, and Cowardin Classification of the delineated resources are provided in Table 1 below:

Grajewski Property Water Resource Summary Table					
Wetland ID	**Cowardin Classification**	**Delineated Resources**		**Latitude**	**Longitude**
		Acres	**Sq. Ft.**		
Wetland 1	PEM	6.89	300,128	41.19540	-76.20698
	PSS	1.28	55,759	41.19520	-76.20729
	PFO	0.27	11,761	41.19778	-76.20672
Wetland 2	PEM	0.14	6,098	41.19986	-76.20893
UNT 1	R3	0.01	570	41.19828	-76.20570
UNT 2	R3	<0.01	338	41.19740	-76.20680
UNT 3	R3	0.05	2,240	41.19874	-76.20680

Table 1: Waters of the United States Summary Table (Grajewski)

4.2 KISTLER MITIGATION SITE (CENTRAL DELAWARE RIVER SUBBASIN)

The Kistler Farm is located approximately 1.5 miles west of the town of Libertyville, West Penn Township, Schuylkill County, Pennsylvania. This site is located approximately 20 miles west of the PennEast Pipeline Project. Coordinates of the site are: Latitude: 40.722175°N / Longitude: -75.892200 °W. The proposed wetland enhancement area is currently and has historically been used as a cattle pasture. Upon implementation of the deed restriction on the property, pasturing operations on this portion of the farm will be retired, and the site will be planted with trees and shrubs to create a contiguous buffer of woody vegetation along the UNT to Lizard Creek and within the wetland complex.

4.2.1 Hydrology

The wetland mitigation site is located within the Lizard Creek watershed which, according to the Pa. Code 25, Chapter 93 water quality standards, is classified as: Trout Stocked Fishes, Migratory Fishes (TSF, MF). Lizard Creek is also listed as a naturally reproducing trout stream by the Pennsylvania Fish and Boat Commission. The proposed wetland enhancement area's primary source of hydrology is a shallow groundwater table. Overbank flow from a perennial stream channel is also a contributing factor.

4.2.2 Soil Descriptions

Soil units mapped within the mitigation area include five (5) primary soil classifications: Atkins silt loam (At), Berks shaly silt loam (BeC), Shelmadine silt loam (ShB), Water (W), and Watson silt loam (WaB). Atkins silt loam (At) and Shelmadine silt loam (ShB) are listed as being a hydric soils. The following briefly

describes soils found within the project area as described by the USDA/NRCS Web Soil Survey:

4.2.2.1 Atkins silt loam, 0 to 3% slope (At):

This mapping unit is located on nearly level floodplains. The taxonomic class is fine-loamy, mixed, active, acid, mesic Fluvaquentic Endoaquepts. The main limitations of this mapping unit are flooding high water table, strongly acid soil, and a high available water capacity. Rooting depth is restricted by the high water table.

4.2.2.2 Berks shaly silt loam, 8 to 15% slope (BeC):

This mapping unit is located on summits, shoulders, and backslopes of dissected uplands formed in residuum weathered from shale interbedded with fine grained sandstone and siltstone. The taxonomic class is loamy-skeletal, mixed, active, mesic Typic Dystrudepts. The main limitation of this soil mapping unit is the moderately steep slopes.

4.2.2.3 Shelmadine very stony loam, 3 to 8% slope (SmB):

This mapping unit consists of very deep, poorly drained soils formed in glacial or periglacial material. Shelmadine soils are located on nearly level to moderately sloping soils on upland flats, depressions, drainageways and stream heads. The taxonomic class is fine-loamy, mixed, semiactive, mesic Typic Fragiaquults. Shelmadine soils are poorly drained and have slow permeability.

4.2.2.4 Watson silt loam, 3 to 8% slope (WaB):

This mapping unit consists of very deep, moderately well drained soils formed in pre-Wisconsin glacial till derived from sandstone, siltstone, and shale. Watson soils are located on mainly on slopes within the glaciated section of the Ridge and Valley area. The taxonomic class is Fine-loamy, mixed, active, mesic Typic Fragiudults. Watson soils are moderately well drained.

4.2.3 Waters of the United States

A field investigation was conducted to delineate wetland and water resource boundaries on a portion of the property (See Attachment B – Wetland Delineation Report, Kistler Mitigation Site) and to determine if suitable conditions exist for mitigation activities to take place onsite. The property was delineated on September 6th, 2013, with a follow-up field visit to review wetland boundaries on March 27th, 2015.

Two (2) PEM wetlands were delineated and determined to be conducive for mitigation activities. A shallow groundwater table, overland sheet flow, and one (1) perennial channel located within and abutting the wetland areas provide hydrology. Vegetation within the portion the wetlands where mitigation activities are proposed includes: *Polygonum sagittatum* (arrowleaf tearthumb, OBL), *Juncus effusus* (soft rush, OBL) *Impatiens capensis* (jewelweed, FACW), *Scirpus cyperinus*

(woolgrass, FACW), *Scirpus atrovirens* (green bulrush, FACW), *Carex stricta* (shallow sedge, OBL), *Lythrum salicaria* (purple loosestrife, FACW), and *Polygonum pensylvanicum* (smartweed, FACW).

Observed soils in the wetland areas had a dominant matrix of 10YR 4/2 from 0-14" with 10% 10YR 5/6 redox concentrations. Oxidized rhizospheres were located throughout the soil profile. The size, coordinates, and Cowardin Classification of the delineated resources are provided in Table 2 below:

Kistler Property Water Resource Summary Table					
Wetland ID	Cowardin Classification	Delineated Resources		Latitude	Longitude
		Acres	Sq. Ft.		
Wetland 1	PEM	4.86	211,492	40.72138	-75.89206
Wetland 2	PEM	2.56	11,897	40.72194	-75.89088
UNT 1	R3	0.40	17,304	40.72206	-75.89233

Table 2: Waters of the United States Summary Table (Kistler)

4.3 SHIRK MITIGATION SITE (CENTRAL DELAWARE RIVER SUBBASIN)

The Shirk Farm is located approximately 2.25 miles southeast of the town of New Tripoli in the western portion of Lehigh County. This site is located approximately 20 miles west of the PennEast Pipeline Project. Coordinates of the site are Latitude: 40.650982° N / Longitude: -75.734577° W. The areas currently proposed for wetland enhancement activities are periodically mowed in the dry season. Historic land use consists of agricultural lands primarily used to harvest hay, occasional corn and/or small grain crops. Through a review of historic aerial imagery, the property has been utilized for agriculture for at least 70 years. The portion of property proposed for mitigation contains marginal agricultural land due to the high-water table and frequent flooding and ponding at the site. The proposed planting plan is intended to jump start or supplement naturally occurring succession (volunteer species) that will result from the permanent change in the land use type. The deed restriction to be applied to this site will permanently protect these resources from being brought back into agricultural operations by future landowners.

4.3.1 Hydrology

The wetland mitigation site is located within the Switzer Creek watershed which, according to the Pa. Code 25, Chapter 93 water quality standards, is classified as: High Quality Cold Water Fishes, Migratory Fishes (HQ-CWF, MF). The proposed wetland enhancement area's primary sources of hydrology are a high groundwater table and overbank flow from Switzer Creek.

4.3.2 Soil Descriptions

Soil mapping units mapped within the mitigation area include one (1) primary soil classifications: Holly silt loam 0 to 3% slope (Ho).

4.3.2.1 Holly silt loam 0 to 3% slope (Ho):

This mapping unit is located on broad flat areas and in slight depressions on flood plains receiving alluvium from upland areas of low-lime drift and noncalcareous sandstone and shale formed in loamy alluvium on flood plains. The taxonomic class is fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts. Holly soils are listed as being hydric and have a frequency of flooding.

4.3.2.2 Comly silt loam 3 to 8% slope (CpB):

Comly soils consists of moderately well drained very deep soils formed in colluvium, residuum or materials that were altered by periglacial or glacial activity. The taxonomic class is fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs. A fragipan is typically present at 20 to 35 inches. Permeability is moderate above the fragipan and moderately slow in the fragipan. Runoff is medium and available water capacity is low.

4.3.2.3 Berks-Weikert Complex 8 to 15% slope (BkC); 15 to 25%:

The Berks – Weikert complex is comprised of 65% Berks soils, 25% Weikert soils, and 10% other components. Berks soils consist of well-drained, moderately deep soils formed in residuum weathered from mostly shales interbedded with fine-grained sandstone and siltstone. The taxonomic class is loamy-skeletal, mixed, active, mesic Typic Dystrudepts. Permeability is somewhat rapid and runoff is medium. The available water capacity is very low.

Weikert soils consist of well-drained, shallow soils formed in gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone. The taxonomic class is loamy-skeletal, mixed, active, mesic Lithic Dystrudepts. Permeability is moderately rapid and runoff is low. The available water capacity is very low.

4.3.3 Waters of the United States

A field investigation was conducted to delineate wetland and water resource boundaries on a portion of the property (See Attachment B – Wetland Delineation Report; Shirk Mitigation Site) and to determine if suitable conditions exist for mitigation activities to take place onsite. The property was delineated on April 15, 2018.

One large wetland complex abutting Switzer Creek was delineated and determined to be conducive for mitigation activities. A shallow groundwater table, overbank flow provides the primary hydrology to the wetland. Dominant vegetation within the portion the wetlands where mitigation activities are proposed includes: *Phalaris arundinacea* (reed canarygrass, FACW), purple loose-strife (*Lythrum salicaria*, FACW), soft rush (*Juncus effusus*, FACW), and fringed sedge (*Carex crinita*, OBL). The most commonly observed soils within the mitigation area contained a dominant matrix of 10YR 4/2 with 5% 10YR 5/8 redox concentrations

from 0-10 inches. The size, coordinates, and Cowardin Classification of the delineated resources are provided in Table 3 below:

Shirk Property Water Resource Summary Table					
Wetland ID	Cowardin Classification	Delineated Waterways		Latitude	Longitude
		Acres	Sq. Ft.		
Wetland 1	PEM	6.94	302,487	40.651271° N	-75.733184° W
Switzer Creek	R5	-	14,204	40.650870° N	- 75.734490° W

Table 3: Waters of the United States Summary Table (Shirk)

5.0 CREDIT DETERMINATION METHODOLOGY

Because the pipeline will be placed subsurface, there will be no permanent loss of wetland habitat for functional conversion impacts; however, a functional conversion from a PSS / PFO community to PSS and PEM wetland communities are anticipated. See Table 4 (Mitigation Summary Table) for more details. The proposed wetland mitigation project will provide compensation for unavoidable impacts to wetlands associated with the Project which will result in the permanent functional conversion of 6.16 acres of PFO wetlands and 0.94 acres of PSS wetlands. Permanent functional conversion impacts are proposed to be offset though an acreage-based replacement ratio methodology. Each wetland mitigation site will serve to increase functions and values in the form of wetland enhancement and the permanent protection of existing, degraded wetland ecosystems which abut stream channels (replacement will occur at a 2:1 ratio for PFO conversions, 2.5:1 for EV, PFO conversions, 1.5:1 ratio for PSS conversions, and 1.75:1 for EV, PSS conversions).

In addition, the Project will result in permanent fill being placed in 0.04 acres of PEM wetlands and 0.02 acres of PFO-mosaic wetlands. The proposed wetland mitigation project will result in 0.08 acres of wetland creation consisting of mixed PEM, PSS, PFO wetland habitat at the Shirk property. Permanent PEM impacts will be offset utilizing a 1:1 ratio and permanent PFO-mosaic impacts will be offset at a 2:1 ratio.

The functions and values provided at each mitigation site will provide sufficient compensation within the designated geographic service areas. The functional conversion impacts will be offset by providing a functional gain in low quality PEM wetlands historically used for agricultural purposes by reverting to a higher quality wetland/riparian buffer ecosystem. The mitigation areas will enhance the wetland complex associated with each site. The work plan will result in a functional improvement of the existing condition of the PEM wetlands onsite, which are considered low quality due to land use. The permanent protection/conservation of the area, including implementation of a diverse tree and shrub planting plan, will result in an enhanced wetland ecosystem consisting of a mixed wetland /riparian buffer complex. The mitigation activities at the three sites will allow for the areas to once again provide essential functions and values within the sensitive resource areas. The primary functional improvements of the mitigation area include: 1) water quality benefits through the increased sediment and nutrient sequestration; 2) floral and vegetative diversity; and 3) enhanced wildlife habitat / utilization.

PENNEAST PIPELINE PROJECT – MITIGATION SUMMARY TABLE								
Geographic Service Area (PA State Water Plan)	**Impact Type**	**Conversion Description**	**Wetland Classification**	**Fill Type**	**Impact (acres)**	**Mitigation Ratio**	**Mitigation Site**	**Mitigation Area (acres)**
Upper Central Susquehanna River Subbasin	PSS	10-ft annually mowed ROW will result in permanent conversion to PEM wetlands	EV	None	0.13	1.75 to 1	Grajewski	0.22
			Other		0.003	1.5 to 1		0.005
	PFO	10-ft annually mowed ROW will result in permanent conversion to PEM wetlands	EV	None	0.02	2.5 to 1		0.05
			Other		0.01	2 to 1		0.02
	PSS	Remaining 20 feet of the 30-ft maintained ROW will remain PSS wetlands but may be mowed as frequently as once every 3 years	EV	None	0.25	1.5 to 1		0.37
			Other		0.01	1.5 to 1		0.01
	PFO	Remaining 20 feet of the 30-ft maintained ROW will be converted to PSS wetlands and may be mowed as frequently as once every 3 years	EV	None	0.11	2 to 1		0.21
			Other		0.02	2 to 1		0.05
				Subtotal	**0.54**			**0.93**
Central Delaware River Subbasin	PSS	10-ft annually mowed ROW will result in permanent conversion to PEM wetlands	EV	None	0.07	1.75 to 1	Kistler/Shirk	0.12
			Other		0.08	1.5 to 1		0.12
	PFO	10-ft annually mowed ROW will result in permanent conversion to PEM wetlands	EV	None	1.05	2.5 to 1		2.62
			Other		0.44	2 to 1		0.89
	PSS	Remaining 20 feet of the 30-ft maintained ROW will remain PSS wetlands but may be mowed as frequently as once every 3 years	EV	None	0.16	1.5 to 1		0.24
			Other		0.24	1.5 to 1		0.37
	PFO	Remaining 20 feet of the 30-ft maintained ROW will be converted to PSS wetlands and may be mowed as frequently as once every 3 years	EV	None	3.71	2 to 1		7.42
			Other		0.80	2 to 1		1.60
	PEM	Permanent Fill	Other	PEM	0.04	1 to 1		0.04
	PFO	Permanent Fill	Other	PFO Mosaic	0.02	2 to 1		0.05
				Subtotal	**6.62**			**13.46**
				PROJECT TOTAL	**7.16**			**14.39**

Table 4: Mitigation Summary

6.0 MITIGATION WORK PLAN

The proposed design of the mitigation sites consists of the enhancement of existing, degraded PEM wetlands through the changing the land use type, permanent protection (deed restriction), and the installation of trees and shrubs to allow the site to revert to mixed PSS and PFO wetland communities. The proposed mitigation work plan will result in a functional improvement of the wetland's existing condition. The current land use and position of each mitigation site within each of the watersheds results in considerable nutrient inputs and minimal canopy cover. The vegetative design of the sites is intended to supplement naturally occurring succession (volunteer species) that will result from the change in land use type. The enhancement areas each abut streams and will lead to an overall benefit to functions and values in wetland / riparian ecosystem within each sites local watershed.

6.1 VEGETATION ENHANCEMENT

Wetlands within each of the proposed enhancement areas are considered PEM wetlands. The existing vegetation with the proposed enhancement areas will be

supplemented with native tree and shrub plantings to allow the wetlands to revert to a forested and/or scrub-shrub state; thereby increasing functions and values in these sensitive resource areas. The vegetative design proposed will incorporate diverse planting plans for each site that consist of a clumped distribution of monocultural blocks of trees and shrubs within the wetland enhancement areas to create a mixed wetland ecosystem. A vegetation design for each site is included below:

GRAJEWSKI SITE PLANTING PLAN (0.93 ACRES)				
Scientific Name	***Common Name***	***Status***	***Container***	***Spacing***
Cornus amomum	silky dogwood	FACW Shrub	bare root / 1 gallon	4' O.C.
Cornus racemosa	gray dogwood	FAC Shrub	bare root / 1 gallon	4' O.C.
Ilex verticillata	winterberry	FACW Shrub	bare root / 1 gallon	4' O.C.
Alnus serrulata	hazel alder	OBL Shrub	bare root / 1 gallon	4' O.C.
Salix discolor	pussy willow	FACW Shrub	cutting / 1 gallon	4' O.C.
Salix nigra	black willow	OBL Shrub/Tree	cutting / 1 gallon	4' O.C.
Quercus palustris	pin oak	FACW Tree	1 or 2 gallon	10' O.C.
Acer saccharinum	silver maple	FACW Tree	1 or 2 gallon	10' O.C.
Nyssa sylvatica	black gum	FAC Tree	1 of 2 gallon	10' O.C.
Platanus occidentalis	american sycamore	FACW Tree	1 or 2 gallon	10' O.C.
***Select a minimum of 3 tree species and 3 shrubs species to be planted in enhancement area.**				
****Plant at a density of 400 stems per acre (or 372 total stems) with trees (186) and shrubs (186)**				

Table 5: Grajewski Mitigation Site Planting Plan

KISTLER SITE PLANTING PLAN (7.37 ACRES)				
Scientific Name	***Common Name***	***Status***	***Container***	***Spacing***
Cornus amomum	silky dogwood	FACW Shrub	bare root / 1 gallon	4' O.C.
Cornus racemosa	gray dogwood	FAC Shrub	bare root / 1 gallon	4' O.C.
Ilex verticillata	winterberry	FACW Shrub	bare root / 1 gallon	4' O.C.
Alnus serrulata	hazel alder	OBL Shrub	bare root / 1 gallon	4' O.C.
Cephalanthus occidentalis	common buttonbush	OBL Shrub	cutting / 1 gallon	4' O.C.
Salix discolor	pussy willow	FACW Shrub	cutting / 1 gallon	4' O.C.
Salix nigra	black willow	OBL Shrub/Tree	cutting / 1 gallon	4' O.C.
Diospyros virginiana	common persimmon	FAC Tree	1 or 2 gallon	10' O.C.
Quercus palustris	pin oak	FACW Tree	1 or 2 gallon	10' O.C.
Acer saccharinum	silver maple	FACW Tree	1 or 2 gallon	10' O.C.
Nyssa sylvatica	black gum	FAC Tree	1 of 2 gallon	10' O.C.
Platanus occidentalis	American sycamore	FACW Tree	1 or 2 gallon	10' O.C.
***Select a minimum of 4 tree species and 3 shrubs species to be planted in enhancement area.**				
****Plant at a density of 400 stems per acre (or 2,948 total stems) with trees (2,063) and shrubs (885)**				

Table 6: Kistler Mitigation Site Planting Plan

SHIRK SITE PLANTING PLAN (6.09 ACRES)				
Scientific Name	***Common Name***	***Status***	***Container***	***Spacing***
Cornus amomum	silky dogwood	FACW Shrub	bare root / 1 gallon	4' O.C.
Cornus racemosa	gray dogwood	FAC Shrub	bare root / 1 gallon	4' O.C.
Alnus serrulata	hazel alder	OBL Shrub	bare root / 1 gallon	4' O.C.
Lindera benzoin	spicebush	FAC Shrub/Tree	bare root / 1 gallon	4' O.C.
Salix discolor	pussy willow	FACW Shrub	cutting / 1 gallon	4' O.C.
Salix nigra	black willow	OBL Shrub/Tree	cutting / 1 gallon	4' O.C.
Acer rubrum	red maple	FAC Tree	1 or 2 gallon	10' O.C.
Quercus palustris	pin oak	FACW Tree	1 or 2 gallon	10' O.C.
Acer saccharinum	silver maple	FACW Tree	1 or 2 gallon	10' O.C.
***Select a minimum of 4 tree species and 3 shrubs species to be planted in enhancement area.**				
****6.09 total acres includes 6.01 acres of wetland enhancement and 0.08 acres of wetland creation.**				
*****Plant at a density of 400 stems per acre (or 2,440 total stems) with trees (1,708) and shrubs (732).**				

Table 7: Shirk Mitigation Site Planting Plan

6.1.1 METHOD OF PLANTING

All plants shall be installed according to acceptable standards of the trade and under the supervision of a landscape professional with suitable practical field experience in wetlands installation projects. All plant materials shall be nursery grown and shall be guaranteed to be true to name and healthy upon delivery.

Shrubs and trees shall be planted by digging a hole twice the size of the width of the rootball down into the substrate at the point of installation. If the plant is in a plastic container, this shall be carefully removed to keep the rootball intact. After planting, the area should be backfilled and watered. Trees may be provided with support stakes if this is deemed necessary by the installer.

6.1.2 PLANT DENSITY

All plants will be planted in clumps of monocultures consisting of five (5) to ten (10) plants. Specifics on spacing methods for each species is listed in Tables 5 -7 above. The following is a brief description of the spacing methods recommended. Shrub and willow monocultures will be planted 4.0 ft. on center Tree monocultures are to be planted 10.0 ft. on center.

6.1.3 WILDLIFE DAMAGE CONTROL

After planting of the site has been completed, a method for herbivory control will be established through the installation of tree tubes and shrub shelters. Other methods of wildlife damage control may include the application of rodenticide to each tree/shrub and meadow vole bait stations, if deemed necessary.

6.1.4 INVASIVE SPECIES CONTROL

Only two (2) species listed on the PA noxious weed list and federal noxious weed list were observed at the sites. A presence of purple loosestrife (*Lythrum salicaria*) was noted within portions of the Kistler and Shirk Mitigation Site. The

enhancement area will be inspected for the presence of purple loosestrife at the initiation of the project and controlled by means of hand pulling and/or spot treated with glyphosate (Rodeo) herbicide. There was also a small presence of multifora rose (*Rosa multifora*) surrounding the proposed enhancement area at the Grajewski Mitigation Site. If multiflora rose is encountered within the enhancement area during the monitoring period it will be removed by mechanical and chemical control methods which will involve grubbing, if feasible, or by a cut and spray method. Follow up control methods will take place throughout the 5-year monitoring period, as necessary. The likelihood of invasive species colonizing the site and becoming dominant after the performance standards are met at the end of the five-year monitoring period, including the tree/shrub canopy, is highly unlikely.

6.2 WETLAND CREATION

6.2.1 HYDROLOGIC DESIGN

Wetland creation will only occur at the Shirk property. The hydrology that drives the existing wetland is the result of a seasonal high-water table within 0 to 12 inches in the spring, fall and winter that exists within the poorly drained Holly silt loam. Overbank flows from the adjacent Switzer Creek also provide additional hydrology during flooding events. Ancillary hydrologic inputs include upslope runoff and direct precipitation. The wetland complex experiences natural drawdown during the drier months of the growing season. The hydrologic design for the wetland creation areas will mimic that of the existing adjacent wetlands hydrology, resulting in a shared hydrology model. Grading will be conducted to lower elevations in creation areas to provide closer interface with the water table. As a result, the mitigation design is primarily dependent on groundwater with runoff, flooding, and direct precipitation as the ancillary hydrologic inputs for the created wetlands. Primary water losses are expected to result from evapotranspiration.

6.2.2 GRADING DESIGN

With respect to the design, the soils poorly drained and have a high-water table within 0 to 12 inches during most of the year. Therefore, a wetland design based on capturing runoff and holding precipitation through the use of embankments is not appropriate in this setting/hydrogeomorphic landscape position. Instead, a wetland design approach that seeks to excavate to intercept high water tables and eliminates potential failure from loss of earthen structures during major flood events is best suited for this site.

Shallow excavations in the wetland creation area will be necessary to interface with seasonal groundwater and thereby support wetland development and creation. Side slopes will be graded at a 3:1 ratio.

Contour elevations selected for the site are such that a significant soil surplus is not expected. Excess material generated by grading operations will be placed adjacent to the site in the designated fill placement area. No excess spoil will be placed within the floodplain or existing wetland. Elevations for newly

graded contours have been based in part on depths of predicted seasonal groundwater as interpreted by depths of low chroma colors and redoximorphic features. The overall grading design within wetland creation areas will include the stripping of topsoil layer with a typical thickness of 10 – 12 inches, prior to initial grading. The areas will then be brought to within 10 inches (minimum) of final grade and the topsoil replaced to a minimum thickness of 10 inches. The existing topsoil will be acceptable as a substrate for wetland seeding due to the presence of ample sequestered organic matter.

6.2.3 VEGETATION DESIGN

The wetland creation area will be seeded utilizing Ernst Waterfowl Buffet Mix for permanent wetland seeding. The area will also have a temporary seed mix of annual rye grass applied as well as straw mulch in order to stabilize the site quickly. See Table 7 (Shirk Seeding Table) below for details.

ERNST - WATERFOWL BUFFET MIX		
(Application Rate - 15 pounds per acre)		
Percent	***Scientific Name***	***Common Name***
30%	*Carex vulpinoidea*	Fox Sedge
15%	*Elymus virginicus*	Virginia Wildrye
12%	*Carex intumescens*	Bladder Sedge
12%	*Carex lupulina*	Hop Sedge
12%	*Carex lurida*	Shallow Sedge
6%	*Carex granularis var. haleana*	Limestone Meadow Sedge
5.5%	*Sparganium americanum*	Eastern Bur Reed
3%	*Juncus effusus*	Soft Rush
2%	*Alisma subcordatum*	Water Plantain
1%	*Sagittaria latifolia*	Duck Potato
1%	*Scirpus validus*	Softstem Bulrush
0.5%	*Carex stricta*	Tussock Sedge
COVER CROP*		
Percent	***Scientific Name***	***Common Name***
100%	*Lolium multiflorum*	Annual Ryegrass
* Cover crop should be installed with the addition of straw mulch at 3 tons/acre.		

Table 8 – Shirk Seeding Table

In addition to being seeded, the creation area will have trees and shrubs installed to create a mixed PEM, PSS, PFO wetland community. See section 6.1 (Vegetation Enhancement) for planting details and Table 7 (Shirk Site Planting Plan) for a list of tree and shrub species. The acreage and number of trees and shrubs for the creation area have already been included in Table 7 (Shirk Site Planting Plan). Plantings within the creation area will mirror that of the enhancement area.

6.2.4 INVASIVE SPECIES CONTROL

Only two (2) species listed on the PA noxious weed list and federal noxious weed list were observed at the sites. A presence of purple loosestrife (*Lythrum salicaria*) was noted within portions of the Kistler and Shirk Mitigation Site. The enhancement area will be inspected for the presence of purple loosestrife at the initiation of the project and controlled by means of hand pulling and/or spot treated with glyphosate (Rodeo) herbicide. There was also a small presence of multifora rose (*Rosa multifora*) surrounding the proposed enhancement area at the Grajewski Mitigation Site. If multiflora rose is encountered within the enhancement area during the monitoring period it will be removed by mechanical and chemical control methods which will involve grubbing, if feasible, or by a cut and spray method. Follow up control methods will take place throughout the 5-year monitoring period, as necessary. The likelihood of invasive species colonizing the site and becoming dominant after the performance standards are met at the end of the five-year monitoring period, including the tree/shrub canopy, is highly unlikely.

6.3 BOUNDARY DEMARCATION

The boundary of the recorded conservation area will be demarcated in the field with either fiberglass sign/posts marked "Conservation Area", with metal t-posts, or with large boulders. Once trees and shrubs are established within the mitigation area, the woody vegetation shall also serve as the demarcation of the conservation area.

7.0 MAINTENANCE PLAN

The overall goal of the proposed wetland enhancement areas is for the sites to be self-sustaining post-construction, with no maintenance needs beyond the five-year monitoring period. Maintenance activities will take place in conjunction with the monitoring requirements for the site. Monitoring will involve periodic inspections by qualified personnel for a period of at least five consecutive growing seasons. The inspections will take place at an interval of not less than twice per year for the first two years and not less than once per year during the following three years, or as directed by permit requirements. Maintenance of the site may include, but is not limited to, the realignment of tree tubes and shrub shelters, pest control, herbicide application and additional plantings, if necessary.

8.0 PERFORMANCE STANDARDS

Performance standards have been established that correspond with the goals and objectives of offsetting wetland functional conversion impacts. These standards will be used to determine the success of the project. By monitoring each site for a period of not less than five years, and comparing results to the performance standards, a determination of the success of the site can be evaluated. The performance standards are as follows:

- Provide 14.31 acres of wetland enhancement. The wetland enhancement shall consist of a mixed PSS & PFO habitat;

- Provide 0.08 acres of wetland creation. The wetland creation shall consist of a mixed PEM, PSS, & PFO habitat;

- Planted trees and shrubs shall meet 85% survivorship during the 5-year monitoring period. Native woody plants naturally colonizing the enhancement area shall be included in plant density estimates;

- Vegetation within the enhanced wetland areas shall not be dominated by state or federally listed introduced, invasive, and/ or noxious species identified on the current *Pennsylvania noxious weed control list* and the *Federal noxious weed list;*

- Any deviation from these standards must be agreed upon by appropriate regulatory agencies.

If the performance standards have not been achieved, appropriate remedial actions, as outlined in the adaptive management plan must take place to ensure the success of the site. A vegetative analysis must continue on a yearly basis until the performance standards or goals have been met. In situations where mitigation is not successful, the monitoring report must include a discussion of remedial measures to correct the deficiencies.

9.0 MONITORING REQUIREMENTS

Monitoring will involve periodic inspections by qualified personnel for a period of not less than five (5) years unless reduced by the district engineer. The inspections will take place at an interval of not less than twice per year during the growing season for the first two years and not less than once per year during the growing season for the following three years or as outlined in permit conditions. Following each inspection, qualified personnel shall submit an analysis of the mitigation activities, discussions of any problems encountered, and photographs of the site with a plan showing the location of each photograph. Each monitoring report will include, at a minimum, the following information to document the success of the site:

a) Dates of inspection;
b) Photographic Documentation;
c) Vegetation data that summarizes vegetative density, invasive species, dominant species, and species diversity, and;
d) Identification of any problems that need required remedial measures.

10.0 LONG-TERM MANAGEMENT PLAN

The goal of the wetland enhancement sites is to be self-sustaining natural areas with no long-term management needs. No mechanical structures or controls were incorporated into the design of the sites. The enhancement will result in wetland communities that will fit naturally into the landscape. The deed restriction placed on each property will ensure long-term protection of the area and will be referenced by future landowners. After meeting performance standards, long-term financing mechanisms for each site are not proposed due to the nature of the work, and the likeliness of invasive species colonizing and becoming dominant at the site after tree/shrub canopy has become fully established is unlikely.

11.0 ADAPTIVE MANAGEMENT PLAN

A qualified professional with documented experience in wetland mitigation will oversee the project. If plant species or spacing requirements need to be modified during the project, the consultant shall notify the district engineer of the modifications and why they were necessary to

achieve the overall goal of the project. Minor changes to the plan that will not adversely affect the overall success of the site or enhance to success of the site will be implemented during the project.

To ensure the compensatory mitigation proposed meets the objectives and goals outlined in the offsite wetland mitigation plan, measures will be implemented to identify if success is being achieved, and to modify activities during and post-construction to ensure success of the site. Adaptive management is closely related to the mitigation work plan, monitoring/maintenance plan, and linked directly to the performance standards. Monitoring of the sites will identify the progression of the mitigation areas toward the performance standards set, and will identify any areas not trending in the desired direction. For any areas not progressing towards the performance standards, appropriate remedial actions or measures, as outlined below will be implemented.

Although most of the mitigation activities proposed are low risk in nature, several potential challenges to achieving success have been identified. These challenges will be discussed as they relate to each individual mitigation work plan: plant survival, and invasive species control.

11.1 PLANT SURVIVAL

The planting plan was developed with the knowledge that trees and shrubs do not survive or do well in all locations within wetlands. Several potential challenges to the success of plantings have been identified. These challenges relate to competition from other vegetation, predation by deer and meadow voles, and mortality from excessively wet soils.

To prevent competition with other vegetation, herbicide application is proposed as a remedial measure and will be applied at the base of trees and shrub shelters. Herbicide application will be performed at an interval necessary to suppress growth in these areas as the trees and shrubs become established. The installation of tree and shrub shelters will also aid in this concern.

Predation due to deer browse and meadow vole girdling is a noted concern for newly planted woody vegetation. Tree and shrub shelters will protect woody vegetation from browsing until a time when they've become established or branches of trees are above browse height. Also, each planted tree/shrub will include the application and reapplications of Repellex tablets (animal repellent). In certain situations, where the meadow vole population is extensive, meadow vole bait stations including rodenticide may be utilized to control the local population.

If the survival rate is not meeting performance standards, replanting will take place. Replanting will be based upon best professional judgment when determining the conditions that may have resulted in the low survival rate. Replanting could take into account a species-specific replanting or only planting woody vegetation within certain locations within the mitigation area that are more adaptable.

Additionally, if plant survival was decreased due to poor stock, incorrect planting methods, drought, or disease, supplemental planting will occur. Although excessively wet areas are not targeted for plantings, some mortality may be due to the excessive wet

conditions. If this occurs, supplemental plantings will occur outside the excessively wet areas, since woody vegetation may not be appropriate due to the extended hydroperiod.

11.2 INVASIVE SPECIES CONTROL

Only two (2) species listed on the PA noxious weed list and federal noxious weed list were observed at the sites. Purple loosestrife (*Lythrum salicaria*) and multifora rose (*Rosa multifora*) were present at within portions of the mitigation areas. Prior to or during planting operations, purple loosestrife will be hand pulled and/or spot treated with glyphosate (Rodeo) herbicide. Mutilflora rose will be removed by mechanical and chemical control methods which will involve the cut and spray method. If the percentage of invasive species within the proposed mitigation areas are not meeting performance standards or permit conditions, follow up herbicide application and control may take place, as deemed appropriate through monitoring, and will include spot spraying or mechanical control of the occurrences of these or other non-desirable species encountered. The likeliness of invasive species colonizing the site after performance standards are met after the five-year monitoring period which includes tree/shrub canopy becoming fully established is highly unlikely.

12.0 FINANCIAL ASSURANCES

The permittee has contracted WHM Solutions, Inc. (WHM) to provide mitigation services as it relates to the proposed project. WHM will be responsible for the execution of the deed restriction on the property, the permitted design, construction, and monitoring/maintenance of the project. D. Josh Lincoln is the principal project manager. Kevin Clark, PWS, is the lead designer and will carry out his role as a technical advisor for this project.

WHM has successfully employed over 30 wetland mitigation projects in the Baltimore, Pittsburgh, and Philadelphia USACE Districts over the past 15 years. Within the last 5 years, most of the mitigation provided has consisted of wetland enhancement primarily due to permanent functional conversion impacts (similar to this proposed mitigation project). Financial Assurances have not been required due to the relative nature of these projects (tree and shrub plantings within existing wetlands), selecting of appropriate sites for mitigation activities to occur, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met the mitigation area will be maintained in a natural state. Attachment F – Past Performance History, Resumes & Project Profiles has been included to outline our experience.

13.0 REFERENCES

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ATTACHMENT A:

DECLARATION OF RESTRICTIVE COVENANTS AGREEMENTS

Agreement documents have been redacted from the public file

ATTACHMENT B:

WETLAND DELINEATION REPORTS

GRAJEWSKI MITIGATION SITE

PENN EAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT
COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

HUNTINGTON TOWNSHIP
LUZERNE COUNTY, PENNSYLVANIA

GRAJEWSKI PROPERTY WETLAND DELINEATION REPORT

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B Photographic Documentation

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PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT
COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

HUNTINGTON TOWNSHIP, LUZERNE COUNTY, PENNSYLVANIA

GRAJEWSKI PROPERTY WETLAND DELINEATION REPORT

1.0 INTRODUCTION

WHM Solutions, Inc. (WHM) was retained by PennEast Pipeline Company, LLC (PennEast) to conduct a delineation of wetland and water resources associated with the Grajewski Property located in Huntingdon Township, Luzerne County, Pennsylvania (Figure 2 – Project Location Map). PennEast proposes to use this property for mitigation purposes to offset unavoidable impacts to aquatic resources resultant from the proposed PennEast Pipeline Project (Project). The purpose of this investigation was to determine if regulated wetlands and waters exist within the proposed project area in accordance with U.S. Army Corps of Engineers (USACE) guidelines as regulated under Section 404 of the Clean Water Act (CWA) and Pa Code 25 Chapter 105. This report provides information on the methodology, data collected, delineation field findings, and conclusions pertaining to wetland and water resources identified within the investigation area. The delineation was performed by Paul Fisher of WHM during July of 2013. A follow-up field visit to review the boundaries, as delineated in 2013, was conducted by David Wood, Lawrence Burns and Taylor Harris of WHM on December 8th, 2015.

2.0 METHODOLOGY

WHM conducted investigations on the subject project area according to the procedures and technical guidelines outlined in the 1987 *USACE Wetland Delineation Manual* including specifically the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (January 2012, Version 2.0).* The USACE protocol establishes a three parameter approach for identification and delineation of wetlands, which includes confirmation of the following:

I. Hydrophytic Vegetation: This condition exists when greater than 50% of the dominant plant species contain obligate (OBL), facultative-wet (FACW), or facultative (FAC) indicator statuses.

II. Hydric Soils: Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Register, July 13, 1994).

III. Wetland Hydrology: Wetland hydrology is recognized through evidence of inundation and/or saturation to the soil surface for at least 5% of the growing season during most years.

In undisturbed conditions, all three parameters must be confirmed to be present to characterize an area as a wetland. In highly disturbed or problematic wetland situations, Corps guidance details procedures to be used for evaluating these areas and determining which areas are most likely considered wetlands upon review by a Corps representative. Upon completing our investigations, areas exhibiting all three of the USACE criteria presented above and which also have surface water connection to other waters of the United States are identified as resources that are likely to be regulated by the USACE as Jurisdictional Wetlands. Areas exhibiting all three parameters but without surface water connection to other waters are also likely to be designated as wetlands or waters but may or may not be regulated by the USACE. In many cases, wetland areas not regulated by the USACE are still likely to be regulated by other state or local governing bodies.

In addition to wetlands, WHM also identifies waterways likely to be regulated as waters of the United States, including ephemeral, intermittent and perennial waterways. The term "jurisdictional waters of the United States" as used by Section 404 of the CWA and defined under 33 Code of Federal Register (CFR) Section 328.1, includes adjacent wetlands and tributaries to traditionally navigable waters (TNW) and other waters with a hydrological connection to a TNW.

WHM provides a complete delineation flagging of wetland/waters resources and supporting data. As noted above, our determinations are based on our collective "best professional judgment" exercised with the guidance of the Corps' Manual and Supplements. However, the final determination of the Jurisdictional status of the resources identified lies entirely within the review of the reviewing regulatory agencies. In other words, we identify a technically defensible boundary that must either be accepted or adjusted by the reviewing regulatory agencies in situations where encroachments may occur. As consultant environmental scientists, we do not have authority to assign regulatory jurisdiction.

For delineations performed in the Commonwealth of Pennsylvania, all wetlands and waters identified during the wetland delineation are deemed probable "Jurisdictional waters of the United States" until otherwise reviewed and accepted by the USACE and/or Pennsylvania Department of Environmental Protection (DEP). If upon review the wetland or water is determined to be isolated by the regulators (i.e. has no significant nexus to "jurisdictional waters of the United States"), the regulatory body for such waters then becomes the jurisdiction of the DEP.

3.0 DESKTOP FINDINGS

WHM completed a review of natural resource data associated with the project site prior to conducting field investigations. Specifically, WHM reviewed USGS 7.5 minute topographical mapping for Shickshinny, Pennsylvania, U.S. Fish and Wildlife National Wetland Inventory mapping, and the U.S Department of Agriculture – NRCS Soil Survey for Luzerne County, Pennsylvania. The results of this desktop analysis were used to help establish probable areas where wetlands and watercourses could be located before conducting the field investigation portion of the project.

3.1 USGS & TOPOGRAPHIC DATA

According to the 7.5 minute USGS quadrangle for Shickshinny, Pennsylvania, the center of the project area is located at 41.196433° N, -76.207543° W.

3.2 WATER QUALITY

The project area is located within the Huntington Creek watershed. According to PA Code 25, Chapter 93 Water Quality Standards, the Huntington Creek watershed is classified as a Trout Stocked Fishery with Migratory Fishes (TSF, MF). Huntington Creek is listed as a naturally reproducing trout stream. Therefore, wetlands that are hydrologically connected are considered Exceptional Value (EV).

3.3 NATIONAL WETLAND INVENTORY

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping within and surrounding the project area are presented in Figures 3 – USDA-NRCS Soils and NWI Map. According to NWI mapping, there are three (3) NWI wetlands located within project area. The NWI classifications within the project area include:

PSS/EM5C – Palustrine Scrub-Shrub/ Emergent Phragmites australis Seasonally Flooded

PEM5C- Palustrine Emergent Phragmites australis Seasonally Flooded

3.4 USDA/NRCS SOIL DESCRIPTIONS

The soil associations on the site are identified through the Natural Resources Conservation Service (NRCS) web soil survey for Luzerne County, Pennsylvania. Six (6) soil mapping units are located within the project area: Braceville gravelly loam (BrB), Chenango gravelly loam (ChA,ChB), Holly silt loam (Ho), Mardin channery silt loam (MaB), Rexford loam (RdA). Additionally, the Hydric Soils List for Luzerne County was reviewed to determine the Hydric Rating for these soil mapping units. There are no hydric soils within the proposed mitigation site. The mapping limits of these soils can be viewed in Figure 3 - USDA-NRCS Soils and NWI Map. The following briefly describes the soil series mapped within the investigation area as described in the Soil Survey for Luzerne County, Pennsylvania:

Braceville gravelly loam (BrB): The Braceville series consists of very deep, moderately well drained soils formed in glacial outwash of stratified sand, silt, and gravel. They are on terraces, benches, fans, and moraines. Permeability is moderately slow to slow. Taxonomic class is coarse-loamy, mixed, active, mesic Typic Fragiudepts. The following is a typical soil profile for the Braceville soil series:

Ap--0 to 8 inches, dark grayish brown (10YR 4/2) gravelly loam; weak medium granular structure; friable, nonsticky, slightly plastic; 15 percent rock fragments; strongly acid; abrupt smooth boundary. (6 to 11 inches thick.)

Bw1--8 to 18 inches, yellowish brown (10YR 5/4) gravelly loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 20 percent rock fragments; strongly acid; clear wavy boundary. (5 to 15 inches thick.)

Bw2--18 to 24 inches, yellowish brown (10YR 5/4) gravelly loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; 20 percent rock fragments; strongly acid; abrupt wavy boundary. (4 to 14 inches thick.)

Bx--24 to 36 inches, brown (10YR 5/3) gravelly loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; grayish brown (10YR 5/2) faces of prisms; weak very coarse prismatic structure parting to weak medium platy; firm, brittle; few faint clay films lining pores; 30 percent rock fragments; strongly acid; gradual wavy boundary. (8 to 35 inches thick.)

C--36 to 60 inches, grayish brown (2.5Y 5/2) stratified sand and gravel; common medium distinct gray (N 5/) streak-like mottles; single grain; strongly acid.

Chenango gravelly loam (ChA, ChB): The Chenango series consists of very deep, well and somewhat excessively drained soils formed in water-sorted material on outwash plains, kames, eskers, terraces, and alluvial fans. The taxonomic class is loamy-skeletal, mixed, superactive, mesic Typic Dystrudepts. The following is a typical soil profile for the Chenango soil series:

Ap -- 0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, light brownish gray (10YR 6/2) crushed and dry; weak fine and medium granular structure; friable; many fine roots; 20 percent pebbles; moderately acid; abrupt boundary.

Bw1 -- 8 to 12 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; very weak fine subangular blocky and very weak very fine granular structure; very friable; many fine roots; common fine pores; 15 percent dark grayish brown (10YR 4/2) material filling earthworm channels; 30 percent pebbles; strongly acid.

Bw2 -- 12 to 20 inches; dark yellowish brown (10YR 4/4) very gravelly silt loam; very weak fine and medium subangular blocky structure; friable; few fine roots; common fine pores; 40 percent pebbles; strongly acid; gradual wavy boundary.

BC -- 20 to 30 inches; brown (10YR 4/3) very gravelly loam; massive; friable; few fine roots; common fine and medium pores; 50 percent pebbles; strongly acid.

2C -- 30 to 72 inches; dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), and brown (10YR 4/3) extremely gravelly loamy coarse sand; upper surface of pebbles have thin caps of dark grayish brown (10YR 4/2) loamy material; single grain except massive in caps; loose; few roots in upper part; 10 percent soft dark

brown and dark yellowish brown weathered pebbles; strongly acid in the upper part grading to slightly acid with depth.

Holly silt loam (Ho): The Holly series consists of very deep, very poorly and poorly drained hydric soils formed in loamy alluvium on flood plains. Saturated hydraulic conductivity is moderately high through high in the mineral soil. Slope ranges from 0 through 3 percent. The taxonomic class is fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts. The following is a typical soil profile for the Holly soil series:

A-- 0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; slightly acid; clear wavy boundary. (2 to 8 inches thick.)

Bg1-- 3 to 9 inches; dark gray (5Y 4/1) silt loam; weak medium subangular blocky structure; friable; common fine prominent brown (7.5YR 4/4) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg2-- 9 to 14 inches; dark gray (5Y 4/1) silt loam; weak coarse subangular blocky structure; friable; common medium prominent yellowish red (5YR 4/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg3-- 14 to 27 inches; gray (5Y 5/1) sandy loam; weak coarse subangular blocky structure; friable; common medium and fine prominent brown (7.5YR 4/4) and strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary. (Combined thickness of the Bg horizons are 10 through 32 inches.)

C1-- 27 to 35 inches; gray (N 5/0) loam; massive; friable; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary.

C2-- 35 to 43 inches; dark gray (N 4/0) sandy loam; massive; friable; slightly alkaline; clear wavy boundary.

2C3-- 43 to 60 inches; dark greenish gray (5BG 4/1) gravelly sand; single grain; loose; slightly alkaline.

Mardin channery sillt loam (MaB): The Mardin series consists of very deep, moderately well drained soils on glaciated uplands, mostly on broad hilltops, shoulder slopes and backslopes. These soils formed in loamy till, and have a dense fragipan that starts at a depth of 36 to 66 cm (14 to 26 in) below the soil surface. The taxonomic class is coarse-loamy, mixed, active, mesic Typic Fragiudepts. The following is a typical soil profile for the Mardin soil series:

Ap--0 to 20 cm (0 to 8 in); brown (10YR 4/3) channery silt loam; pale brown (10YR 6/3) dry; moderate fine granular structure; very friable, nonsticky, slightly plastic; 20 percent channers; neutral, pH 7.0; abrupt smooth boundary.

BE--20 to 30 cm (8 to 12 in); light olive brown (2.5Y 5/4) channery silt loam; weak fine subangular blocky structure; very friable, nonsticky, slightly plastic; 15 percent channers; slightly acid, pH 6.3; clear wavy boundary. (0 to 18 cm thick) (0 to 7 in thick)

Bw1--30 to 41 cm (12 to 16 in); yellowish brown (10YR 5/4) channery silt loam; moderate medium subangular blocky structure; friable, nonsticky, slightly plastic; 20 percent channers; moderately acid, pH 5.8; clear wavy boundary.

Bw2--41 to 51 cm (16 to 20 in); brown (10YR 4/3) channery silt loam; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; 15 percent fine faint pale brown (10YR 6/3) and light brownish gray (10YR 6/2) iron depletions and 15 percent fine faint brown (7.5YR 4/4) masses of oxidized iron; 20 percent channers; strongly acid, pH 5.3; abrupt irregular boundary.

Bx1--51 to 91 cm (20 to 36 in); dark yellowish brown (10YR 4/4) channery silt loam; strong very coarse prismatic structure parts to weak very thick platy structure; very firm, slightly sticky, slightly plastic; brittle; many fine pores; clay films on surfaces along pores; 15 percent fine distinct light brownish gray (10YR 6/2) iron depletions; 30 percent channers; strongly acid, pH 5.3; gradual wavy boundary.

Bx2--91 to 145 cm (36 to 57 in); olive brown (2.5Y 4/4) channery silt loam; strong very coarse prismatic structure parts to weak coarse angular blocky structure; very firm, slightly sticky, moderately plastic; brittle; many fine pores; 20 percent clay films on all faces of peds and 20 percent clay films on surfaces along pores; 15 percent fine distinct light brownish gray (2.5Y 6/2) iron depletions and 15 percent fine distinct brown (7.5YR 4/4) masses of oxidized iron; 35 percent channers

C--145 to 183 cm (57 to 72 in); olive brown (2.5Y 4/4) channery silt loam; massive structure; firm, nonsticky, slightly plastic; 15 percent fine distinct brown (7.5YR 4/4) masses of oxidized iron and 15 percent fine distinct light olive gray (5Y 6/2) iron depletions; 35 percent channers; strongly acid, pH 5.3.

Rexford loam (RdA): The Rexford series consists of very deep, somewhat poorly drained to poorly drained soils on terraces and moraines. They formed in glacial outwash or stream terraces derived mainly from sandstone and shale. Slopes range from 0 to 15 percent. The taxonomic class is Coarse-loamy, mixed, active, mesic Aeric Fragiaquepts. The following is a typical soil profile for the Rexford soil series:

Ap--0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; many fine roots; 10 percent

rock fragments; slightly acid, abrupt wavy boundary. (6 to 10 inches thick)

Bw--8 to 12 inches; yellowish brown (10YR 5/4) loam; common fine distinct grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; 10 percent rock fragments; moderately acid; clear wavy boundary. (2 to 6 inches thick)

Bg--12 to 17 inches; grayish brown (10YR 5/2) loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; common very fine roots; 10 percent rock fragments; moderately acid; gradual wavy boundary. (3 to 12 inches thick)

2Bx1--17 to 30 inches; brown (7.5YR 5/4) gravelly loam; many fine distinct gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium and thick platy; very firm, brittle, slightly sticky, slightly plastic; few faint clay films in pores; 25 percent rock fragments; strongly acid; gradual wavy boundary. (8 to 20 inches thick)

2Bx2--30 to 38 inches; brown (7.5YR 4/4) gravelly loam; many coarse prominent light gray (10YR 7/2) and strong brown (7.5YR 5/8) mottles; moderate very coarse prismatic structure parting to moderate thick platy and weak fine subangular blocky; very firm, brittle, slightly sticky, slightly plastic; very few faint clay films in pores; 15 percent rock fragments; strongly acid; abrupt wavy boundary.

2C1--38 to 44 inches; brown (10YR 5/3) very gravelly sandy loam; massive; firm, nonsticky, nonplastic; 40 percent gravel; strongly acid; abrupt wavy boundary.

2C2--44 to 60 inches; olive brown (2.5Y 4/4) stratified sand and gravel; single grain; loose; strongly acid.

4.0 WATER RESOURCE DESCRIPTIONS

After the completion of a desktop analysis, a formal wetland delineation was completed. Areas exhibiting the potential for regulated wetlands and watercourses were evaluated to determine whether they satisfied the USACE requirements. A total of two (2) wetlands and three (3) streams were located within the investigation area (See Figure 3 – Wetland Delineation Map). Attachment A – Representative Data Forms includes data collected for the wetlands and streams at the site. Attachment B - Photographic Documentation includes photographs of the investigation area as well as a brief description of the featured water resource. The following provides a descriptive summary of the findings within the project area.

4.1 WETLAND 1

Wetland 1 is a complex of Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forested (PFO) wetland. This wetland complex is located within an active agricultural field and adjacent to Grange Road. Wetland 1 receives hydrology from unnamed tributaries (UNTs) 1, 2, and 3 which flow from the northeast corner to the

southeast corner of the investigation area. Wetland 1 has an upper pocket to the north that is connected hydrologically to the main section of the wetland located to the south. This wetland exhibited multiple hydrologic indicators including: standing water, saturation at the surface, and drainage patterns. A restrictive layer was observed at multiple data point locations at a depth of 6 inches. Soil test pits throughout the wetland revealed hydric soils exhibiting depleted matrixes.

Dominant vegetation within the emergent portion of Wetland 1 included common rush (*Juncus effusus,* OBL), reed canarygrass (*Phalaris arundinacea*, OBL). sensitive fern, (*Onoclea sensibilis*, FACW), Devil's beggatick (*Bidens frondosa*, FACW), and shallow sedge (*Carex lurida*, OBL). Dominant vegetation within the Shrub-Scrub portion of Wetland 1 included: silky dogwood (*Cornus amomum*, FACW), reed canarygrass (*Phalaris arundinacea*, OBL), and fowl mannagrass (*Glyceria striata,* OBL). Dominant vegetation within the forested section of Wetland 1 include red maple, (*Acer rubrum*. FAC), common buttonbush (*Cephalanthus occidentalis*, OBL), hazel alder (*Alnus serrulata*, OBL), and silky dogwood, *Cornus amomum*, FACW).

Observed soils in the wetland area from 0-4 inches displayed a matrix of 10YR 4/1 with 5% 7.5YR 5/6 redox concentrations. From 4-10 inches soils displayed the same characteristics as the layer above, except in some cases where a fragipan was encountered at a depth of 6 inches. Soil from 10 - 14 inches displayed a matrix of 10YR 5/2 with 5% 10YR 5/8 redox concentrations except where the restrictive layer was observed. Soil test pits throughout the wetland revealed hydric soils exhibiting depleted matrixes.

The overall wetland complex is approximately 8.44 acres or 367,646 square feet in size of which 6.89 acres or 300,128 square feet is considered PEM, 1.28 acres, or 55,757 square feet is considered PSS, and 0.27 acres, or 11,761 square feet is considered PFO.

4.2 WETLAND 2

Wetland 2 is a small, isolated Palustrine Emergent (PEM) wetland. The wetland lies within an active agricultural field north of Wetland 1. The wetland receives hydrology from a side hill seep. The wetland exhibited multiple hydrologic indicators including: standing water, saturation at the surface, high water table, and oxidized rhizospheres.

Dominant vegetation within Wetland 2 included: reed canarygrass (*Phalaris arundinacea* ,OBL), corn (*Zea mays*, UPL), wrinkleaf goldenrod (*Solidago rugose*, FAC). Observed soils in the wetland area from 0-6 inches displayed a matrix of 10YR 4/1 with 20% 7.5YR 5/6 redox concentrations. A restrictive fragipan was encountered at a depth of 6 inches. A soil test pit taken in the wetland revealed hydric soils exhibiting a depleted matrix. Wetland 2 is 0.14 acres, or 6,098 square feet in size.

4.3 UNT 1

UNT 1 flows into UNT 2 at the northern section of Wetland 1. UNT 1 is a perennial channel that meanders through Wetland 1 providing hydrology. The channel flows in a

southwesterly direction from the northeast corner of the investigation area. The stream channel is well defined and its width ranges from 1-2 feet. Bank heights were approximately 1 feet. The depth of water was 7-12 inches. The substrate of the channel consisted of gravel and silt. The channel was left open ended in the northeast corner of the investigation area. UNT 1 travels for 380 linear feet or 570 square feet within the investigation area.

4.4 UNT 2

UNT 2 is a perennial channel that meanders through Wetland 1 providing hydrology. The channel flows in a southeasterly direction from the western boundary of Wetland 1. The stream channel is well defined and its width ranges from 1-2 feet. Bank heights were approximately 1 feet. The depth of water varied between 7-24 inches. The substrate of the channel consisted of gravel and silt. UNT 2 travels for 225 linear feet or 338 square feet within the investigation area. UNT 2 flows into UNT 3 in the center of Wetland 1.

4.5 UNT 3

UNT 3 is a perennial channel that meanders through Wetland 1 providing hydrology. The channel flows in a southeasterly direction from the northern boundary of Wetland 1. The stream channel is well defined and its width ranges from 1-2 feet. Bank heights were approximately 1 feet. The depth of water varied between 7-12 inches. The substrate of the channel consisted of gravel and silt. UNT 3 travels for 1,494 linear feet or 2240 square feet within the investigation area. UNT 3 flows into Huntington Creek south of the investigation area.

5.0 CONCLUSIONS

Based on the results of the field investigation, 373,745 square feet or 8.58 acres of wetlands and 2,099 linear feet or 3,148 square feet of streams were delineated within the investigation area. Any impacts to the identified resources would require authorization under PADEP and USACOE guidelines.

6.0 REFERENCES

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7. United States Fish and Wildlife Service. National Wetland Inventory Map, 7.5 Minute Series Quadrangle Shickshinny, Pennsylvania.

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ATTACHMENT A

DATA FORMS

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP1

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.19726 Long.: -76.20588 Datum: NAD 83

Soil Map Unit Name Holly silt loam (Ho) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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?	X	**Is the sampled area within a wetland?**	Yes X No ___
Hydric soil present?	X		
Wetland hydrology present?	X	If yes, optional wetland site ID:	Wetland 1

Remarks: Clear skies, high of 45 degrees. Data point located in PEM portion of Wetland 1. Wetland connects to UNT 1, 2, and 3.

HYDROLOGY

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

- X Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present?	Yes X	No ___	Depth (inches):	1"
Water table present?	Yes X	No ___	Depth (inches):	0"
Saturation present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	0"

Wetland hydrology present? Yes X No ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary and secondary hydrology indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP1

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____5'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	35	Y	FACW
2 *Juncus effusus*	20	Y	OBL
3 *Carex sp.*	10	N	FAC
4			
5			
6			
7			
	65 =	Total Cover	

Woody vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
	=	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: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

X 1 - Rapid test for hydrophytic vegetation

X 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: Hydrophytic vegetation present.

SOIL

Sampling Point: DP1

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 Features %	Type*	Loc**	Texture	Remarks
0-10"	10 YR 4/1	85	7.5 YR 5/6	15	C	M	SiL	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Soils exhibit hydric indicators.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP2

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.79893 Long.: -76.20646 Datum: NAD 83

Soil Map Unit Name Chenango gravelly loam (ChA) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N , soil N , or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N , soil N , or hydrology N 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? X

Hydric soil present? X

Wetland hydrology present? X

Is the sampled area within a wetland? Yes X No ___

If yes, optional wetland site ID: Wetland 1

Remarks: Clear skies, high of 45 degrees. DP2 was taken at border of PEM and PFO portion of Wetland 1.

HYDROLOGY

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- ___ FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	X	No	___	Depth (inches): 4"
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 4"

Wetland hydrology present? Yes X No ___

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary hydrologic indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP2

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1 *Acer rubrum*	60	Y	FAC
2			
3			
4			
5			
6			
7			
	60 =	Total Cover	

Sapling/Shrub Stratum (Plot Size: 15')	Absolute % Cover	Dominant Species	Indicator Staus
1 *Cornus amomum*	40	Y	FACW
2 *Cephalanthus occidentalis*	20	Y	OBL
3			
4			
5			
6			
7			
	60 =	Total Cover	

Herb Stratum (Plot Size: 5')	Absolute % Cover	Dominant Species	Indicator Staus
1 *Solidago rugosa*	20	Y	FAC
2 *Carex sp.*	15	Y	FAC
3 *Euthamia graminifolia*	10	N	FAC
4 *Rubus flagellaris*	10	N	FACU
5 *Thelypteris palustris*	5	N	FACW
6			
7			
	60 =	Total Cover	

Woody vine Stratum (Plot Size: 15')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
	=	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

- ___ 1 - Rapid test for hydrophytic vegetation
- X 2 - Dominance test is >50%
- ___ 3 - Prevalence index is ≤3.0*
- ___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: Hydrophytic vegetation present.

SOIL

Sampling Point: DP2

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 Features %	Type*	Loc**	Texture	Remarks
0-12"	10 YR 4/1	80	7.5 YR 5/6	20	C	M	SiL	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Soils exhibit hydric indicators.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP3

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.19862 Long.: -76.20645 Datum: NAD 83

Soil Map Unit Name Braceville gravelly loam (BrB) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N , soil N , or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N , soil N , or hydrology N 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? X

Hydric soil present? X

Wetland hydrology present? X

Is the sampled area within a wetland? Yes X No ___

If yes, optional wetland site ID: Wetland 1

Remarks: Clear skies and high of 45 degrees. DP3 was taken in PSS portion of wetland1.

HYDROLOGY

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

- X Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present? Yes X No ___ Depth (inches): 1"

Water table present? Yes X No ___ Depth (inches): 0"

Saturation present? Yes X No ___ Depth (inches): 0"

(includes capillary fringe)

Wetland hydrology present? Yes X No ___

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary and secondary hydrologic indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP3

Tree Stratum (Plot Size:_____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:____15'_____	Absolute % Cover	Dominant Species	Indicator Staus
1 *Cornus amomum*	15	Y	FACW
2 *Alnus serrulata*	5	Y	OBL
3			
4			
5			
6			
7			
	20 =	Total Cover	

Herb Stratum (Plot Size:_____5'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	50	Y	FACW
2 *Glyceria striata*	30	Y	OBL
a *Onoclea sensibilis*	15	N	FACW
4 *Polygonum sagittatum*	15	N	OBL
5 *Symplocarpus foetidus*	10	N	OBL
6			
7			
	120 =	Total Cover	

Woody vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
	0 =	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

X 1 - Rapid test for hydrophytic vegetation

X 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: Hydrophytic vegetation present.

SOIL

Sampling Point: DP3

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*	Loc**	Texture	Remarks
0-12"	10 YR 4/1	95	7.5 YR 5/6	5	C	M	SiL	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Soils exhibit hydric indicators.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP4

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.19789 Long.: -76.20757 Datum: NAD 83

Soil Map Unit Name Chanengo gravelly loam (ChA) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N , soil N , or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N , soil N , or hydrology N 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? X	**Is the sampled area within a wetland?** Yes X No ___
Hydric soil present? X	
Wetland hydrology present? X	If yes, optional wetland site ID: Wetland 1

Remarks: Clear skies, high of 45 degrees. DP4 was taken at border between PEM and PFO boundary of wetland.

HYDROLOGY

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X 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)
- ___ FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___		
Water table present?	Yes X	No ___	Depth (inches): 6"	**Wetland hydrology present?**	Yes X No ___
Saturation present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 6"		

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary hydrologic indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP4

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	90	Y	FACW
2 *Onoclea sensibilis*	25	Y	FACW
a			
4			
5			
6			
7			
	=	Total Cover	

Woody vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
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: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

X 1 - Rapid test for hydrophytic vegetation

X 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: Hydrophytic vegetation present.

SOIL

Sampling Point: DP4

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*	Loc**	Texture	Remarks
0-12"	10 YR 4/1	80	7.5 YR 5/6	20	C	M	SiL	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Soils exhibit hydric indicators.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP5

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): pasture Local relief (concave, convex, none): none Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.19991 Long.: -76.20991 Datum: NAD 83

Soil Map Unit Name Holly silt loam (Ho) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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?	X	**Is the sampled area within a wetland?**	Yes X No ___
Hydric soil present?	X		
Wetland hydrology present?	X	If yes, optional wetland site ID:	Wetland 2

Remarks: Clear skies, high of 45 degrees. DP5 was taken in the very northern isolated wetland pocket on the border between a corn field and forest.

HYDROLOGY

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

- X Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X 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)
- ___ FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present?	Yes X	No ___	Depth (inches):	2"
Water table present?	Yes X	No ___	Depth (inches):	0"
Saturation present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	0"

Wetland hydrology present? Yes X No ___

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary hydrologic indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP5

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____5'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	40	Y	FACW
2 *Zea mays*	40	Y	UPL
a *Solidago rugosa*	20	Y	FAC
4			
5			
6			
7			
	100 =	Total Cover	

Woody vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
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: 67.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

___ 1 - Rapid test for hydrophytic vegetation

X 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

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

SOIL

Sampling Point: DP5

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 Features %	Type*	Loc**	Texture	Remarks
0-6"	10 YR 4/1	80	7.5 YR 5/6	20	C	M	SiL	Fragipan at 6"

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Fragipan

Depth (inches): 6"

Hydric soil present? Yes X No ___

Remarks: Soil exhibits hydric indicators. Fragipan at depth of 6".

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP6

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): pasture Local relief (concave, convex, none): None Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.19824 Long.: -76.20575 Datum: NAD 83

Soil Map Unit Name Mardin channery silt loam (MaB) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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? N	**Is the sampled area within a wetland?** Yes ___ No X
Hydric soil present? N	
Wetland hydrology present? N	If yes, optional wetland site ID: ___

Remarks: Mainly sunny, high of 45 degrees. DP6 is an upland point in the southwestern portion of the Investigation Area.

HYDROLOGY

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)
- ___ FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___	
Water table present?	Yes ___	No X	Depth (inches): ___	**Wetland hydrology present?** Yes ___ No X
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___	

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No primary or secondary hydrologic indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP6

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____5'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Lolium perenne*	25	Y	FACU
2 *Phluem pratense*	15	Y	FACU
a *Anthoxanthum odoratum*	15	Y	FACU
4			
5			
6			
7			
	55 =	Total Cover	

Woody vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
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: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species		x 1 =		
FACW species		x 2 =		
FAC species		x 3 =		
FACU species	55	x 4 =	220	
UPL species		x 5 =		
Column totals	55	(A)	220	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X

Remarks: Hydrophytic vegetation is not present.

SOIL

Sampling Point: DP6

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*	Loc**	Texture	Remarks
0-6"	10 YR 4/4	100					SiL	Restrictive layer at 6"

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Fragiapan

Depth (inches): 6"

Hydric soil present? Yes ___ No X

Remarks: Soils exhibited no hydric indicators. A fragipan was observed at a depth of 6".

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Grajewski Farm City/County: Luzerne Sampling Date: 12/8/15

Applicant/Owner: PennEast State: PA Sampling Point: DP7

Investigator(s): LB, DW, TH Section, Township, Range: Huntington Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat.: 41.19726 Long.: -76.20574 Datum: NAD 83

Soil Map Unit Name Rexford loam (RdA) NWI Classification: n/a

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N , soil N , or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N , soil N , or hydrology N 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? X	**Is the sampled area within a wetland?** Yes X No ___
Hydric soil present? X	
Wetland hydrology present? X	If yes, optional wetland site ID: Wetland 1

Remarks: Mainly sunny, high of 45 degrees. DP7 is a PEM data point taken in the southwestern portion of the wetland.

HYDROLOGY

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X 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)
- X 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)
- ___ FAC-Neutral Test (D5)
- ___ Microtopographic Relief (D4)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___	
Water table present?	Yes ___	No X	Depth (inches): ___	**Wetland hydrology present?** Yes X No ___
Saturation present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0"	

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary and secondary hydrologic indicators present.

VEGETATION - Use scientific names of plants

Sampling Point: DP7

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Scripus cyperinus*	30	Y	OBL
2 *Phalaris arundinacea*	30	Y	FACW
a *Bidens frondosa*	25	Y	FACW
4 *Carex lurida*	25	Y	OBL
5 *Onoclea sensibilis*	25	Y	FACW
6 *Verbena hastata*	15	Y	FACW
7 *Euthamia graminifolia*	10	Y	FAC
	160 =	Total Cover	

Woody vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
	0 =	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across all Strata: 7 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

X 1 - Rapid test for hydrophytic vegetation

X 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: Hydrophytic vegetation present.

SOIL

Sampling Point: DP7

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*	Loc**	Texture	Remarks
0-6"	10 YR 4/1	80	7.5 YR 5/6	20	C	M	SiL	Fragipan at 6"

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Suface (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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ 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)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Fragipan

Depth (inches): 6"

Hydric soil present? Yes X No ___

Remarks: Soils exhibited a depleted matrix hydric indicator. A fragipan was observed to a depth of 6".

STREAM ID: SS UNT 1

STREAM DATA

☐ ROW ☐ Project Facility STATE PA
☐ Access Road ☐ Staging/Storage Area

County: Luzerne

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 12/8/15

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Map No. :

Observers: DW, LB, TH

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: SW

Width (ft) (water's edge to water's edge): 1-2ft

Width (ft) (bank to bank): 1-2ft
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☐ Sand
- ☑ Silt
- ☐ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☐ N/A
- ☐ 0 – 6"
- ☑ 7 – 12"
- ☐ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☑ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other

BANK HEIGHT AND SLOPE

Left Bank*
Height (ft): 1'
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Right Bank*
Height (ft): 1'
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 1'
*Direction when facing downstream

Evidence of Erosion: ☐ yes ☑ no

☐ Sloughing ☐ Undercutting ☐ Impact from Cattle

☐ Other:

NOTES for HIGH BANK for Construction (if present)
Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
*Direction when facing downstream

ASSOCIATED HABITAT

Riparian Vegetation
☐ yes, list ID: HB-
☑ no
If yes, list:

Width of riparian corridor (ft):

Stream Fringe (5' or less including both banks and does not meet wetland criteria)
☑ yes, width (ft): 15
☐ no
If yes, list :
reed canary grass

Aquatic Vegetation
☑ yes
☐ no
If yes, list:
watercress

ASSOCIATED SPECIES

Aquatic Organisms
☐ yes
☑ no
If yes, list:

Riparian/Terrestrial Organisms
☐ yes
☑ no
If yes, list:

Stream has potential for fish presence
☐ yes
☑ no

T&E Species
☐ yes, list ID: WL/VG-
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☐ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☑ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):

Discontinuous OHWM: ☐ yes ☑ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☐ pools ☐ riffles
Explain:

Is the stream/tributary:
☑ natural
☐ manmade – Explain:
☐ man-altered – Explain:

NOTES:
UNT 1 has a confluence with UNT 3 and then begins to flow south, as well as a confluence with UNT 2 and continues to flow south.

STREAM ID: SS UNT 2

STREAM DATA

☐ ROW ☐ Project Facility STATE PA
☐ Access Road ☐ Staging/Storage Area

County: Luzerne

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 12/8/15

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Map No. :

Observers: DW, LB, TH

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: E

Width (ft) (water's edge to water's edge): 1-2ft

Width (ft) (bank to bank): 1-2ft
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☐ Sand
- ☑ Silt
- ☐ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☐ N/A
- ☐ 0 – 6"
- ☑ 7 – 12"
- ☑ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☑ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other

BANK HEIGHT AND SLOPE

Left Bank*
Height (ft): 1'
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Right Bank*
Height (ft): 1'
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 1'
*Direction when facing downstream

Evidence of Erosion: ☐ yes ☑ no

☐ Sloughing ☐ Undercutting ☐ Impact from Cattle

☐ Other:

NOTES for HIGH BANK for Construction (if present)
Width (ft) Highest Bank to Highest Bank:
Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
*Direction when facing downstream

ASSOCIATED HABITAT

Riparian Vegetation
☐ yes, list ID: HB-
☑ no
If yes, list:

Width of riparian corridor (ft):

Stream Fringe (5' or less including both banks and does not meet wetland criteria)
☑ yes, width (ft): 15
☐ no
If yes, list :
reed canary grass

Aquatic Vegetation
☑ yes
☐ no
If yes, list:
watercress

ASSOCIATED SPECIES

Aquatic Organisms
☐ yes
☑ no
If yes, list:

Riparian/Terrestrial Organisms
☐ yes
☑ no
If yes, list:

Stream has potential for fish presence
☐ yes
☑ no

T&E Species
☐ yes, list ID: WL/VG-
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☐ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☑ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):

Discontinuous OHWM: ☐ yes ☑ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☐ pools ☐ riffles
Explain:

Is the stream/tributary:
☑ natural
☐ manmade – Explain:
☐ man-altered – Explain:

NOTES:
UNT 2 has a confluence with UNT 1 and then begins to flow south.

STREAM ID: SS UNT 3

STREAM DATA

☐ ROW ☐ Project Facility STATE PA
☐ Access Road ☐ Staging/Storage Area

County: Luzerne

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 12/8/15

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Map No. :

Observers: DW, LB, TH

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: SE

Width (ft) (water's edge to water's edge): 1-2ft

Width (ft) (bank to bank): 1-2ft
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☐ Sand
- ☑ Silt
- ☐ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☐ N/A
- ☐ 0 – 6"
- ☑ 7 – 12"
- ☐ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☑ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other

BANK HEIGHT AND SLOPE

Left Bank*
Height (ft): 1'
Slope:
- ☑ 0-30º (4:1)
- ☐ 31-45º (3:1)
- ☐ 46-60º (2:1)
- ☐ 61-90º (1:1)

Right Bank*
Height (ft): 1'
Slope:
- ☑ 0-30º (4:1)
- ☐ 31-45º (3:1)
- ☐ 46-60º (2:1)
- ☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 1'
*Direction when facing downstream

Evidence of Erosion: ☐ yes ☑ no

☐ Sloughing ☐ Undercutting ☐ Impact from Cattle

☐ Other:

NOTES for HIGH BANK for Construction (if present)
Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
*Direction when facing downstream

ASSOCIATED HABITAT

Riparian Vegetation
☐ yes, list ID: HB-
☑ no
If yes, list:

Width of riparian corridor (ft):

Stream Fringe (5' or less including both banks and does not meet wetland criteria)
☐ yes, width (ft):
☑ no
If yes, list :

Aquatic Vegetation
☑ yes
☐ no
If yes, list:
watercress

ASSOCIATED SPECIES

Aquatic Organisms
☐ yes
☑ no
If yes, list:

Riparian/Terrestrial Organisms
☐ yes
☑ no
If yes, list:

Stream has potential for fish presence
☐ yes
☑ no

T&E Species
☐ yes, list ID: WL/VG-
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☑ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☐ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):

Discontinuous OHWM: ☐ yes ☑ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☐ pools ☐ riffles
Explain:

Is the stream/tributary:
☑ natural
☐ manmade – Explain:
☐ man-altered – Explain:

NOTES:
UNT 3 has a confluence with UNT 1 and then continues to flow south.

ATTACMENT B

PHOTOGRAPHIC DOCUMENTATION

ID: Photo 1

Date: 12/08/15

Taken by: DW

Comments: This photo depicts a western view from the eastern boundary of Wetland 1.

ID: Photo 2

Date: 12/08/15

Taken by: DW

Comments: This photo shows a southern view from the northern isolated pocket of Wetland 1.

ID: Photo 3

Date: 12/08/15

Taken by: DW

Comments: This photo depicts a southern view from the northern boundary of the main section of Wetland 1.

ID: Photo 4

Date: 12/08/15

Taken by: DW

Comments: This photo depicts a southern view across the majority of Wetland 1.

ID: Photo 5

Date: 12/08/15

Taken by: DW

Comments:
This photo depicts an eastern view from the western boundary of Wetland 1.

ID: Photo 6

Date: 12/08/15

Taken by: DW

Comments:
This photo depicts a southern view from the southern boundary of Wetland 1.

ID: Photo 7

Date: 12/08/15

Taken by: DW

Comments: This photo shows an eastern view from the western boundary of Wetland 1.

ID: Photo 8

Date: 12/08/15

Taken by: DW

Comments: This photo shows a northern view from the southern boundary of Wetland 1.

ATTACHMENT C

WATER RESOURCE SUMMARY TABLE

GRAJEWSKI PROPERTY										
WATER RESOURCE SUMMARY TABLE										
Waters Name	Cowardin Code	HGM Code	Estimated Amount of Aquatic Resource in Review Area (sq ft)	Estimated Amount of Aquatic Resource in Review Area Linear (ft)	Estimated Channel Width (ft)	Water Types	Latitude (dd nad 83)	Longitude (dd nad 83)	Local Waterway	Stream Type (P-Perennial, I-Intermittent, or E-Ephemeral)
Wetland 1	PEM	DEPRESS	300,128	N/A	N/A	RPWWD	41.19571	-76.20754	Huntington Creek	N/A
Wetland 1	PSS	DEPRESS	55,757	N/A	N/A	RPWWD	41.19687	-76.20781	Huntington Creek	N/A
Wetland 1	PFO	DEPRESS	11,761	N/A	N/A	RPWWD	41.19774	-76.20695	Huntington Creek	N/A
Wetland 2	PEM	DEPRESS	6,098	N/A	N/A	RPWWD	41.19991	-76.20899	Huntington Creek	N/A
UNT 1	R3	RIVERINE	570	380	1-2	RPW	41.19828	-76.20570	Huntington Creek	P
UNT 2	R3	RIVERINE	338	225	1-2	RPW	41.19740	-76.20680	Huntington Creek	P
UNT 3	R3	RIVERINE	2,240	1,494	1-2	RPW	41.19874	-76.20680	Huntington Creek	P
		Total	376,893	2,099						

ATTACHMENT D

RESUMES

COMPANY TITLE:

Environmental Specialist

EDUCATION

- *BA, Environmental Studies, The Pennsylvania State University, 2010: Minor in Biology*

PROFESSIONAL CERTIFICATIONS

- *Ohio Rapid Assessment Method (ORAM) Certification*
- *NCCER Craft Instructor Performance Evaluator Certification Nov. 2013*
- *38-Hour training on the "Army Corps of Engineers Wetland Delineation / Waters of the United States Training"*
- *"Overview of Wetland Delineation Protocols and the Interim NC/NE Regional Supplement to the USACE Delineation Manual".*

PROFESSIONAL TRAINING

- *Pennsylvania Natural Heritage Program – PNDI Updates Presentation Harrisburg, Pa - Dec. 16, 2013*
- *PA One Call System, Inc. Locater Program – State College, Pa November 20, 2013*
- *NCCER Performance Verifications October 28, 2013*
  - *PV151 15.1 Visual inspection*
  - *PV152 15.2 Reporting protocols*
  - *PV320 32.0 Monitoring Excavation Activities*
- *AOCFG- Abnormal Operating Conditions- Field NCCER Sept. 18, 2013*
- *Custom Pipeline Inspector NCCER Sept. 18, 2013*
  - *Task 15 Inspect Surface Conditions of Right-of-Away 15.1 Visual inspection 15.2 Reporting Protocols*
  - *Task 32 Monitoring Excavation Activities*
- *PA DEP ESCGP-2 Training July 10, 2013 State College, PA*
- *OSHA 8 Hour HAZWOPER Refresher Training; AllProbe Environmental; June 2013, 2014*
- *OSHA 40 Hour HAZWOPER Training; AllProbe Environmental; June 2012*
- *PA SFI® Training; Prof. Timber Harvesting Ess., Wildlife - Young Forest Initiative, Game of Logging - Level 1; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Federal Energy Commission "Environmental Review and Compliance for Natural Gas Facilities Seminar" San Antonio, Texas Sept. 24-26, 2013*
- *Marcellus Workshop February 2012 "An Update On PHMSA Pipeline Regulations & Act 127" "Taking Cartopac Into The Field {Who, How, And Why)" "Streamlining Field Data Collection For Pipeline And Environmental Workflows"*
- *General Permit – 4 (PASPGP-4) Workshop; Army Corps of Engineers, Baltimore District, Regulatory Branch; October 2011*

David Wood

Mr. Wood graduated from The Pennsylvania State University with a degree in Environmental Studies and a minor in Biology. Since graduation, he has been associated with numerous projects at many different levels and has gained a vast knowledge of all aspects of environmental permitting. He gained skills through his previous experiences and WHM Consulting, Inc. in various environmental projects dealing with water quality and land use.

PROFESSIONAL EXPERIENCE

ENVIRONMENTAL SURVEYS

- Assisted with rare, threatened and endangered plant surveys and reporting, including surveys for: *Scirpus ancistrochaetus*, *Ilex opaca*, *Isotria medeoloides, Asplenium bradleyi, Cyperus refractus, Solidago simplex spp. Randii var. Ra, Tripsacum dactyloides, Cimicifuga Americana, Oxypolis rigidior, Castilleja coccinea, Clethra acuminata, Trillium cernuum, Solidago speciosa var. speciosa, Chenopodium foggii, Helianthemum bicknellii, Prunus alleghaniensis*.
- Field assistant on multiple Timber Rattlesnake Phase I and II surveys and Allegheny Wood Rat surveys.
- Performed macroinvertebrate sampling.
- Forest inventory and assessment.

WATER RESOURCE PROJECTS

- Performed water resource delineations and reporting, and performed wetland and stream mitigation monitoring and reporting.
- Conducted wetland mitigation construction and planting oversite on various mitigation projects throughout Pennsylvania.
- Collected water samples and onsite water quality data.

ENVIRONMENTAL PERMITTING

- Produced mitigation plans for wetland and stream impacts, including vegetative design, vegetative planting zones, enhancement species lists.
- Performed Erosion and Sediment control inspections on gas well sites.
- Assisted with a variety of environmental permitting projects.
- Conservation Methods Storm Waste Water Wetlands.
- Conservation Methods Pond Complex.

EQUIPMENT AND MAPPING

- Perform task utilizing Trimble surveying equipment.
- Utilize GIS software for mapping and data analysis.

Taylor R. Harris

COMPANY TITLE:
Environmental Technician

EDUCATION

- *Environmental Resource Management, Bachelors of Science, The Pennsylvania State University, University Park, Pennsylvania, 2014.*

INDEPENDENT COURSEWORK

- *Conservation Biology*
- *Environmental Resource Systems Analysis*
- *Limnology*
- *Air Pollution effects on Terrestrial Ecosystems*
- *Ecosystem Management*
- *Fundamentals of Organic Chemistry I & II*
- *Calculus I & II*
- *Plant Physiology*
- *Wetland Conservation*
- *Legal Aspects of Resource Management*

PROFESSIONAL TRAINING

- *PAPSS Delineation Training; 2015*
- *ACOE Wetland Delineation Training; 2015*
- *OSHA 24 Hour HAZWOPER Training; AllProbe Environmental; July 2014*
- *Williams Contractor Safety; April 2014*

Mr. Harris is a graduate from The Pennsylvania State University in 2014, where he was awarded a Bachelors degree in Environmental Resource Management from the College of Agricultural Sciences. Since graduation he has gained experience in many environmental areas including: wetland delineations, stream restoration, threatened and endangered species surveys and Geographic Information System.

PROFESSIONAL EXPERIENCE

GENERAL ENVIRONMENTAL PROJECTS

- GIS software for mapping and analysis
- GPS for delineating boundaries and mapping purposes
- Performed land analysis using GIS Software to determine suitable areas for development.

WETLAND AND STREAM RESTORATION PROJECTS

- Conducted wetland monitoring and maintenance on various wetlands
- Assisted Stream Restoration projects
- Performed wetland delineations using US Army Corps of Engineers Wetlands Delineation Manual 1987 and applicable regional supplements
- Used the Pa Code Chapter 93 Water Quality Standards and Chapter 105 Dam safety and Waterway Management
- Skilled with surveying equipment to characterize stream profiles for mapping and design purposes

BIOLOGICAL EXPERIENCE

- Assisted various threatened and endangered species Phase I surveys
- Identified and documented different herpetile species at numerous wetland sites
- Composed various Threatened and Endangered species reports
- Performed Macro-invertebrate sampling on several streams
- Performed wildlife habitat assessments

COMPANY TITLE:
Environmental Technician

EDUCATION

- ***Biology, Bachelors of Science, The Pennsylvania State University, University Park, Pennsylvania, 2013.***

INDEPENDENT COURSEWORK

- ***Biological Evolution***
- ***Field Biology***
- ***Tropical Field Ecology (Class in Costa Rica)***
- ***Mammology***
- ***Elementary Statistics***
- ***Fundamentals of Organic Chemistry I & II***
- ***Calculus I & II***
- ***Plant Physiology***
- ***Mammalian Physiology***
- ***Physics I & II***

PROFESSIONAL TRAINING

- ***Federal Regulatory Energy Commission Training- February 2015***
- ***OSHA 24 Hour HAZWOPER Training; AllProbe Environmental; July 2014***
- ***Williams Contractor Safety; April 2014***

Lawrence R. Burns

Mr. Burns is a graduate from The Pennsylvania State University in 2013, where he was awarded a Bachelors degree in Biology from the Eberly College of Science. Since graduation he has gained experience in many environmental areas including wetland delineations, stream projects, threatened and endangered species surveys and GIS mapping.

PROFESSIONAL EXPERIENCE

GENERAL ENVIRONMENTAL PROJECTS

- Used GIS software for mapping and analysis
- Used a Trimble GPS for mapping boundaries for mapping purposes
- Composed various Environmental Reports for landfills, gas companies, wind farms, construction companies, private landowners, and regulatory agencies
- Performed land analysis's using GIS Software for determining suitable areas for development.

WETLAND AND STREAM RESTORATION PROJECTS

- Performed wetland monitoring and maintenance on various wetlands
- Performed Stream Surveys
- Practiced wetland delineations using US Army Corps of Engineers Wetlands Delineation Manual 1987 and applicable regional supplements
- Used the Pa Code Chapter 93 Water Quality Standards and Chapter 105 Dam safety and Waterway Management
- Used surveying equipment to characterize stream profiles for mapping and design purposes
- Delineated wetlands and water resources at projects throughout Pennsylvania
- Conducted tidal marsh wetland assessment (MIDTRAM)
- Checked seismic testing locations for wetlands.

BIOLOGICAL EXPERIENCE

- Assisted on Bog Turtle Phase I, II, and III surveys
- Assisted on threatened and endangered species Phase I surveys
- Identified and documented different herpetile species at numerous wetland sites
- Composed various Threatened and Endangered species reports
- Performed Macro-invertebrate sampling on several streams.
- Performed wildlife habitat assessments

KISTLER MITIGATION SITE

PENN EAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT
COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

WEST PENN TOWNSHIP
SCHUYLKILL COUNTY, PENNSYLVANIA

KISTLER PROPERTY WETLAND DELINEATION REPORT

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- 4.2 Wetland 2
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5.0 Conclusions

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PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT
COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

WEST PENN TOWNSHIP, SCHUYLKILL COUNTY, PENNSYLVANIA

KISTLER PROPERTY WETLAND DELINEATION REPORT

1.0 INTRODUCTION

WHM Solutions, Inc. (WHM) was retained by PennEast Pipeline Company, LLC (PennEast) to conduct delineation of wetland and water resources at the Kistler Farm located in West Penn Township, Schuylkill County, Pennsylvania (Figure 6 – Project Location Map). PennEast proposes to use this property for mitigation purposes to offset unavoidable impacts to aquatic resources resultant from the proposed PennEast Pipeline Project (Project). The purpose of this investigation was to determine if regulated wetlands and waters exist within the subject area in accordance with U.S. Army Corps of Engineers (USACE) guidelines, as regulated under Section 404 of the Clean Water Act (CWA) and Pa Code 25 Chapter 105. This report provides information on the methodology, data collected, delineation field findings, and conclusions pertaining to wetland and water resources identified in the study area. The delineation was performed by Paul Fisher and Brant Hoover of WHM on September 6th, 2013. A follow-up field visit to review the boundaries, as delineated in 2013, was conducted by Kevin Clark of WHM on March, 27th, 2015.

2.0 METHODOLOGY

WHM conducted investigations on the subject project area according to the procedures and technical guidelines outlined in the 1987 *USACE Wetland Delineation Manual* including specifically the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (January 2012, Version 2.0)*. The USACE protocol establishes a three parameter approach for identification and delineation of wetlands, which includes confirmation of the following:

I. Hydrophytic Vegetation: This condition exists when greater than 50% of the plant species contain obligate (OBL), facultative-wet (FACW), or facultative (FAC) indicator status.

II. Hydric Soils: Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Register, July 13, 1994).

III. Wetland Hydrology: Wetland hydrology is recognized through evidence of inundation and/or saturation to the soil surface for at least 5% of the growing season during most years.

In undisturbed conditions, all three parameters must be confirmed to be present to characterize an area as a wetland. In highly disturbed or problematic wetland situations, Corps guidance details procedures to be used for evaluating these areas and determining which areas are most likely considered wetlands upon review by a Corps representative. Upon completing our investigations, areas exhibiting all three of the USACE criteria presented above and which also have surface water connection to other waters of the United States are identified as resources that are likely to be regulated by the USACE as Jurisdictional Wetlands. Areas exhibiting all three parameters but without surface water connection to other waters are also likely to be designated as wetlands or waters but may or may not be regulated by the USACE. In many cases, wetland areas not regulated by the USACE are still likely to be regulated by other state or local governing bodies.

In addition to wetlands, WHM also identifies adjacent waterways likely to be regulated as waters of the United States, including ephemeral, intermittent and perennial waterways. The term "jurisdictional waters of the United States" as used by Section 404 of the CWA and defined under 33 Code of Federal Register (CFR) Section 328.1, includes adjacent wetlands and tributaries to traditionally navigable waters (TNW) and other waters with a hydrological connection to a TNW.

WHM provides a complete delineation flagging of wetland/waters resources and supporting data. As noted above, our determinations are based on our collective "best professional judgment" exercised with the guidance of the Corps' Manual and Supplements. However, the final determination of the Jurisdictional status of the resources identified lies entirely within the review of the reviewing regulatory agencies. In other words, we identify a technically defensible boundary that must either be accepted or adjusted by the reviewing regulatory agencies in situations where encroachments may occur. As consultant environmental scientists, we do not have authority to assign regulatory jurisdiction.

For delineations performed in the Commonwealth of Pennsylvania, all wetlands and waters identified during the wetland delineation are deemed probable "Jurisdictional waters of the United States" until otherwise reviewed and accepted by the USACE and/or Pennsylvania Department of Environmental Protection (DEP). If upon review the wetland or water is determined to be isolated by the regulators (i.e. has no significant nexus to "jurisdictional waters of the United States"), the regulatory body for such waters then becomes the jurisdiction of the DEP.

3.0 DESKTOP FINDINGS

Prior to conducting field investigations, WHM completed a review of natural resource data associated with the project site. Specifically, WHM reviewed USGS 7.5 minute topographical mapping for New Ringgold, Pennsylvania, U.S. Fish and Wildlife National Wetland Inventory mapping, and the U.S Department of Agriculture – NRCS Soil Survey for Schuylkill County, Pennsylvania. The results of this desktop analysis were used to help establish probable areas where wetlands and watercourses could be located before conducting the field investigation portion of the project.

3.1 USGS & TOPOGRAPHIC DATA

According to the 7.5 minute USGS quadrangle for the New Ringgold, Pennsylvania, the center of the investigation area is located at approximately 40.722063°, -75.892164° decimal degrees.

3.2 WATER QUALITY

The project is located in the Lizard Creek watershed, which has a Designated Use as a Trout Stocked Fishes, Migratory Fishes (TSF, MF), under PA Code 25, Chapter 93 Water Quality Standards. Lizard Creek is also listed as a naturally reproducing trout stream. Therefore, wetlands that are hydrologically connected are considered Exceptional Value (EV).

3.3 NATIONAL WETLAND INVENTORY

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping within and surrounding the project area are presented in Figure 7 – USDA-NRCS Soils and NWI Map. According to the NWI mapping there are three (3) NWI wetlands located in or around the project area.

POWZh - Palustrine, Open Water, Excavated Wetlands

POWZx - Palustrine, Open Water, Intermittently Exposed, Excavated

PSS1/EM5A - Palustrine, Scrub-Shrub, Broad- Leaved Deciduous/Palustrine, Emergent, *Phragmites australis*, Temporary Flooded

3.4 USDA/NRCS SOIL DESCRIPTIONS

The soil associations on the site are identified through the Natural Resources Conservation Service (NRCS) web soil survey for Schuylkill County, Pennsylvania. Five (5) soil mapping units were located within the investigation area: Atkins silt loam (At), Berks shaly silt loam (BeC), Shelmadine silt loam (ShB), Water (W), Watson silt loam (WaB). Additionally, the Hydric Soils List for Schuylkill County was reviewed to determine the Hydric Rating for these soils. Atkins and Shelmadine soils are listed as being hydric. The mapping limits of these soils can be viewed in Figure 7 – USDA-NRCS and Soils Map. The following briefly describes the soil series mapped within the study area as described in the Soil Survey for Schuylkill County, Pennsylvania:

Atkins silt loam, 0 to 3% slope (At): This mapping unit is located on nearly level floodplains. The taxonomic class is fine-loamy, mixed, active, acid, mesic Fluvaquentic Endoaquepts. The main limitations of this mapping unit are flooding high water table, strongly acid soil, and a high available water capacity. Rooting depth is restricted by the high water table. A typical Atkins soil profile includes:

Oi--0 to 1 inches; slightly decomposed loose hardwood leaf litter.

Oe--1 to 1.5 inches; Moderately decomposed organic matter.

A--1.5 to 5 inches; dark grayish brown (10YR 4/2) loam with few fine strong brown (7.5YR 5/6) iron stains along root channels and lining pores; weak fine and medium granular structure; very friable; many very fine to coarse roots; very strongly acid; clear wavy boundary. (1 to 8 inches thick).

AB--5 to 8 inches; dark grayish brown (10YR 4/2) loam with few fine strong brown (7.5YR 5/6) iron stains along root channels and lining pores; weak fine subangular blocky structure; friable; common very fine to coarse roots; very strongly acid; clear wavy boundary. (0 to 6 inches thick).

Bg1--8 to 14 inches; grayish brown (10YR 5/2) loam with few fine and medium strong brown (7.5YR 5/6) and strong brown (7.5YR 5/8) iron stains in the matrix and on ped faces; weak medium subangular blocky structure; friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

Bg2--14 to 26 inches; grayish brown (2.5Y 5/2) loam with common fine and medium strong brown (7.5YR 5/6) and strong brown (7.5YR 5/8) iron stains in the matrix and on ped faces; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary. (Combined thickness of the Bg horizons is 12 to 34 inches).

BCg--26 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam with common fine and medium strong brown (7.5YR 5/6) and strong brown (7.5YR 5/8) iron stains in the matrix and on ped faces, and common fine black (7.5YR 2.5/1) soft iron-manganese masses in the matrix; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; clear wavy boundary. (0 to 18 inches thick).

Cg1--38 to 47 inches; grayish brown (2.5Y 5/2) clay loam with many fine and medium strong brown (7.5YR 5/6) and strong brown (7.5YR 5/8) iron stains in the matrix; massive; friable; strongly acid; gradual wavy boundary.

Cg2--47 to 66 inches; gray (2.5Y 5/1) clay loam with many fine and medium strong brown (7.5YR 5/6) and strong brown (7.5YR 5/8) iron stains in the matrix; massive; friable; strongly acid.

Berks shaly silt loam, 8 to 15% slope (BeC): This mapping unit is located on summits, shoulders, and backslopes of dissected uplands formed in residuum weathered from shale interbedded with fine grained sandstone and siltstone. The taxonomic class is loamy-skeletal, mixed, active, mesic Typic Dystrudepts. The main limitation of this soil mapping unit is the moderately steep slopes. A typical Berks soil profile includes:

Ap--0 to 10 inches; brown (10YR 4/3) channery loam; weak fine granular structure; friable; 30 percent rock fragments; moderately acid; abrupt smooth boundary (6 to 12 inches thick).

Bw1--10 to 17 inches; yellowish brown (10YR 5/6) very channery loam; weak fine subangular blocky structure; friable, slightly sticky and

slightly plastic; 35 percent rock fragments; slightly acid; gradual wavy boundary (4 to 12 inches thick).

Bw2--17 to 21 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine subangular blocky structure modified by rock fragments; slightly sticky and nonplastic; very few faint clay films on rock fragments; 50 percent rock fragments; slightly acid; abrupt wavy boundary (2 to 10 inches thick).

CB--21 to 26 inches; strong brown (7.5YR 5/6) extremely channery loam; structure obscured by rock fragments; friable; 60 percent rock fragments; slightly acid; clear irregular boundary (0 to 10 inches thick).

C--26 to 33 inches; yellowish brown (10YR 5/6) extremely channery loam; fines are concentrated in pockets between and as coatings on rock fragments; massive; friable; 75 percent rock fragments; moderately acid; clear wavy boundary (0 to 14 inches thick).

R-- 33 inches; very dark grayish brown (10YR 3/2) and light olive brown (2.5Y 5/6) fractured shale bedrock.

Shelmadine very stony loam, 3 to 8% slope (SmB): This mapping unit consists of very deep, poorly drained soils formed in glacial or periglacial material. Shelmadine soils are located on nearly level to moderately sloping soils on upland flats, depressions, drainageways and stream heads. The taxonomic class is fine-loamy, mixed, semiactive, mesic Typic Fragiaquults. Shelmadine sois are poorly drained and have slow permeability. A typical Shelmadine soil profile includes:

Ap--0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; 10 percent rock fragments; strongly acid; abrupt smooth boundary. (5 to 10 inches thick)

Btg--9 to 22 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and gray (10YR 5/1) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky, plastic; continuous faint clay films on faces of peds; 10 percent rock fragments; strongly acid; clear wavy boundary. (7 to 24 inches thick)

Bxg1--22 to 38 inches; dark yellowish brown (10YR 4/4) channery silty clay loam,grayish brown (10YR 5/2) coatings on peds; many medium distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; moderate very coarse prismatic structure parting to moderate medium platy; brittle, firm and very firm, slightly sticky, plastic; many prominent clay films on faces of peds and in pores; common faint iron and manganese coatings and concretions; 15 percent rock fragments; very strongly acid; gradual wavy boundary.(10 to 20 inches thick)

Bxg2--38 to 46 inches; dark grayish brown (10YR 4/2) channery loam; many medium distinct brown (7.5YR 5/4) and gray (10YR 6/1) mottles; moderate very

coarse prismatic structure parting to weak thick platy; brittle, firm, slightly sticky, slightly plastic; few faint clay films in pores; common distinct iron and manganese coatings and concretions; 20 percent rock fragments; very strongly acid; gradual wavy boundary. (5 to 14 inches thick)

C--46 to 64 inches; brown (10YR 4/3) channery loam; common distinct brown (7.5YR 5/4) and gray (10YR 6/1) mottles; massive; friable and firm, slightly sticky, slightly plastic; common dark coatings; 20 percent rock fragments; very strongly acid.

Watson silt loam, 3 to 8% slope (WaB): This mapping unit consists of very deep, moderately well drained soils formed in pre-Wisconsin glacial till derived from sandstone, siltstone, and shale. Watson soils are located on mainly on slopes within the glaciated section of the Ridge and Valley area.The taxonomic class is Fine-loamy, mixed, active, mesic Typic Fragiudults. Watson soils are moderately well drained. A typical Watson soil profile includes:

Ap--0 to 10 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; 10 percent gravel; slightly acid; abrupt smooth boundary. (7 to 12 inches thick)

Bt1--10 to 16 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate fine subangular blocky structure; friable, sticky, plastic; few faint clay films on faces of peds; 15 percent gravel; moderately acid; gradual wavy boundary. (4 to 9 inches thick)

Bt2--16 to 23 inches; reddish yellow (7.5YR 6/6) gravelly silty clay loam; moderate medium and fine blocky structure; friable, sticky, plastic; few faint clay films on faces of peds; 15 percent gravel; moderately acid; clear wavy boundary. (4 to 12 inches thick)

Bt3--23 to 27 inches; reddish yellow (7.5YR 6/6) gravelly silty clay loam; common medium faint very pale brown (10YR 7/3)mottles; moderate medium blocky structure; firm, sticky, plastic; few distinct clay films on faces of peds; 20 percent gravel; moderately acid; abrupt wavy boundary. (0 to 8 inches thick)

Bx1--27 to 46 inches; yellowish red (5YR 5/6) gravelly clay loam, gray (10YR 6/1) coating on faces of prisms; many coarse prominent light gray (10YR 7/2) mottles; weak very coarse prismatic structure parting to moderate medium blocky; very firm, brittle, sticky, plastic; common distinct clay films on faces of peds and in pores; many black manganese stains; 30 percent gravel; strongly acid; gradual wavy boundary. (15 to 25 inches thick)

Bx2--46 to 65 inches; yellowish red (5YR 5/6) very gravelly loam, gray (10YR 6/1) coatings on faces of prisms; many coarse prominent light gray (2.5Y 7/2) and reddish yellow (7.5YR 6/8) mottles; weak very coarse prismatic structure parting to moderate medium blocky; very firm, brittle, sticky, plastic; common

distinct clay films on faces of peds and in pores; many coarse black stains; 40 percent gravel; strongly acid.

4.0 WATER RESOURCE DESCRIPTIONS

After the completion of a desktop analysis, a formal wetland delineation was completed. Areas exhibiting the potential for regulated wetlands and watercourses were evaluated to determine whether they satisfied the USACE requirements. Two (2) wetlands and one (1) stream channel were identified during the delineation (See Figure 8 – Wetland Delineation Map). Attachment A - Data Forms includes data collected for the wetlands and channels at the site. Attachment B - Photographic Documentation includes photographs of the investigation area as well as a brief description. The following provides a descriptive summary of the findings within the investigation area.

4.1 Wetland 1 and Wetland 2

Wetland 1 and 2 are both palustrine emergent (PEM) wetlands located within the floodplain of UNT 1 (an unnamed tributary to Lizard Creek). A raised farm road separates the two wetland areas. These wetlands receive direct hydrology from UNT 1 during high flow events. The hydrology within these wetlands is also driven by a seasonal high water table. Primary hydric soil and hydrology indicators with Wetlands 1 and 2 consisted of oxidized rhizospheres, saturated soils, standing water, inundation visible on aerial imagery, and a depleted matrix.

The wetland areas are dominated by thick herbaceous vegetation but may have been used by cattle in the past. Dominant vegetation included: arrowleaf tearthumb (*Polygonum sagittatum,* OBL) and purple loosestrife (*Lythrum salicaria*, FACW). The soils observed in both wetlands had a dominant matrix of 10YR 4/2 from 0-14”+ with 10% 10YR 5/6 redox concentrations. Wetland 1 is approximately 211,492 square feet or 4.86 acres in size. Wetland 2 is approximately 111,897 square feet or 2.56 acres in size.

4.2 UNT 1 (Unnamed Tributary of Lizard Creek)

An unnamed tributary to Lizard Creek, UNT 1, abuts Wetlands 1 and 2. This perennial stream channel is well defined and is approximately 10 to 15 feet wide. Minnows were observed throughout the stream. The substrate of the channel consists of gravel, silt, clay, and cobbles. The channel was left open ended on both sides of the investigation area. UNT 1 travels for 79 linear feet or 17,304 square feet within the investigation area.

5.0 CONCLUSIONS

Based on the results of the field investigation 323,388 square feet or 7.42 acres of wetlands and 1,106 linear feet or 17,304 square feet of channels was identified within the investigation area. Any impacts to the identified resources would require authorization under PADEP and USACE guidelines.

6.0 REFERENCES

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   U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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ATTACHMENT A

DATA FORMS

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Kistler Farm City/County: Schuylkill County Sampling Date: 9/06/13

Applicant/Owner: David Kistler State: PA Sampling Point: DP-Wet-1

Investigator(s): PF,BH Section, Township, Range: West Penn

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-3%

Subregion (LRR or MLRA): MLRA Lat.: 40.721422 Long.: -75.891944 Datum: NAD 83

Soil Map Unit Name Water (W) NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation No , soil No , or hydrology No significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation No , soil No , or hydrology No 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 Hydric soil present? Yes Wetland hydrology present? Yes	**Is the sampled area within a wetland?** Yes x No ___

Remarks: Partly Cloudy 70 degrees. Wetland-1 is located in a farm pasture.

HYDROLOGY

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- x Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- x 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)
- ___ Sparsley Vegetated Concave Surface
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- x 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	x	Depth (inches): ___
Water table present?	Yes	___	No	x	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	x	No	___	Depth (inches): 0-14"+

Wetland hydrology present? Yes X No ___

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Oxdized rhizosheres were present.

VEGETATION - Use scientific names of plants

Sampling Point: DP-Wet-1

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Lythrum salicaria*	50	Yes	FACW
2 *Polygonum sagittatum*	40	Yes	OBL
3 *Juncus effusus*	30	No	FACW
4 *Scirpus cyperinus*	30	No	FACW
5 *Polygonum pensylvanicum*	20	No	FACW
6 *Scirpus atrovirens*	20	No	OBL
7			
	190 =	Total Cover	

Woody Vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
	=	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: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

x 1 - Rapid test for hydrophytic vegetation

x 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 x No ___

Remarks: Purple Loosestrife is present throughout the wetland area.

SOIL

Sampling Point: DP-Wet-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*	Loc**	Texture	Remarks
0-14"+	10YR 4/2	90	10YR 5/6	10	C	M	silt loam	oxidized roots present

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)

___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) (**MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes x No ___

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Kistler Farm City/County: Schuylkill County Sampling Date: 9/06/13

Applicant/Owner: David Kistler State: PA Sampling Point: DP-UP-1

Investigator(s): PF,BH Section, Township, Range: West Penn

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-3%

Subregion (LRR or MLRA): MLRA Lat.: 40.721673 Long.: -75.890484 Datum: NAD 83

Soil Map Unit Name Watson silt loam (WaB) NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation No , soil No , or hydrology No significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation No , soil No , or hydrology No 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? No Hydric soil present? No Wetland hydrology present? No	**Is the sampled area within a wetland?** Yes ___ No x

Remarks: Partly Cloudy 70 degrees. Up-1 is located in a farm pasture.

HYDROLOGY

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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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	x	Depth (inches):	
Water table present?	Yes ___	No	x	Depth (inches):	
Saturation present? (includes capillary fringe)	Yes ___	No	x	Depth (inches):	

Wetland hydrology present? Yes ___ No x

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No hydrology was present, dry soil

VEGETATION - Use scientific names of plants

Sampling Point: DP-UP-1

Tree Stratum (Plot Size:_____)		Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
5				
6				
7				
		=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____		Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
5				
6				
7				
		=	Total Cover	

Herb Stratum (Plot Size:_____)		Absolute % Cover	Dominant Species	Indicator Staus
1	*Dactylis glomerata*	60	Yes	FACU
2	*Solidago canadensis*	40	Yes	FACU
3	*Trifolium repens*	20	No	FACU
4				
5				
6				
7				
		120 =	Total Cover	

Woody Vine Stratum (Plot Size:_____		Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
		=	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: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species		x 1 =		
FACW species		x 2 =		
FAC species		x 3 =		
FACU species	120	x 4 =	480	
UPL species		x 5 =		
Column totals	120	(A)	480	(B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 x

Remarks: No wetland vegetation was present.

SOIL

Sampling Point: DP-UP-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*	Loc**	Texture	Remarks
0-8"	10YR 4/3	100					silt loam	dry soil
8-14"+	10YR 4/4	100					silt loam	dry soil

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) (**MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Yes ___ No x

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Kistler Farm City/County: Schuylkill County Sampling Date: 9/06/13

Applicant/Owner: David Kistler State: PA Sampling Point: DP-Wet-2

Investigator(s): PF,BH Section, Township, Range: West Penn

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-3%

Subregion (LRR or MLRA): MLRA Lat.: 40.721901 Long.: -75.891944 Datum: NAD 83

Soil Map Unit Name Shelmadine silt loam (ShB) NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation No , soil No , or hydrology No significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation No , soil No , or hydrology No 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 Hydric soil present? Yes Wetland hydrology present? Yes	**Is the sampled area within a wetland?** Yes x No ___

Remarks: Partly Cloudy 70 degrees. Wetland-2 is located in a farm pasture.

HYDROLOGY

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- x Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- x 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)
- ___ Sparsley Vegetated Concave Surface
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- x 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	x	Depth (inches): ___
Water table present?	Yes	___	No	x	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	x	No	___	Depth (inches): 0-14"+

Wetland hydrology present? Yes X No ___

Descrive recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Oxdized rhizosheres were present.

VEGETATION - Use scientific names of plants

Sampling Point: DP-Wet-2

Tree Stratum (Plot Size:_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Sapling/Shrub Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	=	Total Cover	

Herb Stratum (Plot Size:_____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Lythrum salicaria*	40	Yes	FACW
2 *Polygonum sagittatum*	40	Yes	OBL
3 *Juncus effusus*	20	No	FACW
4 *Scirpus cyperinus*	20	No	FACW
5 *Polygonum pensylvanicum*	20	No	FACW
6 *Scirpus atrovirens*	20	No	OBL
7			
	160 =	Total Cover	

Woody Vine Stratum (Plot Size:_____	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
	=	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: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

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:

x 1 - Rapid test for hydrophytic vegetation

x 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 x No _____

Remarks: Purple Loosestrife is present throughout the wetland area.

SOIL

Sampling Point: DP-Wet-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*	Loc**	Texture	Remarks
0-14"+	10YR 4/2	90	10YR 5/6	10	C	M	silt loam	oxidized roots present

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)

___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) (**MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Yes x No ___

Remarks:

STREAM ID: SS UNT 1

STREAM DATA

☐ ROW ☐ Project Facility STATE Pennsylvania
☐ Access Road ☐ Staging/Storage Area

County: Schuylkill

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 9/6/2013

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Map No. :

Observers: Paul Fisher, Carissa Butler

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: southwest

Width (ft) (water's edge to water's edge): 9-14'

Width (ft) (bank to bank): 10-15'
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☐ Sand
- ☑ Silt
- ☑ Cobbles
- ☑ Clay
- ☐ Concrete
- ☐ Other _____

Probed Stream Depth
- ☑ N/A
- ☐ 0 – 6"
- ☐ 7 – 12"
- ☐ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☑ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other_____

BANK HEIGHT AND SLOPE

Left Bank*
Height (ft):_____
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Right Bank*
Height (ft):_____
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed):_____
*Direction when facing downstream

Evidence of Erosion: ☐ yes ☑ no

☐ Sloughing ☐ Undercutting ☐ Impact from Cattle

☐ Other:_____

NOTES for HIGH BANK for Construction (if present)
Width (ft) Highest Bank to Highest Bank:_____

Highest Left Bank Height*:_____
Highest Left Bank Slope*:_____
Highest Right Bank Height*:_____
Highest Right Bank Slope*:_____
*Direction when facing downstream

ASSOCIATED HABITAT

Riparian Vegetation
☐ yes, list ID: HB-_____
☑ no
If yes, list:

Width of riparian corridor (ft):_____

Stream Fringe (5' or less including both banks and does not meet wetland criteria)
☐ yes, width (ft):_____
☐ no
If yes, list :

Aquatic Vegetation
☐ yes
☑ no
If yes, list:

ASSOCIATED SPECIES

Aquatic Organisms
☑ yes
☐ no
If yes, list:
minnows

Riparian/Terrestrial Organisms
☐ yes
☐ no
If yes, list:

Stream has potential for fish presence
☑ yes
☐ no

T&E Species
☐ yes, list ID: WL/VG-_____
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☑ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☐ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):_____

Discontinuous OHWM: ☐ yes ☑ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☐ pools ☐ riffles
Explain: Small amount of water present during investigation.

Is the stream/tributary:
☑ natural
☐ manmade – Explain:_____
☐ man-altered – Explain:_____

NOTES:

ATTACMENT B

PHOTOGRAPHIC DOCUMENTATION

ID: Photo 1

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a southeastern view of the existing access road that separates the two wetland areas.

ID: Photo 2

Date: 09/06/13

Taken by: PF

Comments: This photo depicts an eastern view of UNT 1.

ID: Photo 3

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a western view Wetland 1.

ID: Photo 4

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a northwestern view Wetland 1.

ID: Photo 5

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a northwestern view Wetland 2.

ID: Photo 6

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a northeastern view of Wetland 2 looking from the access road.

ATTACHMENT C

WATER RESOURCE SUMMARY TABLE

KISTLER FARM										
WATER RESOURCE SUMMARY TABLE										
Waters Name	**Cowardin Code**	**HGM Code**	**Estimated Amount of Aquatic Resource in Review Area (sq. ft.)**	**Estimated Amount of Aquatic Resource in Review Area Linear (ft.)**	**Estimated Channel Width (ft)**	**Waters Types**	**Latitude (dd nad83)**	**Longitude (dd nad83)**	**Local Waterway**	**Stream Type (P-Perennial, I-Intermittent, or E-Epherneral)**
Wetland 1	PEM	RIVERINE	211,492	N/A	N/A	RPWWD	40.721348	-75.892229	Lizard Creek	N/A
Wetland 2	PEM	RIVERINE	111,897	N/A	N/A	RPWWD	40.721957	-75.890768	Lizard Creek	N/A
UNT 1	R3	RIVERINE	17,304	1,106	10 to 15	RPW	40.722074	-75.892319	Lizard Creek	P
		TOTAL	**340,693**	**1,106**						

ATTACHMENT D

RESUMES

COMPANY TITLE:

Environmental Specialist
Health and Safety Officer (HSO)

EDUCATION

- *Environmental Soil Science, Bachelors of Science, The Pennsylvania State University, University Park, Pennsylvania, 2009.*

CERTIFICATIONS

- *NCCER Craft Instructor Performance Evaluator Certification October 2013*
- *Southwestern Energy (SWN) Training Assurance Program (TAP) Instructor Certification Oct. 2013*
- *Professional Wetland Scientist Seal # 2560*
- *Occupational Safety and Health Professional Certification May 2012*

PROFESSIONAL TRAINING

- *2014 ABC Safety Expo - OSHA & Job Site Safety Training Jan. 2014*
- *NCCER Performance Vetifications Feb. 2013 - PV151 15.1 - PV152 15.2 - PV320 32.0*
- *AOCFG- Abnormal Operating Conditions-Field NCCER Sept. 18, 2013*
- *Custom Pipeline Inspector NCCER Sept. 2013*
  - *Task 15 - 15.1 , 15.2 & Task 32*
- *PA DEP ESCGP-2 Training July 2013 State College, PA*
- *OSHA 40 Hour HAZWOPER Training; AllProbe Environmental; June 2013*
- *E&S Manual Training – Scranton, PA - PA Association of Conservation Districts - May 2013, at the Hilton Scranton & Conference Center*
- *Hydric Soil Indicators Field Seminar April 2013 Pennsylvania Association of Professional Soil Scientists - Stoll Natural Resources Center, Wysox, PA*
- *Williams Contractor Safety; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio May 2012*
- *132 Hour Occupational Safety and Health Professional Training – OSHA Academy, May 2012*
- *"Planning Hydrology for Constructed Wetlands", Wetland Training Institute, State College, PA November 2011*
- *"Grasses, Sedges, and Rushes" Pennsylvania Institute for Conservation Education, Shavers Creek Environmental Center, Huntingdon, PA August 2011*
- *Hydrology of Wetlands Rutgers University – New Jersey Agricultural Experiment Station Tuckerton, New Jersey May, 2011*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts - Overview and Discussion", State College, PA – M.N. Gilbert Environmental April , 2011*
- *ACOE Wetland Delineation/Regional Supplement Training Richard Chinn Environmental Training State College, March*

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Mr. Fisher is a graduate from The Pennsylvania State University in 2009, where he was awarded a Bachelors degree in Environmental Soil Science. Mr. Fisher is a Professional Wetland Scientist (PWS) certified by the Society of Wetland Scientists (SWS) that manages field and wetland crews for WHM. Mr. Fisher is also the Heatlh and Safety Officer for WHM in which he oversees and implements the corporate Heatlh and Safety Plan. Mr. Fisher has over 6 years of professional expereince with GIS Analysis and Mapping, environmental permitting, wetland delineations, stream assessments, pipeline routing, wetland mitigation, functional assessments, ORAM, riparian planting, project management and oversite.

PROFESSIONAL EXPERIENCE

GENERAL ENVIRONMENTAL PROJECTS

- Used GIS software for mapping and analysis
- Used a Trimble GPS for mapping boundaries for mapping purposes
- Composed various Environmental Reports for landfills, gas companies, wind farms, construction companies, private landowners, and regulatory agencies
- Performed land analysis's using GIS Software for determining suitable areas for development.
- Completed various Environmental Permits for clients.

ENVIRONMENTAL PROJECTS

- Performed wetland monitoring and maintenance on various wetlands
- Performed Stream Surveys
- Practiced wetland delineations using US Army Corps of Engineers Wetlands Delineation Manual 1987 and applicable regional supplements
- Used the Pa Code Chapter 93 Water Quality Standards and Chapter 105 Dam safety and Waterway Management
- Used surveying equipment to characterize stream profiles for mapping and design purposes
- Delineated wetlands and water resources at several projects throughout Pennsylvania, Ohio and West Virginia.
- Managed several wetland projects in Pennsylvania and Ohio.

HEALTH AND SAFETY EXPERIENCE

- Developed Site Health and Safety Plans for several projects in different industries.
- Completed Hazard Assessments for all WHM projects
- Implements the WHM Corporate Health and Safety Plan.
- Oversees all Health and Safety training and record keeping.

Brant W. Hoover

COMPANY TITLE:
CADD Technician/ GIS Specialist

EDUCATION

- *BS, Environmental Resource Management, The Pennsylvania State University, 2010*

PROFESSIONAL TRAINING

- *EnerGIS – Geospatial Information and Technology Association May 18th & 19th, 2015*
- *PA DEP ESCGP-2 Training July 10, 2013 State College, PA*
- *Hydric Soil Indicators-Field Seminar; April 25, 2013 at Bradford Co Conservation District, Wysox, PA*
- *AutoCAD Civil 3D 2012 Introduction; CADAdvisoors; Jonathan Stewart; June 2012*
- *AutoCAD Civil 3D 2010 Introduction; CADAdvisoors; Jonathan Stewart; April 2011*
- *Williams Contractor Safety; May 2012*
- *PA SFI® Training; Prof. Timber Harvesting Ess., Wildlife - Young Forest Initiative, Game of Logging - Level 1; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Marcellus Workshop February 2012 "An Update On PHMSA Pipeline Regulations & Act 127" "Taking Cartopac Into The Field {Who, How, And Why)" "Streamlining Field Data Collection For Pipeline And Environmental Workflows"*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts - Overview and Discussion", State College, PA – M.N. Gilbert Environmental April , 2011*

Mr. Hoover is a graduate from The Pennsylvania State University, where he gained a Bachelors degree in Environmental Resource Management with minors in Watershed/Water Resources, Geographical Information Systems, and Geography. As a Fisheries Technician for the Pennsylvania Fish and Boat Commission, Mr. Hoover gained various experience in fisheries biology. As a CADD Technician and GIS Specialists for WHM, he is responsible for developing and maintaining geographic, political and environmental databases that are pertinent to the region. Mr. Hoover has continuously gained skills through his academic and work experience in various environmental projects dealing with water quality, land development and use.

PROFESSIONAL EXPERIENCE

MAPPING AND SURVEYING

- Plan, design, draft and analyze topographic plans and details using AutoCAD Civil 3D 2013 for various projects utilizing field collected data and other associated data;
- Used GIS software for compiling field collected data, land use data, tabular data, and other data to produce figures for analysis and to calculate statistics of various environmental projects;
- Utilized GPS units for surveying various points and boundaries for mapping purposes;
- Performed land analysis's using GIS Software for determining suitable areas for development based on environmental parameters;
- Use of survey equipment in characterizing stream profiles for mapping and design purposes.

FISHERIES BIOLOGIST AID

- Collected samples of various species of fish and aquatic life
- Test water quality
- Determine physical characteristics of waterways including the stream bottom composition
- Prepared field notes
- Microscopic and laboratory analyses of biological samples to identify, classify and isolate species
- Gather and analyze data

FIELD/LAB TECHNICIAN

- Compiled soil cores and analyzed for carbon, nitrogen, and phosphorus content
- Collected soil respiration and sampled for N2O using gas chromatograph
- Performed Murphy and Riley method for phosphorus determination
- Verified organic and carbonate concentrations through Loss on Ignition method
- Carried out potassium chloride extractions on soil

WETLAND AND STREAM RESTORATION PROJECTS

- Performed wetland delineations on small and large scale projects;
- Performed wetland monitoring and maintenance on mitigation wetland sites;
- Collected and analyzed all data associated with stream restoration projects including, but not limited to, Stream Profile and Cross section data, bar sampling, and pebble counts.

Kevin Clark, PWS

COMPANY TITLE:
Project Manager

EDUCATION

- *BA, Environmental Studies, The Pennsylvania State University, 2006*

CERTIFICATIONS

- *Professional Wetland Scientist PWS Seal #: 2285*

PROFESSIONAL TRAINING

- *Federal Energy Commission "Environmental Review and Compliance for Natural Gas Facilities Seminar" Orlando, Florida Feb. 26-28, 2013*
- *Planning Hydrology, Vegetation, and Soils for Constructed Wetlands – The Wetland Training Institute; State College, PA – Sept. 10-12, 2012*
- *Erosion & Sediment (E&S) Manual Training (Northampton Co.) by the PACD in conjunction PADEP August 20, 2012*
- *Williams Contractor Safety; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio May 23, 2012*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts - Overview and Discussion", State College, PA – M.N. Gilbert Environmental April , 2011*
- *PaDEP—Technical Review of the revised Chapter 102 Regulations, Penn Tech Campus, Williamsport, PA – December, 2010*
- *"Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual": PAPSS, DCNR Bureau of Forestry, Laporte, PA - April, 2010*
- *Department of Environmental Protection "Regulatory Requirements Seminar for Marcellus Shale"; Harrisburg, PA - March , 2010*
- *Wetland Delineator Training, Institute for Wetland and Environmental Education and Research, Inc., Tiner and Veneman, Albany, New York – July, 2008.*
- *Plant ID: Wetlands and Their Borders, Institute for Wetland and Environmental Education and Research, Inc., Weldy, Albany, New York - July 2008.*
- *DEP Stormwater Best Management Practices Manual Training Session, State College, Pennsylvania - May 2007.*

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Kevin Clark has over 7 years experience with wetland delineation and evaluation, permitting, mitigation design, and the preparation of environmental compliance documents in accordance with national (NEPA), state, and local criteria and guidelines. Mr. Clark is a Professional Wetland Scientist (PWS) certified by the Society of Wetland Scientists (SWS) that manages the design and construction of habitat and wetland restoration, enhancement and replacement projects for WHM. Additionally, Mr. Clark, specializes in the assessment and remediation of polluted mine drainage, primarily by passive treatment techniques. Mr. Clark regulary works with various watershed organizations, townships and municipalities, non-profit organizations, engineering firms, energy companies, and state and federal agencies. Mr. Clark also has been successful in acquiring state and federal grants for non-profit organizations to secure funding for water quality improvement projects.

PROFESSIONAL EXPERIENCE

ENVIRONMENTAL PERMITTING

- Completed local, state, and federal environmental permitting for various types of development and water quality improvement projects, which included detail studies/reports and thorough coordination with regulatory agencies;
- Completed and assisted with NPDES permit applications, Erosion and Sedimentation Control Plans, and Post-Construction Stormwater Management Plans;
- Produced detailed ArcGIS and AutoCAD maps of various projects.

WATER RESOURCE PROJECTS

- Completed and assisted with wetland and stream mitigation plans, including designs, in accordance with USACE's *Compensatory Losses of Aquatic Resources* guidance document;
- Construction oversight and monitoring of wetland construction project;
- Completed small to large scale delineations throughout the northeast in accordance with 1987 USACE Wetland Delineation Manual and applicable regional supplements.
- Completed numerous watershed assessments to determine point and non-point source pollution with a main focus on Abandoned Mine Lands (AML) and Abandoned Mine Drainage (AMD) impacted streams;
- Assisted with treatment system design and restoration plans for watersheds impacted by AMD;
- Conducted water quality analysis's including: macroinvertebrate sampling and identification and habitat assessment.
- Obtained numerous Growing Greener and Chesapeake Bay Small Watershed Grant awards for several non-profit organizations for AMD related issues.
- Utilized GPS units for high accurate field data collection and produce detailed mapping.
- Assisted with threatened and endangered species surveys through the Pennsylvania Natural Diversity Index (PNDI) program for various plant and animal species.

SHIRK MITIGATION SITE

SHIRK PROPERTY
COMPENSATORY WETLAND MITIGATION PLAN

LYNN TOWNSHIP, LEHIGH COUNTY, PENNSYLVANIA

WETLAND DELINEATION REPORT

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4.0 Water Resource Descriptions

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- 4.2 Switzer Creek

5.0 Conclusions

6.0 References

Attachments

A Representative Data Forms

B Photographic Documentation

C Aquatic Resource Summary Table

D Resumes

SHIRK PROPERTY
COMPENSATORY WETLAND MITIGATION PROJECT

LYNN TOWNSHIP, LEHIGH COUNTY, PENNSYLVANIA

WETLAND DELINEATION REPORT

1.0 INTRODUCTION

WHM Solutions, Inc. (WHM) conducted a delineation of wetland and water resources associated with the Shirk Property, located in Lynn Township, Lehigh County, Pennsylvania (Figure 1 – Project Location Map). WHM proposes to use this property for mitigation purposes to offset unavoidable impacts to aquatic resources resultant from development projects within the Central Delaware River Subbasin as defined by the Pennsylvania State Water Plan (See Figure 2 – Geographic Service Area Map). The purpose of this investigation was to determine if regulated wetlands and waters exist within the subject project area in accordance with U.S. Army Corps of Engineers (USACE) guidelines as regulated under Section 404 of the Clean Water Act (CWA) and Pa Code 25 Chapter 105. This report provides information on the methodology, data collected, delineation field findings, and conclusions pertaining to wetland and water resources identified in the study area. The delineation was performed by WHM on April 15th, 2018.

2.0 METHODOLOGY

WHM conducted investigations on the subject project area according to the procedures and technical guidelines outlined in the 1987 *USACE Wetland Delineation Manual* including specifically the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (April 2012, Version 2.0)*. The USACE protocol establishes a three-parameter approach for identification and delineation of wetlands, which includes confirmation of the following:

I. Hydrophytic Vegetation: This condition exists when greater than 50% of the plant species contain obligate (OBL), facultative-wet (FACW), or facultative (FAC) indicator status.

II. Hydric Soils: Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Register, July 13, 1994).

III. Wetland Hydrology: Wetland hydrology is recognized through evidence of inundation and/or saturation to the soil surface for at least 5% of the growing season during most years.

In undisturbed conditions, all three parameters must be confirmed to be present to characterize an area as a wetland. In highly disturbed or problematic wetland situations, Corps guidance details procedures to be used for evaluating these areas and determining which areas are most likely considered wetlands upon review by a Corps representative. Upon completing our investigations, areas exhibiting all three of the USACE criteria presented above and which also have surface water connection to other waters of the United States are identified as resources that are likely to be regulated by the USACE as Jurisdictional Wetlands. Areas exhibiting all three parameters but without surface water connection to other waters are also likely to be designated as wetlands or waters but may or may not be regulated by the USACE. In many cases, wetland

areas not regulated by the USACE are still likely to be regulated by other state or local governing bodies.

In addition to wetlands, WHM also identifies adjacent waterways likely to be regulated as waters of the United States, including ephemeral, intermittent and perennial waterways. The term "jurisdictional waters of the United States" as used by Section 404 of the CWA and defined under 33 Code of Federal Register (CFR) Section 328.1, includes adjacent wetlands and tributaries to traditionally navigable waters (TNW) and other waters with a hydrological connection to a TNW.

WHM provides a complete delineation flagging of wetland/waters resources and supporting data. As noted above, our determinations are based on our collective "best professional judgment" exercised with the guidance of the Corps' Manual and Supplements. However, the final determination of the Jurisdictional status of the resources identified lies entirely within the review of the reviewing regulatory agencies. In other words, we identify a technically defensible boundary that must either be accepted or adjusted by the reviewing regulatory agencies in situations where encroachments may occur. As consultant environmental scientists, we do not have authority to assign regulatory jurisdiction.

For delineations performed in the Commonwealth of Pennsylvania, all wetlands and waters identified during the wetland delineation are deemed probable "Jurisdictional waters of the United States" until otherwise reviewed and accepted by the USACE and/or Pennsylvania Department of Environmental Protection (DEP). If upon review the wetland or water is determined to be isolated by the regulators (i.e. has no significant nexus to "jurisdictional waters of the United States"), the regulatory body for such waters then becomes the jurisdiction of the DEP.

3.0 DESKTOP FINDINGS

Prior to conducting field investigations, WHM completed a review of natural resource data associated with the Project site. Specifically, WHM reviewed USGS 7.5-minute topographical mapping for Wagontown, Pennsylvania, U.S. Fish and Wildlife National Wetland Inventory (NWI) mapping, and the U.S. Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS) Soil Survey for Lehigh County, Pennsylvania. The results of the desktop analysis were used to help establish probable areas where wetlands and watercourses could be located before conducting the field investigation portion of the Project.

3.1 USGS & TOPOGRAPHIC DATA

According to the 7.5-minute USGS quadrangle for Slatedale, Pennsylvania, the center of the Project area is located approximately at 40.650982° N, -75.734577° W.

3.2 WATER QUALITY

The Project area is located within the Switzer Creek watershed. According to PA Code 25, Chapter 93 Water Quality Standards, Switzer Creek has a Designated Use as High Quality - Cold Water Fishes, Migratory Fishes (HQ-CWF, MF). The Pennsylvania Fish and Boat Commission lists Switzer Creek as a Trout Stocked Stream and Approved Trout Waters. Switzer Creek is listed as siltation impaired in the 2016 Pennsylvania Integrated Water Quality and Monitoring Assessment Report.

3.3 NATIONAL WETLAND INVENTORY

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping within and surrounding the project area are presented in Figure 11 – USDA-NRCS Soils and NWI Wetlands Map. According to NWI mapping there are two NWI wetlands located within, or in the vicinity of, the Project area:

PFO1A – Palustrine Forested, Broad-Leaved Deciduous, Temporary Flooded

PEM5A – Palustrine Emergent, *Phragmites australis*, Temporary Flooded

3.4 USDA/NRCS SOIL DESCRIPTIONS

The onsite soil associations have been identified through the United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS) web soil survey for Lehigh County, Pennsylvania. Four (4) soil mapping units are located within the Project area: Berks-Weikert complex (BkC, BkD), Comly silt loam (CpB), and Holy silt loam (Ho). Additionally, the Hydric Soils List for Lehigh County was reviewed to determine the Hydric Rating for these soils. Holly soils are listed as hydric soils. None of the soils were listed as having hydric inclusions. The mapping limits of these soils can be viewed in Figure 4 – USDA-NRCS Soils and NWI Wetlands Map. The following describes the soil series mapped within the investigation area as described in the Soil Survey for Lehigh County, Pennsylvania:

Berks – Weikert complex 8 to 15% slopes (BkC); 15 to 25% slopes (BkD): The Berks – Weikert complex is comprised of 65% Berks soils, 25% Weikert soils, and 10% other components. Berks soils consist of well-drained, moderately deep soils formed in residuum weathered from mostly shales interbedded with fine-grained sandstone and siltstone. The taxonomic class is loamy-skeletal, mixed, active, mesic Typic Dystrudepts. Permeability is somewhat rapid and runoff is medium. The available water capacity is very low. A representative Berks soil profile includes:

Ap--0 to 10 inches; brown (10YR 4/3) channery loam; weak fine granular structure; friable; 30 percent rock fragments; moderately acid; abrupt smooth boundary (6 to 12 inches thick).

Bw1--10 to 17 inches; yellowish brown (10YR 5/6) very channery loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; 35 percent rock fragments; slightly acid; gradual wavy boundary (4 to 12 inches thick).

Bw2--17 to 21 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine subangular blocky structure modified by rock fragments; slightly sticky and nonplastic; very few faint clay films on rock fragments; 50 percent rock fragments; slightly acid; abrupt wavy boundary (2 to 10 inches thick).

CB--21 to 26 inches; strong brown (7.5YR 5/6) extremely channery loam; structure obscured by rock fragments; friable; 60 percent rock fragments; slightly acid; clear irregular boundary (0 to 10 inches thick).

C--26 to 33 inches; yellowish brown (10YR 5/6) extremely channery loam; fines are concentrated in pockets between and as coatings on rock fragments; massive; friable; 75 percent rock fragments; moderately acid; clear wavy boundary (0 to 14 inches thick).

R-- 33 inches; very dark grayish brown (10YR 3/2) and light olive brown (2.5Y 5/6) fractured shale bedrock.

Weikert soils consist of well-drained, shallow soils formed in gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone. The taxonomic class is loamy-skeletal, mixed, active, mesic Lithic Dystrudepts. Permeability is moderately rapid and runoff is low. The available water capacity is very low. A representative Weikert soil profile includes:

Ap--0 to 7 inches; brown (10YR 4/3) channery silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many fine and medium roots; 30 percent angular and subangular shale channers; strongly acid, clear smooth boundary. (5 to 9 inches thick)

Bw--7 to 14 inches; yellowish brown (10YR 5/4) very channery silt loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; common fine roots; 50 percent angular and subangular shale channers; strongly acid; gradual wavy boundary. (3 to 12 inches thick)

C--14 to 18 inches; yellowish brown (10YR 5/4) extremely channery silt loam; massive; friable; nonsticky and nonplastic; few fine roots; common distinct sily and clay deposits on channers; 70 percent angular and subangular shale channers; very strongly acid; clear wavy boundary. (0 to 8 inches thick)

R--18 inches; dark gray (10YR 4/1) fractured acid shale and siltstone bedrock.

Comly silt loam – 3 to 8% slopes (CpB): Comly soils consists of moderately well drained very deep soils formed in colluvium, residuum or materials that were altered by periglacial or glacial activity. The taxonomic class is fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs. A fragipan is typically present at 20 to 35 inches. Permeability is moderate above the fragipan and moderately slow in the fragipan. Runoff is medium and available water capacity is low. A representative Comly soil profile includes:

Ap--0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; 5 percent rock fragments; slightly acid; clear wavy boundary. (8 to 12 inches thick)

Bt1--9 to 20 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few faint clay films on faces of peds; 5 percent rock fragments; slightly acid; clear wavy boundary. (7 to 15 inches thick)

Bt2--20 to 27 inches; light yellowish brown (10YR 6/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) and light gray (10YR 7/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm, slightly sticky, plastic; common faint clay films on faces of peds and lining pores; 10 percent rock fragments; strongly acid; clear wavy boundary. (5 to 10 inches thick)

Btx1--27 to 53 inches; yellowish brown (10YR 5/4) channery loam; many fine distinct yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2) mottles and many fine faint dark brown (10YR 4/3) mottles; weak very coarse prismatic structure parting to weak medium platy; very firm, brittle, slightly sticky, slightly plastic; common faint clay films on faces of peds; few prominent black coatings; 20 percent rock fragments; strongly acid; clear wavy boundary. (10 to 30 inches thick)

Btx2--53 to 62 inches; yellowish brown (10YR 5/4) very channery loam; many medium faint pale brown (10YR 6/3) and distinct gray (5Y 5/1) mottles; weak very coarse prismatic structure parting to weak thin and medium platy; very firm, brittle, slightly sticky, slightly plastic; few faint clay films on faces of peds and lining pores; few prominent black coatings. 40 percent rock fragments; moderately acid; gradual wavy boundary.

R--62 inches; light olive brown (2/5Y 5/4) weathered shale.

Holy silt loam – (Ho): Holly soils consists of poorly drained very deep soils formed in the alluvium from upland areas of noncalcareous sandstone and shale as well as low-lime drift. The taxonomic class is Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts. Permeability is moderately high. Runoff is negligible and available water capacity is high. A representative Holly soil profile includes:

A -- 0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; slightly acid; clear wavy boundary. (2 to 8 inches thick.)

Bg1 -- 3 to 9 inches; dark gray (5Y 4/1) silt loam; weak medium subangular blocky structure; friable; common fine prominent brown (7.5YR 4/4) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg2 -- 9 to 14 inches; dark gray (5Y 4/1) silt loam; weak coarse subangular blocky structure; friable; common medium prominent yellowish red (5YR 4/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg3 -- 14 to 27 inches; gray (5Y 5/1) sandy loam; weak coarse subangular blocky structure; friable; common medium and fine prominent brown (7.5YR 4/4) and strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary. (Combined thickness of the Bg horizons are 10 through 32 inches.)

C1 -- 27 to 35 inches; gray (N 5/0) loam; massive; friable; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary.

C2 -- 35 to 43 inches; dark gray (N 4/0) sandy loam; massive; friable; slightly alkaline; clear wavy boundary.

2C3 -- 43 to 60 inches; dark greenish gray (5BG 4/1) gravelly sand; single grain; loose; slightly alkaline.

4.0 WATER RESOURCE DESCRIPTIONS

After the completion of a desktop analysis, a formal wetland delineation was completed. Areas exhibiting the potential for regulated wetlands and watercourses were evaluated to determine whether they satisfied the USACE requirements. One (1) wetland and one (1) stream channel were identified during the delineation (See Figure 3 – Wetland Delineation Map). Attachment A - Representative Data Forms includes data collected for the wetlands at the site. Attachment B - Photographic Documentation includes photographs of the investigation area as well as a brief description. Attachment C – Water Resource Summary Table provides the classifications, locations and dimensions of the delineated water resources found within the investigation area. The following provides a descriptive summary of the findings within the investigation area.

4.1 WETLAND 1

Wetland 1 is a palustrine emergent (PEM) floodplain wetland located within and active agricultural field. Switzer Creek flows throughout the wetland and provides hydrology to it. A stream crossing is located within the wetland. Primary soil and hydrology indicators consisted of surface water, a high-water table, saturation, and a depleted matrix.

Dominant vegetation included: purple loose-strife (*Lythrum salicaria*, FACW), reed canary grass (*Phalaris arundinacea*, FACW), soft rush (*Juncus effusus*, FACW), fringed sedge (*Carex crinita*, OBL), and jewelweed *(Impatiens capensis,* FACW). Observed soils varied throughout the wetland however, the dominant matrix of 10YR 4/2 with 5% 10YR 5/8 redox concentrations from 0-10 inches was most commonly observed. Wetland 1 is 6.94 acres or 302,487 sq. ft. in size.

4.2 SWITZER CREEK

Switzer Creek is a perennial stream channel that meanders in an eastern direction throughout Wetland 1. Switzer Creek provides hydrology to Wetland 1. The channel is well-defined throughout and is approximately 10 to 20 feet wide. Potential for fish and aquatic insects is present. Snails and crayfish were observed within the channel. The substrate is comprised of gravel, sand silt, and cobbles. Beaver Creek travels for approximately 946 linear feet or 14,204 square feet within the investigation area.

5.0 CONCLUSIONS

Based on the results of the field investigation 6.94 acres or 302,487 square feet of wetlands and 946 linear feet or 14,204 square feet of stream channel were identified within the investigation area. Any impacts to the identified resources would require authorization under PADEP and USACE guidelines.

6.0 REFERENCES

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ATTACHMENT A

REPRESENTATIVE DATA FORMS

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Shirk Property City/County: Lehigh Sampling Date: 4/25/18

Applicant/Owner: WHM Solutions, Inc. State: PA Sampling Point: DP-1

Investigator(s): Kevin Clark, Paul Fisher Section, Township, Range: Lynn Township

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0 - 3

Subregion (LRR or MLRA): LRR Lat.: 40.651162 Long.: -75.734742 Datum: NAD 83

Soil Map Unit Name: Comly silt loam (CpB) NWI Classification: N/A

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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 Hydric soil present? Yes Wetland hydrology present? Yes	**Is the sampled area within a wetland?** Yes X No ___

Remarks: (Explain alternative procedures here or in a separate report.) DP-1 was taken within Wetland -1, a floodplain wetland located between an agriculture field and a stream.

HYDROLOGY

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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	X	Depth (inches):	___
Water table present?	Yes X	No	___	Depth (inches):	8"
Saturation present? (includes capillary fringe)	Yes X	No	___	Depth (inches):	8"

Wetland hydrology present? Yes X No ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Several primary hydrologic indicators were present at DP-1.

VEGETATION - Use scientific names of plants

Sampling Point: DP-1

Tree Stratum (Plot Size:____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:___15'____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Herb Stratum (Plot Size:____5'____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	90	Yes	FACW
2 *Lythrum salicaria*	25	Yes	FACW
3			
4			
5			
6			
7			
	115 =	Total Cover	

Woody Vine Stratum (Plot Size____30'___)	Absolute % Cover	Dominant Species	Indicator Staus
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: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	0	(A)	0	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

x 1 - Rapid test for hydrophytic vegetation

x 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: (Include photo numbers here or on a separate sheet) Reed canary grass and Purple Loosestrife were the dominant vegetation across all strata. Hydrophytic vegetation was present at DP-1

SOIL

Sampling Point: DP-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*	Loc**	Texture	Remarks
0 - 8	10 YR 4/2	98	10 YR 4/1	2	C	M	Silt Loam	
8 - 14	10 YR 4/2	85	10 YR 4/1	5	C	M	Silt Loam	
8 - 14			10 YR 5/6	10	C	M	Silt Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Hydric soil was present at DP-1.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Shirk Property City/County: Lehigh Sampling Date: 4/25/18

Applicant/Owner: WHM Solutions, Inc. State: PA Sampling Point: DP-2

Investigator(s): Kevin Clark, Paul Fisher Section, Township, Range: Lynn Township

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0 - 3

Subregion (LRR or MLRA): LRR Lat.: 40.651172 Long.: -75.734785 Datum: NAD 83

Soil Map Unit Name: Comly silt loam (CpB) NWI Classification: N/A

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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? No Hydric soil present? No Wetland hydrology present? No	**Is the sampled area within a wetland?** Yes ___ No X

Remarks: (Explain alternative procedures here or in a separate report.) DP-2 was taken in an agriculture field that is considered upland.

HYDROLOGY

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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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 X	Depth (inches): ___	
Water table present?	Yes ___	No X	Depth (inches): ___	**Wetland hydrology present?** Yes ___ No X
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___	

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No primary and secondary hydrologic indicators were present at DP-2.

VEGETATION - Use scientific names of plants

Sampling Point: DP-2

Tree Stratum (Plot Size:____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:___15'____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Herb Stratum (Plot Size:____5'____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Dactylis glomerata*	45	Yes	FACU
2 *Solidago canadensis*	45	Yes	FACU
3 *Glycine max*	15	Yes	UPL
4 *Rosa multiflora*	10	Yes	FACU
5 *Allium schoenoprasum*	10	Yes	FACU
6			
7			
	125 =	Total Cover	

Woody Vine Stratum (Plot Size____30'___)	Absolute % Cover	Dominant Species	Indicator Staus
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:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	110	x 4 =	440	
UPL species	15	x 5 =	75	
Column totals	125	(A)	515	(B)

Prevalence Index = B/A = 4.12

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X

Remarks: (Include photo numbers here or on a separate sheet) Orchard grass, Canada goldenrod, Soybean, Multiflora rose, and Wild chive were all dominant vegetation across all strata. Hydrophytic vegetation was not present at DP-2

SOIL

Sampling Point: DP-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*	Loc**	Texture	Remarks
0 - 10	10 YR 4/3	100					Gravelly Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Yes _____ No X

Remarks: Hydric soil was not present at DP-2.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Shirk Property City/County: Lehigh Sampling Date: 4/25/18

Applicant/Owner: WHM Solutions, Inc. State: PA Sampling Point: DP-3

Investigator(s): Kevin Clark, Paul Fisher Section, Township, Range: Lynn Township

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0 - 3

Subregion (LRR or MLRA): LRR Lat.: 40.651886 Long.: -75.733108 Datum: NAD 83

Soil Map Unit Name Holly silt loam (Ho) NWI Classification: N/A

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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? No Hydric soil present? No Wetland hydrology present? No	**Is the sampled area within a wetland?** Yes ___ No X

Remarks: (Explain alternative procedures here or in a separate report.) DP-3 was taken within an agriculture field in what was considered an upland area.

HYDROLOGY

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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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 X	Depth (inches): ___	
Water table present?	Yes ___	No X	Depth (inches): ___	**Wetland hydrology present?** Yes ___ No X
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___	

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No primary and secondary hydrologic indicators were not present at DP-3.

VEGETATION - Use scientific names of plants

Sampling Point: DP-3

Tree Stratum (Plot Size:____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:___15'____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Herb Stratum (Plot Size:____5'____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Euthamia graminifolia*	40	Yes	FAC
2 *Elaeagnus umbellata*	30	Yes	UPL
3 *Rosa multiflora*	20	No	FACU
4 *Allium schoenoprasum*	15	No	FACU
5 *Betula allefhaniesis*	15	No	FAC
6 *Phalaris arundinaccea*	10	No	FACW
7			
	130 =	Total Cover	

Woody Vine Stratum (Plot Size____30'___)	Absolute % Cover	Dominant Species	Indicator Staus
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: 2 (B)

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

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	55	x 3 =	165
FACU species	35	x 4 =	140
UPL species	30	x 5 =	150
Column totals	130 (A)		475 (B)

Prevalence Index = B/A = 3.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X

Remarks: (Include photo numbers here or on a separate sheet) Flat top goldentop and Autumn Olive were the only dominant vegetation across all strata. Hydrophytic vegetation was not present at DP-3

SOIL

Sampling Point: DP-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*	Loc**	Texture	Remarks
0 - 11	10YR 4/3	100					Silt Loam	
11 +	10YR 5/6	100					Silt Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Yes ____ No X

Remarks: Hydric soil was not present at DP-3.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Shirk Property City/County: Lehigh Sampling Date: 4/25/18
Applicant/Owner: WHM Solutions, Inc. State: PA Sampling Point: DP-4
Investigator(s): Kevin Clark, Paul Fisher Section, Township, Range: Lynn Township
Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0 - 3
Subregion (LRR or MLRA): LRR Lat.: 40.651764 Long.: -75.732962 Datum: NAD 83
Soil Map Unit Name Holly silt loam (Ho) NWI Classification: N/A
Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)
Are vegetation N , soil N , or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___
Are vegetation N , soil N , or hydrology N 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 Hydric soil present? Yes Wetland hydrology present? Yes	**Is the sampled area within a wetland?** Yes X No ___

Remarks: (Explain alternative procedures here or in a separate report.) DP-4 was taken within Wetland 1, in an angriculture field near a Switzer Creek.

HYDROLOGY

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

- X Surface Water (A1)
- X High Water Table (A2)
- X 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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 X	Depth (inches): ___		
Water table present?	Yes X	No ___	Depth (inches): 8"	**Wetland hydrology present?**	Yes X No ___
Saturation present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 8"		

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary hydrologic indicators were present at DP-4.

VEGETATION - Use scientific names of plants

Sampling Point: DP-4

Tree Stratum (Plot Size:____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:___15'____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Herb Stratum (Plot Size:____5'____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	60	Yes	FACW
2 *Lythrum salicaria*	20	No	FACW
3 *Juncus effusus*	20	No	FACW
4 *Elaeagnus umbellata*	2	No	UPL
5 *Dactylis glomerata*	2	No	FACU
6			
7			
	104 =	Total Cover	

Woody Vine Stratum (Plot Size____30'___)	Absolute % Cover	Dominant Species	Indicator Staus
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: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

x 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: (Include photo numbers here or on a separate sheet) Reed canary grass is the dominant vegetation across all strata. Hydrophytic vegetation was present at DP-4

SOIL

Sampling Point: DP-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*	Loc**	Texture	Remarks
0 - 8	10 YR 4/2	95	10 YR 5/8	5	C	M	Silt Loam	
8 +	10 YR 4/1	80	10 YR 5/6	20	C	M	Silt Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Suface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Hydric soil was present at DP-4.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Shirk Property City/County: Lehigh Sampling Date: 4/25/18

Applicant/Owner: WHM Solutions, Inc. State: PA Sampling Point: DP-5

Investigator(s): Kevin Clark, Paul Fisher Section, Township, Range: Lynn Township

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0 - 3

Subregion (LRR or MLRA): LRR Lat.: 40.651273 Long.: -75.733183 Datum: NAD 83

Soil Map Unit Name Holly silt loam (Ho) NWI Classification: N/A

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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 Hydric soil present? Yes Wetland hydrology present? Yes	**Is the sampled area within a wetland?** Yes X No ___

Remarks: (Explain alternative procedures here or in a separate report.) DP-5 was taken within an agriculture field, closest data point to the stream.

HYDROLOGY

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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	X	Depth (inches):	___
Water table present?	Yes X	No	___	Depth (inches):	8"
Saturation present? (includes capillary fringe)	Yes X	No	___	Depth (inches):	8"

Wetland hydrology present? Yes X No ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary hydrologic indicators were present at DP-5.

VEGETATION - Use scientific names of plants

Sampling Point: DP-5

Tree Stratum (Plot Size:____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:___15'____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Herb Stratum (Plot Size:____5'____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Carex crinita*	60	Yes	OBL
2 *Impatiens capensis*	20	Yes	FACW
3 *Lythrum slicaria*	20	Yes	FACW
4 *Symplocarpus foetidus*	15	No	OBL
5 *Phalaris arundinacea*	10	No	FACW
6			
7			
	125 =	Total Cover	

Woody Vine Stratum (Plot Size____30'___)	Absolute % Cover	Dominant Species	Indicator Staus
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: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	0	(A)	0	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

x 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: (Include photo numbers here or on a separate sheet) Fringed sedge, Jewelweed, and Purple loosestrife were all dominant vegetation across all strata. Hydrophytic vegetation was present at DP-5

SOIL

Sampling Point: DP-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*	Loc**	Texture	Remarks
10 +	10YR 4/2	95	10YR 5/8	5	C	M		

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Suface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Hydric soil was present at DP-5.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Shirk Mitigation Site City/County: Lehigh Sampling Date: 4/25/18

Applicant/Owner: WHM Solutions, Inc. State: PA Sampling Point: DP-6

Investigator(s): Kevin Clark, Paul Fisher Section, Township, Range: Lynn Township

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0 - 3

Subregion (LRR or MLRA): LRR Lat.: 40.651271 Long.: -75.733184 Datum: NAD 83

Soil Map Unit Name: Comly silt loam (CpB) NWI Classification: N/A

Are climatic/hydrologic conditions of the site typical for this time of the year? Yes X No ___ (If no, explain in remarks)

Are vegetation N, soil N, or hydrology N significantly disturbed? Are "normal circumstances" present? Yes X No ___

Are vegetation N, soil N, or hydrology N 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 Hydric soil present? Yes Wetland hydrology present? Yes	**Is the sampled area within a wetland?** Yes X No ___

Remarks: (Explain alternative procedures here or in a separate report.) DP-6 was taken within Wetland -1, a floodplain wetland located an agriculture field.

HYDROLOGY

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Sparsley Vegetated Concave Surface
- ___ 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	X	Depth (inches):	___
Water table present?	Yes X	No	___	Depth (inches):	8"
Saturation present? (includes capillary fringe)	Yes X	No	___	Depth (inches):	8"

Wetland hydrology present? Yes X No ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary hydrologic indicators were present at DP-6.

VEGETATION - Use scientific names of plants

Sampling Point: DP-6

Tree Stratum (Plot Size:____30'_____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size:___15'____)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
6			
7			
	0 =	Total Cover	

Herb Stratum (Plot Size:____5'____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Phalaris arundinacea*	90	Yes	FACW
2 *Lythrum salicaria*	10	Yes	FACW
3			
4			
5			
6			
7			
	100 =	Total Cover	

Woody Vine Stratum (Plot Size____30'___)	Absolute % Cover	Dominant Species	Indicator Staus
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: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X 1 - Rapid test for hydrophytic vegetation

x 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ 5 - Problematic hydrophytic vegetation* (explain)

*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 X No ___

Remarks: (Include photo numbers here or on a separate sheet) Reed canary grass and Purple Loosestrife were the dominant vegetation across all strata. Hydrophytic vegetation was present at DP-6

SOIL

Sampling Point: DP-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*	Loc**	Texture	Remarks
0 - 8	10 YR 4/2	98	10 YR 4/1	2	C	M	Silt Loam	
8 - 14	10 YR 4/2	85	10 YR 4/1	5	C	M	Silt Loam	
8 - 14			10 YR 5/6	10	C	M	Silt Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147,148)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 136, 122)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Yes X No ___

Remarks: Hydric soil was present at DP-6.

STREAM ID: SS Switzer Creek

STREAM DATA

☐ ROW ☑ Project Facility STATE PA
☐ Access Road ☐ Staging/Storage Area

County: Lehigh

Stream Name: ☐ UNNAMED ☑ NAMED: Switzer Creek

Date: 4/25/18

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Map No. :

Observers: KC, PF

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: East

Width (ft) (water's edge to water's edge): 10-20 ft.

Width (ft) (bank to bank): 10-20 ft.
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☑ Sand
- ☑ Silt
- ☑ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other _____

Probed Stream Depth
- ☐ N/A
- ☐ 0 – 6"
- ☐ 7 – 12"
- ☑ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☑ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other_____

BANK HEIGHT AND SLOPE

Left Bank*
Height (ft): 1
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Right Bank*
Height (ft): 1
Slope: ☑ 0-30º (4:1) ☐ 31-45º (3:1) ☐ 46-60º (2:1) ☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed):_____
*Direction when facing downstream

Evidence of Erosion: ☐ yes ☑ no

☐ Sloughing ☐ Undercutting ☐ Impact from Cattle

☐ Other:_____

NOTES for HIGH BANK for Construction (if present)
Width (ft) Highest Bank to Highest Bank:_____

Highest Left Bank Height*:_____
Highest Left Bank Slope*:_____
Highest Right Bank Height*:_____
Highest Right Bank Slope*:_____
*Direction when facing downstream

ASSOCIATED HABITAT

Riparian Vegetation
☐ yes, list ID: HB-_____
☑ no
If yes, list:

Width of riparian corridor (ft):_____

Stream Fringe (5' or less including both banks and does not meet wetland criteria)
☐ yes, width (ft):_____
☑ no
If yes, list :

Aquatic Vegetation
☐ yes
☑ no
If yes, list:

ASSOCIATED SPECIES

Aquatic Organisms
☑ yes
☐ no
If yes, list:
snails, crayfish

Riparian/Terrestrial Organisms
☐ yes
☑ no
If yes, list:

Stream has potential for fish presence
☑ yes
☐ no

T&E Species
☐ yes, list ID: WL/VG-_____
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☑ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☐ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):_____

Discontinuous OHWM: ☐ yes ☐ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☐ pools ☑ riffles
Explain:

Is the stream/tributary:
☑ natural
☐ manmade – Explain:_____
☐ man-altered – Explain:_____

NOTES:

ATTACHMENT B

PHOTOGRAPHIC DOCUMENTATION

ID: Photo 1

Date: 4/25/2018

Taken by: PF

Comments: This photo depicts a southeastern view of Wetland 1. The existing farm lane that divides the wetland can be seen in the foreground.

ID: Photo 2

Date: 4/25/2018

Taken by: PF

Comments: This photo depicts a southern view of the western portion of Wetland 1. The banks of Switzer Creek can be seen in the background.

ID: Photo 3

Date: 4/25/2018

Taken by: CB

Comments: This photo depicts a northeastern view of the western portion of Wetland 1.

ID: Photo 4

Date: 4/25/2018

Taken by: PF

Comments: The photo depicts a northeastern view of the western portion of Wetland 1. Switzer Creek can be seen in the running throughout the wetland.

ID: Photo 5

Date: 4/25/2018

Taken by: PF

Comments:
The photo depicts a southeastern view of the eastern portion of Wetland 1. Switzer Creek can be seen in the background.

ID: Photo 6

Date: 4/25/2018

Taken by: PF

Comments:
The photo depicts a southeastern view of Switzer Creek.

ATTACHMENT C

AQUATIC RESOURCES SUMMARY TABLE

SHIRK PROPERTY
WATER RESOURCE SUMMARY TABLE

Waters Name	Cowardin Code	HGM Code	Estimated Amount of Aquatic Resource in Review Area (sq. ft.)	Estimated Amount of Aquatic Resource in Review Area Linear (ft.)	Estimated Channel Width (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local Waterway	Stream Type (P-Perennial, I-Intermittent, or E-Ephemeral)	PA Code Ch. 93 Water Quality Standards - Existing Use	PA Code Ch. 93 Water Quality Standards - Designated Use
Wetland 1	PEM	DEPRESS	302,487	N/A	N/A	DELINEATE	40.651271	-75.733184	Switzer Creek	-	-	OTHER
Switzer Creek	R5	N/A	14,204	946	10-20	RPW	40.650870	-75.734490	Switzer Creek	P	-	HQ-CWF, MF
TOTAL			**316,691**	**946**								

ATTACHMENT D

RESUMES

COMPANY TITLE

Project Manager

EDUCATION

- *BA, Environmental Studies, The Pennsylvania State University, 2006*

CERTIFICATIONS

- *Professional Wetland Scientist #2285*

HEALTH & SAFETY CERTIFICATIONS & TRAINING

- *PEC - 100794096*
- *ISN- 02053332*
- *Energy Transfer Contractor Safety Orientation Dec. 2016*
- *Southwestern Energy (SWN) Training Assurance Program (TAP) Oct. 2016*
- *Shell Contractor HSE Handbook Sept. 2016*
- *Safeland September 2016*
- *OSHA 40 Hour HAZWOPER Training; All Probe Environmental; October 2016*
- *Adult First Aid/CPR– American Heart Association, Pennsylvania – Feb 2016*
- *Williams Contractor Safety; May 2012*

PROFESSIONAL TRAINING

- *PADEP Technical Workshops - Prepare for The New Aquatic Resource Condition Assessments (Ch. 105) – June 2017*
- *PASPGP-5 Training, Marcellus Shale Coalition, Hershey PA – July 2016*
- *Chapter 102/NPDES Training Centre & Clinton County Conservation Districts, March 2016*
- *PADEP ESCGP-2 Permit Training, State College, PA July 2013*
- *Planning Hydrology, Vegetation, and Soils for Constructed Wetlands – The Wetland Training Institute; State College, PA – Sept 10-12, 2012*
- *Erosion & Sediment (E&S) Manual Training (Northampton Co) by the PACD in conjunction PADEP August 20, 2012*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio, May 23, 2012*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts State College, PA – M N Gilbert Environmental April 2011*
- *PaDEP—Technical Review of the revised Chapter 102 Regulations, Penn Tech Campus, Williamsport, PA – Dec. 2010*
- *"Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual": PAPSS, DCNR Bureau of Forestry, Laporte, PA - April 2010*
- *Department of Environmental Protection "Regulatory Requirements Seminar for Marcellus Shale"; Harrisburg, PA - March 2010*
- *Wetland Delineator Training, Institute for Wetland & Environmental Education & Research, Inc, Tiner and Veneman, Albany, New York – July 2008*
- *Plant ID: Wetlands & Their Borders, Institute for Wetland & Environmental Education & Research, Inc, Albany, New York - July 2008*
- *DEP Stormwater Best Management Practices Manual Training Session, State College, Pennsylvania - May 2007*

Kevin Clark, PWS

Mr. Clark has over 12 years experience with wetland delineation and evaluation, permitting, mitigation design, and the preparation/management of environmental compliance documents in accordance with federal, state, and local criteria and guidelines. He is a Professional Wetland Scientist (PWS) certified by the Society of Wetland Scientists (SWS). He manages the design and construction of habitat and wetland restoration, enhancement and replacement projects. Additionally, he specializes in environmental permitting for land development projects with experience in Pennsylvania, West Virginia, Ohio and Maryland. He has continuously gained skills through his work experience and interaction with regulatory agencies. Currently, Mr. Clark manages a variety of land development and mitigation projects.

PROFESSIONAL EXPERIENCE

ENVIRONMENTAL SURVEYS & PERMITTING

- Project Management of land development projects requiring local, state and federal permit authorizations with an emphasis on energy related infrastructure, landfills and wetland/stream mitigation.
- Completed and managed small to large scale delineations throughout the in PA, OH, WV, and MD in accordance with 1987 USACE Wetland Delineation Manual and applicable regional supplements;
- Oversee subcontractors and internal personnel associated with wetland and stream restoration/mitigation projects, threatened and endangered species surveys, and archeological surveys;
- Utilized survey-grade GPS units for high accurate field data collection to produce detailed mapping;
- Proficient in providing detailed mapping and design drawings utilizing AutoCAD and ArcGIS software;
- Completed numerous watershed assessments to determine point and non-point Performed and/or managed wetland delineations
- Client and regulatory liaison for projects involving land development and environmental restoration.

WATER RESOURCE RESTORATION/MITIGATION PROJECTS

- Responsible to property acquisition of potential water resource mitigation projects;
- Completed over 100 wetland and stream mitigation plans, including design and permitting in accordance with USACE's *Compensatory Losses of Aquatic Resources* guidance document;
- Manages construction oversight and monitoring of wetland and stream restoration/mitigation projects in accordance with applicable permit conditions;
- Completed watershed assessments and restoration plans;
- Conducted water quality analysis's including: water sampling, macroinvertebrate sampling/identification and general habitat assessment;
- Managed numerous Growing Greener, Chesapeake Bay Small Watershed Grant and other grants associated with stream restoration for non-profit organizations and county conservation districts;

CONFERENCES & SEMINARS

- Federal Energy Regulatory Commission (FERC) Environmental Seminar, Marcellus Shale Coalition, State College, PA – May 2017
- Southern Gas Association (SGA) Technical Conference on Environmental Permitting & Construction, Dallas TX – Feb. 2017
- National Mitigation & Ecosystem Banking Conference, Fort Worth, TX – May 2016
- FERC "Environmental Review and Compliance for Natural Gas Facilities Seminar" Tampa, Florida – Dec. 2015
- SWS Mid-Atlantic Chapter Wetland Mitigation, Restoration and Ecology State College, PA – April 2014

COMPANY TITLE

Environmental Specialist
Health and Safety Officer (HSO)

EDUCATION

- *Environmental Soil Science, Bachelors of Science, The Pennsylvania State University, University Park, Pennsylvania, 2009*

CERTIFICATIONS

- *Professional Wetland Scientist #2560*
- *Maryland Department of the Environment Erosion & Sediment Control Responsible Person Certification #RPC010292*

PROFESSIONAL TRAINING

- *PADEP Technical Workshops - Prepare for The New Aquatic Resource Condition Assessments (Ch. 105) – June 2017*
- *Identification of Wetland Wildflowers, Swamp School, LLC - June 2016*
- *SWS Mid-Atlantic Chapter Dr. Robert Brooks of Penn State University and Riparia on Using Natural Reference Wetland Data for Wetlands Mitigation and Restoration Projects, State College, PA- April 4-5,2014*
- *Ohio Rapid Assessment Method for Wetlands v. 5.0 2014 Training Course, April 2015*
- *PA DEP ESCGP-2 Training July 2013 State College, PA*
- *E&S Manual Training – Scranton, PA - PA Association of Conservation Districts - May 2013, at the Hilton Scranton & Conference Center*
- *Hydric Soil Indicators Field Seminar April 2013 PASS-Stoll Natural Resources Center, Wysox, PA*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio May 2012*
- *"Planning Hydrology for Constructed Wetlands", Wetland Training Institute, State College, PA November 2011*
- *"Grasses, Sedges, and Rushes" Pennsylvania Institute for Conservation Education, Shavers Creek Environmental Center, Huntingdon, PA August 2011*
- *Hydrology of Wetlands Rutgers University – New Jersey Agricultural Experiment Station Tuckerton, New Jersey May 2011*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts", State College, PA – M.N. Gilbert Environmental April 2011*
- *ACOE Wetland Delineation/Regional Supplement Training Richard Chinn State College, March 2010*

Paul Fisher, PWS

Mr. Fisher is a graduate from The Pennsylvania State University in 2009, where he was awarded a Bachelors degree in Environmental Soil Science. Mr. Fisher is a Professional Wetland Scientist (PWS) certified by the Society of Wetland Scientists (SWS) that manages field and wetland crews for WHM. Mr. Fisher has over 8 years of professional experiennce with GIS Analysis and Mapping, environmental permitting, wetland delineations, stream assessments, pipeline routing, wetland mitigation, functional assessments, ORAM, riparian planting, project management and oversite.

Mr. Fisher is also the Health and Safety Officer at WHM responsible for the development and implementation the corporate Health and Safety Plan. He maintains safe working environments, establishes effective best practices, prevention measures, and rapid response processes. Mr. Fisher specializes in protecting workers, assets and the community in the most cost-effective manner.

PROFESSIONAL EXPERIENCE

GENERAL ENVIRONMENTAL PROJECTS

- Used GIS software for mapping and analysis;
- Used a Trimble GPS for mapping boundaries for mapping purposes;
- Composed various Environmental Reports for landfills, gas companies, wind farms, construction companies, private landowners, and regulatory agencies;
- Performed land analysis's using GIS Software for determining suitable areas for development; and
- Completed various Environmental Permits for clients.

ENVIRONMENTAL PROJECTS

- Performed wetland monitoring and maintenance on various wetlands;
- Performed Stream Surveys;
- Practiced wetland delineations using US Army Corps of Engineers Wetlands Delineation Manual 1987 and applicable regional supplements;
- Used the Pa Code Chapter 93 Water Quality Standards and Chapter 105 Dam safety and Waterway Management;
- Used surveying equipment to characterize stream profiles for mapping and design purposes;
- Delineated wetlands and water resources at several projects throughout Pennsylvania, Ohio and West Virginia; and
- Managed several wetland projects in Pennsylvania and Ohio.

HEALTH & SAFETY CERTIFICATIONS & TRAINING

- PEC - 100794102
- ISN- 02053343
- Safeland September 2016
- Shell Contractor HSE Handbook Sept. 2016
- OSHA Safety Training Working in Wetlands, Swamp School, LLC – April 2016
- Oil & Gas Safety & Health Professional Certification Feb. 2016
- Adult First Aid/CPR– American Heart Association, Pennsylvania – Feb 2016
- Energy Transfer Contractor Safety Orientation Instructor Dec. 2015
- NCCER Craft Instructor Performance Evaluator Certification October 2013
- Southwestern Energy Training Assurance Program Instructor Certification Oct. 2013
- NCCER Performance Verifications Feb. 2013 - PV151 15.1 - PV152 15.2 - PV320 32.0
- AOCFG- Abnormal Operating Conditions- Field NCCER Sept. 18, 2013
- Custom Pipeline Inspector NCCER Sept. 2013
  - Task 15 - 15.1, 15.2 & Task 32
- OSHA 40 Hour HAZWOPER Training; All Probe Environmental; June 2013
- Occupational Safety and Health Professional Certification May 2012
- Williams Contractor Safety; May 2012

ATTACHMENT C:

PHOTOGRAPHIC DOCUMENTATION

GRAJEWSKI MITGATION SITE

ID: Photo 1

Date: 12/08/15

Taken by: DW

Comments: This photo shows an eastern view of the wetland enhancement area at the Grajewski Mitigation site.

ID: Photo 2

Date: 12/08/15

Taken by: DW

Comments: This photo shows a northern view the wetland enhancement area at the Grajewski Mitigation site.

KISTLER MITIGATION SITE

ID: Photo 1

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a north western view of the wetland enhancement area within Wetland 1 at the Kistler Mitigation site.

ID: Photo 2

Date: 09/06/13

Taken by: PF

Comments: This photo depicts a northeastern view of the wetland enhancement area within Wetland 2 at the Kistler Mitigation site.

SHIRK MITIGATION SITE

ID: Photo 1

Date: 04/25/18

Taken by: KC

Comments: This photo depicts a eastern view of the wetland enhancement area at the Shirk Mitigation site taken from the access road that bisects the wetland.

ID: Photo 2

Date: 04/25/18

Taken by: KC

Comments: This photo depicts a western view of the wetland enhancement area with Switzer Creek bisecting the mitigation area.

ATTACHMENT D:

PENNSYLVANIA NATURAL DIVERSITY INDEX ENVIRONMENTAL REVIEW RECEIPT

GRAJEWSKI MITIGATION SITE

1. PROJECT INFORMATION

Project Name: **Grajewski Property**
Date of Review: **2/2/2018 10:30:03 AM**
Project Category: **Habitat Conservation and Restoration, Streambank Stabilization (using vegetation, geotextile -- but no riprap)**
Project Area: **24.46 acres**
County(s): **Luzerne**
Township/Municipality(s): **HUNTINGTON**
ZIP Code: **18655**
Quadrangle Name(s): **SHICKSHINNY**
Watersheds HUC 8: **Upper Susquehanna-Lackawanna**
Watersheds HUC 12: **Huntington Creek-Fishing Creek**
Decimal Degrees: **41.196327, -76.207094**
Degrees Minutes Seconds: **41° 11' 46.7757" N, 76° 12' 25.5383" 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.

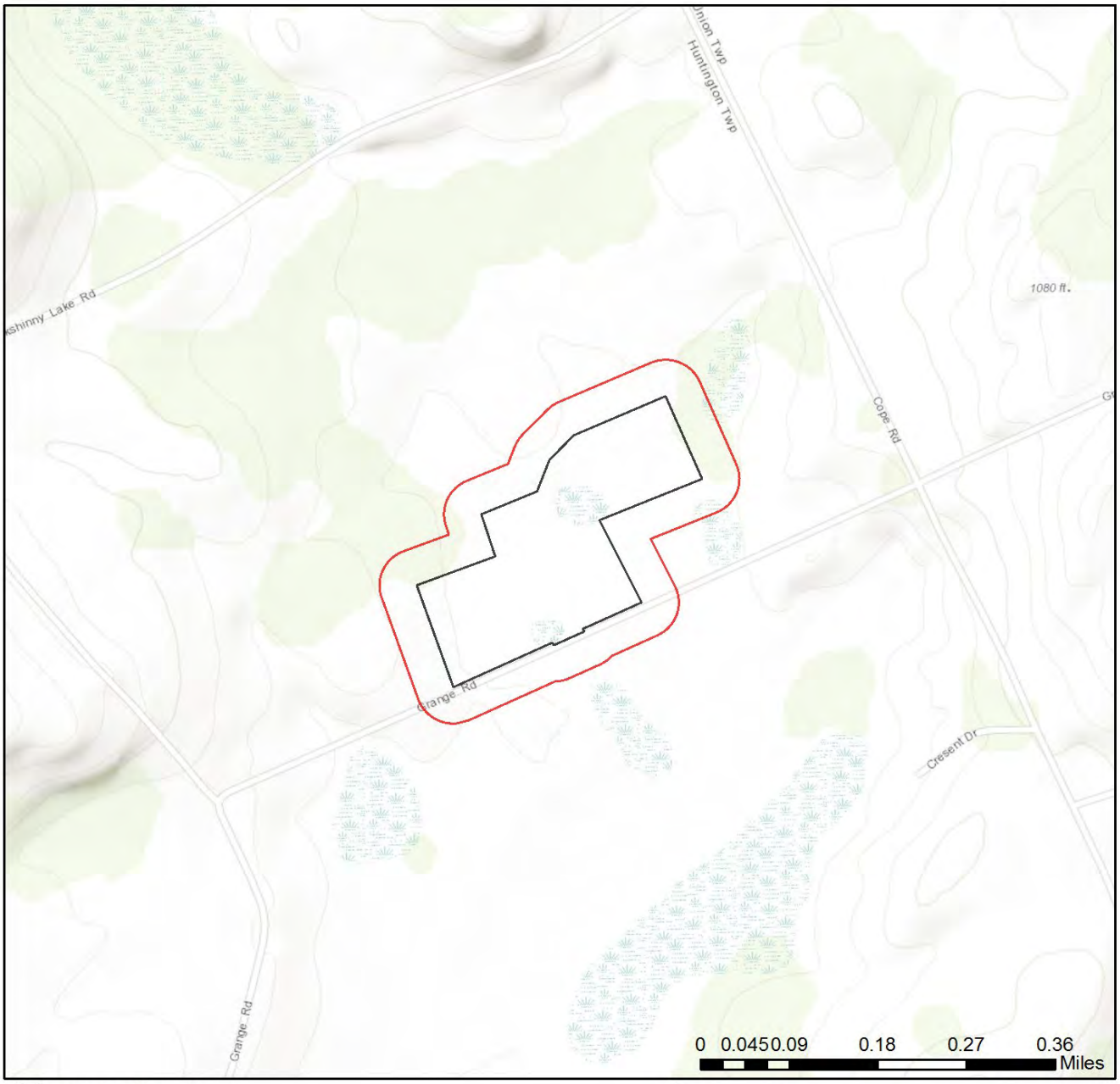
Grajewski Property

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
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user

Grajewski Property



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

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
595 E. Rolling Ridge Dr., 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: Kevin Clark
Company/Business Name: WHM Consulting, Inc
Address: 2525 Green Tech Drive; Suite B
City, State, Zip: State College PA, 16803
Phone: (814) 689-1650 Fax: ( )
Email: kevinc@whmgroup.com

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

11/21/18
date

KISTLER MITIGATION SITE

1. PROJECT INFORMATION

Project Name: **Kistler Property**
Date of Review: **2/2/2018 11:52:23 AM**
Project Category: **Habitat Conservation and Restoration, Wetland Restoration, Wetland Creation, or Wetland Enhancement**
Project Area: **13.78 acres**
County(s): **Schuylkill**
Township/Municipality(s): **WEST PENN**
ZIP Code: **17960**
Quadrangle Name(s): **NEW RINGGOLD**
Watersheds HUC 8: **Lehigh**
Watersheds HUC 12: **Lizard Creek**
Decimal Degrees: **40.721658, -75.891499**
Degrees Minutes Seconds: **40° 43' 17.9691" N, 75° 53' 29.3964" 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.

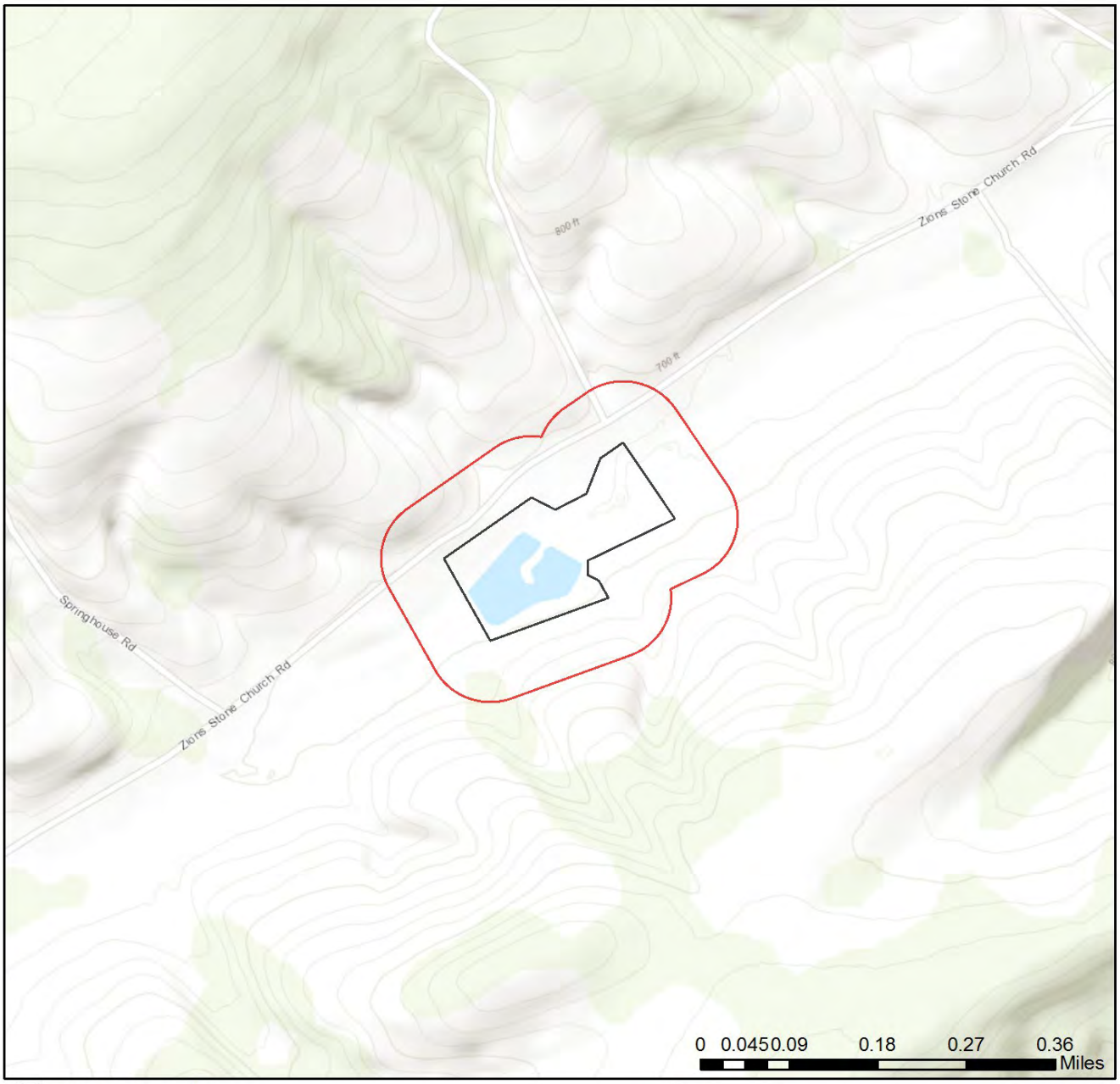
Kistler Property

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
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user

Kistler Property



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.

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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:

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Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

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595 E. Rolling Ridge Dr., 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
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7. PROJECT CONTACT INFORMATION

Name: Kevin Clark
Company/Business Name: WHM Consulting, Inc
Address: 2525 Green Tech Drive; Suite B
City, State, Zip: State College, PA 16803
Phone: (814) 689-1650 Fax: ( )
Email: kevinc@whmgroup.com

8. CERTIFICATION

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applicant/project proponent signature — 11/21/18 date

SHIRK MITIGATION SITE

1. PROJECT INFORMATION

Project Name: **SHIRK MITIGATION SITE**
Date of Review: **5/7/2018 04:25:42 PM**
Project Category: **Habitat Conservation and Restoration, Wetland Restoration, Wetland Creation, or Wetland Enhancement**
Project Area: **8.30 acres**
County(s): **Lehigh**
Township/Municipality(s): **LYNN**
ZIP Code: **18066**
Quadrangle Name(s): **SLATEDALE**
Watersheds HUC 8: **Lehigh**
Watersheds HUC 12: **Upper Jordan Creek**
Decimal Degrees: **40.651058, -75.734150**
Degrees Minutes Seconds: **40° 39' 3.8073" N, 75° 44' 2.9413" W**

2. SEARCH RESULTS

Agency	Results	Response
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Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 must comply with the bog turtle habitat screening requirements of the PASPGP.

SHIRK CONSERVATION AREA

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
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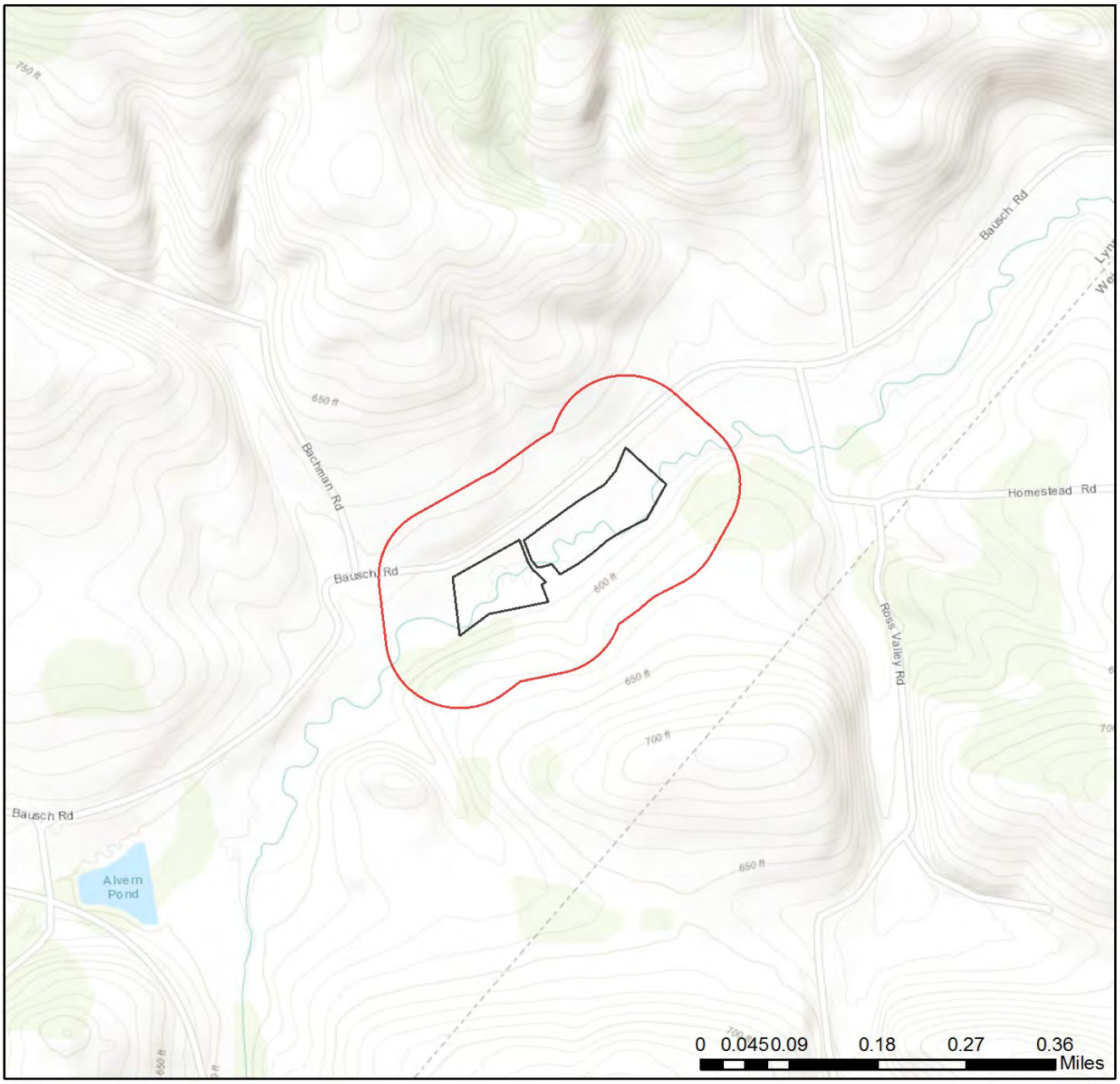
SHIRK CONSERVATION AREA



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2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Brant Hoover
Company/Business Name: WHM Group
Address: 2525 Green Tech Drive
City, State, Zip: State College, PA, 16803
Phone: (814) 689-1650 Fax: (814) 689-1557
Email: branth@whmgroup.com

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Brant W Hoover May 05, 2018

applicant/project proponent signature date

NEGATIVE FINDINGS PHASE I BOG TURTLE REPORT
(SHIRK MITIGATION SITE)

From: UPS Quantum View
To: Kevin Clark
Subject: UPS Delivery Notification, Tracking Number 1Z8797VV0392719009
Date: Monday, November 26, 2018 1:23:54 PM

UPS

Your package has been delivered.

Delivery Date: Monday, 11/26/2018
Delivery Time: 01:18 PM

At the request of WHM CONSULTING, INC this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1Z8797VV0392719009
Ship To:	To Who It May Concern US Fish and Wildlife Service 110 RADNOR RD ROOM 100 STATE COLLEGE, PA 16801 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	FRONT DESK LINDSAY
Reference Number 1:	Solutions 136

Download the UPS mobile app

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May 31, 2018

U.S. Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Rd. Suite 101
State College, PA 16801

RE: NEGATIVE PHASE 1 SURVEY RESULTS BY QUALIFIED BOG TURTLE SURVEYOR: WETLAND ENHANCEMENT SITE – SHIRK PROPERTY; LYNN TOWNSHIP, LEHIGH COUNTY, PA

To whom it may concern,

WHM Consulting, Inc. (WHM) is submitting a courtesy copy of the Negative Phase I Survey Results by a Qualified Bog Turtle Surveyor for the Shirk Property Wetland Enhancement Project (Project). On May 1st, 2018, a Phase I Bog Turtle (*Glyptemys muhlenbergii*) Habitat Assessment was conducted at the above referenced site. The habitat assessment was conducted in accordance with the U.S. Fish and Wildlife Service (USFWS) guidelines. The survey was conducted by Robert Bull (USFWS Qualified Bog Turtle Surveyor) of WHM Consulting, Inc. (WHM). One (1) wetland was observed during the survey. No suitable habitat was found within the investigation area.

Phase I Surveys were conducted in Wetland 1. Wetland 1 is palustrine emergent (PEM) wetland located within a floodplain and adjacent agricultural fields. Dominant vegetation within Wetland 1 consisted of reed canarygrass (*Phalaris arundinacea*), jewelweed (*Impatiens capensis*), and purple loosestrife (*Lythrum salicaria*). Soils within Wetland 1 were not mucky and could not be probed to depths greater than 3 inches. Wetland 1 does not meet the criteria for bog turtle habitat due to a lack of mucky soils and hydrology.

Enclosed you will find a Pennsylvania Natural Diversity Inventory (PNDI) Receipt, Photo Documentation, Bog Turtle Habitat Evaluation Field Forms, Wetland Delineation Map, Project Location Map and Resumes to aid in your review. Thank you for your assistance in this matter. If you need any additional information, please do not hesitate to contact me at (814) 689-1650

Sincerely,

WHM Consulting, Inc.

Paul Fisher, PWS
Environmental Specialist

Enclosures: PNDI Search ID: PNDI-655842
Photo Documentation
Bog Turtle Habitat Evaluation Field Forms
Project Location Map
Wetland Delineation Map
Resume

PNDI RECEIPT

1. PROJECT INFORMATION

Project Name: **SHIRK MITIGATION SITE**
Date of Review: **5/7/2018 04:25:42 PM**
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Project Area: **8.30 acres**
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Township/Municipality(s): **LYNN**
ZIP Code: **18066**
Quadrangle Name(s): **SLATEDALE**
Watersheds HUC 8: **Lehigh**
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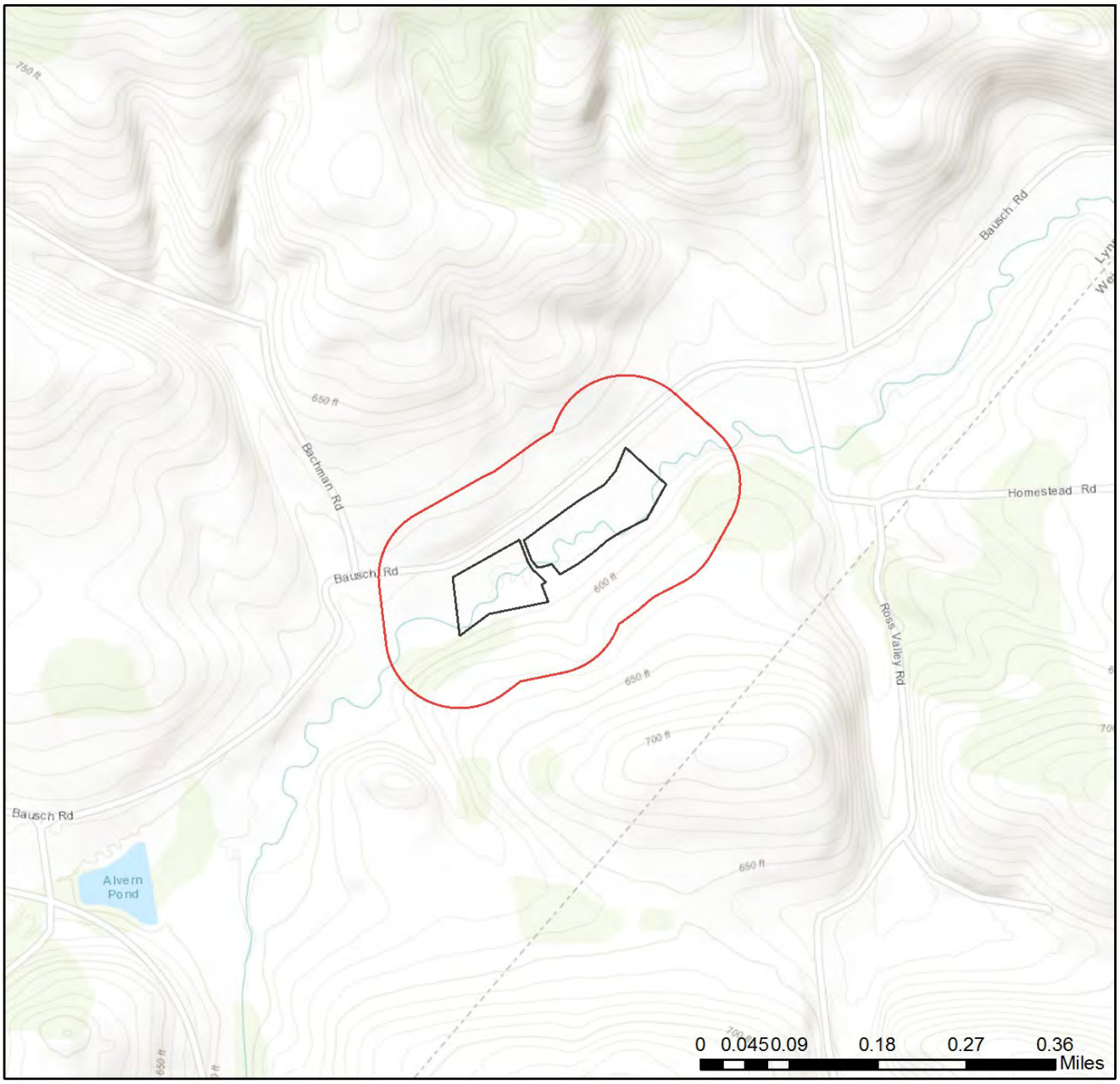
SHIRK CONSERVATION AREA



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Brant W Hoover May 05, 2018

applicant/project proponent signature date

PHOTO DOCUMENTATION

ID: Photo 1

Date: 05/01/18

Taken by: LB

Comments: This photo depicts a northeastern view from Wetland 1.

ID: Photo 2

Date: 05/01/18

Taken by: LB

Comments: This photo shows an eastern view from Wetland 1.

ID: Photo 3

Date: 05/01/18

Taken by: LB

Comments:
This photo gives a southeastern perspective from Wetland 1.

BOG TURTLE HABITAT EVALUATION FIELD FORMS

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form[1]

(revised 06/01/2006)

Project/Property Name: Shirk

Project type: Mitigation Site

Applicant/Landowner Name: Shirk

County: Lehigh Quad: Slatedale Township/Municipality: Lynn Township

PNDI # _____ Potential conflict with USFWS species? ☐ Y ☐ N

ACTION AREA[2]

Action area size: _____ **Does the Phase 1 survey include all wetlands in the action area?** ☒ Y ☐ N[3]

WETLAND ID: Wet #1 **PHOTOS TAKEN:** ☒ Yes ☐ No **WETLAND SIZE:** 7 **acres**

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☐ 0.1-0.5 acre ☐ >0.5 to <1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 40.651612 Long -75.733397

(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 5/1/18 Time In: 14:10 Time Out: 14:40

Last precipitation: ☐ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☐ N ☐ Unknown

How much of this wetland is located *off-site* (*i.e.*, outside the property boundaries or right-of-way)?

☒ none of it – the entire wetland is within the property boundaries (skip next 2 questions)

☐ some of it – _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☐ all of it ☐ part of it (_____% or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (*e.g.*, from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☐ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☐ N ☒ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☒ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Agriculture

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100% ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☐ Y ☒ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

☐ Y ☒ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Project Name Shirk *Wetland* WB5 *(con't)*

Hydrology

☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely ? Watercress present? ☐ Yes ☒ No

☐ Y ☒ N Spring houses in or adjacent to wetland?

☒ Y ☐ N Saturated soils present? If yes, year-round? ☒ Likely ☐ Unlikely ☐ Unknown

☐ Y ☒ N Water visible on surface? Check all that apply: ☐ small puddles/depressions (___" deep)
☐ rivulets (___" deep) ☐ larger pools/ponds (___" deep)

☐ Y ☒ N Evidence of flooding? If yes, describe indicators_____

Soils Mapping Unit (optional):_____

Field observations confirm mapped type? ☐ YES ☐ NO ☐ Unknown

Soils – PEM Portion of Wetland			
Mucky[4]? ☐ YES ☒ NO	How much of it (PEM) is **mucky**? ☐ <10% ☐10-29% ☐ 30-49% ☐ 50-70% ☐ >70%	**Mucky** soils range in depth from: _____ to _____"	**Most** of the **mucky part(s)** of the wetland can be probed[5]: ☐ 3-5" ☐ 6-8" ☐ 9-11" ☐ ≥12"
Non-mucky[6]? ☒ YES ☐ NO	How much of it (PEM) is **non-mucky**? ☐ <10% ☐10-29% ☐ 30-49% ☐ 50-70% ☒ >70%		

Soils – PSS and PFO Portions of Wetland			
Mucky[4]? ☐ YES ☐ NO	How much of it is **mucky**? ☐ <10% ☐10-29% ☐ 30-49% ☐ 50-70% ☐ >70%	**Mucky** soils range in depth from: _____ to _____"	**Most** of the **mucky part(s)** of the wetland can be probed[5]: ☐ 3-5" ☐ 6-8" ☐ 9-11" ☐ ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

☒ sedges ☒ rushes ☒ skunk cabbage ☐ cattail ☐ sweet flag ☒ jewelweed ☐ sphagnum moss
☐ sensitive fern ☐ rice cutgrass ☒ tearthumb ☐ reed canary grass ☐ *Phragmites* ☐ purple loosestrife
☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐_____

Additional dominant species: _____

Herptiles

Were any bog turtles observed? ☐ YES[7] ☒ NO If yes, how many? _____

Other herptiles ☐ observed ☐ previously observed: _____

Additional Comments/Observations: (use additional sheets if necessary)

_____

_____

INVESTIGATOR'S OPINION

☐ YES ☒ NO ☐ UNSURE The hydrology criterion[8] for bog turtle habitat is met.

☐ YES ☒ NO ☐ UNSURE The soils criterion[8] for bog turtle habitat is met.

☒ YES ☐ NO ☐ UNSURE The vegetation criterion[8] for bog turtle habitat is met.

☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Robert Bull — Investigator's Name (print)

R. Bull — Investigator's Signature

5/1/18 — Date

PROJECT LOCATION MAP

WHM consulting, INC.
designs, permits, resolutions
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

SHIRK PROPERTY
WETLAND ENHANCEMENT PROJECT

PROJECT LOCATION MAP

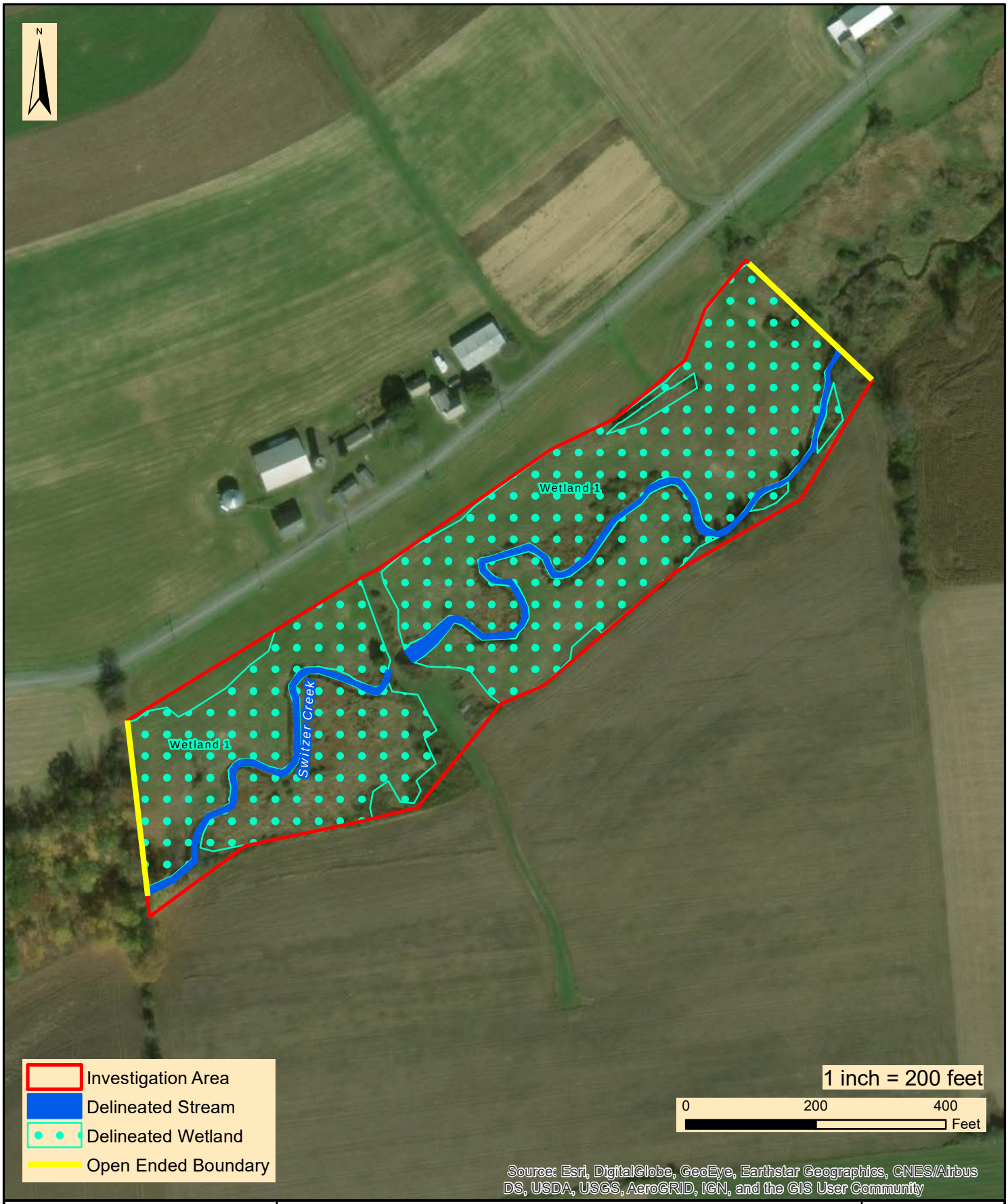
LYNN TOWNSHIP | LEHIGH COUNTY | PENNSYLVANIA

Date: 04/30/18

Drawn By: JSJ

Figure Number: 1

SITE SUMMARY MAP



WHM consulting, INC.
designs, permits, resolutions
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

SHIRK PROPERTY
WETLAND ENHANCEMENT PROJECT

WETLAND DELINEATION MAP

LYNN TOWNSHIP LEHIGH COUNTY PENNSYLVANIA

Date: 04/27/18

Drawn By: EKK

Figure Number: 2

RESUMES

Robert Bull

COMPANY TITLE:

Senior Ecologist/ Qualified Bog Turtle Surveyor

Education

Pursuing a M.S. in Environmental Science and Policy, John Hopkins University

B.S. Biology, York College of Pennsylvania

Cont. Ed & Certifications

- *2010 USDA Certificate of Appreciation*
- *200911997 MDE Erosion and Sediment Control Certification #45230*
- *2009 SHA Erosion w1d Sediment Control Certification #09-503*
- *2009 P AF&BC Certified Bog Turtle Surveyor*
- *2008-09 MDNR Phase 3 Bog Turtle Training*
- *2006 MDNR Certified Bog Turtle Surveyor*
- *USFWS Qualified Bog Turtle Surveyor*
- *1998 Evaluation of Potential Wetlands (EPW) Training*
- *1997 U.S. Army Corps of Engineers Wetland Delineation & Management Training*

Technical Societies

- *Federal Bog Turtle Recovery Committee*

Mr. Bull serves on the Federal Bog Turtle Recovery Committee and has more than 18 years of specialized experience focusing on rare, threatened, and endangered species surveys, wetland delineation and primary functions and values assessment, forest stand delineation, agency coordination, evaluation of impact avoidance/minimization measures, and other natural environment studies for various civil engineering projects in the mid Atlantic region. He has conducted state and federally permitted rare, threatened, and endangered species searches for such diverse animals as the sedge wren, bog turtle, and the Rockville eyeless scud, and for myriad plant species including but not limited to swamp pink, perennial lupine, coastal juneberry, Torrey's sedge, and harperella.

PROFESSIONAL EXPERIENCE

- Natural Environment Inventories and Analysis;
- Endangered Species Surveys;
- Environmental Document Preparation (FEIS, DEIS, NETR, EA, CE, Etc ...) and Avoidance;
- Minimization Studies;
- Coordination With State and Federal Regulatory Agencies (USCOE, UFWS, NRCS, NMFS, MDNR, MDE, Etc ...);
- Liaison With The Maryland State Highway Administration (SHA);
- Bog Turtle Phase I Habitat Assessments;
- Bog Turtle Phase II Physical Surveys and Trapping Services;
- Wetland Assessments and Delineations
- Stream and Wetland Creation Monitoring
- Erosion and Sediment Control Monitoring
- Benthic Macro-Invertebrate Sampling
- Water Quality Sampling
- Specimen Tree Surveys
- Vegetative Community Analysis
- Aquatic Habitat Analysis
- Riparian Corridor Impact Analysis
- R/T/E species coordination for small-flowered baby blue eyes, pumpkin ash and Torrey's rush
- Hazardous Waste Site Assessments

COMPANY TITLE

Environmental Technician

EDUCATION

- *Biology, Bachelors of Science, The Pennsylvania State University, University Park, Pennsylvania, 2013*

HEALTH & SAFETY CERTIFICATIONS & TRAINING

- *PEC - 100794098*
- *ISN- 02754879*
- *Energy Transfer Contractor Safety Orientation Dec. 2016*
- *Southwestern Energy (SWN) Training Assurance Program (TAP) Oct. 2016*
- *Shell Contractor HSE Handbook Sept. 2016*
- *Safeland September 2016*
- *Adult First Aid/CPR– American Heart Association, Pennsylvania – Feb 2016*
- *OSHA 24 Hour HAZWOPER Training; All Probe Environmental; July 2014*
- *Williams Contractor Safety; April 2014*

PROFESSIONAL TRAINING

- *Federal Regulatory Energy Commission Environmental Review and Compliance for Natural Gas Facilities Training - February 2015*
- *38 Hour Army Corps of Engineers Wetland Delineation Training Program Richard Chinn – April 2015*
- *Pennsylvania Association of Professional Soil Scientists Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region – July 2015*

INDEPENDENT COURSEWORK

- *Biological Evolution*
- *Field Biology*
- *Tropical Field Ecology (Class in Costa Rica)*
- *Mammology*
- *Elementary Statistics*
- *Fundamentals of Organic Chemistry I & II*
- *Calculus I & II*
- *Plant Physiology*
- *Mammalian Physiology*

Lawrence R. Burns, WPIT

Mr. Burns is a graduate from The Pennsylvania State University in 2013, where he was awarded a Bachelors degree in Biology from the Eberly College of Science. Since graduation he has gained experience in many environmental areas including wetland delineations, stream projects, threatened and endangered species surveys and GIS mapping.

PROFESSIONAL EXPERIENCE

GENERAL ENVIRONMENTAL PROJECTS

- Used GIS software for mapping and analysis;
- Used a Trimble GPS for mapping boundaries for mapping purposes;
- Composed various Environmental Reports for landfills, gas companies, wind farms, construction companies, private landowners, and regulatory agencies; and
- Performed land analysis's using GIS Software for determining suitable areas for development.

WETLAND AND STREAM RESTORATION PROJECTS

- Performed wetland monitoring and maintenance on various wetlands;
- Performed Stream Surveys;
- Practiced wetland delineations using US Army Corps of Engineers Wetlands Delineation Manual 1987 and applicable regional supplements;
- Used the Pa Code Chapter 93 Water Quality Standards and Chapter 105 Dam safety and Waterway Management;
- Used surveying equipment to characterize stream profiles for mapping and design purposes;
- Delineated wetlands and water resources at projects throughout Pennsylvania;
- Conducted tidal marsh wetland assessment (MIDTRAM); and
- Checked seismic testing locations for wetlands.

BIOLOGICAL EXPERIENCE

- Assisted on Bog Turtle Phase I, II, and III surveys;
- Assisted on threatened and endangered species Phase I surveys;
- Identified and documented different herpetile species at numerous wetland sites;
- Composed various Threatened and Endangered species reports;
- Performed Macro-invertebrate sampling on several streams; and
- Performed wildlife habitat assessments.

ATTACHMENT E:

CULTURAL RESOURCE NOTICE

GRAJEWSKI MITIGATION SITE

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

28 January 2016

Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803

Re: ER 2015-2103-079-B
COE Chapter 105 Permit: Grajewski Property Wetland/Stream Mitigation Project, Huntingdon Township, Luzerne County, Pennsylvania

Dear Mr. Clark:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Thank you for submitting the additional information for the above referenced project. Based on this supplemental information, it is our opinion that no archaeological resources will be affected by this project. Your cooperation in dealing with this matter is appreciated.

If you need further information in this matter please consult Steven McDougal at (717) 772-0923.

Sincerely,

Douglas C. McLearen, Chief
Division of Archaeology & Protection

DCM/srm

KISTLER MITIGATION SITE

Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093
www.phmc.state.pa.us

October 22, 2015

Jenn Jones
WHM Solutions, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803

TO EXPEDITE REVIEW USE
BHP REFERENCE NUMBER

Re: File No. ER 2016-0043-107-A
DEP Chapter 105 Permit: Kistler Property Mitigation Site, West Penn Twp., Schuylkill Co.

Dear Ms. Jones:

Thank you for submitting information concerning the above referenced project. The Bureau for Historic Preservation (the State Historic Preservation Office) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Archaeology

There is a high probability that archaeological resources are located in this project area. In our opinion, the activity described in your proposal should have no effect on such resources. Should the scope of the project be amended to include additional ground disturbing activity this office should be contacted immediately and a Phase I Archaeological Survey may be necessary to locate all potentially significant archaeological resources.

Historic Structures

In our opinion no historic buildings, structures, districts, or objects will be affected by this project.

If you need further information in this matter please consult Mark Shaffer at (717) 783-9900.

Sincerely,

Douglas C. McLearen, Chief
Division of Archaeology & Protection

cc: DEP, Northeast Regional Office

DCM/tmw

SHIRK MITIGATION SITE

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

May 10, 2018

Paul Fisher
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803

NO EXPEDITE REVIEW HERE
BHP REFERENCE NUMBER

Re: File No. ER 2018-1350-077-A
COE Chapter 105 Permit: Shirk Mitigation Project, Lynn Twp., Lehigh Co.

Dear Mr. Fisher:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

There may be historic buildings, structures, and/or archaeological resources located in or near the project area. In our opinion, the activities described in your proposal should have no effect on these resources. Should the scope and/or nature of the project activities change, the PA SHPO should be contacted immediately.

If you need further information concerning archaeological issues please consult Doug McLearen at dmclearen@pa.gov or (717) 772-0925. If you need further information on above ground resources please consult Cheryl Nagle at chnagle@pa.gov or (717) 772-4519.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

DCM/tmw

ATTACHMENT F:

PAST PERFORMANCE HISTORY, PROJECT PROFILES & RESUMES

WHM PERFORMANCE HISTORY

PROJECT NAME	USACE PERMIT #	DEP PERMIT #	USACE DISTRICT	DEED RESTRICTION DATE	MITIGATION ACREAGE	MITIGATION TYPE	PERFORMANCE STANDARD MET / IN COMPLIANCE	FINANCIAL ASSURANCES REQUIRED
BALD EAGLE WETLAND	CENAB-OP-RPA-02-02087-12 CENAB-OP-RPA-04-01670-12	E14-427 E14-465	BALTIMORE USACE - PA	16-Nov-10	52.78	WETLAND CREATION WETLAND ENHANCEMENT WETLAND PRESERVATION	MET	YES
TUNKHANNOCK VIADUCT - WYOMING PIPELINE	CENAB-OP-2010-02810-P13	E6629-003	BALTIMORE USACE - PA	15-Dec-11	1.02	`	IN COMPLIANCE	NO
					4.55	WETLAND ENHANCEMENT		
USG ANCILLARY IMPROVEMENTS PROJECT	CENAB-OP-RPA-2007-1215-P05	E47-087	BALTIMORE USACE - PA	9-Mar-12	2.67	WETLAND CREATION	IN COMPLIANCE	NO
					1.69	WETLAND RESTORATION		
BONNELL TO ROGERS PIPELINE	CENAB-OP-RPA-2011-00411-05	E4129-056	BALTIMORE USACE - PA	22-Dec-11	0.22	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					0.48	RIPARIAN BUFFER		
FRYMIRE GATHERING PIPELINE	CENAB-OP-RPA-2011-00410-P05	E4129-078	BALTIMORE USACE - PA	22-Dec-11	5.07	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
SALT RUN PIPELINE	CENAB-OP-RPA-2011-00410-05	E4129-075	BALTIMORE USACE - PA	22-Dec-11	0.76	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					0.46	RIPARIAN BUFFER		
SALT RUN TO WALLIS RUN_SCHRINERTO WEST LATERAL_NEVIN SMITH TO ANNA SMITH GATHERING	CENAB-OP-RPA-2011-00410 CENAB-OP-RPA-2011-00411	E4129-039 E4129-057	BALTIMORE USACE - PA	22-Dec-11	1.17	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					2.20	RIPARIAN BUFFER		
WARRENSVILLE WEST LATERAL	CENAB-OP-RPA-20 11-00410-05	E4129-020	BALTIMORE USACE - PA	22-Dec-11	1.11	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					2.64	RIPARIAN BUFFER		
BRADFORD WEST COMPRESSOR STATION #2	CENAB-OP-RPA-2011-1923	GP05-08-29-13-026 GP07-08-29-13-006 GP08-08-29-13-024	BALTIMORE USACE - PA	31-Jul-13	0.01	WETLAND CREATION	IN COMPLIANCE	NO
					0.10	WETLAND ENHANCEMENT		
GARRISION PIPELINE & POLOVITCH EW	CENAB-OP2010-0281 0-P 13	GP05-66-29-11-11 GP07-66-29-11-03 GP08-66-29-11-10	BALTIMORE USACE - PA	4-Dec-12	0.09	WETLAND CREATION	IN COMPLIANCE	NO
					0.82	WETLAND ENHANCEMENT		
					0.15	RIPARIAN BUFFER		
POLOVITCH EAST TO JERAULD & TAYLOR PIPELINE	CENAB-OP-RPA-2010-02810-P13	E5829-034	BALTIMORE USACE - PA	15-Dec-11	0.48	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
BARTO TAP SYSTEM PIPELINE	NAB-2011-00177-P05	GP08-41-09-503 E4129-013	BALTIMORE USACE - PA	4-Dec-12	2,154 LINEAR FT	STREAM RESTORATION	IN COMPLIANCE	NO
					6.03	RIPARIAN BUFFER		
CANTON PIPELINE	CENAB-OP-RPA-2012-01107	E4129-037 E5929-030 E0829-039	BALTIMORE USACE - PA	10-Sep-12	0.05	WETLAND CREATION	IN COMPLIANCE	NO
					1.20	RIPARIAN BUFFER		
TGP SOUTH SALES PIPELINE	CENAB-OP-RPA-2012-00368-P09	E0829-055	BALTIMORE USACE - PA	16-Sep-13	3.10	RIPARIAN BUFFER	IN COMPLIANCE	NO
					2.50	WETLAND ENHANCEMENT		
U GATHERING	CENAB-OP-RPA-2012-00368-P09	E0829-061	BALTIMORE USACE - PA	16-Sep-13	1.35	RIPARIAN BUFFER	IN COMPLIANCE	NO
					0.10	WETLAND ENHANCEMENT		
UNIT 4 GATHERING LINE	CENAB-OP-RPA-2012-00368-P09	E0829-058	BALTIMORE USACE - PA	16-Sep-13	0.50	RIPARIAN BUFFER	IN COMPLIANCE	NO
					1.65	WETLAND ENHANCEMENT		
UNIT 9 GATHERING LINE	CENAB-OP-RPA-2012-00368	E0829-066	BALTIMORE USACE - PA	16-Sep-13	0.75	WETLAND ENHANCEMENT		NO
WHITE COMPRESSOR STATION	CANAB-OP-RPA-2012-00368-P09	GP-07-0824 GP-12-028	BALTIMORE USACE - PA	16-Sep-13	0.25	RIPARIAN BUFFER	IN COMPLIANCE	NO
					0.15	WETLAND CREATION		

WHM PERFORMANCE HISTORY

PROJECT NAME	USACE PERMIT #	DEP PERMIT #	USACE DISTRICT	DEED RESTRICTION DATE	MITIGATION ACREAGE	MITIGATION TYPE	PERFORMANCE STANDARD MET / IN COMPLIANCE	FINANCIAL ASSURANCES REQUIRED
WASTEWATER TREATMENT PLANT	CENAB-OP-RPA-2012-01099-05	E41-629	BALTIMORE USACE - PA	9-Mar-12	0.15	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
NW1 GATHERING LINE	CENAB-OP-RPA-2011-01795	E5829-049	BALTIMORE USACE - PA	24-Oct-13	0.60	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
VARGO COMPRESSOR STATION	CENAB-OP-RPA-2011-00410	E4129-080	BALTIMORE USACE - PA	22-Dec-11	0.90	WETLAND CREATION	PENDING 2015 CONSTRUCTION	NO
WARRENSVILLE NORTH EXTENSION	CENAB-OP-RPA-20 11-00410-05	E4129-019	BALTIMORE USACE - PA	22-Dec-11	0.72	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					0.80	RIPARIAN BUFFER		
CHESAPEAKE ABLE LATERAL PIPELINE	CENAB-OP-RPA-2012-00561-05	E4129-052 E5729-038	BALTIMORE USACE - PA	31-Dec-12	0.98	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					3.03	RIPARIAN BUFFER		
S7 CROSSING	CENAB-OP-RPA-2012-01107	E4129-037 E5929-030 E0829-039	BALTIMORE USACE - PA	10-Sep-12	0.20	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
					0.05	WETLAND CREATION		
					1.30	RIPARIAN BUFFER		
AUBURN LINE EXTENSION PROJECT	CENAB-OP-RPA-2011-03756	E4029-003 E6629-015	BALTIMORE USACE - PA	31-Jul-13	3.39	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
TEAM 2014	CENAB-OP-RPA-2013-1374-P12	-	BALTIMORE USACE - PA	14-May-14	4.68	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
CANTON PIPELINE MAJOR MODIFICATION	CENAB-OP-RPA-2012-01107-P05	E4129-037 E5929-030 E0829-039	BALTIMORE USACE - PA	17-Jul-14	9.00	WETLAND CREATION	PENDING 2015 CONSTRUCTION	NO
HEMLOCK LATERAL	CENAB-OP-RPA-2013-00806-05	-	BALTIMORE USACE - PA	17-Jul-14	0.18	WETLAND CREATION	PENDING 2015 CONSTRUCTION	NO
					0.66	WETLAND ENHANCEMENT		
					0.35	RIPARIAN BUFFER		
UNION DALE LATERAL PROJECT	CENAB-OP-RPA-2013-01861-P25	-	BALTIMORE USACE - PA	24-Oct-13	0.21	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
EMERALD LONGWALL MINE PANEL D2 PROJECT	2014-0283	GP113014205 GP083014208	PITTSBURGH USACE - PA	29-Aug-14	0.31	WETLAND CREATION	IN COMPLIANCE	NO
AUBURN LOOP LINE	CENAB-OP-RPA-2010-03756-P25	-	BALTIMORE USACE - PA	24-Oct-13	0.33	WETLAND ENHANCEMENT	PENDING 2015 CONSTRUCTION	NO
LEIDY SOUTHEAST EXPANSION	CENAB-OP-RPA-2013-01107-05	E4129-037 E5929-030	PHILIDELPHIA USACE - PA	20-May-15	15.20	WETLAND ENHANCEMENT	IN COMPLIANCE	NO
BIRCHARD PIPELINE	CENAB-OP-RPA-2009-01676-P25	E5829-091	BALTIMORE USACE - PA	24-Oct-13	0.36	WETLAND ENHANCEMENT	IN COMPLIANCE	NO

BALD EAGLE WETLAND MITIGATION SITE
CENTRE COUNTY, PENNSYLVANIA

Few issues have polarized the business community and environmentalists more than the balance between development and protecting wetlands. WHM has developed a highly innovative approach that creates new wetlands while allowing projects to move ahead. An example is the Bald Eagle Wetland Mitigation Site, the first of its kind in Pennsylvania.

Although avoidance of wetland damage is a goal in highway construction, some impact is unavoidable. The Pennsylvania Department of Transportation hired WHM to provide mitigation for such situations. We utilize a non-traditional methodology, assembling a team to handle everything at no risk to the client. We find a site, purchase the property, acquire the permits, deal with regulatory agencies and construct replacement wetlands – all at a per-acre fixed cost.

Through careful field and desktop evaluations, followed by numerous discussions with property owners, WHM located several potential properties in the Bald Eagle Valley in Centre County, Pa. These properties were selected based on their ability to create wetlands as determined by an examination of hydrology and soils, as well as other environmental and non-environmental factors. Larger contiguous properties create a more diverse habitat than smaller unwanted parcels. Properties that retained a high possibility of success were ranked for acquisition.

After clearances were issued and sites were selected, WHM began to create a design for the Bald Eagle project based on the overall shape of the landscape and the development of a hydrologic water budget. The concept was presented to the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and other state and local agencies. The final design was based on input from each of these agencies, and then used to obtain regulatory approvals necessary for the construction of wetlands.

As the project progressed, a series of construction drawings was developed, resulting in a final, detailed design illustrating phased construction activities, erosion control practices and a complete planting and re-vegetation schedule. As part of the regulatory permits and approvals, WHM developed a monitoring plan to ensure long-term site maintenance and success. Funding for the project includes provisions for ongoing and long-term management of the wetlands by a non-profit organization.

In 2010, a search ensued for a suitable not-for-profit organization for the perpetual care and use of the property. WHM began discussions with the Wildlife for Everyone Endowment Foundation (WFEEF) and determined their goals to support to enhance wildlife habitat, scientific research and education; land preservation; and the development of youth programs would be a great fit as a steward of the property and the habitat into the future. In 2011, WHM donated more than 135 acres of land along Bald Eagle Creek, and a $50,000 maintenance fund for the property to WFEEF. Upon acquisition of the recreational property, WFEEF dedicated the land to an honorary board member and former Pennsylvania Governor Tom Ridge.

The Governor Tom Ridge Wetland Preserve has provided PennDOT with 50 acres of wetland mitigation credits. In addition, wetland preservation, restoration and upland habitat are part of this project. Based on past wetland construction costs for highway projects, the client stands to save considerable money. Rather than utilizing traditional methods of contracting with multiple entities and managing multiple contracts without guarantee of success, WHM provides a single “family” to ensure success.

WETLAND REMEDIATION PROJECT
MONTOUR COUNTY, PENNSYLVANIA

WHM Solutions, Inc. (WHM) was retained by an undisclosed client to provide sufficient compensation to offset impacts incurred by a site improvement project. Due to insufficient compensation of replacement acreage at an existing mitigation site, the client contracted WHM to develop additional compensation within an appropraite geographic service area or watershed. WHM was responsible for the execution of the deed restriction on the property, the permitted design, construction, and monitoring of the project.

BEFORE

DURING

AFTER

WHM completed a desktop analysis within an appropriate geographic service area to determine potential locations to offset water resource impacts resultant of the project. The site selection process focused on the location of the existing water resource impacts which span throughout the watershed, and a conducive location to offset the impacts. Potential sites or leads were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, and hydric soils. Based on the desktop review, landowners with suitable properties were contacted to determine interest of conducting a mitigation project on their property. Several landowners with favorable properties were contacted throughout the site selection process. Ultimately due to site suitability, landowner cooperation, and an onsite field meeting with the USACE, a farm located in Montour County was selected as an appropriate site to conduct wetland remediation measures.

The design of the wetland restoration and wetland creation consisted of increasing and expanding functions of the existing bottomland wetland located to the south of the mitigation area. The purpose of the remediation project was to provide additional compensation and the creation of a functional wetland system. The design incorporated expansion of the bottomland forest wetland with shallow vegetated open-water components to create and enhance habitat for amphibians, waterfowl, wading birds, and migratory songbird species. The design provided random clumped distribution of tree plantings positioned on graded low hummocks or mounds where the tree collars will be above typical standing water elevations early in the growing season. Trees were also planted along the perimeter of the site to act as screening/buffer for the wetlands. The open-water flightway was paralleled by emergent and scrub/shrub fringe to enhance diversity and mimic natural oxbow features in the watershed.

The result of the project has provided a native wetland community and riparian buffer that fit naturally into the landscape. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.

MOORE FARM WETLAND MITIGATION SITE
LYCOMING COUNTY, PENNSYLVANIA

WHM Solutions, Inc. (WHM) offers comprehensive solutions to difficult environmental problems, steamlining the business endeavors of our clients while preserving our country's environmental assests. From permitting to design to erosion and settlement controls, we handle every aspect of the mitigation process and present it in one fixed-rate, turnkey package.

BEFORE

An undisclosed midstream company contracted WHM to develop compensation for several proposed natural gas pipeline projects in north central Pennsylvania that would result in wetland damage. WHM was responsible for the execution of the deed restriction on the property, for acquiring all necessary permits and dealing with regulatory agencies, and for the design, construction, and monitoring of the project.

DURING

WHM completed a desktop analysis within the appropriate geographic service area to determine potential locations. These sites were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, hydric soils, and tax parcel data. Landowners with suitable property to conduct mitigation activities were contacted and several landowners with favorable properties were approached throughout the site selection process. Ultimately, due to site suitability, landowner cooperation, and the non-attaining status of the waters, a farm located in Piatt Township, Lycoming County was chosen to accomplish compensatory mitigation for the proposed project impacts.

AFTER

The design of the mitigation site consists of wetland enhancement and the installation of a forested riparian buffer. The mitigation area is a contiguous land feature that will be expanded by future projects leading to an overall benefit to functions and values. The work plan will enhance functions of the existing wetland which is in a degraded state due to the current land use as a cattle pasture, resulting in considerable nutrient inputs. The purpose of the project is to offset function and value losses resulting from impacts associated with the proposed pipeline project. The design will incorporate wetland and stream fencing to remove cattle from the areas proposed for mitigation. It will include a meandering flightway to create and enhance habitat for waterfowl, wading birds, and migratory songbird species. The flightway will be paralleled by an emergent and scrub/shrub fringe. The vegetative design of the site will incorporate a diverse planting plan consisting of herbaceous seeding followed by a clumped distribution of tree and shrub plantings. Once the mitigation areas are established, increased nutrient and sediment sequestering will be provided within the areas resulting in an improvement of water quality and habitat enhancement.

The result of the project has provided 11.82 acres of native wetland community and 6.58 acres of forested riparian buffer that fit naturally into the landscape. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.

WHM's design-built and innovative approach to wetland mitigation proves that development in the natural gas industry doesn't have to come at the risk of our aquatic resources or at the hassle of our clients working towards the future of the energy industry.

SPADINE FARM MITIGATION SITE
WYOMING COUNTY, PENNSYLVANIA

WHM Solutions, Inc. (WHM) has a design-built and highly innovative approach to wetland mitigation that allows our clients to move projects forward without compromising the condition of our natural resources.WHM is unique in that everything from permitting, to design, to monitoring, and more is handled through one company. An undisclosed midstream company retained WHM to provide compensatory mitigation projects for several pipeline projects that caused functional conversion and permanent wetland impacts in the Upper Susquehanna – Tunkhannock Subbasin.

BEFORE

WHM completed a desktop analysis to determine geographically appropriate location sites. These sites were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, hydric soils, and tax parcel data. Landowners with suitable property to conduct mitigation activities were contacted and several landowners with favorable properties were approached throughout the site selection process. Ultimately, due to site suitability, landowner cooperation, and previous mitigation activities already occurring on portions of this property, a farm located in Nicholson Township, Wyoming County was selected as an appropriate site to conduct mitigation measures.

DURING

The design for the 6.78 acre wetland enhancement and 1.14 acre wetland creation consists of increasing and expanding functions of the adjacent existing wetland which is in a degraded state due to current and past agricultural use. The design will incorporate minor grading in the wetland creation area and a diverse planting plan to expand function and value of the adjacent existing mitigation areas.

The vegetative design of the site is intended to jump start or supplement naturally occurring succession (volunteer species) ensuing from the change in land use type as a result of installation of cattle exclusion fencing. The planting plan will consist of a clumped distribution of monocultural blocks of trees and shrubs within portions of the wetland system. A 0.15 acre forested riparian buffer will be installed along the spring fed channel which flows into an Unnamed Tributary to Tunkhannock Creek. The area will be planted with a forested riparian buffer to create a stable ecosystem adjacent to the water's edge, provide soil/water contact area to facilitate nutrient buffering processes, provide shade to moderate and stabilize water temperature encouraging the production of beneficial algal forms and to contribute necessary detritus and large woody debris to the stream ecosystem.

AFTER

The result of the project provides 7.72 acres of native wetland community and .15 acres of forested riparian buffer that fit naturally into the landscape. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.

TAYLOR PROPERTY WETLAND MITIGATION SITE
TIOGA COUNTY, PENNSYLVANIA

Natural gas development is one of the fastest growing industries in our country and the new infrastructure necessary to keep production moving forward sometimes begets an unavoidable impact on our aquatic resources. WHM Solutions, Inc. (WHM) offers an all-encompassing remediation solution, handling every aspect of the mitigation process from design to landowner relations to permitting.

BEFORE

An undisclosed midstream company contracted WHM to develop compensation for a new natural gas pipeline project that resulted in significant temporary and converstion impacts to wetlands and channels crossed by the pipeline. WHM was responsible for the execution of the deed restriction on the property, for acquiring all necessary permits and dealing with regulatory agencies, and for the design, construction, and monitoring of the project.

DURING

WHM completed a desktop analysis within watersheds proposed to be impacted by the project. These sites were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, hydric soils, and tax parcel data. Landowners with suitable property to conduct mitigation activities were contacted and several landowners with favorable properties were approached throughout the site selection process. Ultimately, due to site suitability, landowner cooperation, and the degraded state of the waters onsite, a farm located in Liberty Township, Tioga County within the Little Elk Run watershed was chosen to accomplish compensatory mitigation for the proposed impacts.

AFTER

The design of the mitigation site consists of a wetland creation area and the installation of a forested riparian buffer. The mitigation area is a contiguous land feature that will lead to an overall benefit to functions and values in Little Elk Run and the Antes-Lycoming Creeks watershed. The work plan will establish a forested riparian buffer and additional wetland acreage adjacent to Little Elk Run to increase functions and values of the existing condition of the water resources which is in a degraded state due to the current land use as a cattle pasture, resulting in considerable nutrient inputs. The design will incorporate the removal of cattle from the areas proposed for mitigation. The vegetative design of the site will incorporate a diverse planting plan consisting of herbaceous seeding in the wetland creation area and a clumped distribution of tree and shrub plantings. Once the mitigation areas are established, increased nutrient and sediment sequestering will be provided within the areas resulting in an improvement of water quality and habitat enhancement.

The result of the project created 2,364 square feet, or 0.05 acres, of wetland by taking the area out of an active cattle pasture and reverting to functional forested wetland habitat. It has also provided 1.2 acres of forested riparian buffer along Little Elk Run. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.

COMPANY TITLE:
Chief Operating Officer

Education

- *BS, Environmental Resource Management, The Pennsylvania State University, 1998*

Professional Training

- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *"Applied Fluvial Geomorphology", Canaan Valley Institute, WV, 2000.*
- *"River Morphology and Applications" Wildland Hydrology, Pagosa Springs, CO, 2000.*
- *"Macroinvertebrate Monitoring for North Carolina Stream Restoration" Raleigh NC, 2001.*
- *"River Assessment and Monitoring", Wildland Hydrology, Pagosa Springs, CO, 2001*
- *"River Restoration and Natural Channel Design", Wildland Hydrology, Pagosa Springs CO, 2002*
- *"AutoCAD use for Stream Restoration and Monitoring", The North Carolina State University, University Park, PA, 2005*
- *"Overview of Wetland Delineation Protocols and the Interim Regional Supplement to the USACE Delineation Manual", State College, April 2011*
- *"Planning Hydrology for Constructed Wetlands", Wetland Training Institute, State College, PA November 2011*

Conferences and Seminars

- *The SGA Technical Conference on Environmental Permitting & Construction Hyatt Regency – Austin TX February 17-19, 2014*
- *Mid-Atlantic Stream Restoration Conference, Baltimore, MD 21530 , 2013*
- *Federal Energy Commission "Environmental Review and Compliance for Natural Gas Facilities Seminar" San Antonio, TX, 2013*
- *SGA FERC Environmental Permitting & Construction Compliance Workshop, Houston, TX, 2013*
- *SGA FERC Environmental Permitting & Construction Compliance Workshop, New Orleans, LA, 2012*
- *SGA FERC Environmental Permitting & Construction Compliance Workshop, San Antonio, TX, 2011*
- *Mid-Atlantic Stream Restoration Conference, Flinstone, MD 21530 , 2011*

D. Josh Lincoln

Mr. Lincoln has over 12 years of experience providing professional environmental and natural resource consulting services to private, industrial and institutional landowners; nonprofit organizations, and all levels of government. He has implemented eclectic blends of regulatory strategies and restoration practices to support land development, energy, transportation, mining, solid waste, and community infrastructure. Technical proficiencies include resource assessment, impact analysis, permitting and compliance, ground and surface water quality, ecosystem restoration design, environmental monitoring, watershed assessments, stream monitoring, stream design, wetland delineation, and construction management. Mr. Lincoln's diverse background in this field allows him to provide turnkey services for environmental resource projects.

As Chief Operating Officer at WHM Consulting, Inc., Mr. Lincoln coordinates and manages scientists, engineers, and environmental experts to oversee environmental projects from planning through construction.

PROFESSIONAL EXPERIENCE

WETLANDS PROJECTS

- Managed wetland investigation teams for large site development projects throughout the Mid-Atlantic.
- Permitting of development projects involving regulated water resources, e.g., landfill expansions, interstate road alignments, wind farms, and residential developments.
- Selection and design of wetland replacement sites.
- Manager of wetland replacement construction projects
- Operator of heavy equipment for the construction of wetland replacement projects.
- Manager of landfill wetland mitigation projects

STREAM RESTORATION

- Monitored stream bank erosion rates and calculated sediment loading curves for several watersheds in Pennsylvania, West Virginia, Maryland, New York and North Carolina.
- Developed regression relations for bankfull stream characteristics based on drainage area used for natural channel design.
- Selected and surveyed reference reach streams to develop natural channel design criteria based on bankfull stage channel dimensions.
- Designer of several miles of stream restoration projects using natural channel design methods in Pennsylvania, North Carolina, New York, Maryland, and West Virginia.
- Manager of several miles of stream restoration projects.
- Operator of heavy equipment to construct cross rock vanes and j-hooks vanes structures for stream restoration project.

WATERSHED MANAGEMENT

- Manager of several watershed assessments conducted throughout Pennsylvania. The projects included developing GIS data bases that inventoried assessment results.
- Developed watershed management plans for nonprofit watershed groups.
- Manager of wind farm permitting projects.
- Prepared grants for nonprofit watershed groups.

Kevin Clark, PWS

COMPANY TITLE:
Project Manager

EDUCATION

- *BA, Environmental Studies, The Pennsylvania State University, 2006*

CERTIFICATIONS

- *Professional Wetland Scientist PWS Seal #: 2285*

PROFESSIONAL TRAINING

- *Federal Energy Commission "Environmental Review and Compliance for Natural Gas Facilities Seminar" Orlando, Florida Feb. 26-28, 2013*
- *Planning Hydrology, Vegetation, and Soils for Constructed Wetlands – The Wetland Training Institute; State College, PA – Sept. 10-12, 2012*
- *Erosion & Sediment (E&S) Manual Training (Northampton Co.) by the PACD in conjunction PADEP August 20, 2012*
- *Williams Contractor Safety; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio May 23, 2012*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts - Overview and Discussion", State College, PA – M.N. Gilbert Environmental April , 2011*
- *PaDEP—Technical Review of the revised Chapter 102 Regulations, Penn Tech Campus, Williamsport, PA – December, 2010*
- *"Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual": PAPSS, DCNR Bureau of Forestry, Laporte, PA - April, 2010*
- *Department of Environmental Protection "Regulatory Requirements Seminar for Marcellus Shale"; Harrisburg, PA - March , 2010*
- *Wetland Delineator Training, Institute for Wetland and Environmental Education and Research, Inc., Tiner and Veneman, Albany, New York – July, 2008.*
- *Plant ID: Wetlands and Their Borders, Institute for Wetland and Environmental Education and Research, Inc., Weldy, Albany, New York - July 2008.*
- *DEP Stormwater Best Management Practices Manual Training Session, State College, Pennsylvania - May 2007.*

Kevin Clark has over 7 years experience with wetland delineation and evaluation, permitting, mitigation design, and the preparation of environmental compliance documents in accordance with national (NEPA), state, and local criteria and guidelines. Mr. Clark is a Professional Wetland Scientist (PWS) certified by the Society of Wetland Scientists (SWS) that manages the design and construction of habitat and wetland restoration, enhancement and replacement projects for WHM. Additionally, Mr. Clark, specializes in the assessment and remediation of polluted mine drainage, primarily by passive treatment techniques. Mr. Clark regulary works with various watershed organizations, townships and municipalities, non-profit organizations, engineering firms, energy companies, and state and federal agencies. Mr. Clark also has been successful in acquiring state and federal grants for non-profit organizations to secure funding for water quality improvement projects.

PROFESSIONAL EXPERIENCE

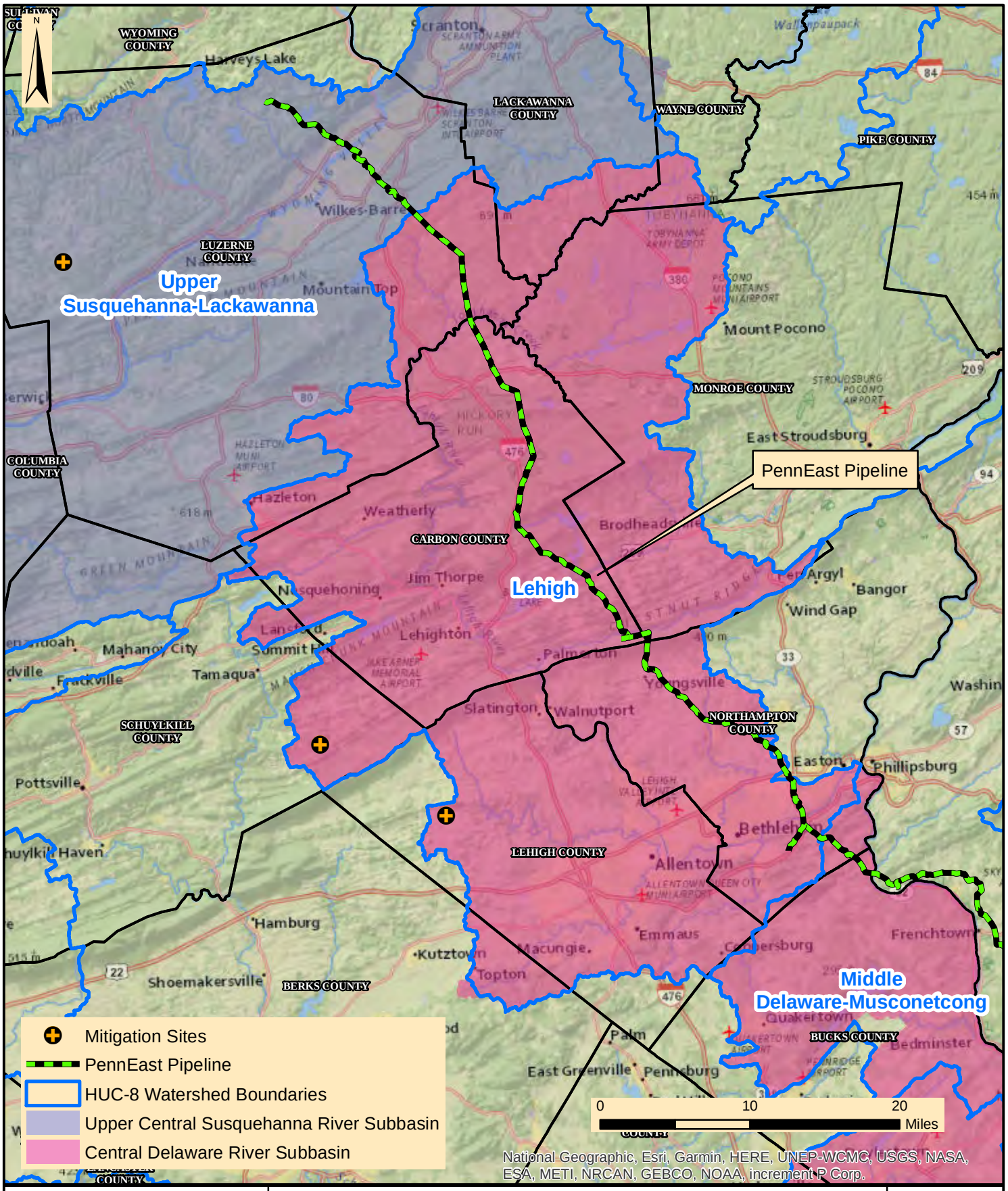
ENVIRONMENTAL PERMITTING

- Completed local, state, and federal environmental permitting for various types of development and water quality improvement projects, which included detail studies/reports and thorough coordination with regulatory agencies;
- Completed and assisted with NPDES permit applications, Erosion and Sedimentation Control Plans, and Post-Construction Stormwater Management Plans;
- Produced detailed ArcGIS and AutoCAD maps of various projects.

WATER RESOURCE PROJECTS

- Completed and assisted with wetland and stream mitigation plans, including designs, in accordance with USACE's *Compensatory Losses of Aquatic Resources* guidance document;
- Construction oversight and monitoring of wetland construction project;
- Completed small to large scale delineations throughout the northeast in accordance with 1987 USACE Wetland Delineation Manual and applicable regional supplements.
- Completed numerous watershed assessments to determine point and non-point source pollution with a main focus on Abandoned Mine Lands (AML) and Abandoned Mine Drainage (AMD) impacted streams;
- Assisted with treatment system design and restoration plans for watersheds impacted by AMD;
- Conducted water quality analysis's including: macroinvertebrate sampling and identification and habitat assessment.
- Obtained numerous Growing Greener and Chesapeake Bay Small Watershed Grant awards for several non-profit organizations for AMD related issues.
- Utilized GPS units for high accurate field data collection and produce detailed mapping.
- Assisted with threatened and endangered species surveys through the Pennsylvania Natural Diversity Index (PNDI) program for various plant and animal species.

FIGURES / DRAWING



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PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

GEOGRAPHIC SERVICE AREA MAP

PENNSYLVANIA

Date:	10/23/19
WHM Drawing Number:	SOL136A001
Drawn By:	PJB
Figure Number:	E1

GRAJEWSKI MITIGATION SITE

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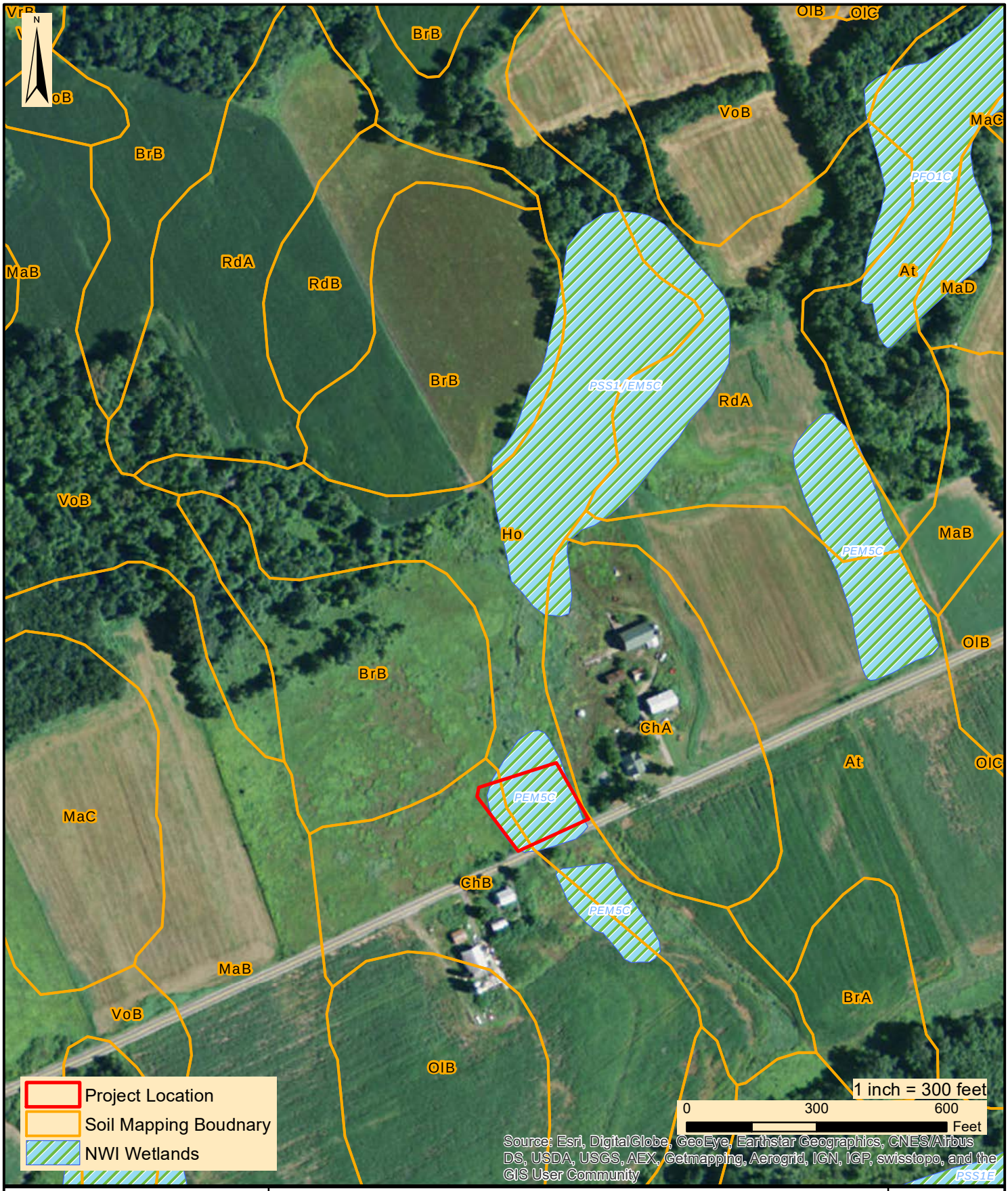
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

GRAJEWSKI PROPERTY
PROJECT LOCATION MAP

HUNTINGTON TOWNSHIP LUZERNE COUNTY PENNSYLVANIA

Date:	12/16/15
WHM Drawing Number:	SOL136A002
Drawn By:	PJB
Figure Number:	E2



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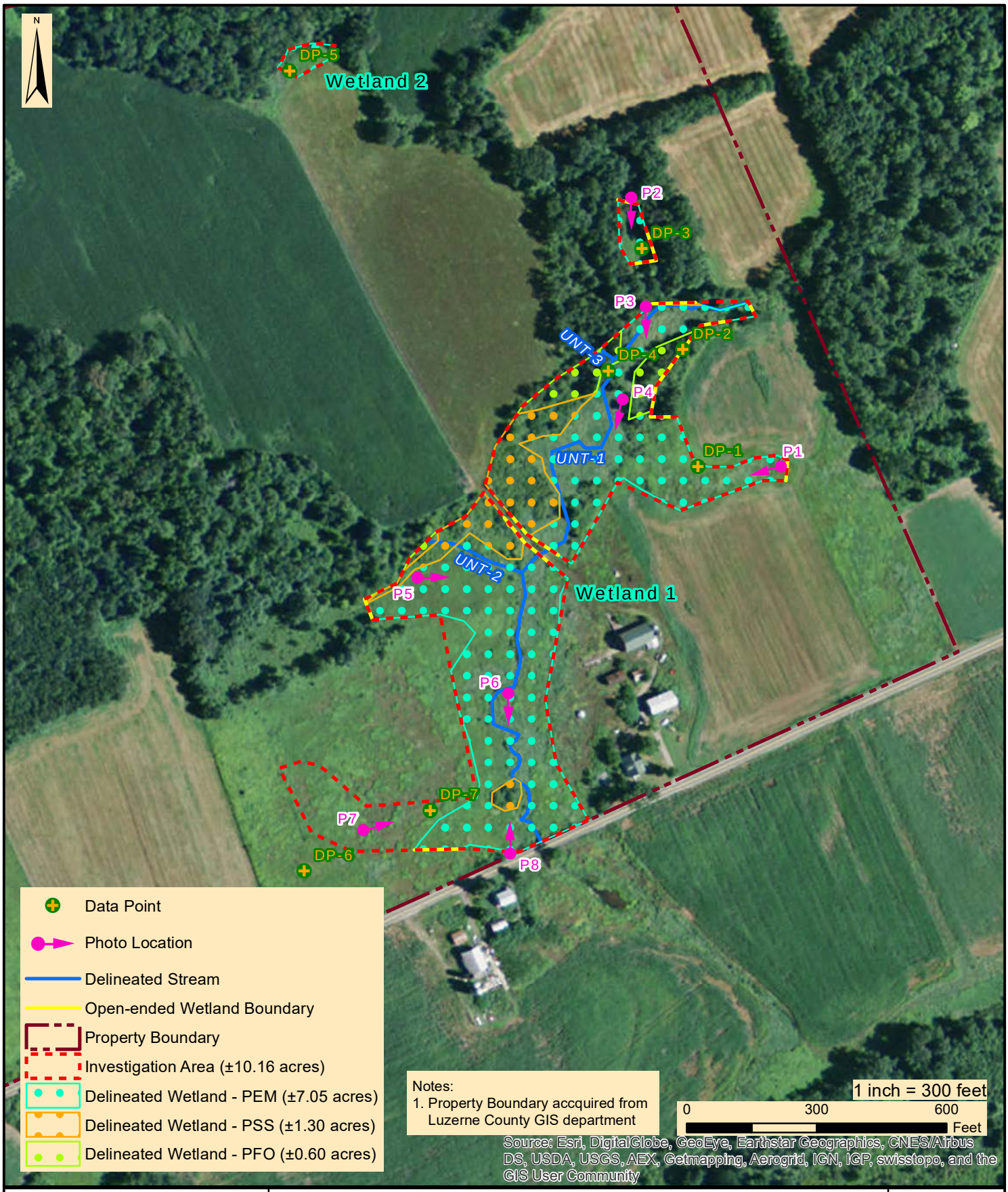
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

GRAJEWSKI PROPERTY
USDA-NRCS SOILS AND NWI MAP

HUNTINGTON TOWNSHIP LUZERNE COUNTY PENNSYLVANIA

Date:	12/16/15
WHM Drawing Number:	SOL136A003
Drawn By:	PJB
Figure Number:	E3



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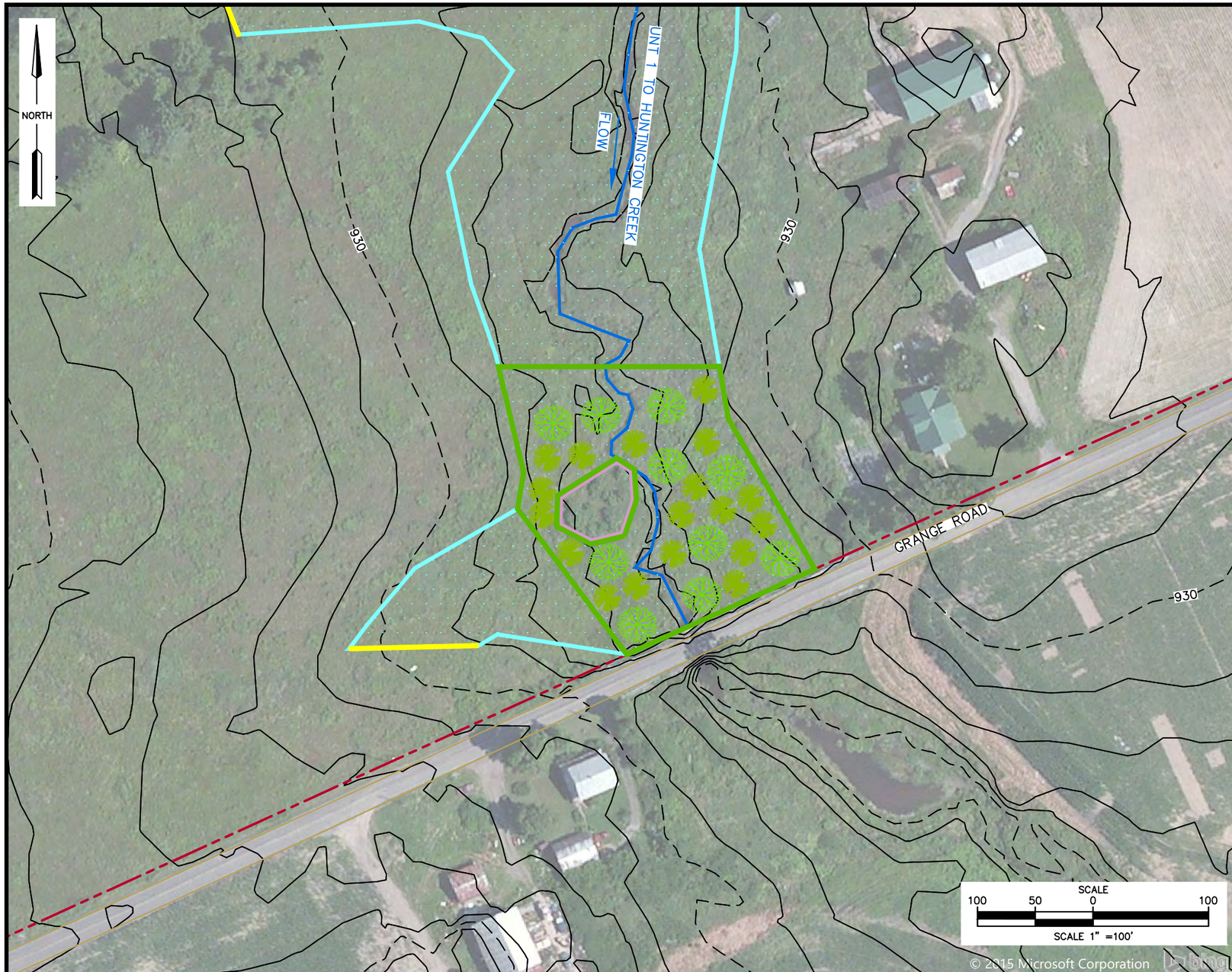
PENNEAST PIPELINE COMPANY, LLC

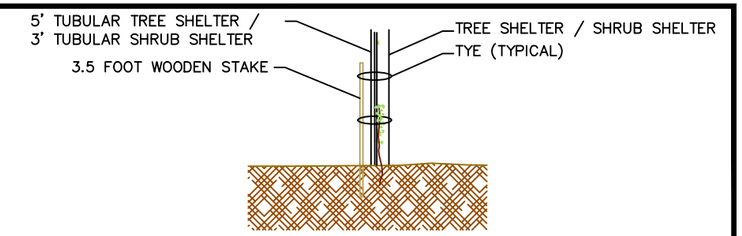
PENNEAST PIPELINE PROJECT

GRAJEWSKI PROPERTY
WETLAND DELINEATION MAP

HUNTINGTON TOWNSHIP LUZERNE COUNTY PENNSYLVANIA

Date:	12/15/15
WHM Drawing Number:	SOL136A004
Drawn By:	PJB
Figure Number:	E4

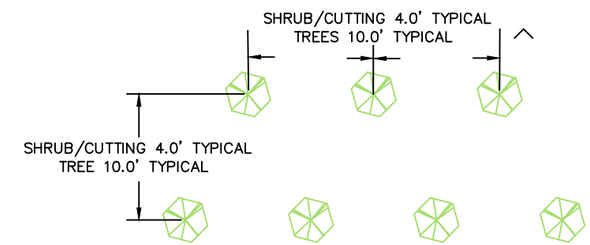




NOTE: TREE SHELTERS ARE TO BE MADE FROM BIODEGRADABLE PLASTIC TUBING.

TYPICAL TREE/SHRUB SHELTER DETAIL

NOT TO SCALE



1. TYPICAL SPACING IS APPROXIMATE. ALL PLANTS WILL BE PLANTED IN A GRID TO PROVIDE UNIFORM COVER OF THE MITIGATION AREA BASED ON CENTERS OUTLINED ABOVE. RANDOM ALTERCATION OF THE TREES AND SHRUBS IN DIFFERENT PLANTING ZONES IS ACCEPTABLE TO PROVIDE GREATER VEGETATIVE DIVERSITY.

PLANT SPACING DETAIL

NOT TO SCALE

GRAJEWSKI SITE PLANTING PLAN (0.93 ACRES)

	Scientific Name	*Common Name*	*Status*	*Container*	*Spacing*
	Cornus amomum	silky dogwood	FACW Shrub	bare root / 1 gallon	4' O.C.
	Cornus racemosa	gray dogwood	FAC Shrub	bare root / 1 gallon	4' O.C.
	Ilex verticillata	winterberry	FACW Shrub	bare root / 1 gallon	4' O.C.
	Alnus serrulata	hazel alder	OBL Shrub	bare root / 1 gallon	4' O.C.
	Salix discolor	pussy willow	FACW Shrub	cutting / 1 gallon	4' O.C.
	Salix nigra	black willow	OBL Shrub/Tree	cutting / 1 gallon	4' O.C.
	Quercus palustris	pin oak	FACW Tree	1 or 2 gallon	10' O.C.
	Acer sacchannum	silver maple	FACW Tree	1 or 2 gallon	10' O.C.
	Nyssa sylvatica	black gum	FAC Tree	1 of 2 gallon	10' O.C.
	Platanus occidentalis	american sycamore	FACW Tree	1 or 2 gallon	10' O.C.

*Select a minimum of 3 tree species and 3 shrubs species to be planted in enhancement area.

**Plant at a density of 400 stems per acre (or 372 total stems) with trees (186) and shrubs (186)

LEGEND

- CONTOUR MAJOR (10' C.I.)
- CONTOUR MINOR (2' C.I.)
- DELINEATED PEM WETLAND
- DELINEATED PSS WETLAND
- DELINEATED CHANNEL
- EXISTING ROAD
- WETLAND ENHANCEMENT AREA (0.93 ACRE)
- OPEN ENDED BOUNDARY
- VEGETATION (SEE PLANTING PLAN)

NOTES:

1. CONTOUR DATA DOWNLOADED FROM PENNSYLVANIA SPATIAL DATA CLEARINGHOUSE.
2. WATER RESOURCES DELINEATED BY WHM GROUP ON JULY 2013 & DECEMBER 2015.
3. PARCEL DATA ACQUIRED FROM LUZERNE COUNTY GIS DEPARTMENT.

REVISIONS

10/19	REVISED CONSERVATION AREA	BH

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PENNEAST PIPELINE COMPANY, LLC.

PENNEAST PIPELINE PROJECT
COMPENSATORY WETLAND MITIGATION PLAN

GRAJEWSKI DESIGN PLAN

HUNTINGTON TOWNSHIP LUZERNE COUNTY PENNSYLVANIA

DATE: 10/03/19
DRAWN BY: BWH
CHECKED: KMC
DRAWING NO. SOL136B001
SHEET NO. 5

KISTLER MITIGATION SITE

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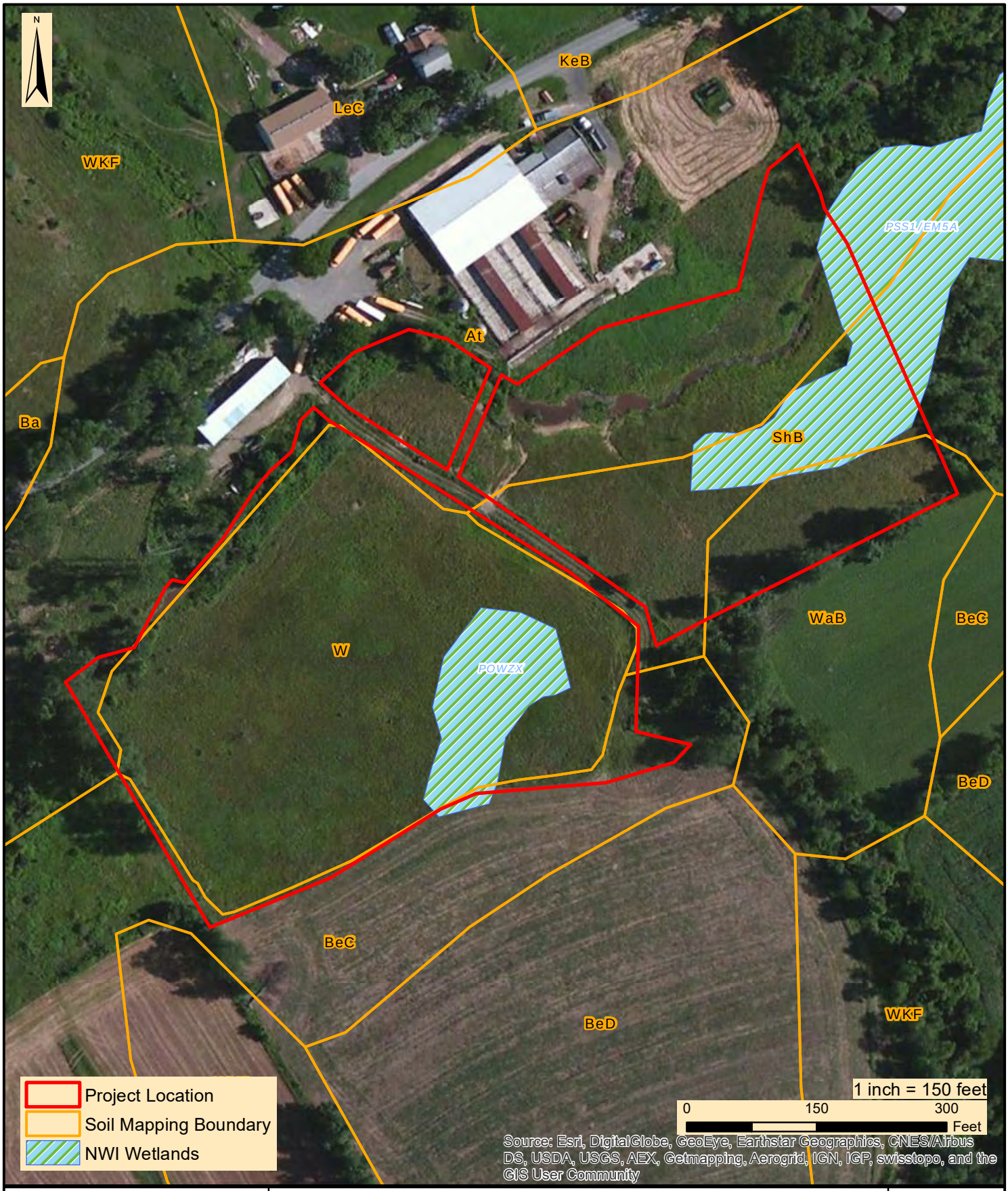
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

KISTLER PROPERTY
PROJECT LOCATION MAP

WEST PENN TOWNSHIP SCHUYLKILL COUNTY PENNSYLVANIA

Date:	12/10/15
WHM Drawing Number:	SOL136A006
Drawn By:	PJB
Figure Number:	E6



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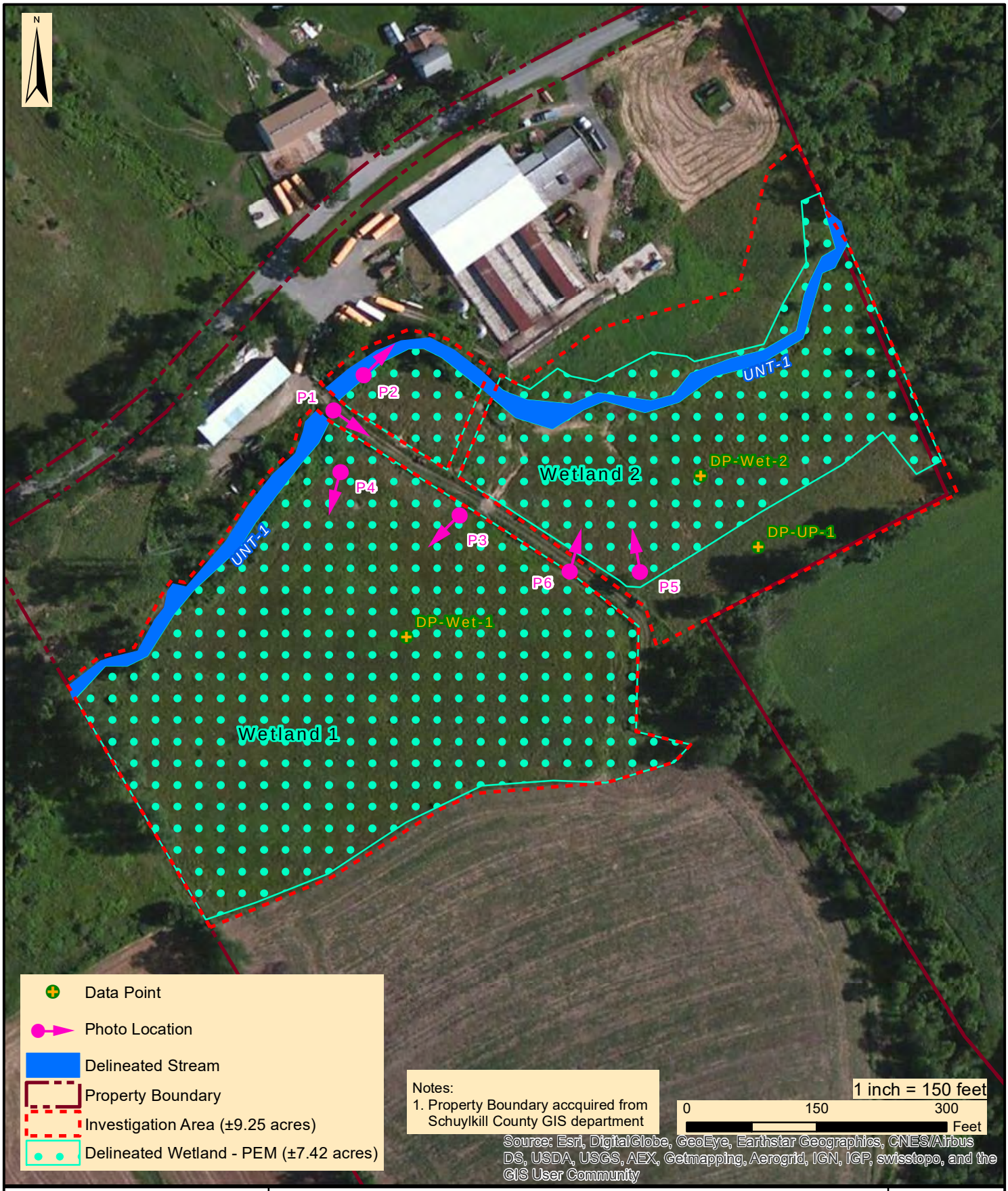
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

KISTLER PROPERTY
USDA-NRCS SOILS AND NWI MAP

WEST PENN TOWNSHIP SCHUYLKILL COUNTY PENNSYLVANIA

Date:	12/10/15
WHM Drawing Number:	SOL136A007
Drawn By:	PJB
Figure Number:	E7



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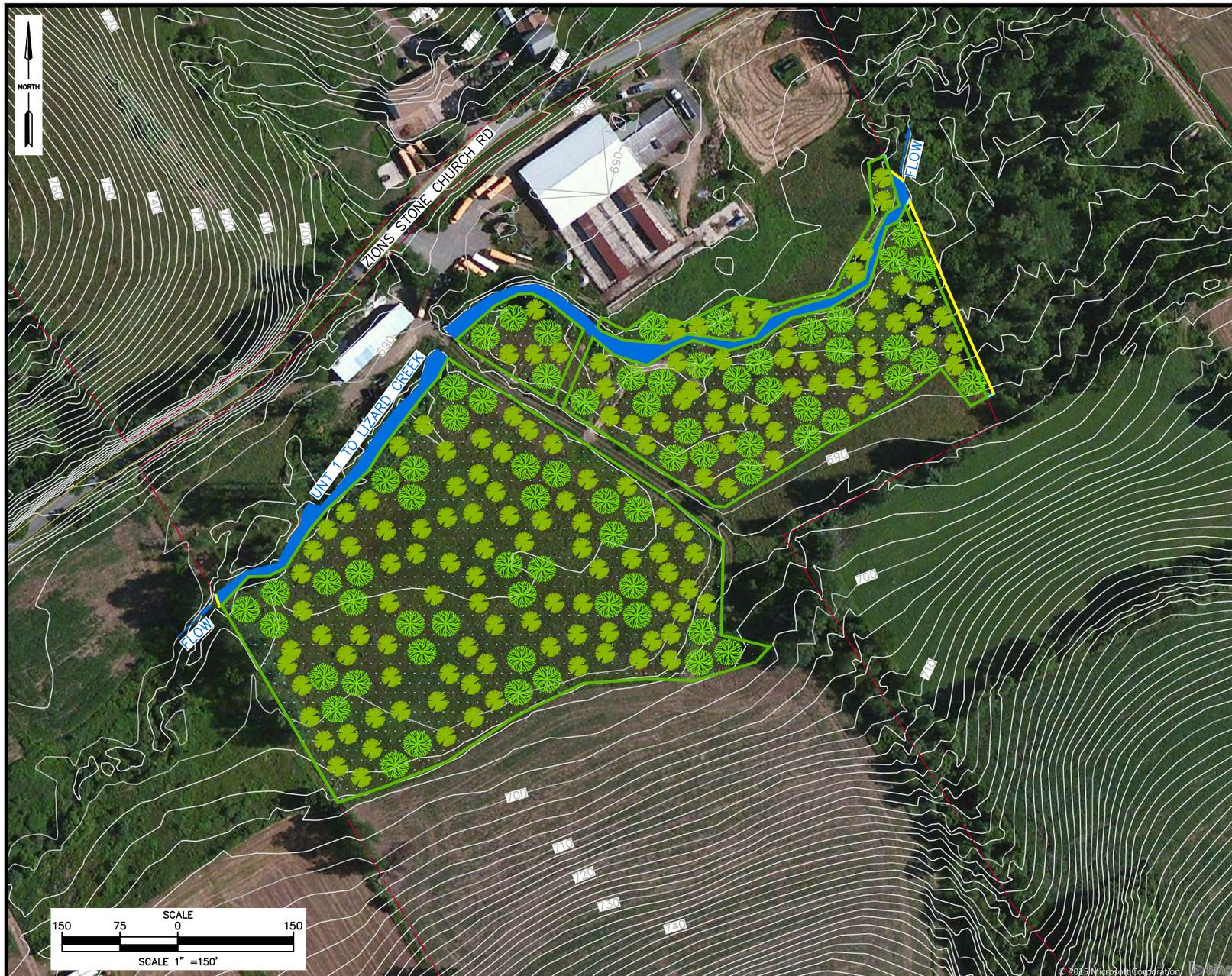
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

KISTLER PROPERTY
WETLAND DELINEATION MAP

WEST PENN TOWNSHIP | SCHUYLKILL COUNTY | PENNSYLVANIA

Date:	12/15/15
WHM Drawing Number:	SOL136A008
Drawn By:	PJB
Figure Number:	E8


NORTH
ZIONS STONE CHURCH RD
UNT 1 TO LIZARD CREEK
FLOW
FLOW
690
690
690

SHIRK MITIGATION SITE

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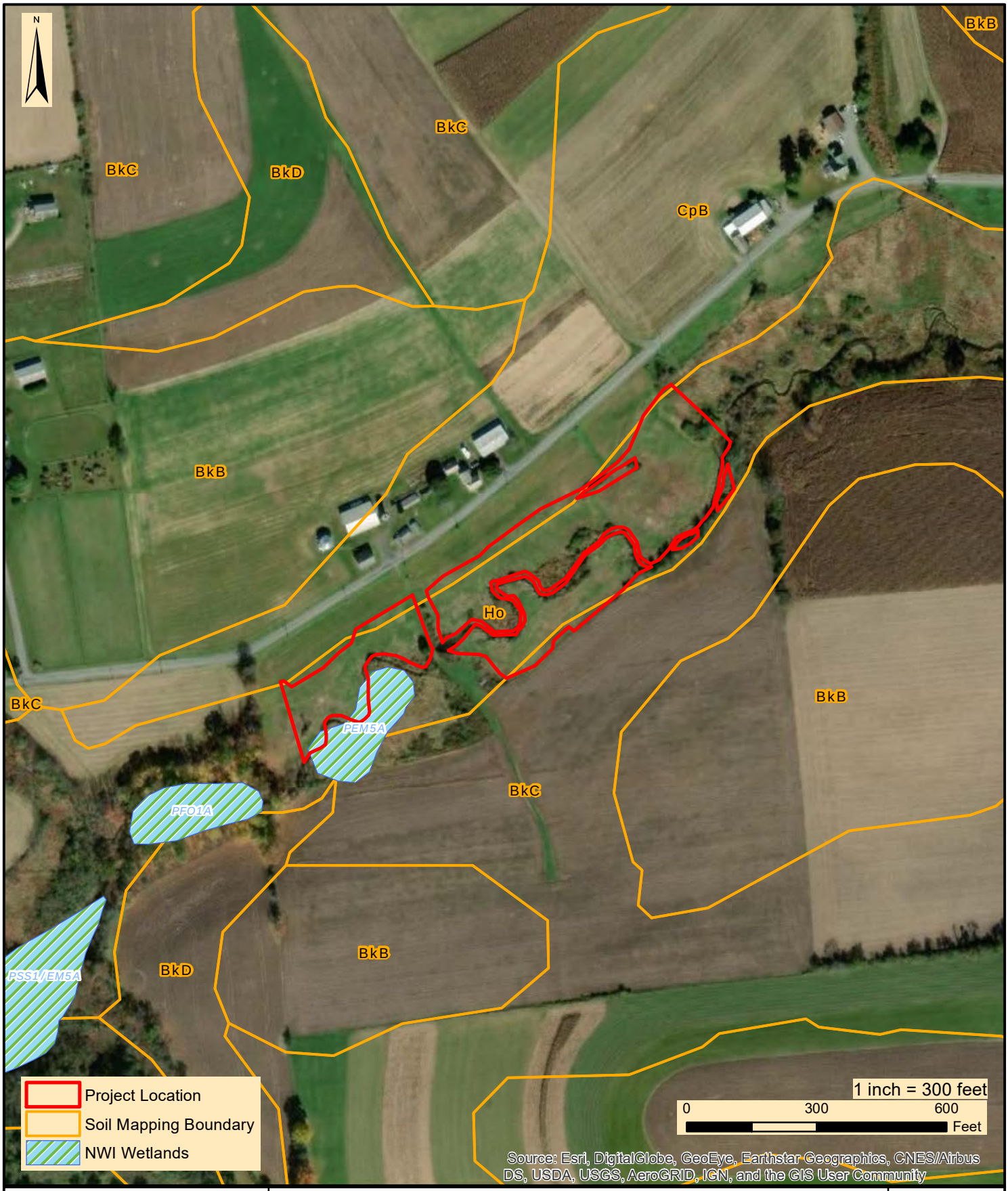
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

SHIRK PROPERTY
PROJECT LOCATION MAP

LYNN TOWNSHIP | LEHIGH COUNTY | PENNSYLVANIA

Date:	05/08/18
WHM Drawing Number:	SOL136A020
Drawn By:	BWH
Figure Number:	E10



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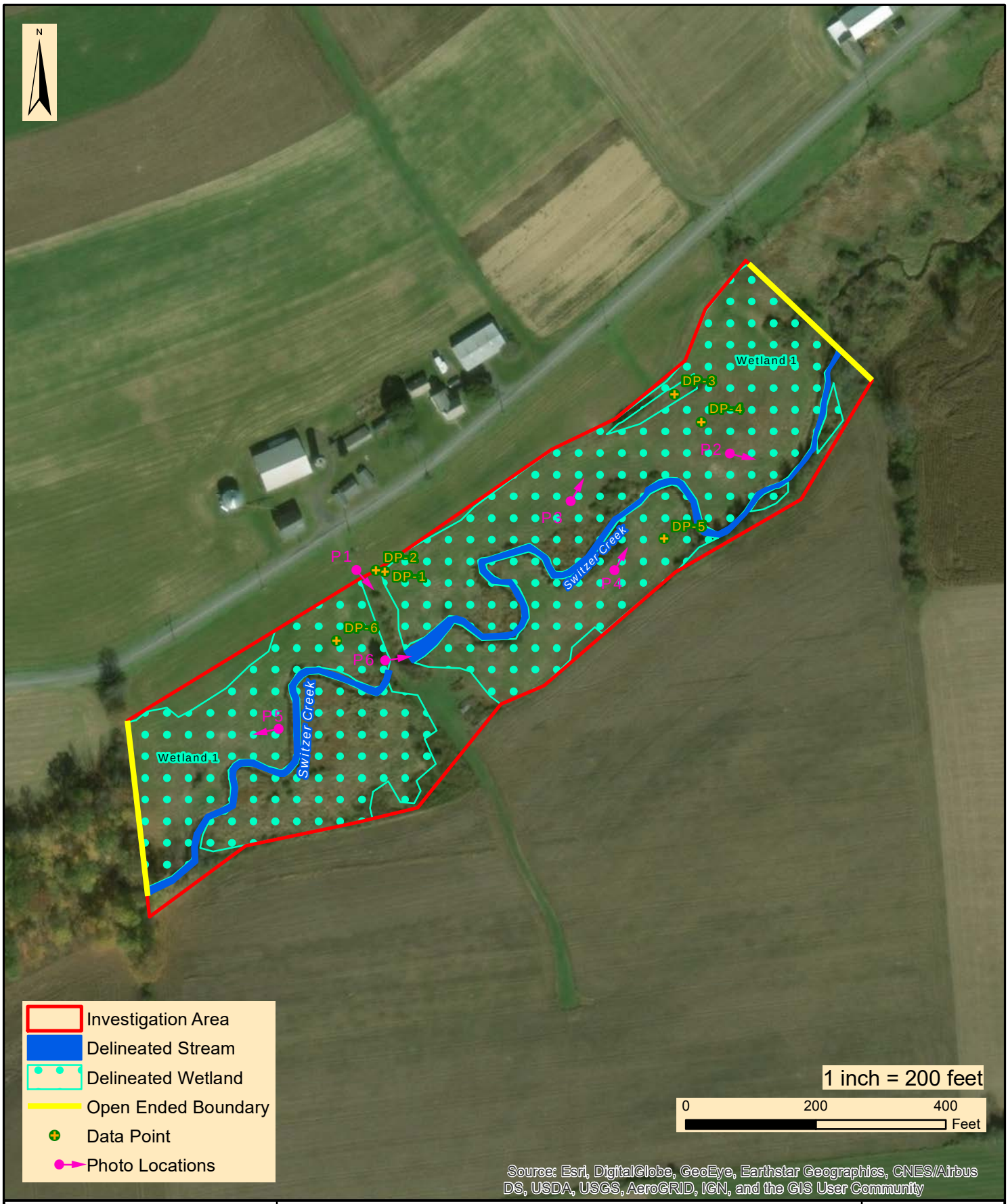
PENNEAST PIPELINE COMPANY, LLC

PENNEAST PIPELINE PROJECT

SHIRK PROPERTY
USDA-NRCS SOILS AND NWI MAP

LYNN TOWNSHIP | LEHIGH COUNTY | PENNSYLVANIA

Date:	05/09/18
WHM Drawing Number:	SOL136A021
Drawn By:	BWH
Figure Number:	E11



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PENNEAST PIPELINE COMPANY, LLC
PENNEAST PIPELINE PROJECT

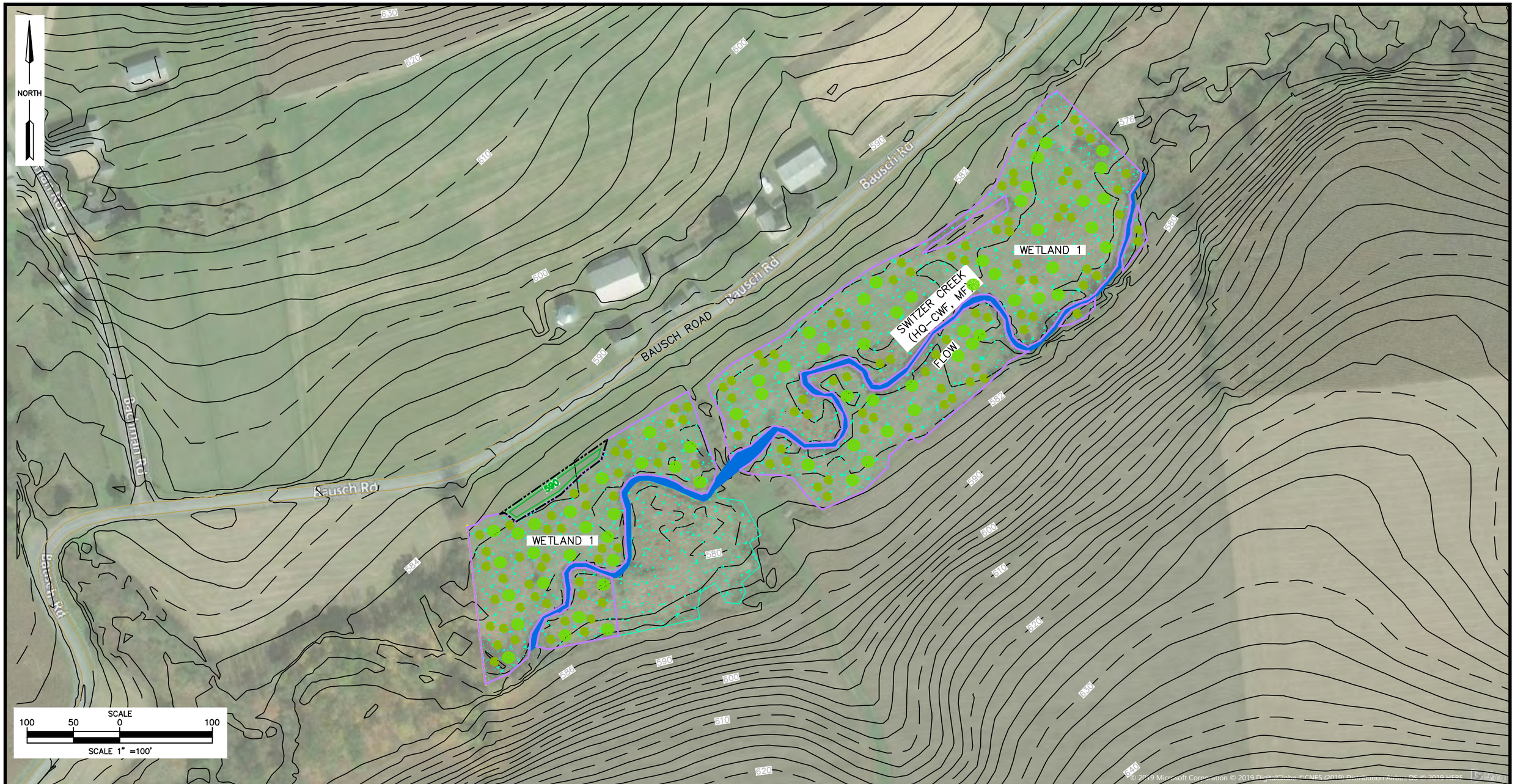
SHIRK PROPERTY
WETLAND DELINEATION MAP

LYNN TOWNSHIP | LEHIGH COUNTY | PENNSYLVANIA

Date: 04/27/18

Drawn By: EKK

Figure Number: E12



LEGEND

- WETLAND ENHANCEMENT AREA (6.01 ACRES)
- CONTOUR MAJOR (10' C.I.)
- CONTOUR MINOR (2' C.I.)
- DELINEATED PEM WETLAND
- DELINEATED CHANNEL
- EXISTING ROAD
- OPEN ENDED BOUNDARY
- VEGETATION (SEE PLANTING PLAN)
- WETLAND CREATION AREA (0.08 ACRE)
- FINAL CONTOUR MAJOR
- FINAL CONTOUR MINOR

NOTES:

1. CONTOUR DATA DOWNLOADED FROM PENNSYLVANIA SPATIAL DATA CLEARINGHOUSE.
2. WATER RESOURCES DELINEATED BY WHM GROUP ON APRIL 15, 2018.
3. PARCEL DATA ACQUIRED FROM LEHIGH COUNTY GIS DEPARTMENT.

REVISIONS

10/19	REVISED CONSERVATION AREA	BH

WHM solutions, INC.
fixed-cost results
2525 GREEN TECH DRIVE, SUITE B
STATE COLLEGE, PA 16803
TELEPHONE: (814)-689-1650 FAX: (814)-689-1557

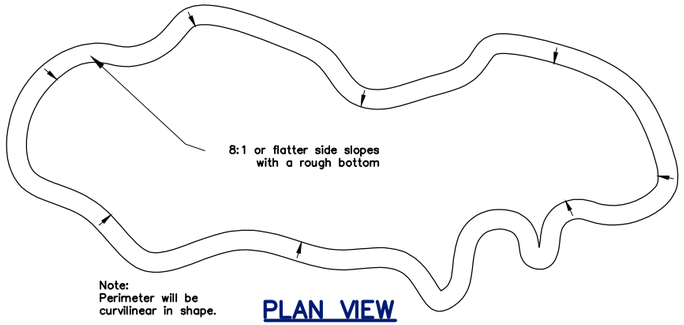
PENNEAST PIPELINE COMPANY, LLC.

PENNEAST PIPELINE PROJECT
COMPENSATORY WETLAND MITIGATION PLAN

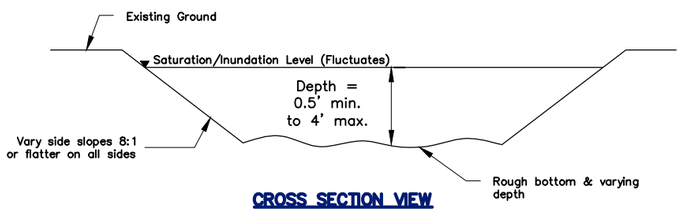
SHIRK DESIGN PLAN

LYNN TOWNSHIP LEHIGH COUNTY PENNSYLVANIA

DATE: 10/03/19
DRAWN BY: BWH
CHECKED: KMC
DRAWING NO. SOL136B013
SHEET NO. 13



PLAN VIEW



CROSS SECTION VIEW

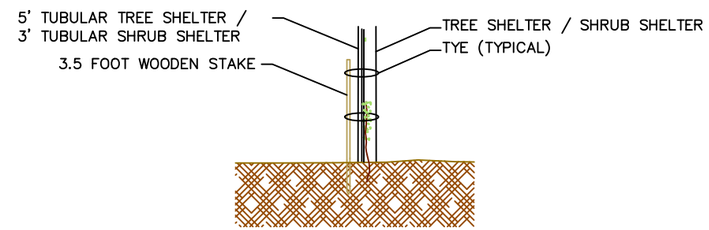
See Sheet 3 for the
location of the scrapes

TYPICAL WETLAND CREATION / EXPANSION DETAIL

NOT TO SCALE

NOTES:

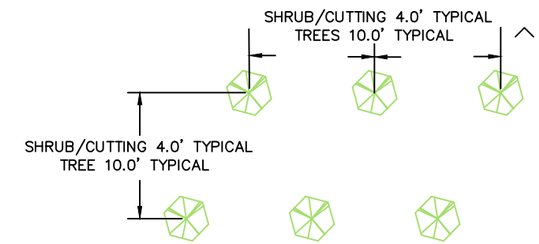
1. WETLAND CREATION/EXPANSION AREAS WILL BE CONSTRUCTED AT LOCATIONS AND DEFINED ON PLAN DRAWINGS.
2. WETLAND BOTTOM SHALL BE IRREGULAR IN SHAPE WHEN COMPLETED.
3. STRIP MINIMUM 10" OF TOPSOIL AND STOCKPILE IT FOR SPREADING, IF NEEDED, AFTER THE EXCAVATION IS COMPLETED.
4. BEFORE TOPSOIL IS SPREAD, THE DEPTH AND SLOPES MUST BE CHECKED BY THE ONSITE PROJECT MANAGER. SEEDING SHALL BE DONE AS AS OUTLINED ON SHEET 4.
5. SPOIL SHALL BE DISPOSED OF AT LOCATIONS APPROVED BY THE ONSITE PROJECT MANAGER.



NOTE: TREE SHELTERS ARE TO BE MADE FROM BIODEGRADABLE PLASTIC TUBING.

TYPICAL TREE/SHRUB SHELTER DETAIL

NOT TO SCALE



1. TYPICAL SPACING IS APPROXIMATE. ALL PLANTS WILL BE PLANTED IN A GRID TO PROVIDE UNIFORM COVER OF THE MITIGATION AREA BASED ON CENTERS OUTLINED ABOVE. RANDOM ALTERCATION OF THE TREES AND SHRUBS IN DIFFERENT PLANTING ZONES IS ACCEPTABLE TO PROVIDE GREATER VEGETATIVE DIVERSITY.

PLANT SPACING DETAIL

NOT TO SCALE

ERNST - WATERFOWL BUFFET MIX		
(Application Rate - 15 pounds per acre)		
Percent	*Scientific Name*	*Common Name*
30%	*Carex vulpinoidea*	Fox Sedge
15%	*Elymus virginicus*	Virginia Wildrye
12%	*Carex intumescens*	Bladder Sedge
12%	*Carex lupulina*	Hop Sedge
12%	*Carex lurida*	Shallow Sedge
6%	*Carex granularis var. haleona*	Limestone Meadow Sedge
5.5%	*Sparganium americanum*	Eastern Bur Reed
3%	*Juncus effusus*	Soft Rush
2%	*Alismo subcordatum*	Water Plantain
1%	*Sagittaria latifolia*	Duck Potato
1%	*Scirpus validus*	Softstem Bulrush
0.5%	*Carex stricta*	Tussock Sedge
COVER CROP*		
Percent	*Scientific Name*	*Common Name*
100%	*Lolium multiflorum*	Annual Ryegrass
* Cover crop should be installed with the addition of straw mulch at 3 tons/acre.		

SHIRK SITE PLANTING PLAN (6.09 ACRES)				
Scientific Name	*Common Name*	*Status*	*Container*	*Spacing*
Cornus amomum	silky dogwood	FACW Shrub	bare root / 1 gallon	4' O.C.
Cornus racemosa	gray dogwood	FAC Shrub	bare root / 1 gallon	4' O.C.
Alnus serrulata	hazel alder	OBL Shrub	bare root / 1 gallon	4' O.C.
Lindera benzoin	spicebush	FAC Shrub/Tree	bare root / 1 gallon	4' O.C.
Salix discolor	pussy willow	FACW Shrub	cutting / 1 gallon	4' O.C.
Salix nigra	black willow	OBL Shrub/Tree	cutting / 1 gallon	4' O.C.
Acer rubrum	red maple	FAC Tree	1 or 2 gallon	10' O.C.
Quercus palustris	pin oak	FACW Tree	1 or 2 gallon	10' O.C.
Acer saccharinum	silver maple	FACW Tree	1 or 2 gallon	10' O.C.
*Select a minimum of 4 tree species and 3 shrubs species to be planted in enhancement area.				
**6.09 total acres includes 6.01 acres of wetland enhancement and 0.08 acres of wetland creation.				
***Plant at a density of 400 stems per acre (or 2,440 total stems) with trees (1,708) and shrubs (732).				

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DETAILS

LYNN TOWNSHIP LEHIGH COUNTY PENNSYLVANIA

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SHEET NO. 14