REQUIREMENT L
ENVIRONMENTAL ASSESSMENT FORM

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
and
U.S. ARMY CORPS OF ENGINEERS

ENVIRONMENTAL ASSESSMENT FORM (E.A. Form)

PART 1 - RESOURCE IDENTIFICATION

1. Indicate water resources which exist on the project site.

Name of streams(s) and/or body of water (including wetlands) See Tables 3 and 4 in Enclosure A

Size of body of water (in acres) See Tables 3 and 4 in Enclosure A

Provide a table detailing all proposed aquatic resource impacts including type of structure or activity, length and width of streams or floodways, and acreage of wetlands or other bodies of water. All structures or activities must also include latitude and longitude for each proposed location.

Wetland - If wetlands are present at the project site, provide the following information relative to the person(s) or organization performing the wetland identification, delineation and related work (attach additional sheets if needed):

Last Name	First Name	MI	Telephone
Rucker	Kevin	R	717-732-8576
Mailing Address	**City**	**State**	**Zip + 4**
2020 Good Hope Road	Enola	PA	17025
Email Address krucker@dawood.cc			

QUALIFICATIONS

38 Hour US Army Corps of Engineers Wetland Delineator Certification Program

12 years professional experience

If wetlands are present, attach a copy of the wetland delineation report identified and labeled as **Enclosure A**. Include all field data sheets, denote the size (in acres) of the wetland. If this information details any physical information or features not shown in the "site plan" please attach additional plans which illustrate these features.

Enclosure A

PART 1 - RESOURCE IDENTIFICATION (continued)	**YES**	**NO**
2. **Is the site located within or adjacent to any of the following? Please mark either the "yes" or "no" column for each question.**		
A. National, state or local park, forest or recreation area	☒	☐
B. Natural, wild, or wilderness area	☐	☒
C. National natural landmark	☐	☒
D. National wildlife refuge, or Federal, state, local or private wildlife or plant sanctuaries	☐	☒
E. State Game Lands	☐	☒
F. Areas identified as prime farmland	☒	☐
If not included in the permit application package, please attach a map (e.g. 1:2400 scale or greater) indicating the location of the project, all water resources and the features identified above. Label the map as Enclosure B.	**ENCLOSURE B**	
3. Is the water resource listed as trout stocked waters by the Pennsylvania Fish and Boat Commission?	☒	☐
4. Is the water resource designated as a wild trout stream by the Pennsylvania Fish and Boat Commission?	☒	☐
5. Is the water resource listed as High Quality or Exceptional Value in Title 25 Pa. Code Chapter 93?	☐	☒
Indicate the stream classification found in Chapter 93. Classification Schuylkill River Basin – WWF, Hay Creek - CWF		
6. Is the water resource designated as a National Wild or Scenic River or as part of the Commonwealth's Scenic Rivers System or classified as priority 1-A for inclusion in the system?	☒	☐
7. Is the water resource part of or located along a private or public water supply?	☒	☐
(IF COMPLETING A SMALL PROJECT APPLICATION ADVANCE TO PART 3)	**ENCLOSURE C**	
8. Provide a written narrative, identified and labeled as "Enclosure C - Description of Aquatic Habitat," discussing the following ecological functions:		
A. Aquatic habitats including:		
(1) Food chain production		
(2) General habitat a. Nesting e. Migration b. Spawning f. Feeding c. Rearing g. Escape Cover d. Resting h. Other		
(3) Habitat for Federal threatened and endangered plant and animal species or State T&E species or species of special concern (Discuss results of the PNDI Receipt and Bog Turtle Habitat Screening)		
(4) Environmental Study Areas a. Sanctuaries b. Refuges		
(5) If project proposes a stream relocation, a stream enclosure, or dredging, provide a description of the instream macroinvertebrate community.		

PART 1 - RESOURCE IDENTIFICATION (continued)	**ENCLOSURE C** **Description of Aquatic Habitat**
B. Water Quantity and Streamflow	
(1) Natural drainage patterns	
(2) Flushing characteristics	
(3) Current patterns	
(4) Groundwater discharge for baseflow	
(5) Natural recharge area for ground and surface waters	
(6) Storm and floodwater storage and control	
C. Water Quality	
(1) Preventing Pollution	
(2) Sedimentation control and patterns	
(3) Salinity distribution	
(4) Natural water filtration	
D. Recreation	
(1) Game Species	
(2) Non Game Species	
(3) Fishing	
(4) Hiking	
(5) Observation (plant/wildlife)	
(6) Other	
E. Upstream and Downstream Property	
(1) Public Water Supplies (PWS)	
F. Other Environmental Factors Determined by Site Investigation	
PART 2 - PROJECT DESCRIPTION	
9. **Project Impacts** For impacts to regulated waters of the Commonwealth, answer fully, completely and in detail the following questions; attach and label as **Enclosure D**.	**ENCLOSURE D**
A. Discuss the impacts on:	
(1) National, state or local park, forest or recreation area	
(2) Natural, wild, or wilderness area	
(3) National, state, or local historic site	
(4) National natural landmark	
(5) National wildlife refuge	
(6) Cultural or archaeological landmarks	
(7) State Game Lands	

PART 2 - PROJECT DESCRIPTION (continued)	ENCLOSURE D Project Impacts
(8) Federal, state, local or private plant or wildlife sanctuaries	
(9) Areas identified as prime farmland	
B. Discuss the environmental impacts on:	
(1) Aquatic habitats including:	
a. Food Chain production	
b. General habitat (1) Nesting (5) Migration (2) Spawning (6) Feeding (3) Rearing (7) Escape Cover (4) Resting (8) Other	
c. Habitat for threatened and endangered plant and animal species	
d. Environmental Study Areas (1) Sanctuaries (2) Refuges	
(2) Water Quantity and Streamflow	
a. Natural drainage patterns	
b. Flushing characteristics	
c. Current patterns	
d. Groundwater discharge for baseflow	
e. Natural recharge area for ground and surface waters	
f. Storm and floodwater storage and control	
(3) Water Quality	
a. Preventing Pollution	
b. Sedimentation control and patterns	
c. Salinity distribution	
d. Natural water filtration	
(4) Recreation	
a. Game Species	
b. Non Game Species	
c. Fishing	
d. Hiking	
e. Observation (wildlife)	
f. Other	
(5) Upstream and downstream property	
a. Public Water Supplies	
(6) Other Environmental Factors	

PART 2 - PROJECT DESCRIPTION (continued)	ENCLOSURED
C. Identify all environmental impacts on other adjacent land and water resources associated with the construction, modification or operation of the dam, reservoir, water obstruction, or encroachment in the area of the project.	
D. Identify and evaluate the potential cumulative environmental impacts of this project and other potential or existing projects like it, and the impacts that may result through numerous piecemeal changes to the resource.	
E. Identify and describe all other dams, water obstructions or encroachments which may or will be needed, in addition to those described in this Application, to fulfill the purpose of the current project.	

PART 3 – CERTIFICATION AND FEE

I certify that the above statements, attachments including those labeled and identified as Enclosures, and all conclusions are true, correct, and based upon current environmental principles and science, to the best of my knowledge and belief.

☒ Application Fee & Chapter 105 Fee(s) Calculation Worksheet enclosed

Signature of Person Completing the Environmental Assessment Form	Date
	12/06/2017

The Department may waive a specific information requirement in writing, at the request of the Applicant, during the pre-application review process if the Department determines that specific information is not necessary to review the application.

Enclosure A

Wetland and Stream Delineation Report

Wetland and Stream Delineation Report

Birdsboro Power LLC
216040.01

Borough of Birdsboro; Union, Exeter and Robeson Township, Berks County, Pennsylvania

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Prepared for:
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1.0 INTRODUCTION

1.1 GENERAL INFORMATION

This report presents the findings of a wetland and stream delineation study conducted by Dawood Engineering, Inc. (Dawood) on the site of the proposed Birdsboro Power, LLC project. The project area of investigation consists of approximately 277 acres located in the Borough of Birdsboro, Exeter, Union and Robeson Township, Berks County, Pennsylvania (Figure 1).

Dawood conducted the site reconnaissance in July, August, September, and October 2016.

1.2 METHODOLOGY

Dawood identified and delineated potential jurisdictional waters including wetlands and streams (ephemeral, intermittent, and perennial) within the site. The methodology for conducting the wetland and stream delineation work is presented below.

1.2.1 Methodology for Delineating Wetlands

The wetland delineation was based on Dawood's professional judgment and interpretation of the technical criteria presented in the *Corps of Engineers Wetlands Delineation Manual, Environmental Laboratory, 1987* (Manual) and the 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) Regional Supplement*. Wetland boundaries, where present, were delineated using the routine onsite determination method described in the Manual supplemented by *The National Wetland Plant List* (Lichvar 2016) and U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's *Soil Survey Geographic Database* (SSURGO) for Berks County, Pennsylvania map and metadata. Dawood completed the following scope of services to identify and delineate jurisdictional wetland boundaries at the site:

1. Office Data Review: Dawood personnel reviewed the U.S. Geological Survey (USGS) topographic mapping (Figure 1), USDA's SSURGO map (Figure 2), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map (Figure 3), existing aerial photography, and the hydric soils list from the SSURGO's metadata file. These resources were used to identify potential wetland areas prior to conducting the fieldwork. Other potential jurisdictional water bodies located within the project area, such as streams and ponds, were also identified from these resources.

2. Site Reconnaissance: Dawood performed the wetland delineation using the routine onsite determination method (Environmental Laboratory 1987). First, plant communities present on the site were identified. The dominant plant species within each community were identified and a determination was made on whether hydrophytic (wetland) plants dominated the plant community. Next, a representative test site was located within the plant community and soils were sampled using a spade shovel to determine if hydric soil indicators were present. Lastly, the test site was inspected to determine if indicators of wetland hydrology (inundation, soil saturation, etc.) were present. When a test site was determined to be within a wetland, further testing was performed to locate the wetland/non-wetland boundary and a second test site was typically established outside the wetland boundary to document non-wetland conditions. Data forms were completed to record the vegetation, soils and hydrology observations at each wetland and non-wetland test site and representative photographs were taken (Appendix A and Appendix B, respectively). The boundaries of areas having wetland vegetation, hydric soils, and wetland hydrology were marked in the field with consecutively numbered surveyor's ribbon flags and subsequently georeferenced using a handheld Global Positioning System (GPS) with sub-meter accuracy capability.

1.2.2 Methodology for Delineating Streams

In addition to identifying wetlands, Dawood reviewed the site for streams that would likely be considered jurisdictional by state and or federal regulatory agencies. A weight-of-evidence approach for identifying streams was used and was based on the evaluation of multiple lines of evidence concerning physical and biological indicators of stream hydrology. Dawood used field indicators such as flow, substrate composition, embeddedness, presence/absence of defined bed and banks, origin of hydrologic source, presence/absence of vegetation in the stream channel, and composition and relative abundances of resident benthic macroinvertebrates to classify on-site stream segments into three stream types: ephemeral, intermittent, or perennial. A description of each stream type is provided below.

- Ephemeral Stream – Stream reaches lacking flow or benthic macroinvertebrate communities. Ephemeral streams typically flow in direct response to precipitation events and/or snow melt.

- Intermittent Stream – Stream reaches containing seasonal flows and possibly containing a benthic macroinvertebrate community comprised of taxa with short aquatic life stages (e.g., midges, blackfly larvae).

- Perennial Stream – Stream reaches containing year-round flow dominated by a diverse benthic macroinvertebrate community and containing permanently aquatic taxa or

those with long aquatic life stages (e.g., freshwater mussels, dobsonflies, mayflies, and stoneflies).

The uppermost limit of a perennial stream was determined at the point where there was a shift in the benthic macroinvertebrate community, from one with a predominance of long-lived taxa to one dominated by short-lived taxa. The uppermost limit of an intermittent stream was determined at the point where there was a loss of flow and/or benthic macroinvertebrate communities. At this point, the break between intermittent and ephemeral was identified and a GPS point was collected. The uppermost limit of an ephemeral stream was determined at the point where the stream lost its defined bed and bank or ordinary high water mark (OHWM) and a predominance of upland vegetation was observed within the channel.

The limit of each stream segment was marked in the field with surveyors flagging and georeferenced with a handheld GPS unit with sub-meter accuracy capabilities.

The physical characteristics of the stream and field observations are summarized on stream determination data forms presented in Appendix A. Photographs of delineated stream segments are presented in Appendix B.

2.0 FINDINGS

2.1 SITE SOILS

A review of the SSURGO map and database for Berks County, Pennsylvania (USDA, 2015), identified fifteen soil mapping units within the project site. The soil mapping units identified within the project area are shown on Figure 2 and general characteristics are summarized in Table 1 below.

TABLE 1
SUMMARY OF ONSITE SOILS

Soil Mapping Unit Name [(1)]	Soil Mapping Symbol [(1)]	Drainage Class [(1)]	Hydric Soil Designation [(1)]
Abbottstown silt loam, 0 to 3 percent slopes	AbA	Somewhat poorly drained	Hydric Inclusions
Birdsboro silt loam, 3 to 8 percent slopes	BmB	Well drained	Hydric Inclusions
Bowmansville-Knauers silt loams	Bo	Poorly drained	Hydric Inclusions
Croton silt loam, occasionally ponded, 0 to 3 percent slopes	CwA	Poorly drained	Hydric
Gibraltar silt loam	Gc	Well drained	Hydric Inclusions
Joanna loam, 3 to 8 percent slopes	JnB	Well drained	Hydric Inclusions
Lamington silt loam, 0 to 3 percent slopes	LfA	Poorly drained	Hydric
Penn channery silt loam, 3 to 8 percent slopes	PeB	Well drained	Hydric
Penn channery silt loam, 8 to 15 percent slopes	PeC	Well drained	Hydric Inclusions
Penn-Klinesville channery silt loams, 8 to 15 percent slopes	PkC	Well drained	Hydric Inclusions
Penn-Klinesville channery silt loams, 15 to 25 percent slopes	PkD	Well drained	Hydric Inclusions
Raritan silt loam, 3 to 8 percent slopes	RaB	Moderately well drained	Hydric Inclusions
Udorthents	Ua	Moderately well drained	Not Hydric
Urban land, 0 to 8 percent slopes	UgB	n/a	Not Hydric
Urban land-Penn complex, 0 to 8 percent slopes	UxB	n/a	Hydric Inclusions

2.2 NATIONAL WETLANDS INVENTORY MAPS

The USFWS NWI map has been prepared based on high altitude infrared aerial photography and limited ground truthing. Wetlands and deep-water habitats are identified on these maps and classified according to the system developed by Cowardin and et. al. (1979).

Six NWI wetlands were identified within the project area on the Birdsboro, PA quadrangle NWI map (Figure 3) and are tabulated below in Table 2.

TABLE 2
SUMMARY OF NWI WETLANDS

NWI Classification	Wetland Type	Associated Property	Field Determination
PSS1/EM5C	Palustrine Scrub-Shrub/ Emergent Wetland	Schuylkill River*	Schuylkill River
R2UBH	Riverine	Schuylkill River*	Schuylkill River
PFO1A	Palustrine Forested Wetland	Birdsboro Slag Products Co, Inc.	Floodplain
PSS1C	Palustrine Scrub-Shrub Wetland	MET ED/Nassau Properties LLC	Wetland ME1/ Stream ME2
PFO1A	Palustrine Forested Wetland	Exeter Township Authority	UPL (EX-SPU2)
PFO1A	Palustrine Forested Wetland	Paul E Rapak	UPL

*Pennsylvania Wild and Scenic River

2.3 SITE PLANT COMMUNITIES

The dominant plant communities present on the site were primarily riparian floodplain/forest and manicured lawns. Dominant plant species within the plant community were identified and the U.S. Army Corps of Engineers (USACE) wetland plant indicator status was determined according *The National Wetland Plant List* (Lichvar 2016). The USACE has established five wetland plant indicator categories, defined as follows:

(1) Obligate wetland (OBL) – Almost always occur in wetlands; rarely in non-wetlands;
(2) Facultative wetland (FACW) – Usually occur wetlands, but occasionally occur in non-wetlands;
(3) Facultative (FAC) – Commonly occur in wetlands and non-wetlands;
(4) Facultative upland (FACU) – Usually occur in non-wetlands, but occasionally occur in wetlands; and
(5) Upland (UPL) – Almost always occur in non-wetlands, rarely in wetlands.

The USACE and the Pennsylvania Department of Environmental Protection (PADEP) consider plants classified as OBL, FACW or FAC to be wetland plants (or hydrophytes).

2.4 SITE HYDROLOGY

Site elevations range from approximately 140 feet above mean sea level to approximately 290 feet above mean sea level. Hydrology within the study area is conveyed to Heisters Creek, Hay Creek, the Schuylkill River, and various unnamed tributaries of the Schuylkill River. Heisters Creek, Schuylkill River, and all Unnamed Tributaries (UNT) to Schuylkill River are designated for use by Warm Water Fishes and Migratory Fishes (WWF, MF) per Chapter 93, Title 25 of the Pennsylvania Code (Chapter 93). Hay Creek is designated for use by Cold Water Fishes and Migratory Fishes (CWF, MF) according to Chapter 93. Additionally, Hay Creek is classified as a wild trout stream (naturally reproducing) and stocked trout stream.

2.5 DELINEATED WETLANDS

Eight (8) palustrine emergent (PEM) wetland systems, one (1) palustrine scrub-shrub (PSS) wetland, and one (1) palustrine forested (PFO) wetland were identified and delineated within the area of investigation. The size, cover-type based on the Cowardin classification system, and corresponding sample points and photograph numbers are provided below in Table 3. Wetland determination data forms are provided in Appendix A and wetland photographs are provided in Appendix B.

Exceptional value (EV) wetlands deserve special protection and are classified within Chapter 105 Section 17 of the PA Code (§ 105.17). Table 3 includes columns indicating if a wetland is considered to have EV status and under which § 105.17 characteristic it receives such classification. According to Section 17, EV wetlands have one or more of the following characteristics:

(i) Wetlands which serve as habitat for fauna or flora listed as ‘‘threatened’’ or ‘‘endangered’’ under the Endangered Species Act of 1973 (7 U.S.C.A. § 136; 16 U.S.C.A. § § 4601-9, 460k-1, 668dd, 715i, 715a, 1362, 1371, 1372, 1402 and 1531—1543), the Wild Resource Conservation Act (32 P. S. § § 5301—5314), 30 Pa.C.S. (relating to the Fish and Boat Code) or 34 Pa.C.S. (relating to the Game and Wildlife Code).

(ii) Wetlands that are hydrologically connected to or located within 1/2-mile of wetlands identified under subparagraph (i) and that maintain the habitat of the threatened or endangered species within the wetland identified under subparagraph (i).

(iii) Wetlands that are located in or along the floodplain of the reach of a wild trout stream or waters listed as exceptional value under Chapter 93 (relating to water quality standards) and the floodplain of streams tributary thereto, or wetlands within the corridor of a watercourse or body of water that has been designated as a National wild or scenic river in accordance with the Wild and Scenic Rivers Act of 1968 (16 U.S.C.A. § § 1271—1287) or designated as wild or scenic under the Pennsylvania Scenic Rivers Act (32 P. S. § § 820.21—820.29).

(iv) Wetlands located along an existing public or private drinking water supply, including both surface water and groundwater sources, that maintain the quality or quantity of the drinking water supply.

(v) Wetlands located in areas designated by the Department as ‘‘natural’’ or ‘‘wild’’ areas within State forest or park lands, wetlands located in areas designated as Federal wilderness areas under the Wilderness Act (16 U.S.C.A. § § 1131—1136) or the Federal Eastern Wilderness Act of 1975 (16 U.S.C.A. § 1132) or wetlands located in areas designated as National natural landmarks by the Secretary of the Interior under the Historic Sites Act of 1935 (16 U.S.C.A. § § 461—467)

TABLE 3
SUMMARY OF WETLANDS

Wetland Name	Sample Point	Wetland Classification[1]	Total Delineated Wetland Acreage	EV Status	§ 105.17 EV Characteristic	Associated Photograph Number(s)
MB2	MB2-SPW	PEM	0.05	No	-	5
WN1	WN1-SPW	PEM	0.01	No	-	13
ARK7	ARK7-SPW	PEM	0.79	No	-	15
ARK1	ARK1-SPW	PEM	0.01	No	-	16
ARK4	ARK4-SPW	PFO	0.13	No	-	19
ME1	ME1-SPW	PEM	0.31	No	-	22, 25
LI1	LI1-SPW	PSS	0.10	No	-	28
EX3	EX3-SPW	PEM	0.12	No	-	31
FI1	FI1-SPW	PEM	0.04	No	-	32
BR2	BR2-SPW	PEM	0.05	No	-	36

2.6 DELINEATED STREAMS

In addition to identifying wetlands within the site boundary, Dawood identified twenty-eight (28) streams within the AOI that may be considered "jurisdictional" by the USACE.

The stream determination data forms are provided in Appendix A and stream photographs are provided in Appendix B. The stream name, classification, and length are provided in Table 4 below.

TABLE 4
SUMMARY OF STREAMS

Watercourse Name	Waters Classification	Chapter 93 Designation	Delineated Stream Length (feet)	Associated Photograph Number(s)
AR5	Ephemeral	CWF, MF	134	1
Hay Creek	Perennial	CWF, MF	1,282	2
Schuylkill River	Perennial	WWF, MF	675	3
MB1	Perennial	WWF, MF	1,275	4
MB3	Ephemeral	WWF, MF	186	6
FR1	Perennial	WWF, MF	200	7
MB4	Intermittent	WWF, MF	1,542	8
MB5	Ephemeral	WWF, MF	25	9
MB6	Ephemeral	WWF, MF	6	10
MB7	Intermittent	WWF, MF	320	11
MB8	Intermittent	WWF, MF	211	12
WN2	Ephemeral	WWF, MF	54	14
WN3	Ephemeral	WWF, MF	30	-
ARK2	Intermittent	WWF, MF	399	17
ARK3	Intermittent	WWF, MF	381	18
ARK5	Intermittent	WWF, MF	44	20
ARK6	Intermittent	WWF, MF	202	21
ME2	Perennial	WWF, MF	697	22, 23
ME3	Ephemeral	WWF, MF	52	24
NA2	Intermittent	WWF, MF	40	26
NA3	Ephemeral	WWF, MF	48	27
EX1 (Heisters Creek)	Perennial	WWF, MF	1,162	29
EX2	Ephemeral	WWF, MF	163	30
EX4	Ephemeral	WWF, MF	234	37
PA3	Ephemeral	WWF, MF	147	33
PA2	Intermittent	WWF, MF	634	34
BR1	Ephemeral	WWF, MF	226	35
BR3	Ephemeral	WWF, MF	70	38

2.7 OTHER DELINEATED WATERS

No other potentially jurisdictional waters were identified within the project AOI.

3.0 REGULATORY CONSIDERATIONS

3.1 MEETINGS WITH REGULATORY AGENCIES

To date, there have been no meetings between Dawood, PADEP, or USACE regarding delineated limits of jurisdictional waters identified on the project site.

3.2 REGULATORY ISSUES

The USACE and PADEP regulate discharges of fill and obstructions/encroachments within or across jurisdictional wetlands and streams. Discharges of dredged or fill material into waters of the United States, including non-isolated wetlands, require permits from the USACE under the provisions of Section 404 of the Clean Water Act (CWA). A Water Quality Certification must also be obtained from the PADEP, in accordance with Section 401 of the CWA.

Obstructions and encroachments in regulated waters of the Commonwealth, including wetlands, are regulated on the state level by PADEP. Before commencing activities in a stream, river, floodway, lake, pond or wetland, the appropriate permit must be secured. Pennsylvania regulates impacts to wetlands and water bodies under the provisions of 25 PA Code Chapter – 105 *Dam Safety and Waterway Management*.

4.0 CONCLUSIONS

Ten (10) wetland systems and twenty-eight (28) watercourses were identified within the area of investigation. Dawood personnel flagged and subsequently georeferenced aquatic resource boundaries using a survey grade GPS unit with sub-centimeter accuracy capability. The boundaries of all potential jurisdictional waters are shown on Figure 4.

5.0 REFERENCES

Cowardin, L. M., V. Carter, and F. C. Golet. 1979. *Classification of Wetlands and Deep Water Habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service. Washington D. C. FWS/OBS-79/31.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1, U.S. Army Engineer Waterway Experiment Station, Vicksburg, Mississippi.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X

Natural Resources Conservation Service, United States Department of Agriculture, Soil Survey Geographic (SSURGO) Database for Berks County, Pennsylvania. Survey Area Version: 13; Survey Area Version Date: 09/19/2016.

Title 25, Pennsylvania Code, Section 105. *Dam Safety and Waterway Management.*

Title 33, Code of Federal Regulations, Section 404. *Clean Water Act.*

U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0*. ed. J. F. Berkowitz, J. S. Wakeley, R. W. Lichvar, C. V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

6.0 FEBRUARY 2018 ADDENDUM

This addendum was prepared to address the Pennsylvania Department of Environmental Protection (PADEP)'s elevated review comment #5, as described in correspondence dated January 30, 2018. This comment stated: "Provide clarification whether a wetland presence/absence determination was conducted for the proposed ring bus station. Provide documentation and supporting evidence for the determination."

WETLAND DELINEATION PROCEDURE FOR THE RING BUS STATION PARCEL

Figure 4 shows the Area of Investigation (AOI) for the parcel where the proposed ring bus station is proposed to be constructed. An on-site field investigation for water resources was conducted on this site in August 2016. The proposed substation is underlain by Birdsboro silt loam (BmB), which is listed on the PA Hydric Soils list for Berks County. One sample point was formally documented within this soil series unit, BR2-SPU. Sample point BR2-SPU was located on the boundary between the actively managed farmland (cultivating *Glycine max* at the time of investigation) and a more successional herbaceous meadow. The sampling point failed to meet any hydrology, hydrophytic vegetation, or hydric soil indicators. Dominant vegetation was FACU-UPL and soils were documented as 10YR 4/4 from 0-10'' and 7.5YR 5/4 and 7.5YR 4/4 from 10-12'', without any redoximorphic features.

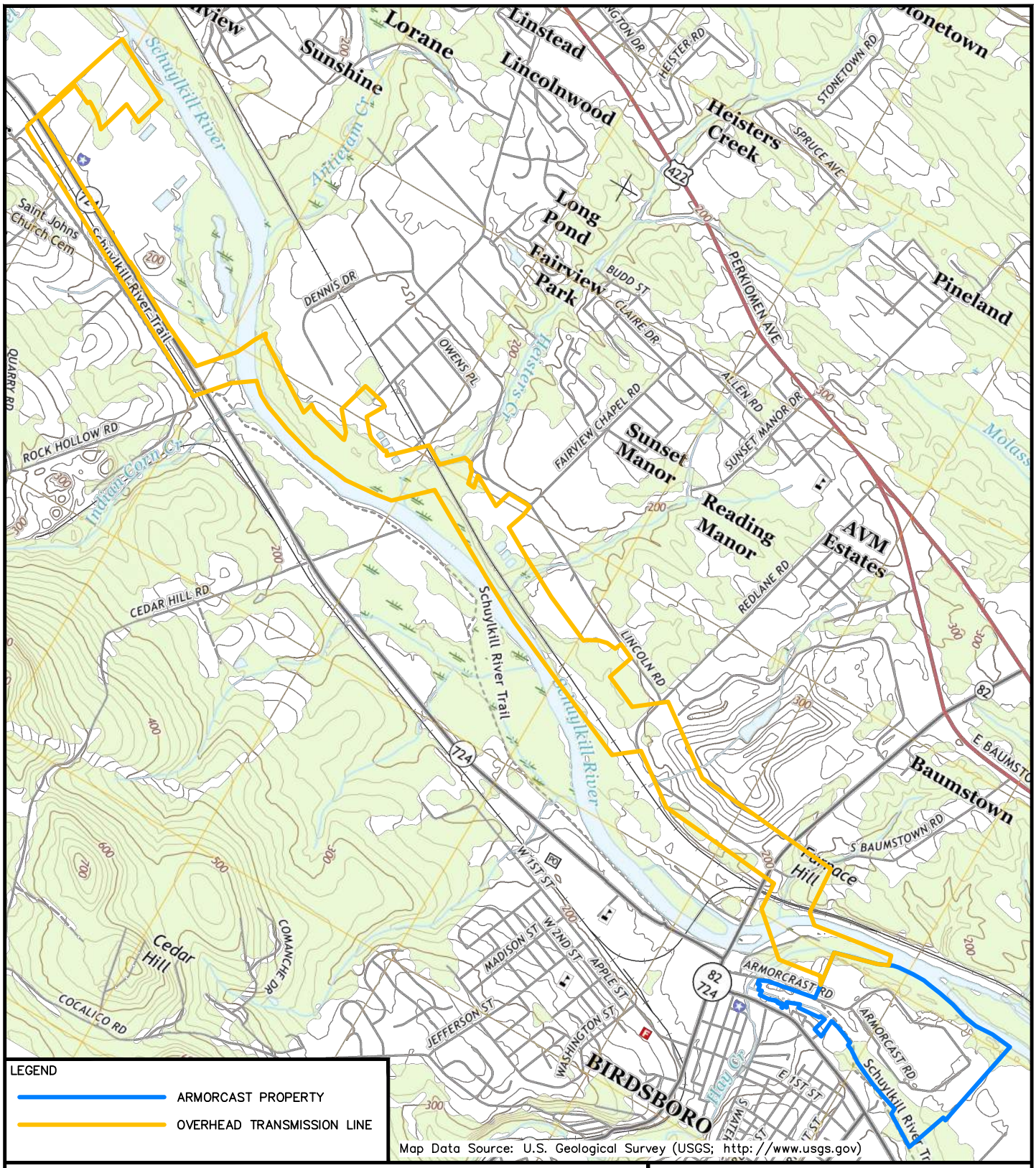
The substation is proposed predominantly on land currently used for agriculture. Per the EMP Regional Manual (Manual), managed plant communities are naturally problematic and can affect the hydrophytic vegetation determination on-site. Per the Manual, the wetland assessment for the cultivated areas on the site was conducted by performing the following recommended procedures:

- Examine the vegetation on a nearby, unmanaged reference site having similar soils and hydrologic conditions. Assume that the same plant community would exist on the managed site in the absence of human alteration.
    - Sample point BR2-SPU was documented at the boundary of one managed soybean field and an herbaceous area in a more successional state.
- For recently cleared or tilled areas (not planted or seeded), leave representative areas unmanaged for at least one growing season with normal rainfall and reevaluate the vegetation.
    - Implementation of this procedure was not feasible.
- If management was initiated recently, use offsite data sources such as aerial photography, NWI maps, and interviews with the land owner and other persons familiar with the area to determine what plant community was present on the site before the management occurred.
    - The site appears to have been managed under an agricultural land use since at least 1937 based on aerial photography.

- If the unmanaged vegetation condition cannot be determined, make the wetland determination based on indicators of hydric soil and wetland hydrology.
    - Sample point BR2-SPU was taken adjacent to an area observed to contain hydrology, hydric soil, and hydrophytic vegetation indicators. Multiple soil probes in or adjacent to the area where the proposed substation is to be constructed were observed to be similar to those observed at BR2-SPU. However, these were not formally documented in the data set as sampling points.
    - Hydrology indicators were not observed at or in the vicinity of the proposed substation location. One hydrology indicator, Indicator D1 (stunted or stressed plants), is typically observed in agricultural fields and managed vegetative communities. Individuals of the managed species growing in a potential wetland are observed to be of smaller stature, less vigorous, or stressed compared with individuals growing in a nearby drier landscape. No soybean crops were observed to be stunted or stressed, as compared to other cultivated areas, during the field investigation.

Based on standard implementation of these procedures and professional judgement, the area of the proposed substation was determined to possess non-wetland characteristics, even though mapped as a hydric soil.

FIGURES



LEGEND

- ARMORCAST PROPERTY
- OVERHEAD TRANSMISSION LINE

DOCUMENT PREPARED BY:

DAWOOD

2020 Good Hope Road
Enola, PA 17025-0246
t: 855.432.9663
f: 717.732.8596

TITLE:	FIGURE 1: SITE LOCATION MAP
PROJECT NAME:	BIRDSBORO POWER, LLC
LOCATION:	EXETER AND ROBESON TOWNSHIPS & BIRDSBORO BOROUGH, BERKS COUNTY, PENNSYLVANIA
MAP REFERENCE:	USGS QUADRANGLES: BIRDSBORO, PA
PROJECT NUMBER:	216040.01
DRAWN BY:	TKM
APPROVED BY:	KRR / JY

N

2000 0 2000

SCALE: 1" = 2000'-0"

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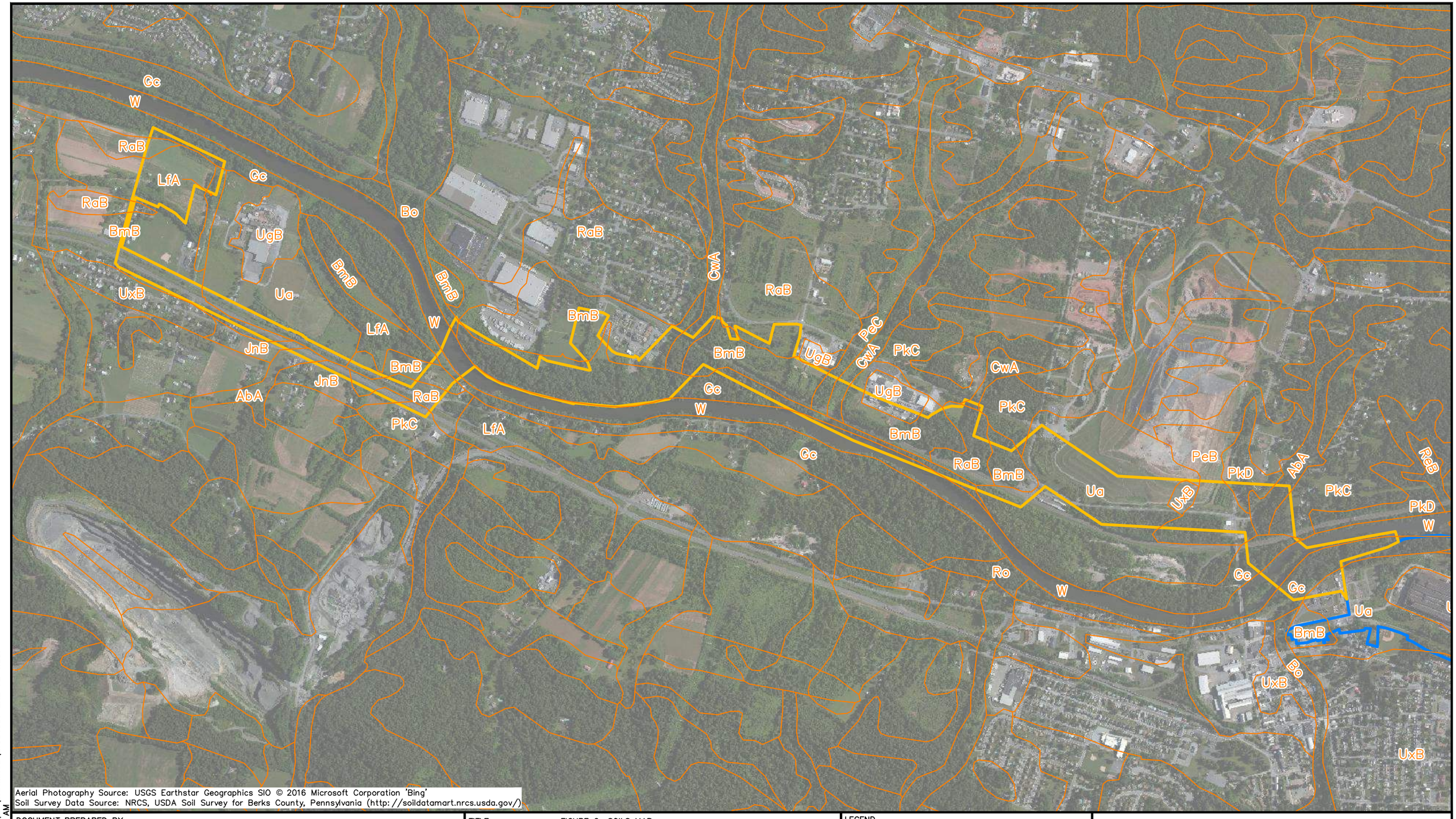

Aerial Photography Source: USGS Earthstar Geographics SIO © 2016 Microsoft Corporation 'Bing'
Soil Survey Data Source: NRCS, USDA Soil Survey for Berks County, Pennsylvania (http: //soildatamart.nrcs.usda.gov/)

DOCUMENT PREPARED BY:

DAWOOD
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Enola, PA 17025-0246
t: 855.432.9663
f: 717.732.8596

TITLE:	FIGURE 2: SOILS MAP		
PROJECT NAME:	BIRDSBORO POWER, LLC		
LOCATION:	EXETER, AND ROBESON TOWNSHIPS & BIRDSBORO BOROUGH, BERKS COUNTY, PENNSYLVANIA		
MAP REFERENCE:	USGS QUADRANGLES: BIRDSBORO, PA		
PROJECT NUMBER:	216040.01		
DRAWN BY:	TKM	APPROVED BY:	KRR / JY

LEGEND

- SOIL BOUNDARY
- OVERHEAD TRANSMISSION LINE
- ARMORCAST PROPERTY

1200 0 1200
SCALE: 1" = 1200'-0"

N

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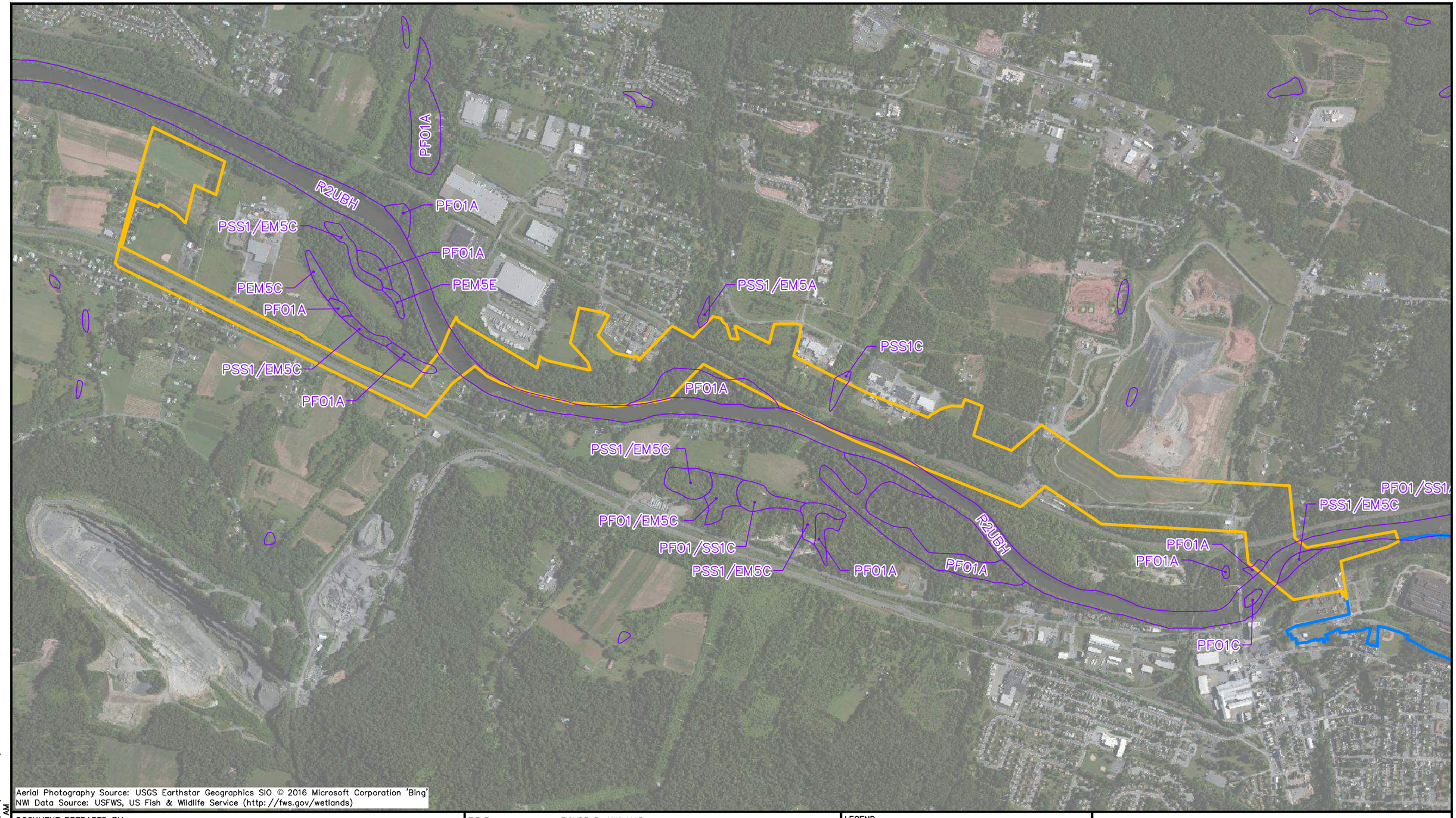
November/21/2016 10:04 AM



Aerial Photography Source: USGS Earthstar Geographics SIO © 2016 Microsoft Corporation 'Bing'
NWI Data Source: USFWS, US Fish & Wildlife Service (http://fws.gov/wetlands)

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November/21/2016 10:05 AM

DOCUMENT PREPARED BY:

DAWOOD
2020 Good Hope Road
Enola, PA 17025-0246
t: 855.432.9663
f: 717.732.8596

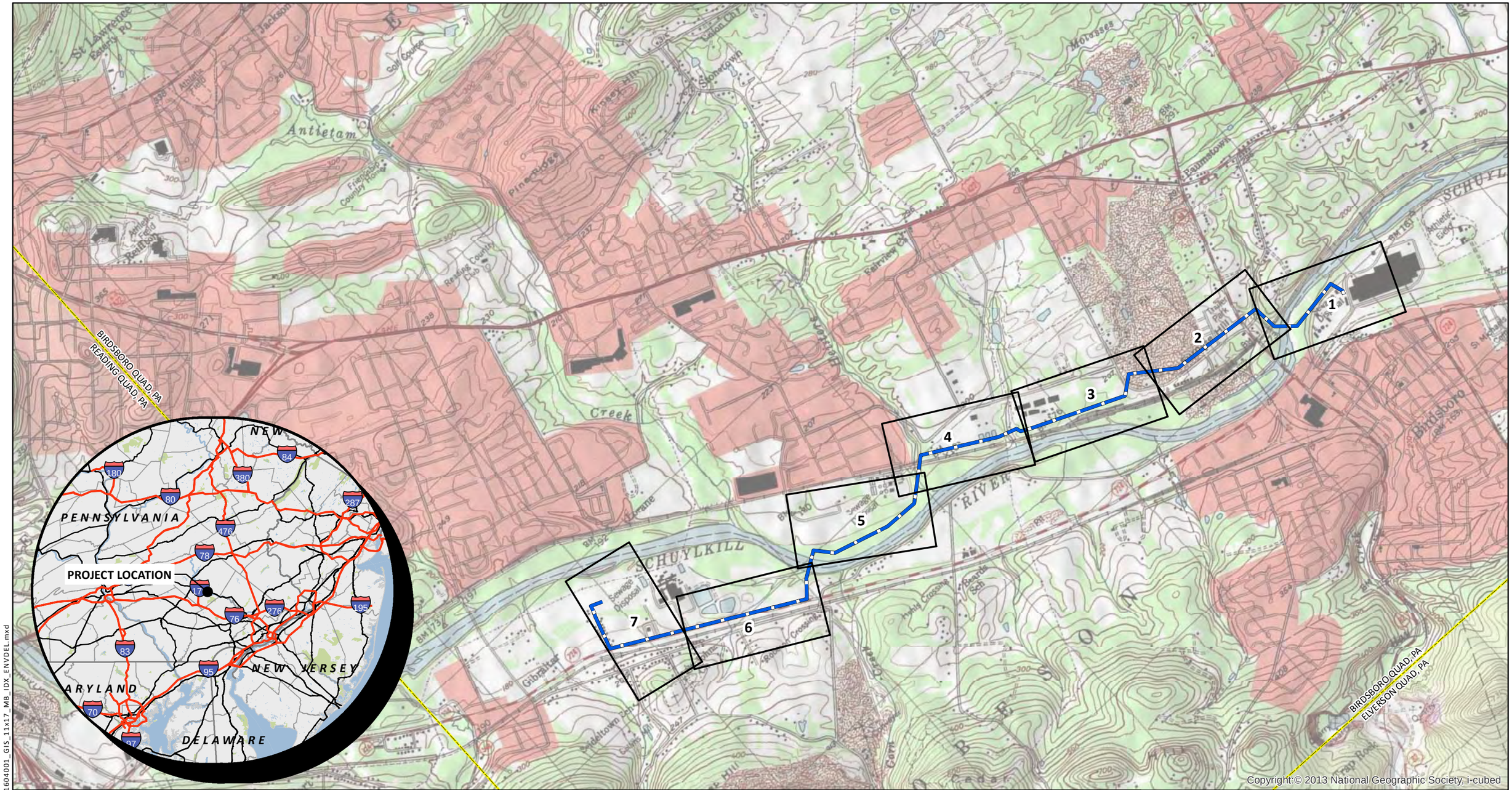
TITLE:	FIGURE 3: NWI MAP		
PROJECT NAME:	BIRDSBORO POWER, LLC		
LOCATION:	EXETER, ROBESON TOWNSHIPS & BIRDSBORO BOROUGH, BERKS COUNTY, PENNSYLVANIA		
MAP REFERENCE:	USGS QUADRANGLES: BIRDSBORO, PA		
PROJECT NUMBER:	216040.01		
DRAWN BY:	TKM	APPROVED BY:	KRR / JY

LEGEND

- NWI BOUNDARY
- OVERHEAD TRANSMISSION LINE
- ARMORCAST PROPERTY

1200 0 1200
SCALE: 1" = 1200'-0"

N



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135 Main Street
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DOCUMENT PREPARED FOR:

BIRDSBORO POWER, LLC.

LEGEND:

- PROPOSED BIRDSBORO TRANSMISSION LINE (APPROX. LENGTH 3.98 MILES)
- SHEET INDEX
- USGS QUADRANGLE BOUNDARY

BIRDSBORO TRANSMISSION LINE ROUTE

FIGURE 4

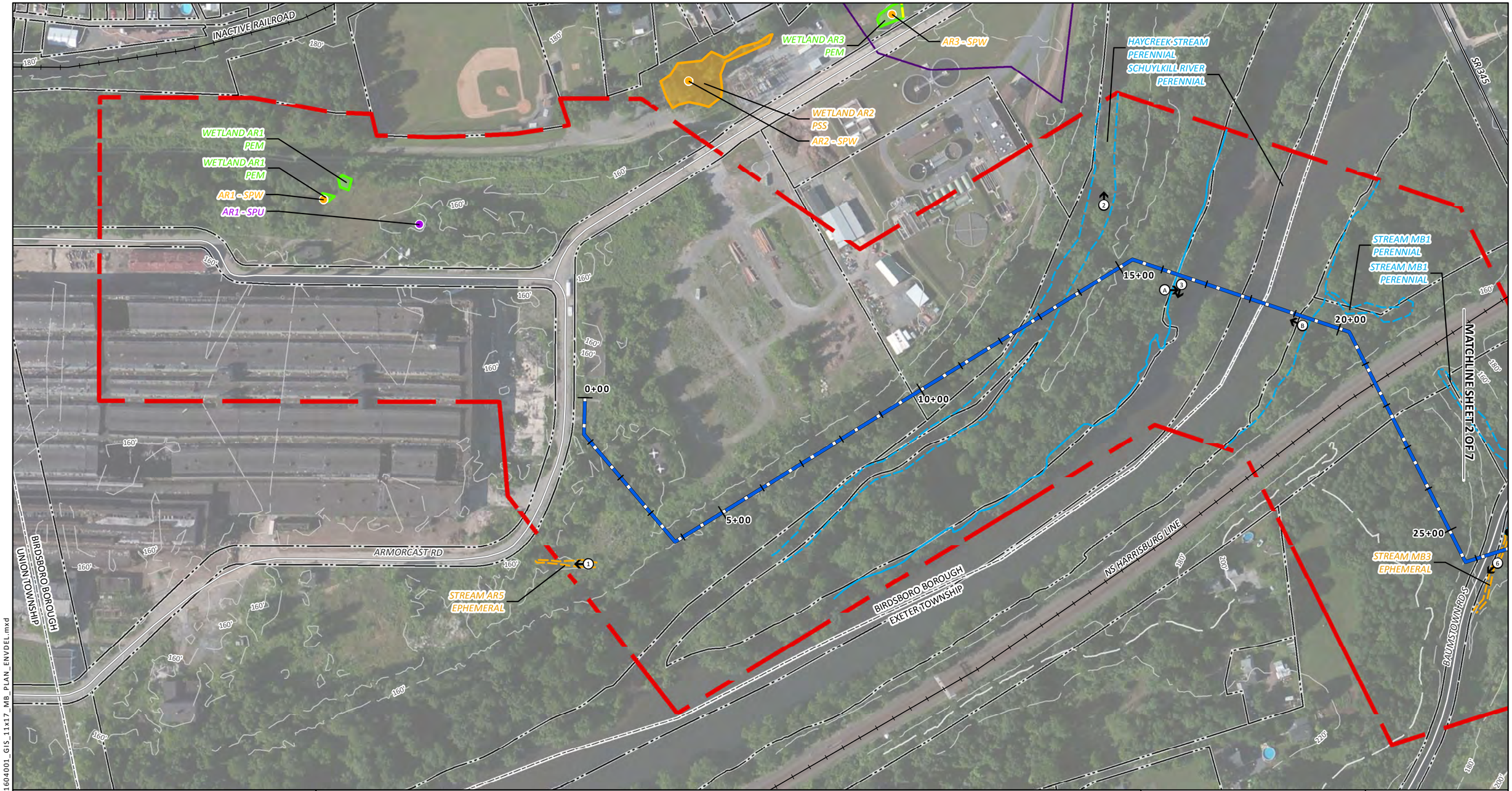
DELINEATION MAP INDEX

BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 2,000 '

2,000 1,000 0 2,000 FEET

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	CS



DOCUMENT PREPARED BY:

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t: 855.432.9663

DOCUMENT PREPARED FOR:

BIRDSBORO POWER, LLC.

LEGEND:

- PHOTO LOCATION
- MILE POST
- UPLAND TEST SITE
- WETLAND TEST SITE
- PROPOSED BIRDSBORO TRANSMISSION LINE (APPROX. LENGTH 3.98 MILES)
- HIGHWAY
- ROAD
- RAILROAD
- MAJOR CONTOUR (100' INDEX)*
- MINOR CONTOUR (20' INTERVAL)*
- WATERCOURSE (EPHEMERAL)
- WATERCOURSE (INTERMITTENT)
- WATERCOURSE (PERENNIAL)
- OPEN END WETLAND
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- PALUSTRINE FORESTED WETLAND BOUNDARY (PFO)
- PALUSTRINE SCRUB SHRUB WETLAND BOUNDARY (PSS)
- PRIME FARMLAND SOIL
- ENVIRONMENTAL AREA OF INVESTIGATION (AOI)
- PROPERTY BOUNDARY
- MUNICIPALITY BOUNDARY

*Contours are from the PAMAP Program, Bureau of Topographic and Geologic Survey, PA Department of Conservation and Natural Resources, 2006.

Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	1 OF 7

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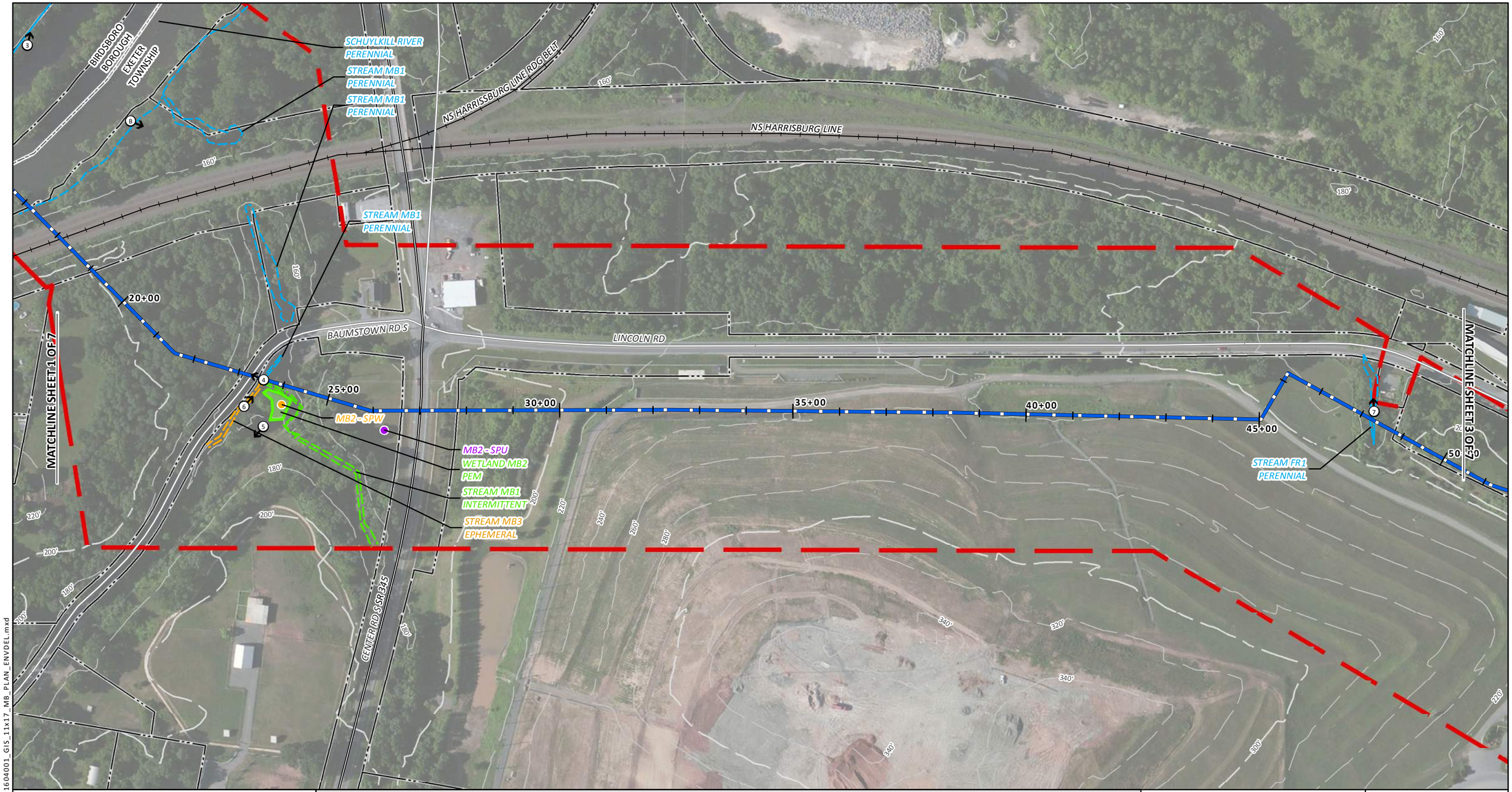

DOCUMENT PREPARED BY:

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BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

N

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
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APPROVED BY:	KRR
SHEET:	2 OF 7

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ROBESON TOWNSHIP
EXETER TOWNSHIP
NS HARRISBURG LINE
STREAM MB4
INTERMITTENT
SCHUYLKILL RIVER
PERENNIAL
STREAM MB6
EPHEMERAL
STREAM MB5
EPHEMERAL
WETLAND ARK4
PFO
ARK4 - SPW
STREAM MB7
INTERMITTENT
MATCHLINE SHEET 2 OF 7
MATCHLINE SHEET 4 OF 7
65+00
70+00
75+00
80+00
60+00
55+00
M.P. 1
BmB
RaB
STREAM ARK5
INTERMITTENT
STREAM ARK3
INTERMITTENT
ARK - SPU
STREAM ARK2
INTERMITTENT
STREAM MB8
INTERMITTENT
ARK7-SPU
STREAM WN3
EPHEMERAL
STREAM WN2
EPHEMERAL
STREAM MB4
INTERMITTENT
ARK1 - SPW
WETLAND ARK1
PEM
ARK7-SPW
WETLAND ARK7
PEM
WN1-SPW
WETLAND WN1
PEM
LINCOLN RD
RED LN
160'
180'
200'
220'
240'
260'
280'

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DOCUMENT PREPARED BY:

DAWOOD

135 Main Street
Sturbridge, MA 01566
t: 855.432.9663

DOCUMENT PREPARED FOR:

BIRDSBORO POWER, LLC.

LEGEND:

- PHOTO LOCATION
- MILE POST
- UPLAND TEST SITE
- WETLAND TEST SITE
- PROPOSED BIRDSBORO TRANSMISSION LINE (APPROX. LENGTH 3.98 MILES)
- HIGHWAY
- ROAD
- RAILROAD
- MAJOR CONTOUR (100' INDEX)*
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*Contours are from the PAMAP Program, Bureau of Topographic and Geologic Survey, PA Department of Conservation and Natural Resources, 2006.

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BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

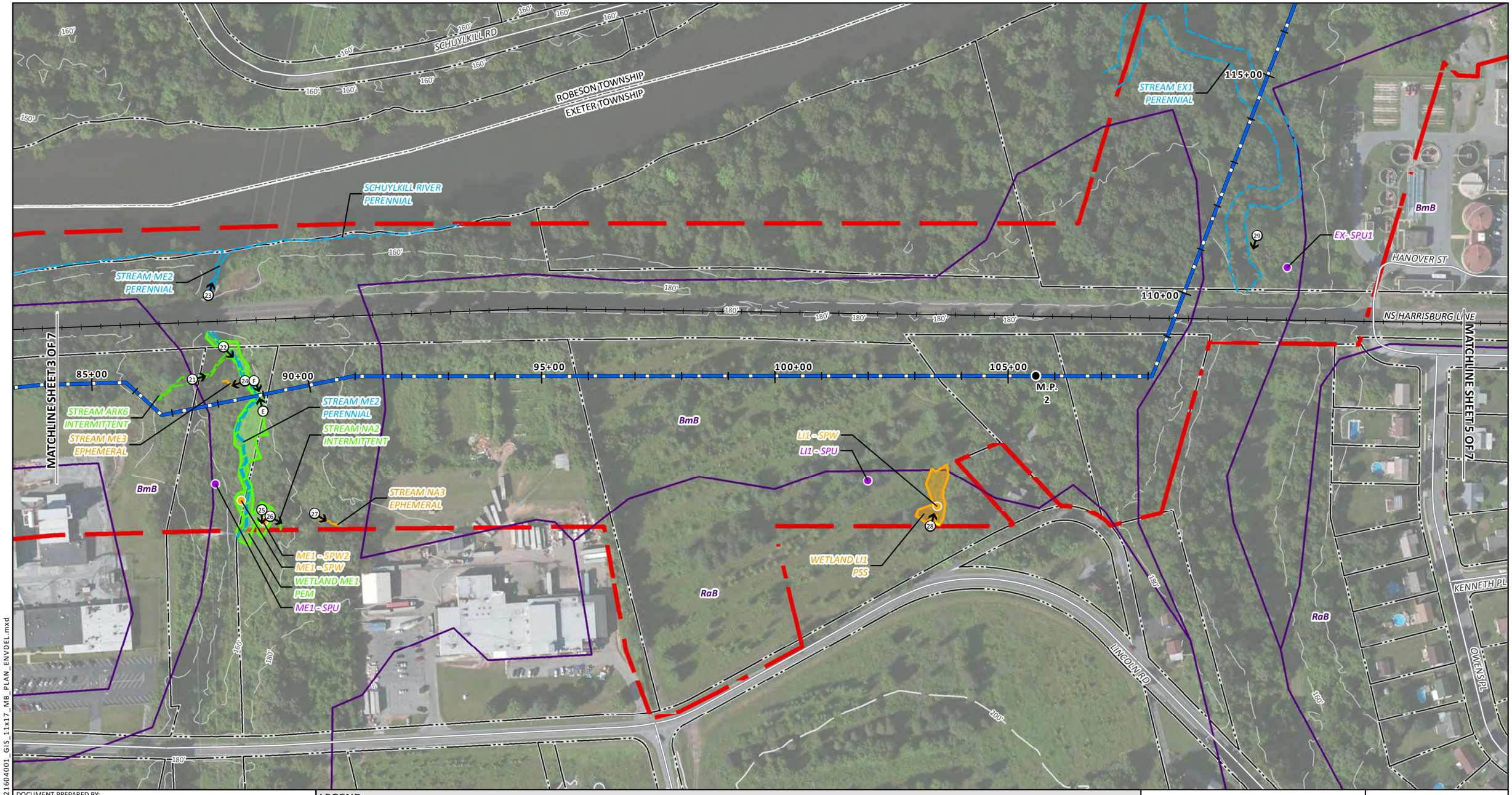
BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

N

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	3 OF 7



DOCUMENT PREPARED BY:

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135 Main Street
Sturbridge, MA 01566
t: 855.432.9663

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BIRDSBORO POWER, LLC.

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BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

N

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	4 OF 7

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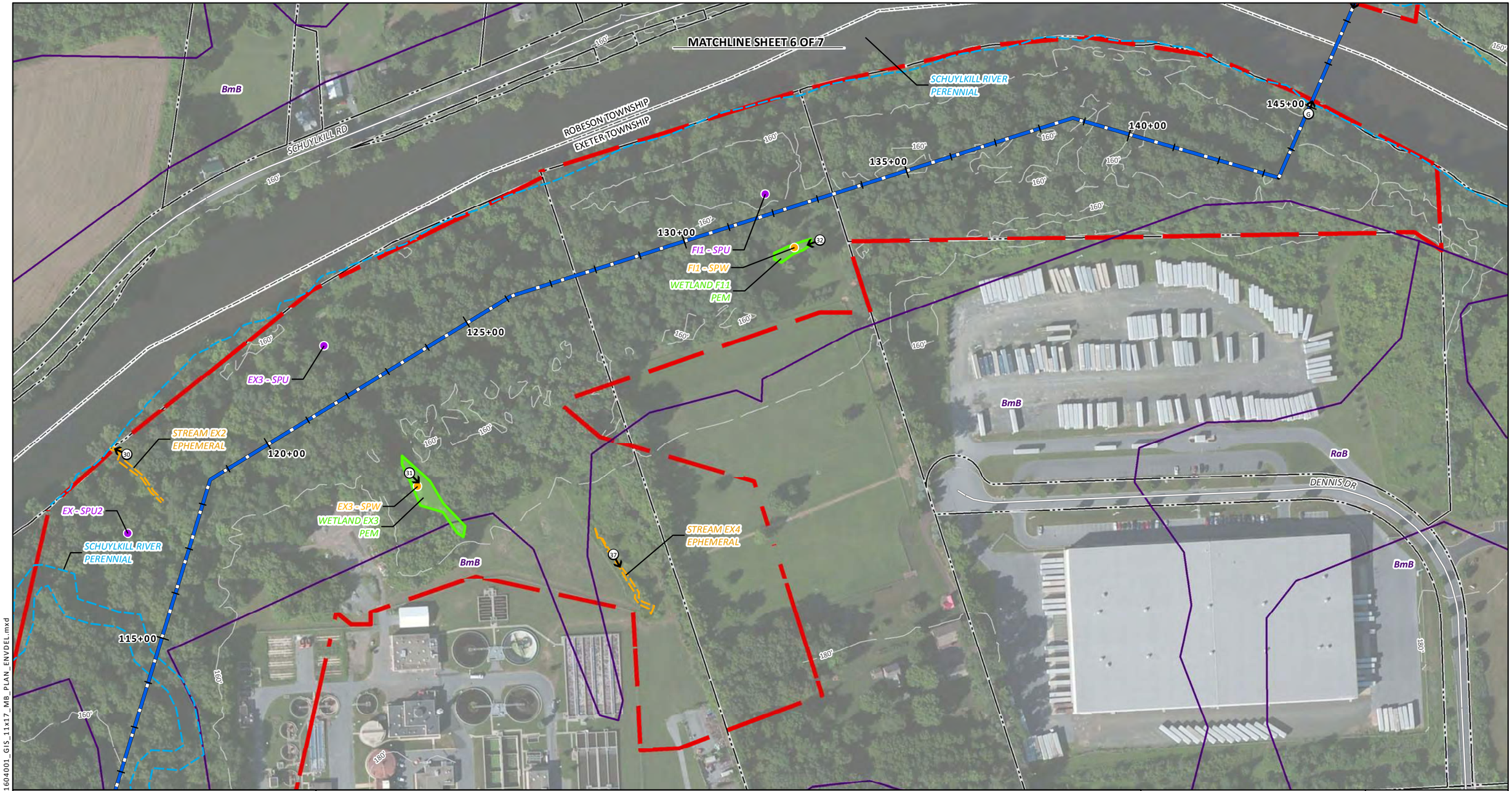

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BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

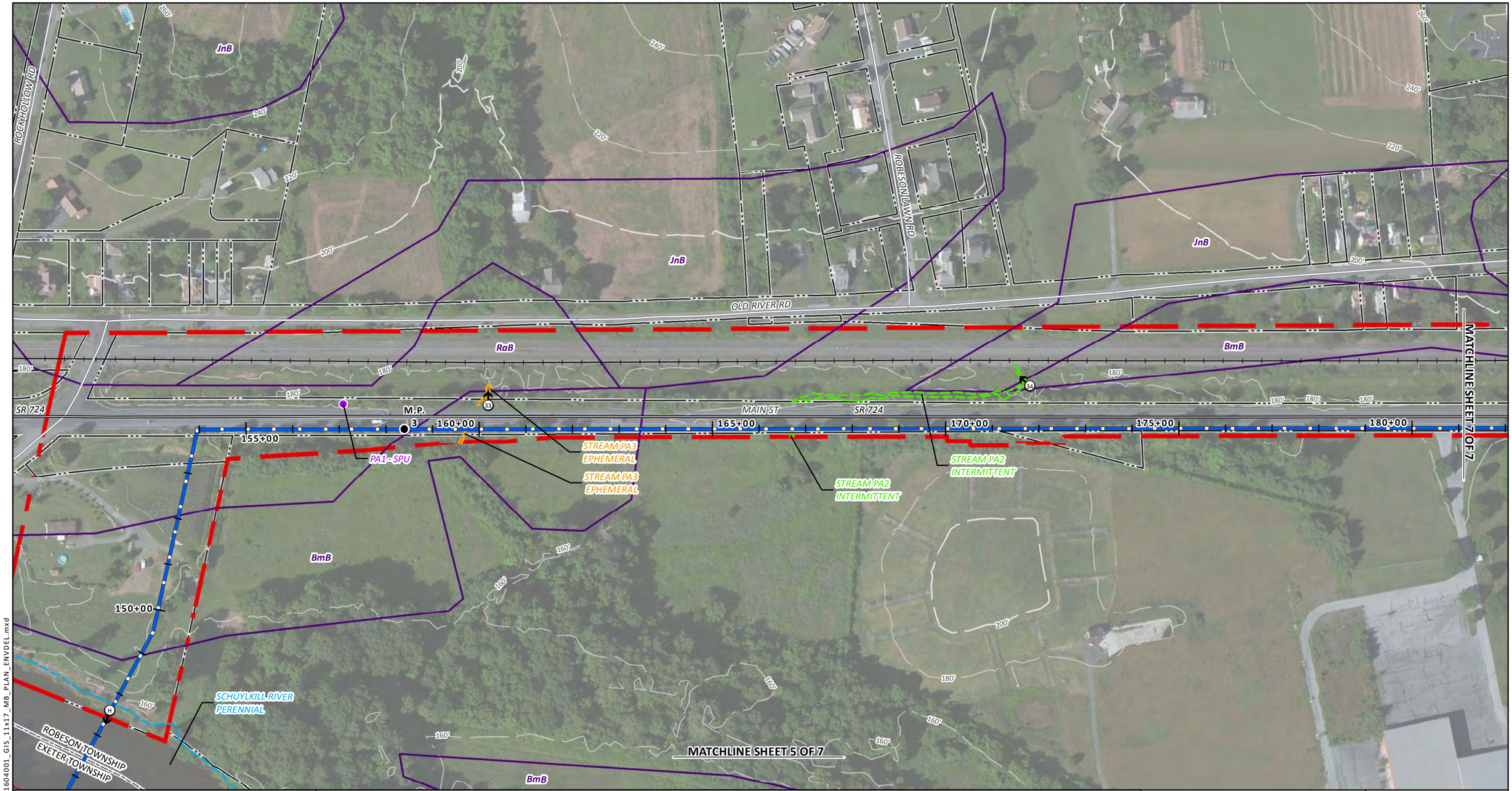
BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

N

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	5 OF 7



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BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

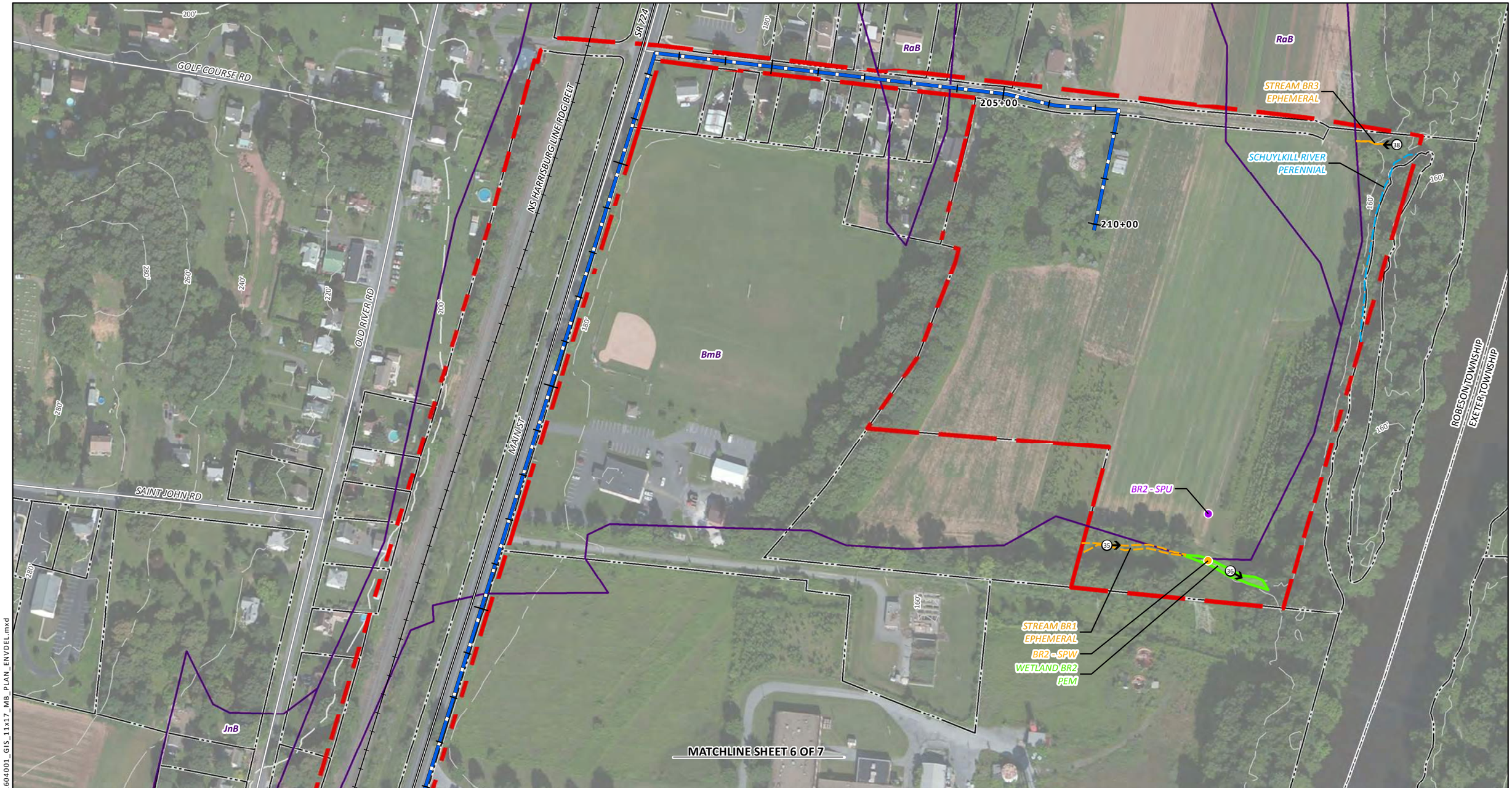
BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

N

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	6 OF 7



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Sturbridge, MA 01566
t: 855.432.9663

DOCUMENT PREPARED FOR:

BIRDSBORO POWER, LLC.

LEGEND:

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BIRDSBORO TRANSMISSION LINE ROUTE

DELINEATION MAPBOOK

BERKS COUNTY, PENNSYLVANIA

SCALE: 1 " = 200 '

200 100 0 200 FEET

DATE:	11/21/2016
PROJECT NUMBER:	216040.01
DRAWN BY:	MSL
REVIEWED BY:	JMG
APPROVED BY:	KRR
SHEET:	7 OF 7

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APPENDIX A

FIELD DATA FORMS

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Birdsboro Borough/Berks Co. **Sampling Date:** 12-Jul-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **AR1-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Undulating **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.267287 **Long.:** -75.799950 **Datum:** NAD 83

Soil Map Unit Name: Udorthents (Ua) **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

previous disturbance activities are evident, albeit no recent disturbance events suspected; red parent material soils

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: AR1-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Juncus tenuis	35	☑	33.3%	FAC
2. Phragmites australis	35	☑	33.3%	FACW
3. Verbena hastata	15	☐	14.3%	FACW
4. Carex vulpinoidea	10	☐	9.5%	OBL
5. Scirpus cyperinus	10	☐	9.5%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	105	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	10	x 1 =	10	
FACW species	60	x 2 =	120	
FAC species	35	x 3 =	105	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	105	(A)	235	(B)

Prevalence Index = B/A = 2.238

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: AR1-SPW

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-10	7.5YR 4/3	60					Silt Loam	
	10YR 5/8	40						

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rock

Depth (inches): 10"

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soil mixing was likely a result of previous disturbance and soils were considered naturally problematic due to red parent material soils; therefore, soils were considered hydric due to prevalence of hydrophytic vegetation and hydrology characteristics.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Birdsboro Borough/Berks Co. **Sampling Date:** 12-Jul-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **AR1-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Undulating **Local relief (concave, convex, none):** convex **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.267634 **Long.:** -75.800559 **Datum:** NAD 83

Soil Map Unit Name: Udorthents (Ua) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

The sample plot is located in a previously disturbed area - most likely due to previous construction activities. No recent disturbance is suspected, therefore significant disturbance is not considered to be applicable. Soils were considered naturally problematic due to red parent material soils.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: AR1-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Salix nigra	40	☑	66.7%	OBL
2. Platanus occidentalis	20	☑	33.3%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	60		= Total Cover	
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0		= Total Cover	
Shrub Stratum (Plot size: 15')				
1. Lonicera morrowii	35	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	35		= Total Cover	
Herb Stratum (Plot size: 5')				
1. Alliaria petiolata	25	☑	35.7%	FACU
2. Ageratina altissima	25	☑	35.7%	FACU
3. Parthenocissus quinquefolia	10	☐	14.3%	FACU
4. Phytolacca americana	10	☐	14.3%	FACU
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 5 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40	
FACW species	20	x 2 =	40	
FAC species	0	x 3 =	0	
FACU species	105	x 4 =	420	
UPL species	0	x 5 =	0	
Column Totals:	165	(A)	500	(B)

Prevalence Index = B/A = 3.030

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: AR1-SPU

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-4	7.5YR	2.5/3	100						Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rock

Depth (inches): 4"

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 10-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ARK1-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Swale **Local relief (concave, convex, none):** concave **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.275421 **Long.:** -75.82298 **Datum:** NAD 83

Soil Map Unit Name: Birdsboro silt loam (BmB) **NWI classification:** PEM

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Wetland ARK1 recieves it's hydrology from an outfall originating from the nearby facility. Vegetation was considered significantly disturbed due to periodic mowing. Red parent material soils were evident, resulting in soils being considered naturally problematic.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ARK1-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Microstegium vimineum	85	☑	84.2%	FAC
2. Cyperus esculentus	5	☐	5.0%	FACW
3. Juncus tenuis	5	☐	5.0%	FAC
4. Echinochloa crus-galli	2	☐	2.0%	FAC
5. Impatiens capensis	2	☐	2.0%	FACW
6. Epilobium coloratum	2	☐	2.0%	FACW
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	101	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	9	x 2 =	18	
FAC species	92	x 3 =	276	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	101	(A)	294	(B)

Prevalence Index = B/A = 2.911

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

Vegetation is significantly disturbed due to periodic mowing, resulting in a low diversity of plant species within the sample plot. The presence of hydrophytic vegetation was evident within the sample plot, albeit in low numbers.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ARK1-SPW

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-2	10YR	4/2	98	7.5YR	4/6	2	C	M	Silty Clay	
2-6	7.5YR	4/3	95	5YR	4/6	5	C	M	Silty Clay	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rocks

Depth (inches): 6"

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils were considered to be naturally problematic due to red parent material soils.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 10-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ARK4-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Lowland **Local relief (concave, convex, none):** concave **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.274425 **Long.:** -75.823518 **Datum:** NAD 83

Soil Map Unit Name: Birdsboro silt loam (BmB) **NWI classification:** PFO

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

The wetland system recieves its hydrology from watercourses ARK2, ARK3, and ARK5 and continually maintains it due to being dammed by the abutting railroad.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ARK4-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Acer negundo	50	☑	66.7%	FAC
2. Acer rubrum	20	☑	26.7%	FAC
3. Fraxinus pennsylvanica	5	☐	6.7%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	75	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Lindera benzoin	20	☑	80.0%	FAC
2. Lonicera tatarica	5	☑	20.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	25	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Microstegium vimineum	5	☑	50.0%	FAC
2. Acer negundo	5	☑	50.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	10	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= 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: 6 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	5	x 2 =	10	
FAC species	100	x 3 =	300	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column Totals:	110	(A)	330	(B)

Prevalence Index = B/A = 3.000

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ARK4-SPW

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	7.5YR	4/2	85						Silty Clay	
	7.5YR	4/3	15						sand	
6-8	10YR	3/2	100						Silt Loam	
8-16	5YR	4/2	90	5YR	5/6	5	C	M	Silty Clay Loam	
				black		5	C	M		

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 10-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** ARK-SPU

Investigator(s): KR, JY **Section, Township, Range:** S T R

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 4.0% / 2.3 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.274942 **Long.:** -75.823511 **Datum:** NAD 83

Soil Map Unit Name: Birdsboro silt loam (BmB) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

no hydrology indicators were observed

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ARK-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Fraxinus americana	40	☑	57.1%	FACU
2. Platanus occidentalis	20	☑	28.6%	FACW
3. Ulmus americana	5	☐	7.1%	FACW
4. Celtis occidentalis	5	☐	7.1%	FACU
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	70	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Lindera benzoin	15	☑	60.0%	FAC
2. Acer negundo	10	☑	40.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	25	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rosa multiflora	15	☑	60.0%	FACU
2. Rubus phoenicolasius	10	☑	40.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	25	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Lonicera japonica	10	☑	50.0%	FACU
2. Parthenocissus quinquefolia	10	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	20	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 8 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 37.5% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	25	x 2 =	50	
FAC species	25	x 3 =	75	
FACU species	90	x 4 =	360	
UPL species	0	x 5 =	0	
Column Totals:	140	(A)	485	(B)

Prevalence Index = B/A = 3.464

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ARK-SPU

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-6	7.5YR 4/4	100					Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rocks

Depth (inches): 6"

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 05-Oct-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ARK7-SPW**

Investigator(s): JY, PS **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Terrace **Local relief (concave, convex, none):** undulating **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.275459 **Long.:** -75.822022 **Datum:** NAD 83

Soil Map Unit Name: Raritan silt loam (RaB) **NWI classification:** PEM

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

the sample plot is located in an annually/bi-annually mowed lawn; therefore vegetation was considered significantly disturbed.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ARK7-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rosa multiflora	5	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	5	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Microstegium vimineum	60	☑	61.9%	FAC
2. Phalaris arundinacea	20	☑	20.6%	FACW
3. Solidago rugosa	10	☐	10.3%	FAC
4. Panicum virgatum	5	☐	5.2%	FAC
5. Toxicodendron radicans	2	☐	2.1%	FAC
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	97	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	20	x 2 =	40	
FAC species	77	x 3 =	231	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column Totals:	102	(A)	291	(B)

Prevalence Index = B/A = 2.853

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

Vegetation was considered significantly disturbed due to the sample plot's location within a periodically maintained lawn. It is expected that, should disturbance cease to continue, hydrophytic vegetation would dominate the wetland system.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ARK7-SPW

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-8	10YR	4/2	97	7.5YR	4/6	3	C	M/PL	Silty Clay Loam	
8-14	10YR	4/2	90	7.5YR	4/6	10	C	M/PL	Silty Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 05-Oct-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ARK7-SPU**

Investigator(s): JY, PS **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Terrace **Local relief (concave, convex, none):** concave **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.275142 **Long.:** -75.821280 **Datum:** NAD 83

Soil Map Unit Name: Raritan silt loam (RaB) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

no hydrology indicators were observed

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ARK7-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Quercus rubra	50	☑	66.7%	FACU
2. Ulmus americana	15	☑	20.0%	FACW
3. Carya glabra	10	☐	13.3%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	75	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Cornus racemosa	20	☑	57.1%	FAC
2. Carya glabra	10	☑	28.6%	FACU
3. Quercus rubra	5	☐	14.3%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	35	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rosa multiflora	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Toxicodendron radicans	5	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	5	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 6 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	15	x 2 =	30	
FAC species	25	x 3 =	75	
FACU species	95	x 4 =	380	
UPL species	0	x 5 =	0	
Column Totals:	135	(A)	485	(B)

Prevalence Index = B/A = 3.593

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ARK7-SPU

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc[2]	Texture	Remarks
0-1	10YR	3/1	100						Silt	organic layer
1-9	10YR	3/3	100						Silt Loam	
9-14	7.5YR	5/3	80						Silt Loam	
	5YR	4/6	20						Silt Loam	
14-16	5YR	4/6	60						Silt Loam	
	10YR	4/2	40						Silty Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Robeson Twp./Berks Co. **Sampling Date:** 04-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **BR2-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Swale **Local relief (concave, convex, none):** concave **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.284898 **Long.:** -75.856795 **Datum:** NAD 83

Soil Map Unit Name: Lamington silt loam (LfA) **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Soils were considered naturally problematic due to Red Parent Material soils.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 8	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: BR2-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Persicaria sagittata	20	☑	26.7%	OBL
2. Lythrum salicaria	10	☑	13.3%	FACW
3. Onoclea sensibilis	10	☑	13.3%	FACW
4. Impatiens capensis	10	☑	13.3%	FACW
5. Phalaris arundinacea	5	☐	6.7%	FACW
6. Euthamia graminifolia	5	☐	6.7%	FAC
7. Solidago rugosa	5	☐	6.7%	FAC
8. Solidago canadensis	5	☐	6.7%	FACU
9. Lysimachia ciliata	5	☐	6.7%	FACW
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	75	= Total Cover		
Woody Vine Stratum (Plot size: 30')				
1. Lonicera spp.	30	☑	100.0%	NI
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	30	= 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: 5 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	20	x 1 =	20	
FACW species	40	x 2 =	80	
FAC species	10	x 3 =	30	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column Totals:	75	(A)	150	(B)

Prevalence Index = B/A = 2.000

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: BR2-SPW

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-8	7.5YR 4/2	100					Silty Clay Loam	
8-16	7.5YR 4/2	90	7.5YR 5/6	10	C	M	Silty Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Robeson Twp./Berks Co. **Sampling Date:** 04-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **BR2-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Terrace **Local relief (concave, convex, none):** level **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.284950 **Long.:** -75.857150 **Datum:** NAD 83

Soil Map Unit Name: Birdsboro silt loam (BmB) **NWI classification:** UPL

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

half of the sample plot is located within an active row-cropped agricultural field, therefore vegetation is considered significantly disturbed

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

no hydrology indicators were observed

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: BR2-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Elaeagnus umbellata	5	☑	100.0%	UPL
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	5	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Glycine max	40	☑	36.4%	UPL
2. Dactylis glomerata	25	☑	22.7%	FACU
3. Daucus carota	15	☐	13.6%	UPL
4. Fragaria virginiana	10	☐	9.1%	FACU
5. Rudbeckia hirta	10	☐	9.1%	FACU
6. Plantago lanceolata	5	☐	4.5%	UPL
7. Toxicodendron radicans	5	☐	4.5%	FAC
8. Trifolium pratense	0	☐	0.0%	FACU
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	110	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	5	x 3 =	15	
FACU species	45	x 4 =	180	
UPL species	65	x 5 =	325	
Column Totals:	115	(A)	520	(B)

Prevalence Index = B/A = 4.522

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: BR2-SPU

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-10	10YR 4/4	100					Silt Loam	
10-12	7.5YR 5/4	70					Silt Loam	
	7.5YR 4/4	30						

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rocks

Depth (inches): 12

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 18-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** EX-SPU1

Investigator(s): KR, JY **Section, Township, Range:** S T R

Landform (hillslope, terrace, etc.): terrace/floodplain **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.278331 **Long.:** -75.835011 **Datum:** NAD 83

Soil Map Unit Name: Croton silt loam (CwA) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

The area is small with limited hydro; has a history of disturbance; and is located just below the toe of slope from railroad construction.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: EX-SPU1

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Acer saccharinum	45	☑	56.3%	FACW
2. Platanus occidentalis	15	☐	18.8%	FACW
3. Fraxinus americana	10	☐	12.5%	FACU
4. Ulmus americana	5	☐	6.3%	FACW
5. Juglans nigra	5	☐	6.3%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	80	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Lindera benzoin	20	☑	57.1%	FAC
2. Acer negundo	5	☐	14.3%	FAC
3. Ulmus americana	5	☐	14.3%	FACW
4. Viburnum sp.	5	☐	14.3%	NI
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	35	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rosa multiflora	5	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	5	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Toxicodendron radicans	15	☑	21.4%	FAC
2. Glyceria sp.	15	☑	21.4%	NI
3. Microstegium vimineum	15	☑	21.4%	FAC
4. Impatiens pallida	10	☐	14.3%	FACW
5. Lysimachia nummularia	10	☐	14.3%	FACW
6. Parthenocissus quinquefolia	5	☐	7.1%	FACU
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 6 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	55	x 3 =	165
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	170 (A)		445 (B)

Prevalence Index = B/A = 2.618

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: EX-SPU1

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	7.5YR	4/2+	100						Silty Clay Loam	
6-10	7.5YR	3/2	100						Silt Loam	fill

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rocks

Depth (inches): 10

Hydric Soil Present? Yes ○ No ◉

Remarks:

chunks of coal, brick, glass, and concrete were evident throughout the soil probe; no evidence of redoximorphic features were observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 18-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** EX-SPU2

Investigator(s): KR, JY **Section, Township, Range:** S T R

Landform (hillslope, terrace, etc.): floodplain **Local relief (concave, convex, none):** flat **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.276657 **Long.:** -75.835802 **Datum:** NAD 83

Soil Map Unit Name: Gibraltar silt loam (Gc) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

the sample plot was located in a documented NWI (PFO1A); no hydric soil characteristics were observed, therefore the area was not considered a wetland

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: EX-SPU2

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Acer negundo	40	☑	72.7%	FAC
2. Celtis occidentalis	10	☐	18.2%	FACU
3. Platanus occidentalis	5	☐	9.1%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	55	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Lindera benzoin	30	☑	75.0%	FAC
2. Viburnum sp.	10	☑	25.0%	NI
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	40	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Microstegium vimineum	50	☑	38.5%	FAC
2. Impatiens capensis	40	☑	30.8%	FACW
3. Urtica dioica	25	☐	19.2%	FACU
4. Parthenocissus quinquefolia	5	☐	3.8%	FACU
5. Pilea pumila	5	☐	3.8%	FACW
6. Persicaria virginiana	5	☐	3.8%	FAC
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	130	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 5 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	0	x 1 =	0	
FACW species	50	x 2 =	100	
FAC species	125	x 3 =	375	
FACU species	40	x 4 =	160	
UPL species	0	x 5 =	0	
Column Totals:	215	(A)	635	(B)

Prevalence Index = B/A = 2.953

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: EX-SPU2

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc[2]	Texture	Remarks
0-4	7.5YR	2.5/1	100						Silty Clay Loam	
4-8	7.5YR	3/1	100						sand	
8-12	black		80						Sand	
	5YR	4/4	20						Clay	
12-24	black		100						Sand	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 22-Sep-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **EX3-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): terrace/floodplain **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.277345 **Long.:** -75.837872 **Datum:** NAD 83

Soil Map Unit Name: Gibraltar silt loam (Gc) **NWI classification:** PEM

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

Are Vegetation ☑ **, Soil** ☑ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

The sample plot is located in a regularly maintained (mowing) sanitary line right-of-way. Vegetation was considered significantly disturbed due to periodic mowing. Soils were considered significantly disturbed due to previous construction activities associated with the sanitary line.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: EX3-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15')				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Juncus tenuis	40	☑	42.1%	FAC
2. Persicaria pensylvanica	20	☑	21.1%	FACW
3. Glechoma hederacea	15	☐	15.8%	FACU
4. Microstegium vimineum	10	☐	10.5%	FAC
5. Lycopus uniflorus	10	☐	10.5%	OBL
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	95	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10	
FACW species	20	x 2 =	40	
FAC species	50	x 3 =	150	
FACU species	15	x 4 =	60	
UPL species	0	x 5 =	0	
Column Totals:	95	(A)	260	(B)

Prevalence Index = B/A = 2.737

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

Vegetation is significantly disturbed due to periodic mowing. It is suspected that should periodic disturbance cease to occur that hydrophytic vegetation would more prominently dominate the wetland system.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: EX3-SPW

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-6	black						sand	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: compacted soils/gravel

Depth (inches): 6

Hydric Soil Present? Yes ◉ No ○

Remarks:

soils within the sample plot were considered significantly disturbed due to construction activities associated with a sanitary-line's right-of-way. According to Chapter 5 of the Regional Supplement, soils of newly formed wetlands can be considered hydric in the presence of wetland hydrology and a dominant hydrophytic vegetative community.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 22-Sep-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **EX3-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): floodplain/terrace **Local relief (concave, convex, none):** flat **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.276351 **Long.:** -75.837850 **Datum:** NAD 83

Soil Map Unit Name: Gibraltar silt loam (Gc) **NWI classification:** UPL

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

Are Vegetation ☑ **, Soil** ☑ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

The sample plot is located in a regularly maintained (mowing) sanitary line right-of-way. Vegetation was considered significantly disturbed due to periodic mowing. Soils were considered significantly disturbed due to previous construction activities associated with the sanitary line.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

The Geomorphic Position hydrology indicator is applicable to this sample plot, due to its location within the floodplain of the Schuylkill River. However, no other hydrology indicators were observed during the field investigation.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: EX3-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rosa multiflora	10	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Glechoma hederacea	40	☑	57.1%	FACU
2. Panicum virgatum	15	☑	21.4%	FAC
3. Parthenocissus quinquefolia	5	☐	7.1%	FACU
4. Persicaria pensylvanica	5	☐	7.1%	FACW
5. Oxalis stricta	5	☐	7.1%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	5	x 2 =	10	
FAC species	15	x 3 =	45	
FACU species	60	x 4 =	240	
UPL species	0	x 5 =	0	
Column Totals:	80	(A)	295	(B)

Prevalence Index = B/A = 3.688

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

Vegetation is significantly disturbed due to periodic mowing.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: EX3-SPU

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-4	black						sand	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: compacted soils/gravel

Depth (inches): 4

Hydric Soil Present? Yes ○ No ◉

Remarks:

Soils within the sample plot were considered significantly disturbed due to construction activities associated with a sanitary-line's right-of-way.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 11-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **FI1-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): basin **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.277361 **Long.:** -75.841300 **Datum:** NAD 83

Soil Map Unit Name: Gibraltar silt loam (Gc) **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 4	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: FI1-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Eleocharis palustris	20	☑	30.8%	OBL
2. Bidens frondosa	20	☑	30.8%	FACW
3. Microstegium vimineum	10	☐	15.4%	FAC
4. Persicaria hydropiper	5	☐	7.7%	OBL
5. Lycopus americanus	5	☐	7.7%	OBL
6. Echinochloa crus-galli	5	☐	7.7%	FAC
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	65	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30	
FACW species	20	x 2 =	40	
FAC species	15	x 3 =	45	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	65	(A)	115	(B)

Prevalence Index = B/A = 1.769

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: FI1-SPW

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-3	10YR 3/1	100					Silty Clay	
3-8	7.5YR 4/4	100					Silty Clay	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rock hardpan

Depth (inches): 8

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils were considered hydric due to the abundance of hydrology and hydrophytic vegetation indicators.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 11-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **FI1-SPU**

Investigator(s): KR, JY **Section, Township, Range: S** **T** **R**

Landform (hillslope, terrace, etc.): terrace/floodplain **Local relief (concave, convex, none):** convex **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.277003 **Long.:** -75.841334 **Datum:** NAD 83

Soil Map Unit Name: Gibraltar silt loam (Gc) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

The Geomorphic Position hydrology indicator is applicable to this sample plot, due to its location within the floodplain of the Schuylkill River. However, no other hydrology indicators were observed during the field investigation.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: FI1-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')				
1. Liriodendron tulipifera	40	☑	57.1%	FACU
2. Robinia pseudoacacia	20	☑	28.6%	FACU
3. Acer rubrum	10	☐	14.3%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	70	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Lindera benzoin	30	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	30	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Microstegium vimineum	20	☑	30.8%	FAC
2. Ageratina altissima	20	☑	30.8%	FACU
3. Lonicera japonica	10	☐	15.4%	FACU
4. Oxalis stricta	10	☐	15.4%	FACU
5. Parthenocissus quinquefolia	5	☐	7.7%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	65	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 5 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	105	x 4 =	420	
UPL species	0	x 5 =	0	
Column Totals:	165	(A)	600	(B)

Prevalence Index = B/A = 3.636

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: FI1-SPU

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-8	10YR 3/2	100					Sandy Loam	
8-16	black	100					Sand	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 22-Sep-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **LI1-SPW**

Investigator(s): KR, JY **Section, Township, Range: S** **T** **R**

Landform (hillslope, terrace, etc.): Undulating **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.278577 **Long.:** -75.831770 **Datum:** NAD 83

Soil Map Unit Name: Raritan silt loam (RaB) **NWI classification:** PSS

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: LI1-SPW

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Acer saccharinum	40	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	40	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rosa multiflora	10	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Euthamia graminifolia	40	☑	47.1%	FAC
2. Microstegium vimineum	20	☑	23.5%	FAC
3. Glechoma hederacea	20	☑	23.5%	FACU
4. Parthenocissus quinquefolia	5	☐	5.9%	FACU
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	85	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	40	x 2 =	80	
FAC species	60	x 3 =	180	
FACU species	35	x 4 =	140	
UPL species	0	x 5 =	0	
Column Totals:	135	(A)	400	(B)

Prevalence Index = B/A = 2.963

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: LI1-SPW

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-8	10YR 5/2	90	7.5YR 4/6	10	C	M	Silty Clay Loam	
8-16	2.5Y 6/6+	80					Silt Loam	
	10YR 5/3	20						

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 22-Sep-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **LI1-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Undulating **Local relief (concave, convex, none):** flat **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.278250 **Long.:** -75.831398 **Datum:** NAD 83

Soil Map Unit Name: Raritan silt loam (RaB) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

no hydrology indicators were observed

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: LI1-SPU

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1. Quercus rubra	50	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	50	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size: 15')				
1. Acer negundo	5	☑	41.7%	FAC
2. Quercus rubra	5	☑	41.7%	FACU
3. Pinus sylvestris	2	☐	16.7%	UPL
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	12	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Dactylis glomerata	60	☑	50.0%	FACU
2. Campsis radicans	50	☑	41.7%	FAC
3. Solidago gigantea	10	☐	8.3%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	120	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 5 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	0	x 1 =	0	
FACW species	10	x 2 =	20	
FAC species	55	x 3 =	165	
FACU species	115	x 4 =	460	
UPL species	2	x 5 =	10	
Column Totals:	182	(A)	655	(B)

Prevalence Index = B/A = 3.599

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: LI1-SPU

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-8	10YR 4/4	100					Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: gravel

Depth (inches): 8

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 13-Jul-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **MB2-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): lowland/floodplain **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.271863 **Long.:** -75.807556 **Datum:** NAD 83

Soil Map Unit Name: Abbottstown silt loam (AbA) **NWI classification:** PEM

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

The sample plot is located in an area that is annually mowed and is used by vehicles - therefore, vegetation was considered significantly disturbed.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 2	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: MB2-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Glyceria grandis	35	☑	33.3%	OBL
2. Phalaris arundinacea	25	☑	23.8%	FACW
3. Persicaria maculosa	15	☐	14.3%	FACW
4. Lysimachia nummularia	15	☐	14.3%	FACW
5. Persicaria hydropiper	5	☐	4.8%	OBL
6. Juncus tenuis	5	☐	4.8%	FAC
7. Carex spp.	5	☐	4.8%	NI
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	105	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	40	x 1 =	40	
FACW species	55	x 2 =	110	
FAC species	5	x 3 =	15	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	165	(B)

Prevalence Index = B/A = 1.650

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: MB2-SPW

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-8	5YR	4/2	97	5YR	5/6	3	C	M	Silty Clay	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rock

Depth (inches): 8"

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 13-Jul-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **MB2-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Terrace **Local relief (concave, convex, none):** none **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.272059 **Long.:** -75.808327 **Datum:** NAD 83

Soil Map Unit Name: Penn-Klinesville channery silt loams (PkD) **NWI classification:** UPL

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

The sample plot is located in an area that is annually mowed - therefore, vegetation was considered significantly disturbed.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

no hydrology indicators were observed

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: MB2-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Plantago lanceolata	25	☑	41.7%	UPL
2. Lotus corniculatus	25	☑	41.7%	FACU
3. Poa spp.	10	☐	16.7%	NI
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	60	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	25	x 4 =	100	
UPL species	25	x 5 =	125	
Column Totals:	50	(A)	225	(B)

Prevalence Index = B/A = 4.500

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: MB2-SPU

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-6	10YR 4/6	100					Loam	resembles fill

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rock

Depth (inches): 6"

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 10-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ME1-SPW**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** concave **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.276583 **Long.:** -75.827099 **Datum:** NAD 83

Soil Map Unit Name: Croton silt loam (CwA) **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Red parent material soils were evident within the soil profile for this sample plot, therefore soils were considered naturally problematic.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 8	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ME1-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Microstegium vimineum	30	☑	42.9%	FAC
2. Impatiens pallida	10	☑	14.3%	FACW
3. Typha latifolia	10	☑	14.3%	OBL
4. Phalaris arundinacea	10	☑	14.3%	FACW
5. Impatiens capensis	5	☐	7.1%	FACW
6. Persicaria perfoliata	5	☐	7.1%	FAC
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	10	x 1 =	10	
FACW species	25	x 2 =	50	
FAC species	35	x 3 =	105	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	70	(A)	165	(B)

Prevalence Index = B/A = 2.357

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ME1-SPW

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-6	5YR 3/2	97	black	3	C	M	Silty Clay	
6-12	7.5YR 4/1+	95	7.5YR 5/6	5	C	M	Silty Clay	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 05-Oct-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ME1-SPW2**

Investigator(s): JY, PS **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Terrace **Local relief (concave, convex, none):** flat **Slope:** 1.0% / 0.6 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.276754 **Long.:** -75.827173 **Datum:** NAD 83

Soil Map Unit Name: Croton silt loam (CwA) **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

Hydrology to this portion of the ME1 wetland system originates from watercourse NA2 (WWF, MF)

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ME1-SPW2

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Persicaria perfoliata	40	☑	42.1%	FAC
2. Persicaria pensylvanica	30	☑	31.6%	FACW
3. Parthenocissus quinquefolia	20	☑	21.1%	FACU
4. Setaria parviflora	5	☐	5.3%	FAC
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	95	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	0	x 1 =	0	
FACW species	30	x 2 =	60	
FAC species	45	x 3 =	135	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column Totals:	95	(A)	275	(B)

Prevalence Index = B/A = 2.895

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ME1-SPW2

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-4	10YR	3/2	100						Silty Clay	
4-12	10YR	4/2	60	7.5YR	4/6	10	C	M	Sandy Clay Loam	
	7.5YR	4/4	30							

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☑ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 10-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **ME1-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 9.0% / 5.1 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.276425 **Long.:** -75.826985 **Datum:** NAD 83

Soil Map Unit Name: Croton silt loam (CwA) **NWI classification:** UPL

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

The upland sample plot is located in a periodically mowed powerline right-of-way, therefore the vegetation is considered significantly disturbed

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

no hydrology indicators were observed

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: ME1-SPU

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Solidago canadensis	35	☑	38.9%	FACU
2. Lonicera japonica	30	☑	33.3%	FACU
3. Ageratina altissima	10	☐	11.1%	FACU
4. Euthamia graminifolia	10	☐	11.1%	FAC
5. Phytolacca americana	5	☐	5.6%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	10	x 3 =	30	
FACU species	80	x 4 =	320	
UPL species	0	x 5 =	0	
Column Totals:	90	(A)	350	(B)

Prevalence Index = B/A = 3.889

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

no hydrophytic vegetation indicators observed

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: ME1-SPU

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	7.5YR	4/6	100						Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: rocks

Depth (inches): 6"

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric soil indicators observed

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 25-Aug-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **PA1-SPU**

Investigator(s): KR, JY **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Swale **Local relief (concave, convex, none):** concave **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.276945 **Long.:** -75.848670 **Datum:** NAD 83

Soil Map Unit Name: Raritan silt loam (RaB) **NWI classification:** UPL

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

Are Vegetation ☐ **, Soil** ☑ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ○ No ◉

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

The sample plot is located within the S.R. 724 right-of-way and adjacent to the railroad right-of-way. The soil is significantly disturbed due to construction activities and soil mixing is evident.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

The sample plot is located in a concave area and therefore the geomorphic position hydrology indicator is applicable. However, no other hydrology indicators were observed during the field investigation.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: PA1-SPU

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30')			
1. Acer negundo	20	☑ 66.7%	FAC
2. Prunus serotina	10	☑ 33.3%	FACU
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
	30	= Total Cover	
Sapling-Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
	0	= Total Cover	
Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Impatiens capensis	30	☑ 33.3%	FACW
2. Setaria pumila	30	☑ 33.3%	FAC
3. Lonicera morrowii	20	☑ 22.2%	FACU
4. Coronilla varia	10	☐ 11.1%	UPL
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
12.	0	☐ 0.0%	
	90	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
	0	= Total Cover	

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	0	x 1 =	0	
FACW species	30	x 2 =	60	
FAC species	50	x 3 =	150	
FACU species	30	x 4 =	120	
UPL species	10	x 5 =	50	
Column Totals:	120	(A)	380	(B)

Prevalence Index = B/A = 3.167

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: PA1-SPU

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	7.5YR	3/2	100						Silty Clay Loam	
6-14	7.5YR	4/2	65						Silty Clay	
	2.5YR	4/4	25						Silty Clay	
	black		10							burnt ash

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

soil mixing was likely a result of previous disturbance

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Power LLC **City/County:** Exeter Twp./Berks Co. **Sampling Date:** 05-Oct-16

Applicant/Owner: Birdsboro Power, LLC **State:** PA **Sampling Point:** **WN1-SPW**

Investigator(s): JY, PS **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** flat **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 148 in LRR S **Lat.:** 40.275573 **Long.:** -75.821035 **Datum:** NAD 83

Soil Map Unit Name: Raritan silt loam (RaB) **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Wetland WN1 is a floodplain system located along the right descending bank of stream MB4. Vegetation was considered naturally problematic due to seasonal drought conditions possibly impacting observed plant species within the wetland system. Based on this reasoning, the location of the system, and the fact that hydrology and hydric soil indicators were present, the system was considered to be a wetland.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 2	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

Rain events (within 7 days of field investigation) exceeded 2" of precipitation and likely resulted in the observed saturation during the field investgation.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: WN1-SPW

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15')				
1. Rubus allegheniensis	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Solidago gigantea	25	☑	33.3%	FACW
2. Glechoma hederacea	20	☑	26.7%	FACU
3. Carex spp.	15	☑	20.0%	NI
4. Ageratina altissima	10	☐	13.3%	FACU
5. Phalaris arundinacea	5	☐	6.7%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	75	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	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: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	30	x 2 =	60	
FAC species	0	x 3 =	0	
FACU species	50	x 4 =	200	
UPL species	0	x 5 =	0	
Column Totals:	80	(A)	260	(B)

Prevalence Index = B/A = 3.250

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

Vegetation was considered naturally problematic due to seasonal drought conditions that may have reduced hydrology to the wetland system and contributed to the proliferation of non-wetland plant species. The proliferation of hydrophytic plant species earlier in the growing season was evident based on the observed remains of a unidentifiable carex species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: WN1-SPW

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-8	5YR	3/2	98	7.5YR	4/6	2	C	M	Sandy Clay Loam	
8-14	5YR	3/2	80	2.5YR	4/4	20	C	M		

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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)
- ☐ Redox Dark Surface (F6)
- ☐ 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[3]:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	Schuylkill River	Project/Task Number:	216040.01
Date:		Investigators:	JY, KR, LD
PADEP Stream Name/Code:	Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area	1,000,000+	acres
Stream Order	7	
Estimated Flow	>500	gal/min
Water Depth	24+	inches
TOB Width	240+	inches

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep	X	Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line	X	Depositional Bars & Benches	X
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences	X		

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	X
Solid blue line on USGS map	X
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	X
Alluvial bars & benches common	X
Riffle-pool sequences common	X
≥ Second order stream	X

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	
Erosional channel/lacks alluvuial deposits	
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [X] **Perennial** [ ] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: Hay Creek	Project/Task Number: 216040.01
Date: 7/12/2016	Investigators: JY, KR, LD
PADEP Stream Name/Code: Hay Creek	Existing Use Chapter 93 Designation: CWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	4+	
Estimated Flow	>100	gal/min
Water Depth	2 to 4	feet
TOB Width	>15	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep	X	Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line	X	Depositional Bars & Benches	X
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences	X		

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	X
Solid blue line on USGS map	X
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	X
Alluvial bars & benches common	X
Riffle-pool sequences common	X
≥ Second order stream	X

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	
Erosional channel/lacks alluvuial deposits	
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [X] **Perennial** [ ] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: AR5	Project/Task Number: 216040.01
Date: 11/9/2016	Investigators: JY
PADEP Stream Name/Code: N/A	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Rainy, 60s-70s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	2 to 5	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	X
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Watercourse carries hydrology under unmaintained trail via culverts then disperses into open, flat area.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	X

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: ARK2	Project/Task Number: 216040.01
Date: 8/10/2016	Investigators: JY, KR
PADEP Stream Name/Code: N/A	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	3 to 20	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	X
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks	X	Debris-filled	X
OHW Mark		Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Braided channel areas were observed during field investigation. Watercourse originated at outfall culvert from Arkema property.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: ARK3	Project/Task Number: 216040.01
Date: 8/10/2016	Investigators: JY, KR
PADEP Stream Name/Code: N/A	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	8 to 12	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks	X	Debris-filled	X
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	
Boulder		Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Watercourse originated at outfall culvert from Arkema property and gains hydrology from the watercourse tributary ARK5.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: ARK5	Project/Task Number: 216040.01
Date: 8/10/2016	Investigators: JY, KR
PADEP Stream Name/Code: N/A	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	3 to 20	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	X
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks	X	Debris-filled	
OHW Mark		Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Braided channel areas were observed during field investigation. Watercourse originated at outfall culvert from Arkema property.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	ARK6	Project/Task Number:	216040.01
Date:	8/10/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	4 to 12	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	BR1	Project/Task Number:	216040.01
Date:	8/4/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	3 to 8	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	X
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble	X	Detritus	X
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	X

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: BR3	Project/Task Number: 216040.01
Date: 11/8/2016	Investigators: JY, PS
PADEP Stream Name/Code: UNT to Schuylkill River	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny, 50s-60s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	1 to 2	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble	X	Detritus	X
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	X

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: EX1	Project/Task Number: 216040.01
Date: 8/18/2016	Investigators: JY, KR
PADEP Stream Name/Code: Heisters Creek	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	>3	
Estimated Flow	50-100	gal/min
Water Depth	1 to 4+	feet
TOB Width	40 to 60	feet

Hydrology Source(s) (check all that apply):

Spring	X	Wetland	X
Seep	X	Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line	X	Depositional Bars & Benches	X
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences	X		

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	X
Solid blue line on USGS map	X
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	X
Alluvial bars & benches common	X
Riffle-pool sequences common	X
≥ Second order stream	X

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	
Erosional channel/lacks alluvuial deposits	
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [X] **Perennial** [ ] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: EX2	Project/Task Number: 216040.01
Date: 8/18/2016	Investigators: JY, KR
PADEP Stream Name/Code: UNT to Schuylkill	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	6 to 10	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	X
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: EX4	Project/Task Number: 216040.01
Date: 8/18/2016	Investigators: JY, KR
PADEP Stream Name/Code: UNT to Schuylkill	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	4 to 10	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	X
Gravel	X	Artificial	X
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	FR1	Project/Task Number:	216040.01
Date:	7/13/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order		
Estimated Flow	<1	gal/min
Water Depth	0-3	inches
TOB Width	10-Jun	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	X
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	X
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	X
Alluvial bars & benches common	X
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	X
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [X] **Perennial** [ ] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	MB1	Project/Task Number:	216040.01
Date:	7/13/2016 & 8/10/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	2	
Estimated Flow	0-1	gal/min
Water Depth	0-72	inches
TOB Width	10-Jun	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake		Culvert	X
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line	X	Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	Present in Scour Hole
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	Present
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

Evidence of Caddisfly cases were apparent on rocks on outskirts of scour hole. Fin Fish were observed living in an approximately 6.0' deep scour hole filled with water a the mouth of culvert south of Railroad.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	X
Solid blue line on USGS map	X
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	X
Alluvial bars & benches common	
Riffle-pool sequences common	X
≥ Second order stream	X

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [X] **Perennial** [ ] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	MB3	Project/Task Number:	216040.01
Date:	7/13/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	6 to 8	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. MB3 is a roadside ditch that collects runoff during precipitation events.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	X

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: MB4	Project/Task Number: 216040.01
Date: 7/13/2016	Investigators: JY, KR
PADEP Stream Name/Code: UNT to Schuylkill	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 80-90s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	2	
Estimated Flow	<1	gal/min
Water Depth		inches
TOB Width	8 to 16	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences	X		

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	
Boulder	X	Clay	
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	X

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	X
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	
Erosional channel/lacks alluvuial deposits	
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	MB5	Project/Task Number:	216040.01
Date:	7/13/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	4	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	X
Gravel		Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	X
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	X

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	MB6	Project/Task Number:	216040.01
Date:	7/13/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	4	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	X
Gravel		Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	X
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	X

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	MB7	Project/Task Number:	216040.01
Date:	7/13/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order		
Estimated Flow		gal/min
Water Depth		inches
TOB Width	6	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	
OHW Mark		Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		A macroinvertebrate study was not conducted.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	X
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	MB8	Project/Task Number:	216040.01
Date:	7/13/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order		
Estimated Flow		gal/min
Water Depth		inches
TOB Width	4 to 8	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	X
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	
OHW Mark		Terrestrial Vegetation	
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

A macroinvertebrate study was not conducted. Watercourse originates from a culvert that runs under Recycling Center property.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	
Terrestrial vegetation in channel	
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	ME2	Project/Task Number:	216040.01
Date:	8/10/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	25-50	gal/min
Water Depth	6 to 72	inches
TOB Width	4 to 20	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	X
Seep	X	Flowing Well	
Run-off	X	Outfall	
Lake			
Pond	X		

Channel Conditions (check all that apply):

USGS Solid Blue Line	X	Depositional Bars & Benches	X
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	
OHW Mark	X	Terrestrial Vegetation	
Riffle-Pool Sequences	X		

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	Abundant
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	Present - Water Striders
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		Fish were observed to be living in watercourse.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	X
Solid blue line on USGS map	X
Streams fed by springs or outflow from lake or large pond	X
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	X
Alluvial bars & benches common	X
Riffle-pool sequences common	X
≥ Second order stream	X

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [x] **Perennial** [ ] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	ME3	Project/Task Number:	216040.01
Date:	10/5/2016	Investigators:	JY, PS
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 70s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	0	gal/min
Water Depth		inches
TOB Width	4 to 6	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	NA2	Project/Task Number:	216040.01
Date:	10/5/2016	Investigators:	JY, PS
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 70s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	0	gal/min
Water Depth		inches
TOB Width	2 to 4	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks	X	Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Watercourse collects run-off from Nassau property parking lot.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	
Channel filled with leaves/debris	
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	NA3	Project/Task Number:	216040.01
Date:	10/5/2016	Investigators:	JY, PS
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 70s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	0	gal/min
Water Depth		inches
TOB Width	4 to 6	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	
Cobble		Detritus	X
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	PA2	Project/Task Number:	216040.01
Date:	9/22/2016	Investigators:	JY, PS
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	0	gal/min
Water Depth		inches
TOB Width	4 to 10	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Watercourse runs from culvert under SR 724 to culvert under Railroad. PA2 is documented as a solid blue line, but field conditions appear to indicate that the watercourse was re-routed via a culvert and was previously impacted affecting the flow. Therefore, the watercourse was considered intermittent.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	X
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	X
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [X] **Intermittent** [ ] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	PA3	Project/Task Number:	216040.01
Date:	9/22/2016	Investigators:	JY, KR
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 80-90s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow		gal/min
Water Depth		inches
TOB Width	8 to 10	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	
Continuous Bed & Banks	X	Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	X
Cobble		Detritus	
Gravel	X	Artificial	
Sand	X		

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View

Notes

No macroinvertebrates were observed. Watercourse runs from culvert under SR 724 to culvert under Railroad.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	X
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name:	WN2	Project/Task Number:	216040.01
Date:	10/5/2016	Investigators:	JY, PS
PADEP Stream Name/Code:	UNT to Schuylkill River	Existing Use Chapter 93 Designation:	WWF, MF
Current Weather:	Sunny 70s	Antecedent Weather:	Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	0	gal/min
Water Depth		inches
TOB Width	4 to 8	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder		Clay	
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

STREAM DETERMINATION FIELD DATA FORM

Stream Name: WN3	Project/Task Number: 216040.01
Date: 10/5/2016	Investigators: JY, PS
PADEP Stream Name/Code: UNT to Schuylkill River	Existing Use Chapter 93 Designation: WWF, MF
Current Weather: Sunny 70s	Antecedent Weather: Sunny

Stream Hydrology:

Watershed Area		acres
Stream Order	1	
Estimated Flow	0	gal/min
Water Depth		inches
TOB Width	4 to 6	feet

Hydrology Source(s) (check all that apply):

Spring		Wetland	
Seep		Flowing Well	
Run-off	X	Outfall	
Lake			
Pond			

Channel Conditions (check all that apply):

USGS Solid Blue Line		Depositional Bars & Benches	
USGS Broken Blue Line		Eroded Channel	X
Continuous Bed & Banks		Debris-filled	X
OHW Mark		Terrestrial Vegetation	X
Riffle-Pool Sequences			

Common Substrate Type(s) (check all >20%):

Bedrock		Silt	X
Boulder	X	Clay	X
Cobble	X	Detritus	
Gravel	X	Artificial	
Sand			

Aquatic Life:

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Fish	P	
Spring salamander	P	
Northern two-lined salamander	P	
Seal salamander	P	
Northern dusky salamander	I	
Mountain dusky salamander	I	
Mayfly nymphs (Ephemeroptera)	P	
Stonefly nymphs (Plecoptera)	P	
Caddisfly larvae (Tricoptera)	P	
Midge larvae (Chironomidae)	P/I	
Black fly larvae (Simulidae)	I	
Cranefly larvae (Tipulidae)	P	
Riffle beetles (Elmidae)	P	
Water pennies (Psephenidae)	P	
Aquatic beetles (Coleoptera)	P	
Water bugs (Hemiptera)	P	
Dobsonfly larvae (Corydalidae)	P	
Alderfly larvae (Sialidae)	P	
Damselfly nymphs (Zygoptera)	P	
Dragonfly nymphs (Anisoptera)	P	

Organism	Indicator	Abundance (Rare, Present, Common, Abundant, Very Abundant)
Scuds (Amphipoda)	I	
Aquatic sowbugs (Isopoda)	I	
Crayfish (Decapoda)	P	
Leeches (Hirudinea)	I	
Aquatic segmented worms (Oligochaeta)	I	
Flatowrms (Platyhelminthes)	I	
Aquatic snails (Gastropoda)	P/I	
Fingernail clams (Sphaeriidae)	P/I	
Freshwater mussels (Unionidae)	I	

Photograph	View	Notes
		No macroinvertebrates were observed.

Indicator: P - Pernnial; I - Intermittent; AV - Aquatic Vegetation Rare = 1-3; Present = 4-10; Common = 11-24; Abundant = 25-99; Very Abundant = 100+

Stream Indicators:

Perennial	
Bivalves (mussels or clams)	
≥ 5 "P" maroinvertebrate taxa	
"P" salamanders and/or fish	
>10% cover by SAV, periphyton	
Flowing during summer/fall	
Solid blue line on USGS map	
Streams fed by springs or outflow from lake or large pond	
P > I (No. Organisms)	
P > I No. Indicators	
Bank soils at OLW are gley	
Channel grain size >> floodplain	
Alluvial bars & benches common	
Riffle-pool sequences common	
≥ Second order stream	

Intermittent	
Very low flow or dry channel during summer/fall	X
I > P Indicators	
I > P (No. Organisms)	
Only "I" salamanders present	
Broken blue line on USGS map	
Bank soils at OLW: matrix chroma 1-2 and mottle chroma ≥ 3	
Channel grain size > floodplain	
Alluvial bars & benches present	
Riffle-run habitat common, well-developed pools uncommon	
First or second order stream	X
Watershed >10acres but <40 acres	

Ephemeral	
Dry channel during winter/spring	
Flow only in response to rainfall	
Little or no aquatic life	X
Erosional channel/lacks alluvuial deposits	X
Terrestrial vegetation in channel	X
Channel filled with leaves/debris	X
Bank soils at OLW: matrix chroma ≥ 3	
Channel grain size = floodplain	x
First order, headwater stream	X
Dendritic pattern on USGS	
Watershed <10 acres	

Determination: [ ] **Perennial** [ ] **Intermittent** [X] **Ephemeral**

APPENDIX B

SITE PHOTOGRAPHS

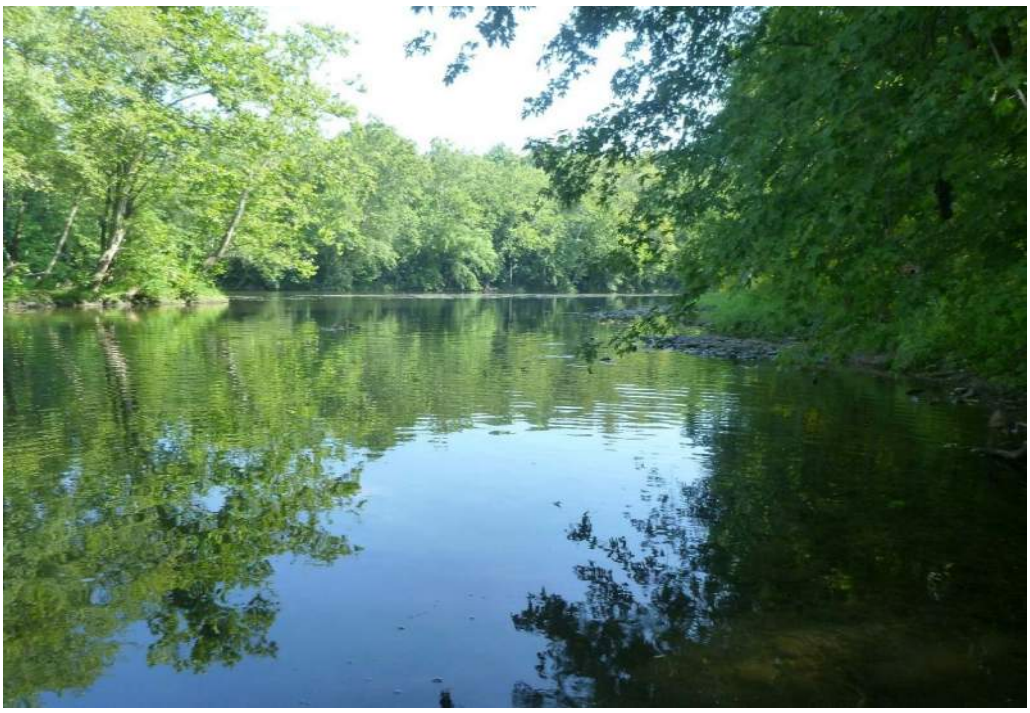
1. LOOKING UPSTREAM AT AR5

2. LOOKING UPSTREAM AT HAY CREEK

DAWOOD
ENGINEERS • PLANNERS • SURVEYORS

Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA



3. LOOKING DOWNSTREAM AT SCHUYLKILL RIVER

4. LOOKING UPSTREAM AT MB1

DAWOOD
ENGINEERS • PLANNERS • SURVEYORS

Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

5. VIEW OF MB2-SPW LOOKING SOUTHWEST

6. LOOKING UPSTREAM AT MB3

DAWOOD
ENGINEERS • PLANNERS • SURVEYORS

Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

7. LOOKING UPSTREAM AT FR1

8. LOOKING DOWNSTREAM AT MB4

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

9. LOOKING UPSTREAM AT MB5

10. LOOKING UPSTREAM AT MB6

DAWOOD
ENGINEERS • PLANNERS • SURVEYORS

Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

11. LOOKING UPSTREAM AT MB7

12. LOOKING UPSTREAM AT MB8

DAWOOD
ENGINEERS • PLANNERS • SURVEYORS

Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

13. VIEW OF WN1 LOOKING NORTH-NORTHEAST

14. LOOKING UPSTREAM AT WN2

DAWOOD
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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

15. VIEW OF ARK7 LOOKING EAST

16. VIEW OF WETLAND ARK1 LOOKING NORTHEAST

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

17. LOOKING DOWNSTREAM AT ARK2

18. LOOKING DOWNSTREAM AT ARK3

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

19. LOOKING SOUTHWEST ACROSS ARK4

20. LOOKING DOWNSTREAM AT ARK5

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

21. LOOKING DOWNSTREAM AT ARK6

22. LOOKING AT ME1/ME2 COMPLEX

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SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

23. LOOKING DOWNSTREAM AT ME2-SCHUYLKILL CONFLUENCE

24. LOOKING UPSTREAM AT ME3

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

25. VIEW OF ME1 LOOKING NORTHEAST

26. LOOKING UPSTREAM AT NA2

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

27. LOOKING UPSTREAM AT NA3

28. VIEW OF WETLAND LI1 LOOKING SOUTHWEST

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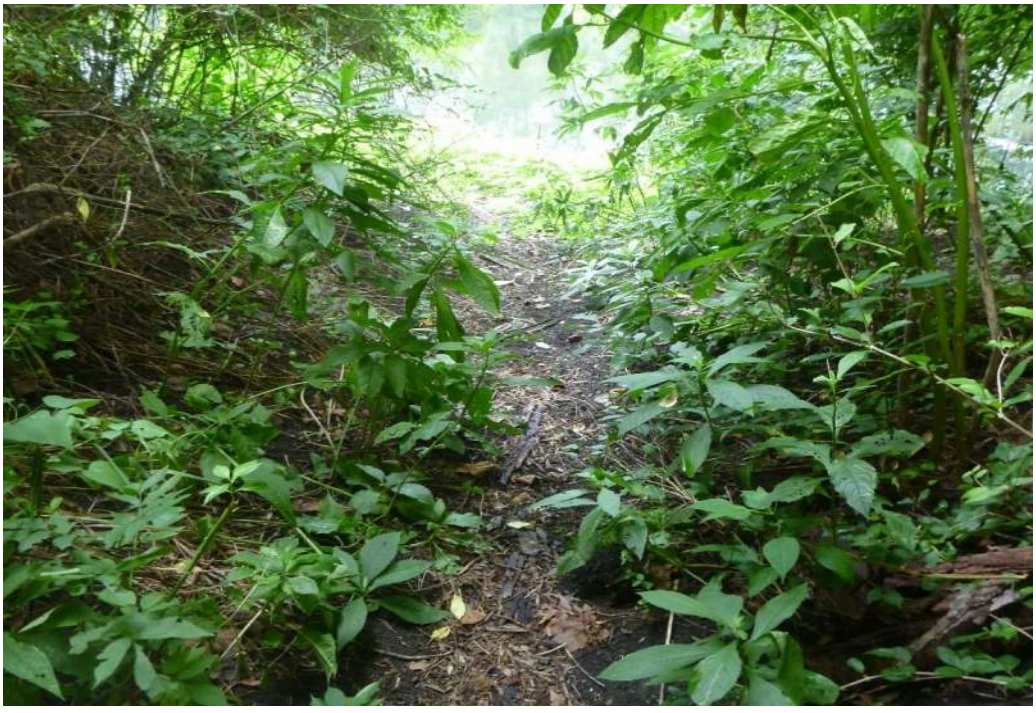
Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

29. LOOKING UPSTREAM AT EX1 (HEISTERS CREEK)



30. LOOKING DOWNSTREAM AT EX2-SCHUYLKILL CONFLUENCE

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

31. VIEW OF WETLAND EX3 LOOKING NORTH

32. VIEW OF WETLAND FI1 LOOKING EAST

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SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

33. VIEW OF PA3 LOOKING SOUTH-SOUTHWEST TOWARD RAILROAD

34. VIEW OF PA2 LOOKING SOUTH TOWARDS RAILROAD

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

35. LOOKING DOWNSTREAM AT BR1

36. VIEW OF WETLAND BR2 LOOKING NORTH-NORTHEAST

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SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

37. LOOKING UPSTREAM AT EX4

38. LOOKING UPSTREAM AT BR3

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Job No. 216040.01

SITE PHOTOGRAPHS
BIRDSBORO POWER, LLC
BOROUGH OF BIRDSBORO; ROBESON, UNION AND EXETER TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

REPORT

TO

Mr. James P. Palumbo, P.E.
Emberclear, Corp.
72 Glenmaura National Boulevard
Suite 104
Moosic, PA 18507

FOR

WETLAND DELINEATION REPORT
BIRDSBORO COMBINED CYCLE PROPERTY

Birdsboro Borough and Union Township
Berks County, Pennsylvania

Prepared By:

JAMES P. SPOSITO ASSOCIATES
ENVIRONMENTAL AND GEOLOGICAL CONSULTANTS
11 Archbald Street
Carbondale, PA 18407
Telephone: 570-282-2819
Fax: 570-282-5460

Date: March, 2016

TABLE OF CONTENTS

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Carbondale, PA, 18407

WETLAND DELINEATION REPORT
BIRDSBORO COMBINED CYCLE PROPERTY
BIRDSBORO BOROUGH AND UNION TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

1.0 INTRODUCTION

The following is a wetland delineation report prepared for the Birdsboro Combined Cycle Property. The purpose of this wetland delineation was to identify, define and map wetland areas on an approximately 100 acre site that meet the requirements and criteria set forth in the U.S. Army Corps of Engineers (USACOE) Wetland Delineation Manual, Technical Report Y-87-1 and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Figure 1).

2.0 PHYSIOGRAPHY, GEOLOGY AND TOPOGRAPHY

TOPOGRAPHY

According to the U.S.G.S. Birdsboro, Pennsylvania Topographic Map the site is at an elevation of approximately 160 feet above sea level (Figure 1). The site consists of relatively flat terrain in the flood plain of Hay Creek and the Schuylkill River that has been historically used for industrial purposes. The topography slopes north toward the Schuylkill River located immediately adjacent the site. Both Hay Creek and the Schuylkill River are classified as a Cold Water Fishery (CWF) Migratory Fishes (MF) according to Chapter 93. Groundwater flow and surface water flow are both generally expected to follow the topography to the north. The nearest traditionally navigable waterway is the Schuylkill River immediately adjacent the site.

PHYSIOGRAPHY AND GEOLOGY

Berks County comprises an area of about 866 square miles. The county is made up of physiographic provinces that consist of the Great Valley Section, Reading Prong Section, and the Gettysburg Newark Lowland Section. The county is drained by the Schuylkill River and its tributaries and is part of the Delaware River Basin.

The site is located in the Gettysburg Newark Lowland Section. This section consists of rolling lowlands, shallow valleys, and isolated hills. The geologic structure is low monoclinal northwest dipping beds with the rock types consisting of red shale, siltstone, sandstone, conglomerate, and diabase.

Bedrock underlying the site is composed of Triassic Age Diabase. Diabase consists of dark gray medium to coarse grained labradorite and various pyroxenes occurring as dikes and sheets.

3.0 SITE SOILS

The soil types throughout the site and wetland delineation area are listed by the Berks County Soil Survey as being characteristic of urban land, udorthents, Birdsboro silt loam, Lamington silt loam, and Gibraltar silt loam (Figure 2).

Urban land is level to moderately steep areas on broad uplands that are so obscured by buildings, roads and other structures that identification of the natural soil is not practical.

Udorthents consist of deep well drained to someone poorly drained soils on uplands, ridges, and side slopes in areas that have been stripped off. They are commonly near urban land. These soils can have a highly variable profile.

The Birdsboro series consists of very deep, well drained, and moderately well drained soils. The soils formed in old alluvial deposits derived from red sandstone, shale, and siltstone. They are on terraces and alluvial fans with convex slopes of 0 to 15 percent. In a typical profile the surface layer is 0 to 10 inches of dark brown (10YR 3/3) silt loam. From 10 to 19 inches is reddish brown (5YR 4/3) silty clay loam. From 19 to 28 inches is reddish brown (5YR 4/4) loam. From 28 to 39 inches is reddish brown (5YR 4/4) loam with common medium prominent yellowish brown (10YR 5/6) iron concentration and pale brown (10YR 6/3) iron depletion. From 39 to 46 inches is brown (7.5YR 4/4) sandy clay loam with many coarse prominent yellowish brown (10YR 5/6) iron concentration and light brownish gray (10YR 6/2) iron depletion. From 46 to 70 inches is reddish brown (5YR 5/4) very gravelly clay loam with common medium prominent yellowish brown (10YR 5/6) iron concentration and light brownish gray (10YR 6/2) iron depletion.

The Lamington series consists of very deep, poorly drained soils formed in old sediments derived primarily from red Triassic shale and sandstone. Slopes range from 0 to 3 percent. In a typical profile the surface layer is 0 to 8 inches of dark grayish brown (10YR 4/2) silt loam. From 8 to 11 inches is dark reddish gray (5YR 4/2) silt loam with common fine prominent red (2.5YR 4/6) masses of oxidized iron. From 11 to 17 inches is pinkish gray (5YR 7/2) silty clay loam with common fine prominent red (10R 4/6) and brown (7.5YR 5/4) masses of oxidized iron. From 17 to 32 inches is reddish gray (5YR 5/2) clay loam with few clay films on faces of peds; few prominent black (N 2/0) manganese coatings on faces of peds; common medium prominent light gray (N 7/0) iron depletion and strong brown (7.5YR 5/6) masses of oxidizes iron on faces of peds. From 32 to 46 inches is pinkish gray (5YR 6/2) cobbly loam with few distinct clay films on faces of peds; few prominent black (N 2/0) manganese coatings and concretions; many coarse prominent strong brown (7.5YR 5/6) masses of oxidized iron and reddish brown (5YR 4/3) iron manganese masses on faces of peds. From 46 to 60 inches is stratified sand and gravel.

The Gibraltar series consists of very deep, well-drained soils formed in recent alluvium derived from coal washings deposited over alluvium from reddish sandstone, siltstone and shale. They are nearly level soils on floodplains. In a typical profile the surface layer

is 0 to 4 inches of very dark gray (10YR 3/1) silt loam. From 4 to 12 inches is very dark gray (10YR 3/1) silt loam. From 12 to 24 inches is black (N 2.5/0) silt loam. From 24 to 30 inches is black (N 2.5/0) sandy loam. From 30 to 38 inches is dark brown (7.5YR 3/2) silt loam. From 38 to 62 inches is reddish brown (5YR 5/4) silt loam.

Of the soils listed above Lamington soils are listed on the Hydric Soils of Pennsylvania List.

4.0 INTERSTATE WATERWAYS AND WETLAND AREAS ON THE PROPERTY

Wetlands on the property were delineated around four palustrine emergent wetlands on the south end of the property that appear to have a drainage connection to interstate waterways (Figure 4). According to the Birdsboro Topographic Map the area on the site containing the wetlands was once part of the Schuylkill Canal that ran along the south side of the Schuylkill River. Historic topographic maps for this area show the Schuylkill Canal connecting into Hay Creek to the west, and other smaller unnamed tributaries to the east. Throughout the 1900s urban development in the Birdsboro area steadily filled in portions of the Schuylkill Canal eliminating a visible hydraulic connection to Hay Creek. Based on areas developed to the east, it appears as though some of the smaller unnamed tributaries formerly hydraulically connected to the Schuylkill Canal may also no longer have a visible hydraulic connection. The four wetland areas are identified and discussed as follows with data sheets and photographs included in Appendices B and C, respectively. Topographic, National Wetland Inventory (NWI), and Soil Survey Maps are attached in Appendix A. The NWI did not identify wetlands on the site.

Wetland Area A

This wetland encompassed wetland delineation flags 83 to 100 and was determined to be 16,311 square feet or 0.374 acres. Wetland vegetation consisted of Phragmites (Reed Grass). Data collected in the field indicated saturated and inundated hydrology and hydric soil conditions. Data sheets from the wetland community and photographs are attached.

The Berks County Soil Survey identifies soils in the area of this wetland as being characteristic of udorthents.

Upland areas surrounding the wetland consisted of herbaceous vegetation consisting of strawberry, red fescue, and violets. Soils identified in upland areas appeared consistent with udorthents soils. Data sheets from the upland community are attached.

Wetland Area B

This wetland encompassed wetland delineation flags 44 to 82 and was determined to be 49,810 square feet or 1.14 acres. Wetland vegetation consisted of watercress, smart weed, and honey locust. Data collected in the field indicated saturated and inundated

hydrology and hydric soil conditions. Data sheets from the wetland community and photographs are attached.

The Berks County Soil Survey identifies soils in the area of this wetland as being characteristic of udorthents.

Upland areas surrounding the wetland consisted of herbaceous vegetation consisting of multiflora rose, mountain maple, and honey locust. Soils identified in upland areas appeared consistent with udorthents soils. Data sheets from the upland community are attached.

Wetland Area C

This wetland encompassed wetland delineation flags 1 to 26 and was determined to be 105,961 square feet or 2.43 acres. Wetland vegetation consisted of Phragmites (reed grass), and red maple. Data collected in the field indicated saturated and inundated hydrology and hydric soil conditions. Data sheets from the wetland community and photographs are attached.

The Berks County Soil Survey identifies soils in the area of this wetland as being characteristic of Lamington silt loam.

Upland areas surrounding the wetland consisted of herbaceous vegetation consisting of multiflora rose and rough golden rod. Soils identified in upland areas appeared consistent with udorthents soils. Data sheets from the upland community are attached.

Wetland Area D

This wetland encompassed wetland delineation flags 27 to 43 and was determined to be 12,161 square feet or 0.279 acres. Wetland vegetation consisted of multiflora rose, smartweed, violet, and sedge. Data collected in the field indicated saturated and inundated hydrology and hydric soil conditions. Data sheets from the wetland community and photographs are attached.

The Berks County Soil Survey identifies soils in the area of this wetland as being characteristic of Birdsboro silt loam.

Upland areas surrounding the wetland consisted of herbaceous vegetation consisting of multiflora rose, mountain maple, sycamore, and honey locust. Soils identified in upland areas appeared consistent with udorthents soils. Data sheets from the upland community are attached.

5.0 ISOLATED WETLAND AREAS

No isolated wetland areas were observed on the site.

6.0 PNDI SEARCH

A Pennsylvania Natural Diversity Inventory (PNDI) records review was conducted to check for known impacts on special concern species and resources for the site.

Based on the project location, the PA Game Commission, the PA Fish and Boat Commission, the PA Department of Conservation and Natural Resources, and the US Fish and Wildlife Service indicated no adverse impact to protected species.

7.0 CONCLUSIONS

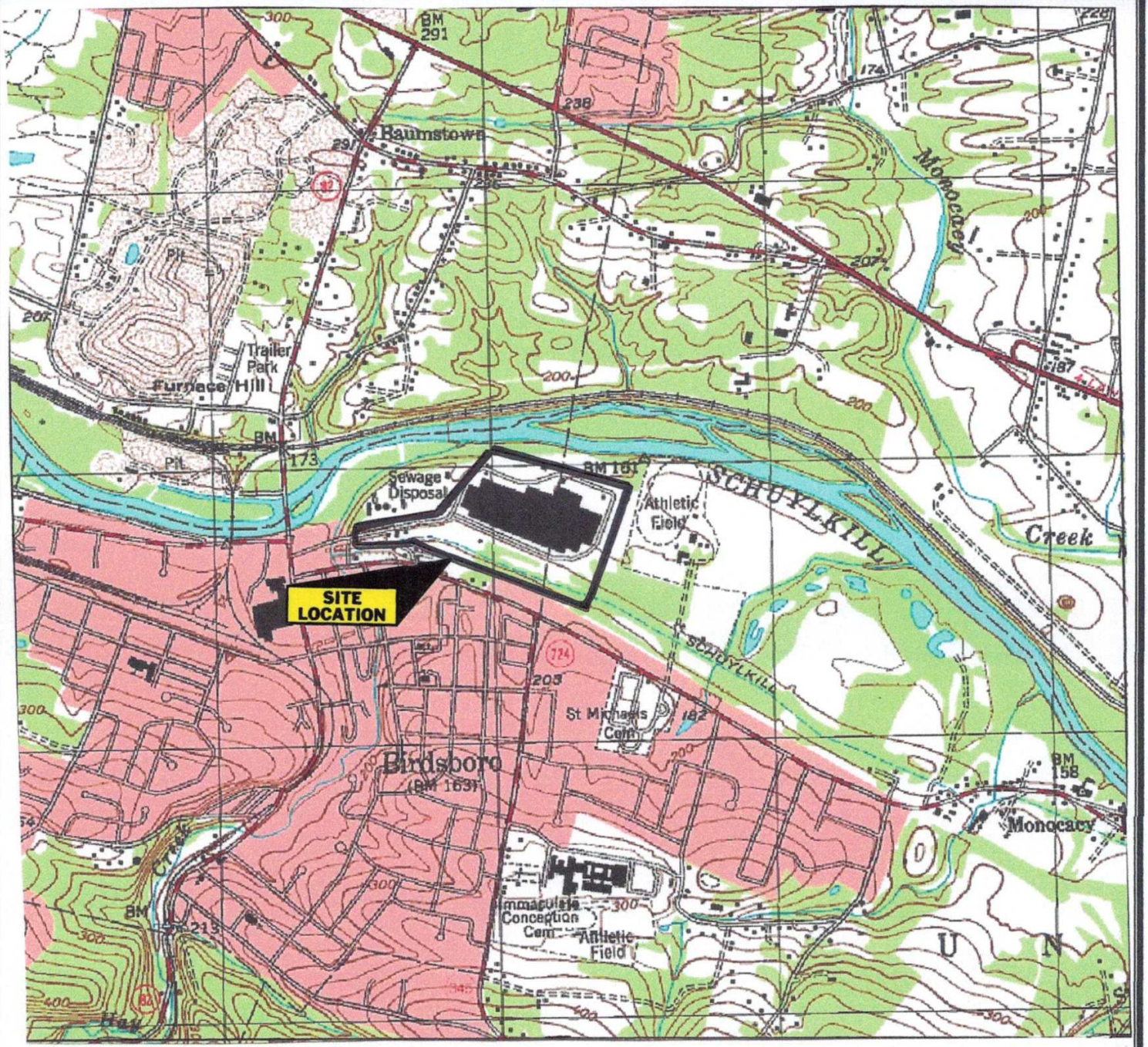
The result of this wetland delineation has identified a significant nexus of wetland areas to waters of the U.S. associated with four wetland areas. Wetland Area A encompassed wetland delineation flags 83 to 100 and was determined to be 16,311 square feet or 0.374 acres. Wetland Area B encompassed wetland delineation flags 44 to 82 and was determined to be 49,810 square feet or 1.14 acres. Wetland Area C encompassed wetland delineation flags 1 to 26 and was determined to be 105,961 square feet or 2.43 acres. Wetland Area D encompassed wetland delineation flags 27 to 43 and was determined to be 12,161 square feet or 0.279 acres. The site topography drains north toward the Schuylkill River. The Schuylkill River is classified as a Cold Water Fishery (CWF) Migratory Fishes (MF) under Chapter 93. Groundwater flow and surface water flow are both generally expected to follow the topography to the north.

Collectively, the site contains 184,243 square feet of wetlands or 4.223 acres.

A Pennsylvania Natural Diversity Inventory (PNDI) records review was conducted to check for known impacts on special concern species and resources for the site.

Based on the project location, the PA Game Commission, the PA Fish and Boat Commission, the PA Department of Conservation and Natural Resources, and the US Fish and Wildlife Service indicated no adverse impact to protected species.

APPENDIX A
FIGURES



SITE LOCATION MAP
U.S.G.S. TOPOGRAPHIC MAP
PORTION OF BIRDSBORO QUADRANGLE

N

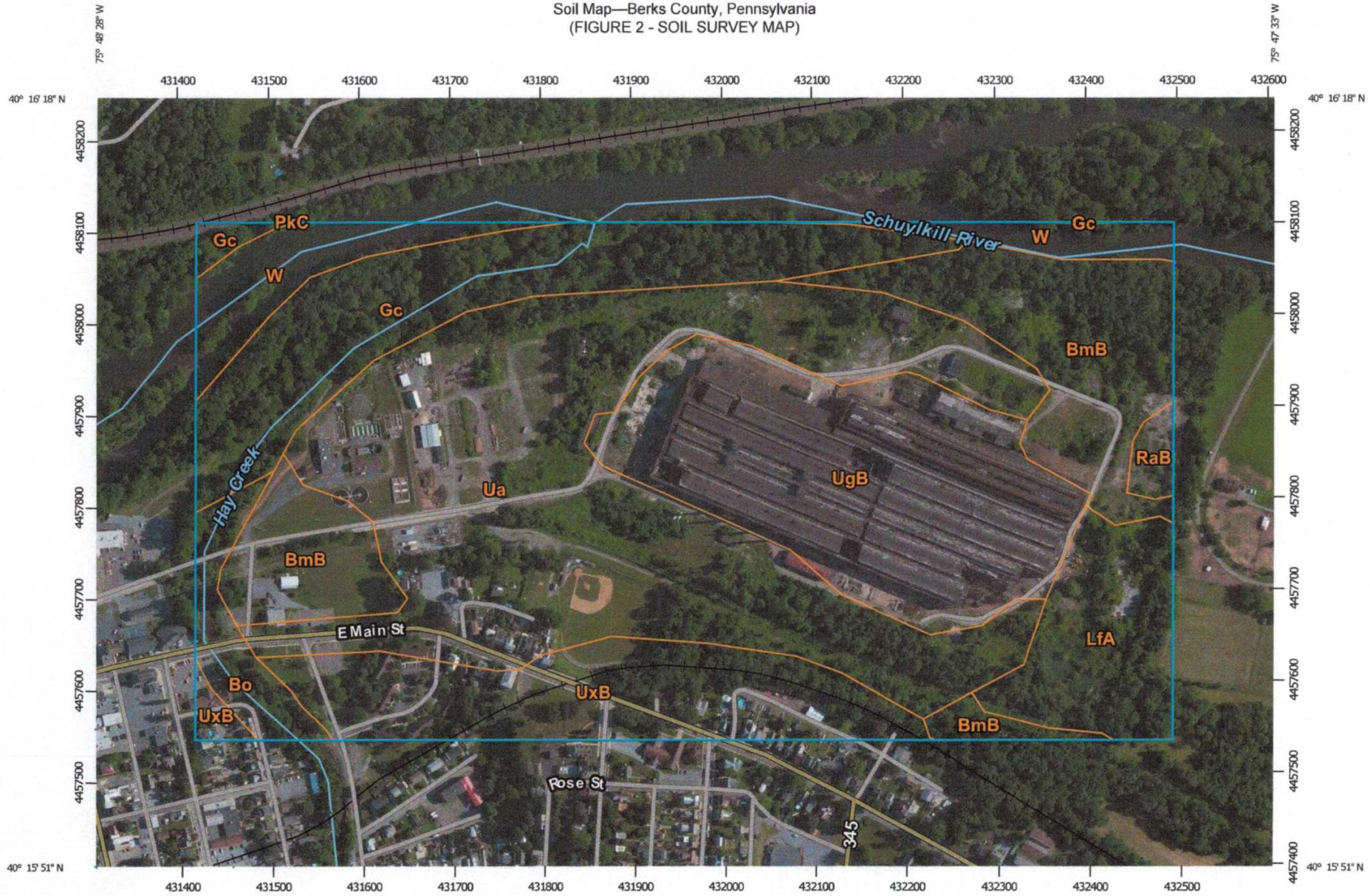
JAMES P. SPOSITO ASSOCIATES

11 ARCHBALD STREET
CARBONDALE, PA 18407

WETLAND DELINEATION REPORT
BIRDSBORO COMBINED CYCLE PROPERTY
BIRDSBORO AND UNION TOWNSHIP
BERKS COUNTY, PENNSYLVANIA

Date:	03/29/16
Drawn By:	J.S.
Scale: 1 :	24,000
Project No.	1301.01
	FIGURE 1

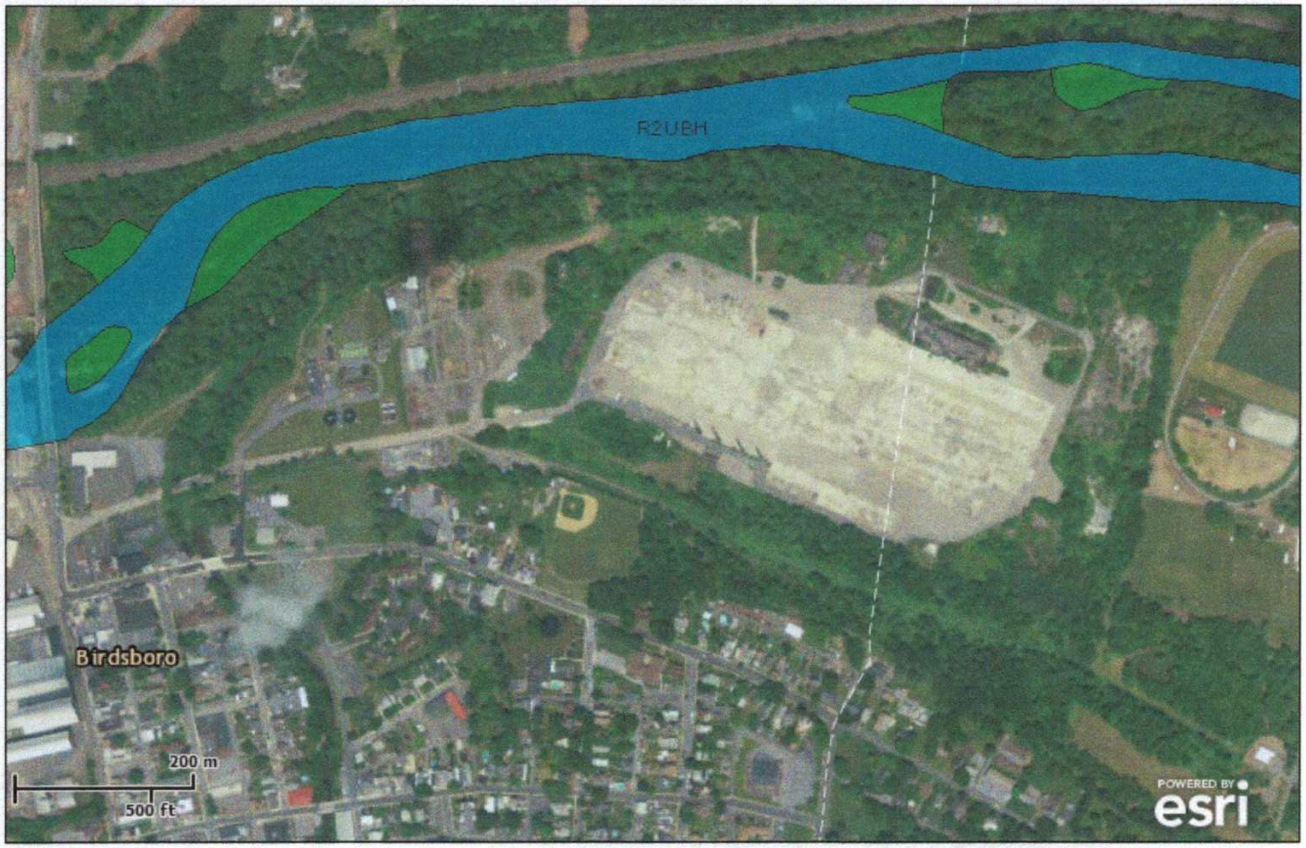
Soil Map—Berks County, Pennsylvania
(FIGURE 2 - SOIL SURVEY MAP)



U.S. Fish and Wildlife Service
National Wetlands Inventory

FIGURE 3 - NWI MAP

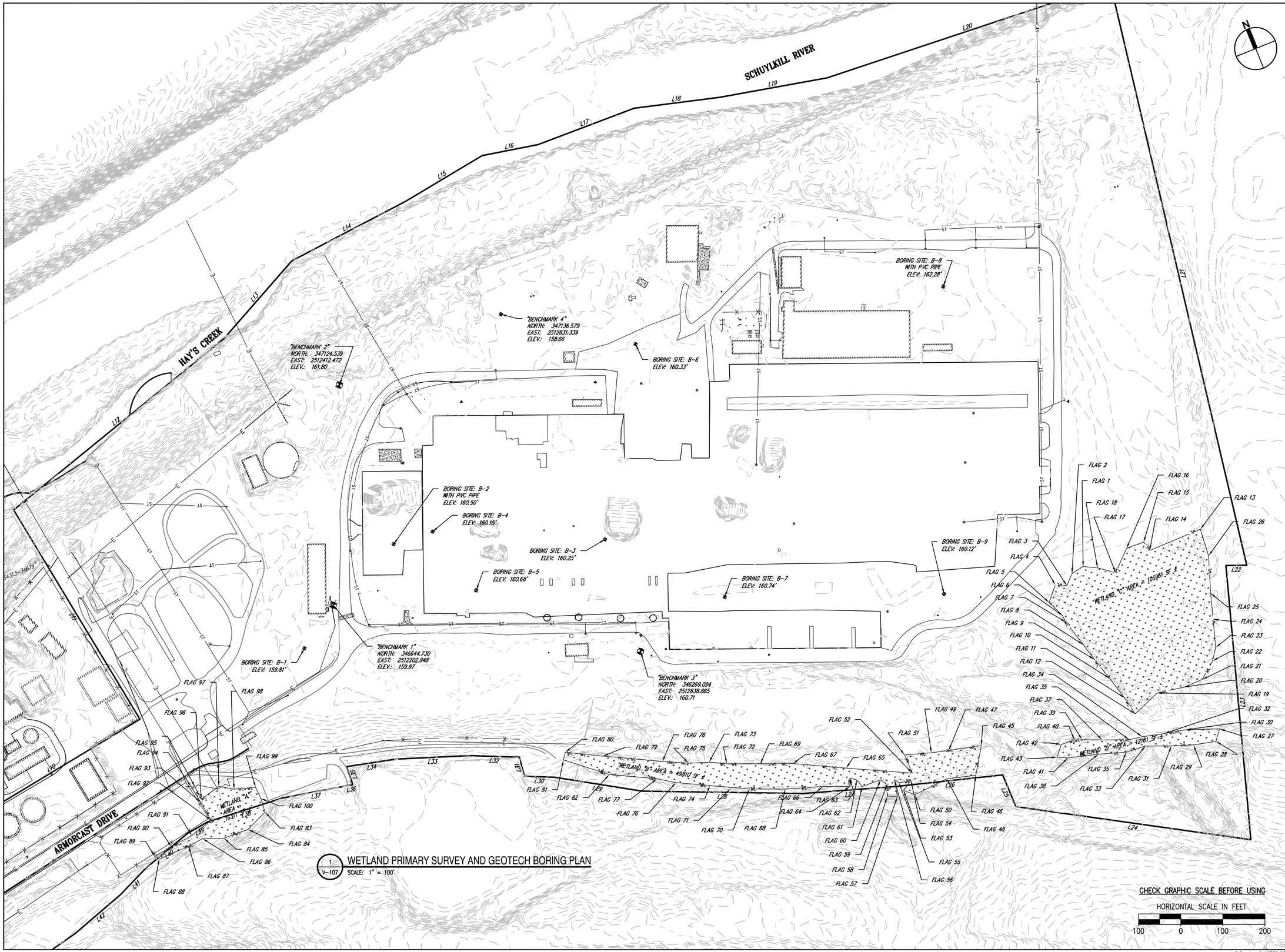
Jan 21, 2016



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

User Remarks:



1 V-107 WETLAND PRIMARY SURVEY AND GEOTECH BORING PLAN
SCALE: 1" = 100'

CHECK GRAPHIC SCALE BEFORE USING

HORIZONTAL SCALE IN FEET

100 0 100 200

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Environmental Services
37 North Washington St.
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www.quad3.com

PROPERTY AND TOPO SURVEYING SERVICES
BIRDSBORO COMBINED CYCLE PROJECT
ARMORCAST DRIVE, BIRDSBORO, PA

EMBERCLEAR
72 GLENMAURA NATIONAL BOULEVARD
SUITE 104
MOOSIC, PA 18507

NO.	DATE	REVISIONS

PROJECT MGR:	RBK	SCALE:	1"=100'
ARCH/ENG:	RBK	DATE:	01/29/16
DRAWN BY:	DAL	JOB NO:	10708.08

DRAWING TITLE:

WETLAND PRIMARY SURVEY AND GEOTECH BORING PLAN

DRAWING NO.

V-107

N:\Srvybase\10708.08 Birdsboro Boundary-Topography\DWG\10708.08_V.107.dwg

APPENDIX B
WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Combined Cycle City/County: Birdsboro/Berks Sampling Date: 1/21/16
Applicant/Owner: Emberclean, Inc State: PA Sampling Point: 9
Investigator(s): J.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 15' 58.74" Long: 75° 47' 44.53" Datum: NAD 83
Soil Map Unit Name: Lamington NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y 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 Y No _____	**Is the Sampled Area within a Wetland?** Yes Y No _____
Hydric Soil Present?	Yes Y No _____	
Wetland Hydrology Present?	Yes Y No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- Y Surface Water (A1)
- Y High Water Table (A2)
- Y 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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 Y	No _____	Depth (inches): 6
Water Table Present?	Yes Y	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes Y	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes Y No _____

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 9

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. Acer Rubrum	10	yes	FAC
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover: _____	20% of total cover: _____		
Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: _____)			
1. Phragmites Australis	90	yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	= Total Cover		
50% of total cover: _____	20% of total cover: _____		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover: _____	20% of 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:		Multiply by:	
OBL species		x 1 =	
FACW species	90	x 2 =	180
FAC species	10	x 3 =	30
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		210 (B)

Prevalence Index = B/A = 2.1

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

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

SOIL

Sampling Point: 9

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
12	10YR 7/2							SANDY GRAY

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Combined Cycle City/County: Birdsboro/Berks Sampling Date: 1/21/16
Applicant/Owner: Exhercium, Inc. State: PA Sampling Point: 9
Investigator(s): J.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Floor Plain Local relief (concave, convex, none): None Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 15' 58.74" Long: 75° 49' 44.53" Datum: NAD83
Soil Map Unit Name: UDorthents NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y 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 _____ No N	**Is the Sampled Area within a Wetland?** Yes _____ No N
Hydric Soil Present?	Yes _____ No N	
Wetland Hydrology Present?	Yes _____ No N	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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 N	Depth (inches): _____
Water Table Present?	Yes _____ No Y	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____ No Y	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No N

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 9

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

50% of total cover: ____ 20% of total cover: ____

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

50% of total cover: ____ 20% of total cover: ____

Shrub Stratum (Plot size:)			
1. ROSA MULTIFLORA	50	yes	FACU
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size:)			
1. SOLIDAGO RUGOSA	50	yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: ____ 20% of 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:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	50	x 3 =	150
FACU species	50	x 4 =	200
UPL species		x 5 =	
Column Totals:	100 (A)		350 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

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

SOIL Sampling Point: 9

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
12	10YR 3/3							GRAVELLY LOAM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Combined Cycle City/County: Birdsboro/Berks Sampling Date: 2/22/16
Applicant/Owner: Exhelon, Inc State: PA Sampling Point: 34
Investigator(s): J.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 15' 56.54" Long: 75° 47' 43.72" Datum: NAD83
Soil Map Unit Name: Birdsboro NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes no No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y 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 Y No _____	**Is the Sampled Area within a Wetland?** Yes Y No _____
Hydric Soil Present?	Yes Y No _____	
Wetland Hydrology Present?	Yes Y No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- Y Surface Water (A1)
- Y High Water Table (A2)
- Y 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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	No _____	Depth (inches): 1
Water Table Present?	Yes Y	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes Y	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes Y No _____

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 34

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Shrub Stratum (Plot size: _____)			
1. ROSA MULTIFLORA	40	yes	FACU
2. CORNUS SPP.	10	yes	FAC
3.			
4.			
5.			
6.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: _____)			
1. POLYGONUM HYDROPIPER	30	yes	OBL
2. VIOLA PAPILIONACEA	10	yes	FAC
3. CAREX SPP.	10	yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
50% of total cover: _____	20% of 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: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species		x 2 =	
FAC species	20	x 3 =	60
FACU species	40	x 4 =	160
UPL species		x 5 =	
Column Totals:	100 (A)		260 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

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

SOIL Sampling Point: 34

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
12	10YR 2/2		5YR 3/4	20		M		Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Combined Cycle City/County: Birdsboro/Berks Sampling Date: 2/22/16
Applicant/Owner: EmberClear, LLC. State: PA Sampling Point: 34
Investigator(s): J.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Flood plain Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 15' 56.54" Long: 75° 47' 43.72" Datum: NAD83
Soil Map Unit Name: UDorthents NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes Y No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y 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 _____ No N	**Is the Sampled Area within a Wetland?** Yes _____ No N
Hydric Soil Present?	Yes _____ No N	
Wetland Hydrology Present?	Yes _____ No N	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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 Y	Depth (inches): _____
Water Table Present?	Yes _____ No Y	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____ No Y	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No N

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 34

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. PLATANUS OCCIDENTALIS	20	yes	FACW-
2.			
3.			
4.			
5.			
6.			
= Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Sapling Stratum (Plot size: _____)			
1. ACER SPICATUM	10	yes	FACU-
2. GLEDITSIA TRIACANTHOS	20	yes	FAC-
3.			
4.			
5.			
6.			
= Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Shrub Stratum (Plot size: _____)			
1. ROSA MULTIFLORA	50	yes	FACU
2.			
3.			
4.			
5.			
6.			
= Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
50% of total cover: _____ 20% of 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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 20	x 2 = 40
FAC species 20	x 3 = 60
FACU species 60	x 4 = 240
UPL species _____	x 5 = _____
Column Totals: 100 (A)	340 (B)

Prevalence Index = B/A = 3.4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No 6

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

SOIL Sampling Point: 34

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
12	7.5YR 3/2							silt loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No b

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro combined cycle City/County: Birdsboro/Berks Sampling Date: 2/22/16
Applicant/Owner: Emberclean, Inc State: PA Sampling Point: 69
Investigator(s): J.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 15' 58.52" Long: 75° 47' 58.00" Datum: NAD83
Soil Map Unit Name: Urban land NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes Y No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y 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 Y No _____	**Is the Sampled Area within a Wetland?** Yes Y No _____
Hydric Soil Present?	Yes Y No _____	
Wetland Hydrology Present?	Yes Y No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- A Surface Water (A1)
- C High Water Table (A2)
- A 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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 N	No _____	Depth (inches): 3
Water Table Present?	Yes Y	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes Y	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes Y No _____

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 69

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

50% of total cover: _____ 20% of total cover: _____

Sapling Stratum (Plot size: _____)			
1. Gleditsia triacanthos	20	yes	FAC-
2.			
3.			
4.			
5.			
6.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: _____)			
1. Nasturtium officinale	40	yes	OBL
2. Polygonum hydropiper	40	yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of 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:	Multiply by:
OBL species 80	x 1 = 80
FACW species _____	x 2 = _____
FAC species 20	x 3 = 60
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 100 (A)	140 (B)

Prevalence Index = B/A = 1.4

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes X No _____

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

SOIL

Sampling Point: 69

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4	10YR 2/2							Silt Loam
12	5YR 3/3							Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes 6 No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Combined Cycle City/County: Birdsboro/Berks Sampling Date: 2/22/16
Applicant/Owner: Exhencleaver, Inc. State: PA Sampling Point: 69
Investigator(s): J.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 15' 58.52" Long: 75° 47' 55.00" Datum: NAD 83
Soil Map Unit Name: Urban land NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of 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 _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 69

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling Stratum (Plot size: _____)			
1. ACER SPICATUM	20	yes	FACU-
2. GLEDITSIA TRIACANTHOS	20	yes	FAC-
3.			
4.			
5.			
6.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Shrub Stratum (Plot size: _____)			
1. ROSA MULTIFLORA	60	yes	FACU
2.			
3.			
4.			
5.			
6.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	20	x 3 =	60
FACU species	80	x 4 =	320
UPL species		x 5 =	
Column Totals:	100 (A)		380 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No to

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

SOIL

Sampling Point: 69

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
12	7.5YR 3/2							Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No 6

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Bingham Combined Cycle City/County: Bingham/Potter Sampling Date: 2/22/16
Applicant/Owner: EmberClear, LLC State: PA Sampling Point: 99
Investigator(s): J.S. Section, Township, Range: Bingham
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 41° 46' 3.38" Long: 77° 48' 10.31" Datum: NAD83
Soil Map Unit Name: UDorthents NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes b No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes b 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 c No _____	**Is the Sampled Area within a Wetland?** Yes b No _____
Hydric Soil Present?	Yes c No _____	
Wetland Hydrology Present?	Yes c No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- A Surface Water (A1)
- B High Water Table (A2)
- C 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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 b	No _____	Depth (inches): 4
Water Table Present?	Yes b	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes b	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes b No _____

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 99

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: _____)			
1. Phragmites Australis	100	yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of 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:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		1.0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- 6 1 - Rapid Test for Hydrophytic Vegetation
- A 2 - Dominance Test is >50%
- D 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes 6 No _____

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

SOIL Sampling Point: 99

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
12	10YR 3/2							Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes 6 No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Birdsboro Combined Cycle City/County: Birdsboro/Berks Sampling Date: 2/22/16
Applicant/Owner: Energy Capital, LLC State: PA Sampling Point: 99
Investigator(s): S.S. Section, Township, Range: Birdsboro
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): None Slope (%): _____
Subregion (LRR or MLRA): _____ Lat: 40° 16' 3.38" Long: 75° 48' 10.31" Datum: NAD83
Soil Map Unit Name: Urban Land NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes 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 ____ No N	**Is the Sampled Area within a Wetland?** Yes ____ No N
Hydric Soil Present?	Yes ____ No N	
Wetland Hydrology Present?	Yes ____ No N	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ 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 N	Depth (inches): ____
Water Table Present?	Yes ____ No N	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____ No N	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No N

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 99

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Shrub Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: _____)			
1. Festuca rubra	40	yes	FACU
2. Fragaria virginiana	40	yes	FACU
3. Viola papilionacea	20	yes	FAC
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Woody Vine Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x 1 =	_____
FACW species	_____	x 2 =	_____
FAC species	20	x 3 =	60
FACU species	80	x 4 =	320
UPL species	_____	x 5 =	_____
Column Totals:	100 (A)		380 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No X

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

SOIL Sampling Point: 99

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
2-5	4/2							GRAVEL FILL

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (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)
- ___ Redox Dark Surface (F6)
- ___ 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[3]:

- ___ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

APPENDIX C
PHOTOGRAPHS

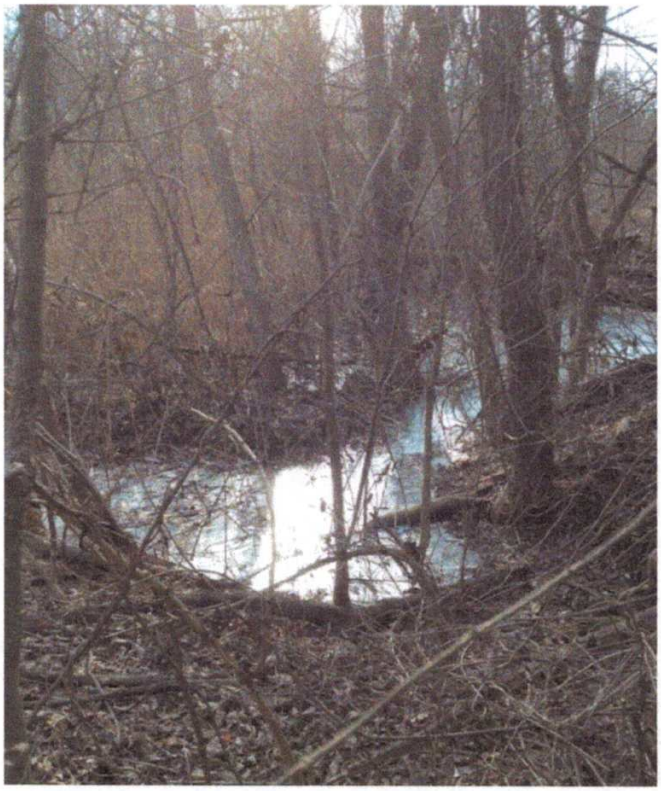

PHOTO # 1 WETLAND AREA C

PHOTO # 2 WETLAND AREA C

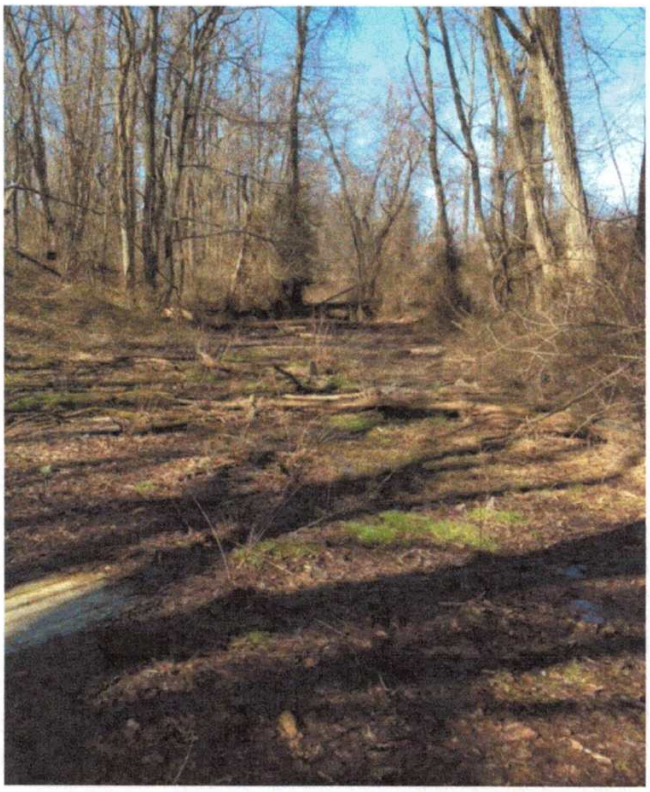

PHOTO # 3 WETLAND AREA D

PHOTO # 4 WETLAND AREA D

PHOTO # 5 WETLAND AREA B

PHOTO # 6 WETLAND AREA B

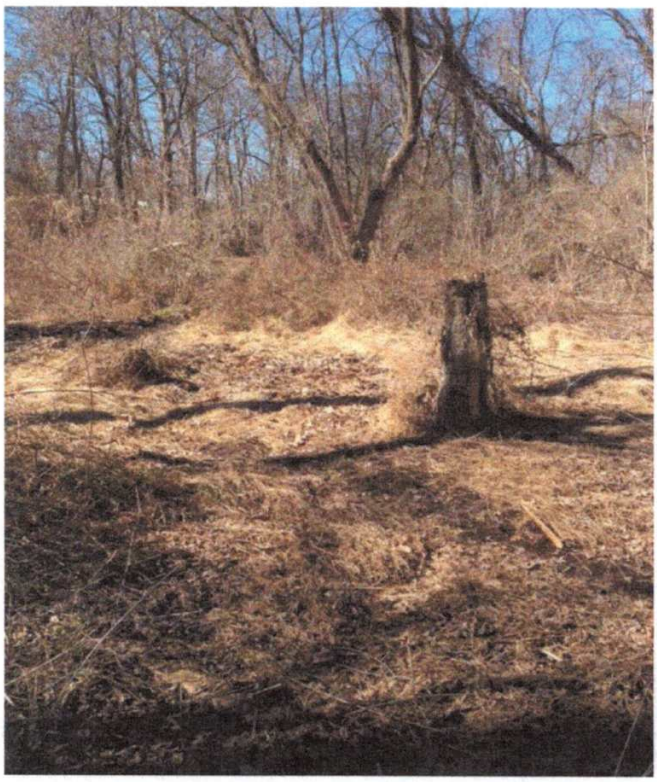

PHOTO # 7 WETLAND AREA B

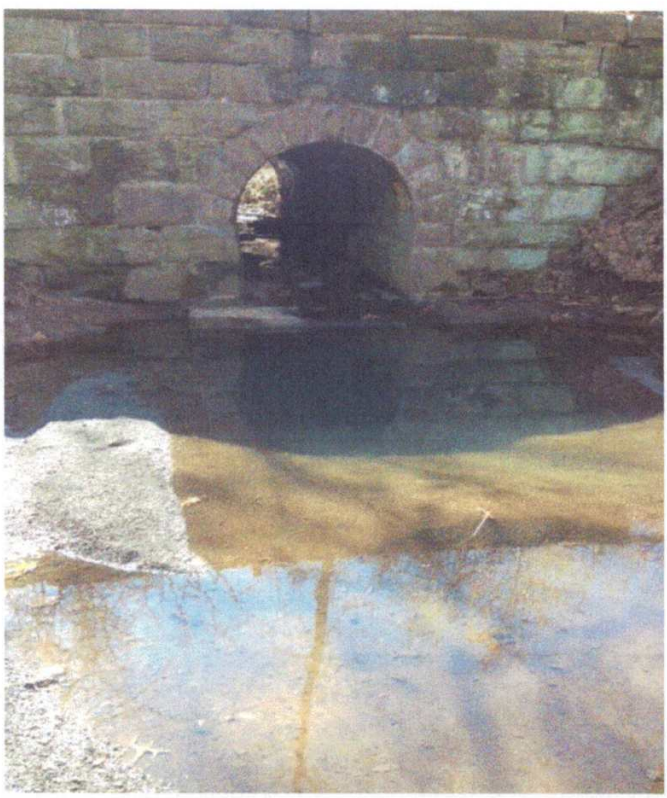

PHOTO # 8 WETLAND AREA B

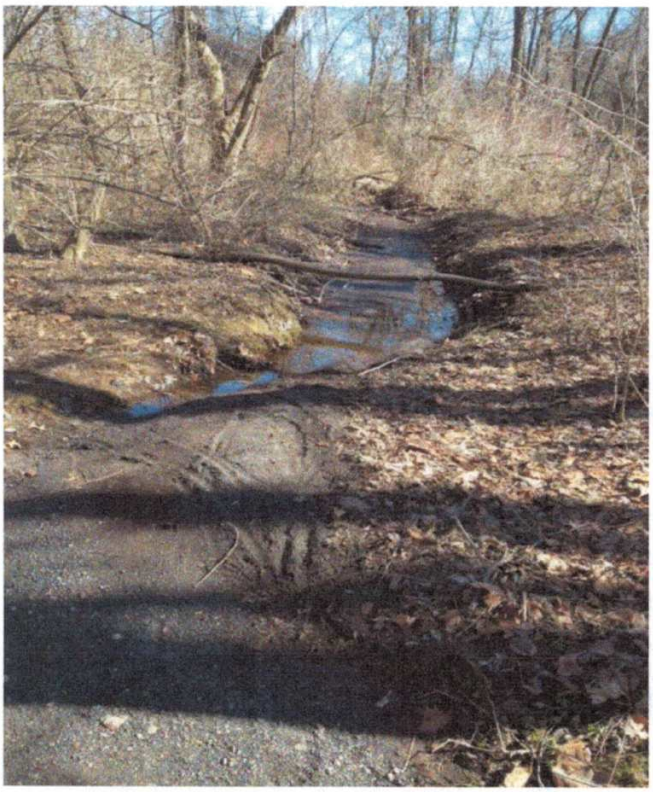

PHOTO # 9 WETLAND AREA B

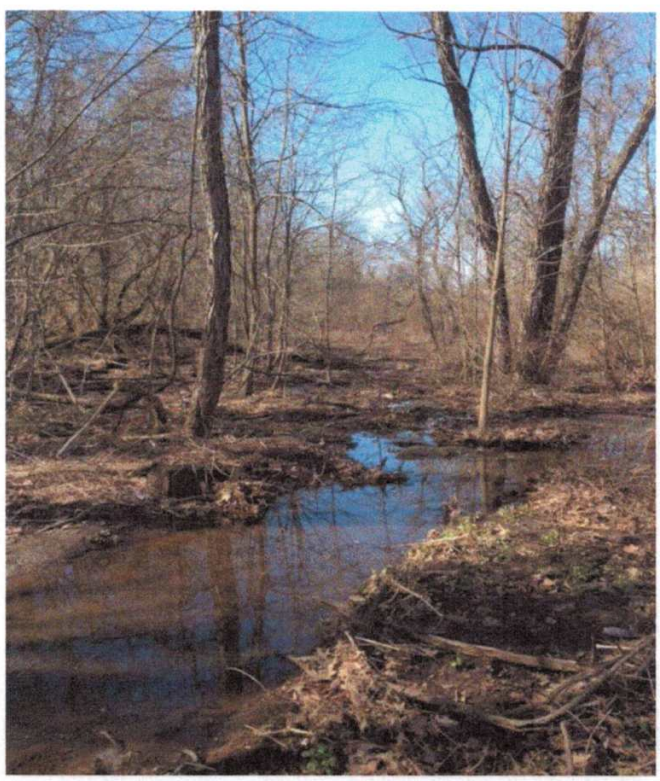

PHOTO # 10 WETLAND AREA B

PHOTO # 11 WETLAND AREA B

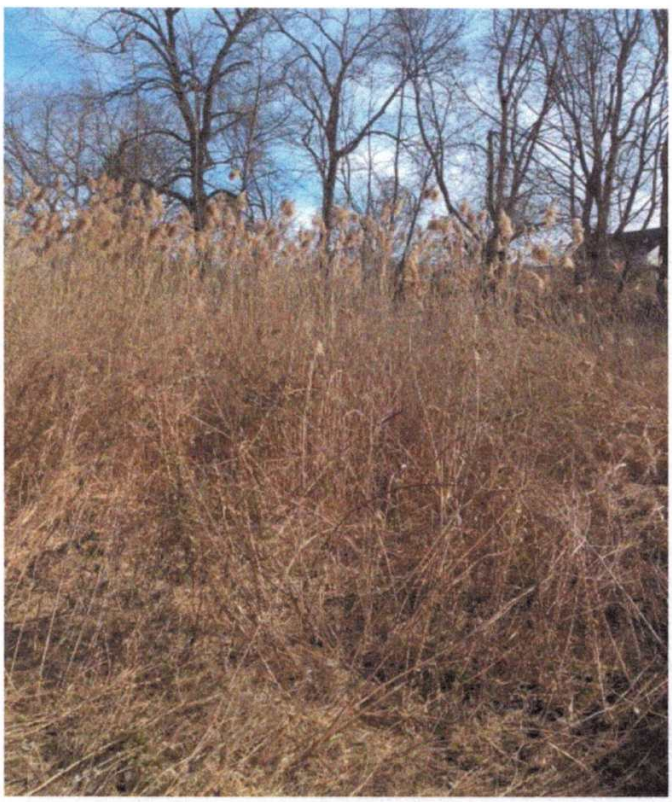

PHOTO # 12 WETLAND AREA A

PHOTO # 13 WETLAND AREA A

SCHUYLKILL RIVER

HAY'S CREEK

ARMORCAST DRIVE

"BENCHMARK 1"
NORTH: 346644.730
EAST: 2512202.948
ELEV.: 159.97

"BENCHMARK 2"
NORTH: 347124.539
EAST: 2512412.472
ELEV.: 161.80

"BENCHMARK 3"
NORTH: 346269.094
EAST: 2512838.865
ELEV.: 160.71

"BENCHMARK 4"
NORTH: 347136.579
EAST: 2512831.339
ELEV.: 158.66

BORING SITE: B-1
ELEV: 159.81'

BORING SITE: B-2
WITH PVC PIPE
ELEV: 160.50'

BORING SITE: B-3
ELEV: 160.25'

BORING SITE: B-4
ELEV: 160.15'

BORING SITE: B-5
ELEV: 160.68'

BORING SITE: B-6
ELEV: 160.33'

BORING SITE: B-7
ELEV: 160.74'

BORING SITE: B-8
WITH PVC PIPE
ELEV: 162.28'

BORING SITE: B-9
ELEV: 160.12'

"WETLAND "A" AREA = 16311 SF ±"

"WETLAND "B" AREA = 49810 SF ±"

"WETLAND "C" AREA = 105961 SF ±"

"WETLAND "D" AREA = 12161 SF ±"

1 / V-107 WETLAND PRIMARY SURVEY AND GEOTECH BORING PLAN
SCALE: 1" = 100'

CHECK GRAPHIC SCALE BEFORE USING

HORIZONTAL SCALE IN FEET

100 0 100 200

N

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BIRDSBORO COMBINED CYCLE PROJECT
ARMORCAST DRIVE, BIRDSBORO, PA

EMBERCLEAR
72 GLENMAURA NATIONAL BOULEVARD
SUITE 104
MOOSIC, PA 18507

NO.	DATE	REVISIONS

PROJECT MGR:	RBK	SCALE:	1"=100'
ARCH/ENG:	RBK	DATE:	01/29/16
DRAWN BY:	DAL	JOB NO:	10708.08

DRAWING TITLE:

WETLAND PRIMARY SURVEY AND GEOTECH BORING PLAN

DRAWING NO.

V-107

N:\Srvybase\10708.08 Birdsboro Boundary-Topography\DWG\10708.08_V.107.dwg

Enclosure B

Please see Figure 4 in the wetland report (Enclosure A)

Enclosure C - Description of Aquatic Habitat

Aquatic Characteristics were assessed primarily through observations during field investigations conducted spring/summer 2016. During field work, 11 wetlands and 26 streams were identified within the study area (see enclosure A). An additional description of aquatic resources is presented below in accordance with ecological functions identified within the PADEP Environmental Assessment Form.

A. Aquatic Habitats Including:

(1) Food Chain Production

Food chain production within streams and wetlands is a presumably simple situation. Herbaceous and woody species make up the first trophic level while insects, birds, small and large mammals comprise the second, third, and fourth trophic levels.

(2) General Habitat – Items a through h

Habitat types encountered within the study area include: A-nesting, B-spawning, C-rearing, D-resting, E-migration, F-feeding, and G-escape cover. Fish, turtles, birds, insects, small and large mammals are the likely beneficiaries of aforementioned habitat features.

(3) Habitat for Threatened and/or Endangered Species.

The proposed project was evaluated through the use of the Pennsylvania Natural Heritage Program's Pennsylvania Conservation Explorer tool. The receipt returned potential impacts under the purview of the PA Fish and Boat Commission and US Fish and Wildlife Service.

PA Fish and Boat
Eastern redbelly turtles are known to inhabit the Schuylkill River. Coordination of proposed earth disturbance activities and permanent facilities associated with the project has occurred with the PFBC. Recommendations for avoidance and conservation of the species were provided by the agency.

US Fish and Wildlife Service
Bog turtle phase I habitat studies have been conducted for all wetlands identified within the study corridor. No bog turtle habitat was identified and a report was submitted to USFWS for concurrence. USFWS determined on November 16, 2016 and again on May 15, 2017 that the project will have no impact on bog turtles.

(4) Environmental Study Area

A review of the USGS Birdsboro, PA 7.5 Minute Quadrangle map in addition to site visitation indicated that no sanctuaries and/or refuges are located within the project area.

(5) If the project proposes stream relocation, a stream enclosure, or dredging, provide a description of the macro-invertebrate community.

Not Applicable

B. Water Quantity and Stream Flow

(1) Natural Drainage Patterns

Hydrology within the study area is eventually conveyed to the Schuylkill River via Hay Creek, Heisters Creek, and numerous other tributaries. No purposefully installed dams or impoundment structures are present in the study area; however, the railroad effectively impounds a few tributaries resulting in the formation of a wetland.

(2) Flushing Characteristics

Debris and sediment buildup do not appear to be an issue in the project area as no major impediments to flow were noted. The Schuylkill River is a wide, slow-moving watercourse that apparently possesses adequate flushing capability within the channel.

(3) Current Patterns

Tributaries delineated in the project area generally flow directly into the Schuylkill River, which flows through the study area in a southeasterly direction.

(4) Groundwater Discharge for Baseflow

Groundwater discharge likely plays a minor role establishing baseflow of tributaries in the study area. Some watercourses were noted as having baseflow at the time of field investigations during an unseasonably hot and dry summer.

(5) Natural Recharge Area for Groundwater and Surface Waters

Natural recharge and groundwater discharge is a freely exchanged when weather conditions permit. Delineated wetlands in the project area likely also serve as a point of recharge for local groundwater supplies.

(6) Storm and Floodwater Storage and Control

The Schuylkill River has some capability to control moderate frequency flood events within it's top of bank. The 100-year floodplain extends beyond the top of bank over its entire length within the project area. The 100-year floodplain corridor is largely intact and relatively undeveloped.

C. Water Quality

(1) Preventing Pollution

Pollution prevention is a key function provided by the riparian buffer associated with the Schuylkill River. Some capacity to treat stormwater for traditional non-point source (NPS) pollutants like nutrients, sediment, and select heavy metals is afforded by the wide riparian buffer. The degree of pollution prevention present in the river is largely a function of water residence time, which is assumed to be relatively long given average flow velocities in the study area.

(2) Sediment Control Patterns

Sediment is a traditional NPS pollutant. Wetlands within the study area will provide some capacity to reduce sediment loads discharged to the river. Slow moving waters of the Schuylkill provide an opportunity for sediments of larger size classes to settle out of the water into the substrate.

(3) Salinity Distribution

No analysis has been conducted concerning distribution of salinity in the river. Salt load in the watercourse will be a factor of the amount of run-off generated from surrounding roadways and parking lots.

(4) Natural Water Filtration

Natural water filtration is known to occur in areas of thick vegetation and wetlands. The stream banks and floodplain corridor are heavily vegetated with a dense understory. Wetlands are not very abundant but will contribute a positive impact with regard to natural water filtration.

D. Recreation

(1) Game Species

Terrestrial game species were observed at the time of the investigation and likely reside within the study area. Evidence of turkeys and white-tailed deer was observed throughout the project area. It is also likely that rabbits, squirrels, waterfowl, and groundhogs are prevalent in the study area. Hunting opportunity within the study area is believed to be good and likely occurs during appropriate seasons.

(2) Non-game Species

Non-game species other than birds were not identified during the time of the investigation. However, ample habitat is present within the project area to support those species that thrive in the forest, forest edge, and wetlands. Skunks, snakes, and turtles are likely present throughout the project area.

(3) Fishing

Fishing from the banks and small watercraft along the Schuylkill is assumed to be popular in the project area. Additionally, Hay Creek is seasonally stocked with trout.

(4) Hiking

Trails were observed throughout the project study area. Opportunity for public access is expected to be minimal as the study area is entirely comprised of private land.

(5) Observation

The project area is located primarily within the forested riparian corridor of the Schuylkill River and the opportunity does exist for observation. Birding should be productive as long as access to private lands is granted.

(6) Other

N/A

E. Upstream and Downstream Properties

Upstream and downstream properties are primarily comprised of woodlands. Municipal holdings are abundant in the study area along with railroads and few residences. Agricultural lands are rare and concentrated at the western terminus of the proposed line.

(1) Public Water Supplies

Public water supply (PWS) wells and surface intakes were identified within 1-mile and 2-mile radius, respectively, of any permit action associated with the proposed project. Twenty-six PWS groundwater well systems were located within a 1-mile radius of all permit actions associated with the project. One surface water intake, operated by Birdsboro Municipal Authority, is present within a 2-mile radius from multiple permit actions associated with the project.

A search for wells and intakes was initiated by referencing the guidance document, “Using eMapPA to Search for Public Water Supplies,” provided by Scott Williamson, DEP Project Manager, via email on March 8, 2017. The guidance document was used to perform a search of the Pennsylvania Department of Environmental Protection’s eMapPA program to identify public water supplies with respect to permitted resource crossings. This document is attached to the end of Enclosure C for reference. Coordination with a portion of the owners and/or responsible officers of groundwater wells and surface water intakes has already been performed. Prior to construction, contact will be made with the owners/responsible officers of all identified PWS groundwater wells. A summary of coordination efforts is documented in the public water supply (PWS) Coordination Status Table located in Enclosure D, B(5)a.

An analysis on the potential for the project to impact PWS wells was discussed in Enclosure D, B(5)a.

(2) Private Water Supplies

Private water supplies are present along the project corridor. Using publicly available information, properties within 450' of project permit actions were examined for their potential to utilize private water supplies.

eMapPA's Public Water Supply Service Area layer was utilized to determine which properties along the project corridor are likely serviced by a public water supply. Any properties located within 450' of a project permit action and not located within eMapPA's Public Water Supply Service Area were considered likely to rely on private water supplies. Coordination with Robeson Township revealed there is no municipal water available to residents so all residential parcels within 450' of a permit action within Robeson Township are assumed to be on private well water. A list of properties potentially containing private water supplies is included in Enclosure D, B(5)a, Table 3.

Addtionally, DCNR's PAGWIS database was searched for springs located in Birdsboro Borough and Union, Exeter, and Robeson Township. None of the listed springs were located within 450' of the project limit of disturbance. A review of the PAGWIS database for groundwater wells for each municipality revealed that a few of the properties contained within Enclosure D, B(5)a, Table 3 have documented private groundwater wells.

F. Other Environmental Factors determined by Site Investigation.

The Schuylkill River has a TMDL in place for PCBs. Fish are believed to be impacted and eating fish caught from the river is not recommended.

Using eMapPA to Search for Public Water Supplies

Access eMapPA: http://www.depgis.state.pa.us/emappa/

Below are instructions for using the buffer tool to buffer a point to search for public water supplies. For public water supplies, the feature layers are listed as "**Groundwater Wells**" and "**Surface Water Intakes.**" For security reasons, the location of public water supply features will not be displayed on the public map; however, the contact information for the responsible official for the public water supply within the buffered area will be displayed. Typically the default Zone II Well Head Protection Area is a 0.5-mile radius. A 2-mile radius is recommended for surface water intakes.

1. Find the location of interest by zooming into the map using the mouse scroll wheel or the zoom in/out tools in emap.

   Zoom in/out tools

2. In the left panel select the "Tasks" tab.

3. Select the "Buffer Sensitive Layer (Data Only)" option.

4. Select the "Point" radio button.

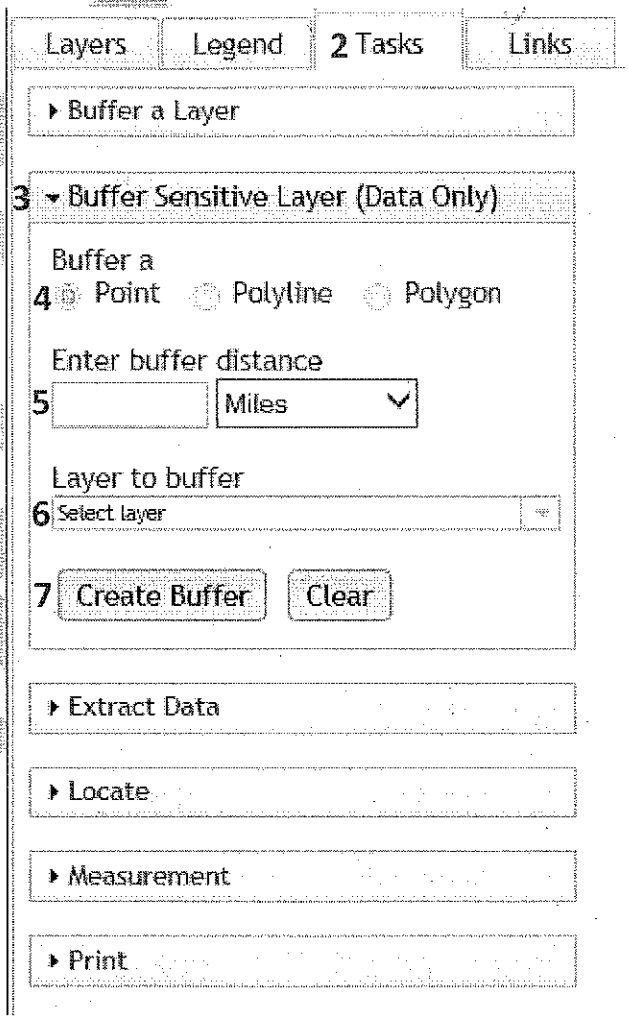
5. Enter desired buffer distance in miles (must be ≥ 0.5 miles).

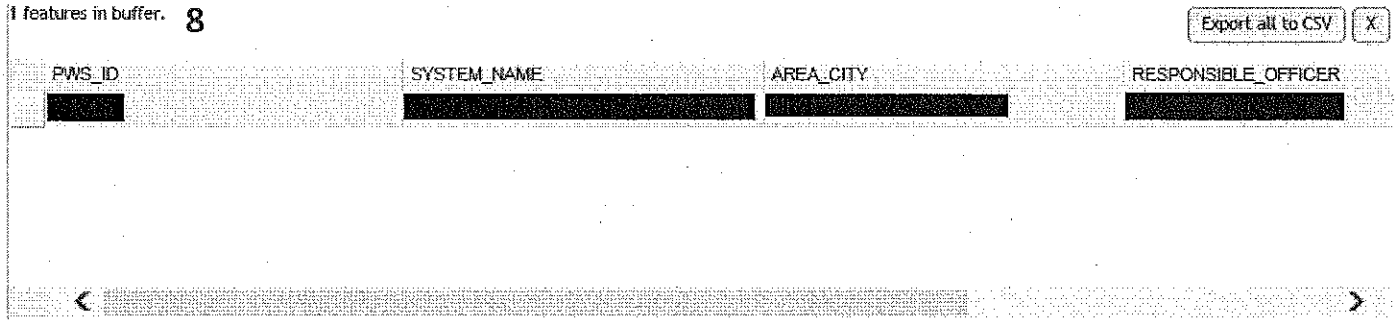
6. In the "Layer to buffer" dropdown menu, select "Groundwater Wells" or "Surface Water Intakes."

7. Click Create Buffer then click a point on the map to crate the buffer.

8. The buffered area will be shaded red on the map and a window will appear at the bottom of the map containing information for any public water supplies in the buffered area. Information includes: PWS ID, System Name, City, Responsible Officer, and a contact phone number.

   If additional information is required (e.g. is a project located upstream or downstream of surface water intake?) please contact the responsible official to discuss specifics.





Enclosure D - Project Impacts

A. Discuss Impacts on:

(1) National, State or Local Park, Forest or Recreation Area

In the Project area, the Schuylkill River is designated as a modified recreational waterway under the Pennsylvania Scenic Rivers Act. In a letter dated October 16, 2017 from the PA DCNR Scenic River program, the agency determined that cumulative impacts from the project on the Schuylkill Scenic River are limited to visual impacts to the scenic nature of the river. PA DCNR requested mitigation actions to be integrated into the project to further protect river values. The mitigation actions include: complete the portion of the project within the scenic river corridor in late fall or early spring when recreation use of the river is minimal, post appropriate safety signage on the Schuylkill River to notify waterway users that they are entering a construction area once construction is underway, minimize the ROW width in riparian zones as much as possible by crossing the river at a perpendicular angle, hand clearing as little vegetation as possible, and incorporate native vegetation in any disturbed areas to maintain the natural character and scenic qualities of the waterway. All mitigation measures will be incorporated to the extent practicable. Please refer to Requirement U of the application package for a complete record of correspondence concerning the PA Scenic Rivers Act.

The river has also been designated as a water trail by the PA Fish and Boat Commission. No construction will occur within the river and the proposed project will not impact water based recreation activities, fish, or other aquatic life. Approximately 10 acres of riparian forest will be cleared and maintained to allow operation of the electric transmission line. A contiguous forested buffer will remain between the Schuylkill River and the edge of the ROW over the entirety of the line except for the river crossings. The remaining riparian buffer will be a minimum of 90’ wide and exceeds 200’ at numerous locations.

(9) Areas Identified as Prime farmland

Overall, the project area contains approximately 27.4 acres of prime farmland soils. The ring bus station construction is the only proposed activity that will directly impact prime farmland. The facility will occupy approximately 2.25 acres of prime farmland soils, of which approximately 1.6 acres are actively farmed. Therefore, approximately 6% of the total prime farmland soils within the proposed project limit of disturbance will be converted to a non-agricultural use. Please refer to the Site Plan located in Requirement H. for a representation of prime farmland mapped soils in relation to project facilities.

Alternative siting of the facility was considered and determined infeasible for a variety of reasons. Adjacent parcels were not available for purchase or easement. Other suitable tie-in locations would require adding at least 0.7 miles to the route, which would result in additional surficial disturbance. Adjacent locations evaluated where a tie-in was potentially feasible are either located within the regulatory floodway or are residential parcels near housing. Based on these constraints, the proposed location was considered the best practicable option.

B. Discuss the Environmental Impacts on:

(1) Aquatic Habitats Including:

a. Food Chain Production

Food chain production within the site is not expected to be altered as a result of the proposed project. Trophic levels and species involved will persist unaffected.

b. General Habitat – Items (1) through (8)

There are no anticipated significant impacts to nesting, rearing, resting, feeding, and escape cover habitat throughout the project area where clearing of the right-of-way occurs. Species currently using the project study area are expected to remain abundant with no measurable decline.

c. Habitat for Threatened and/or Endangered Species.

No significant impacts to threatened and endangered species are anticipated as a result of the proposed project. Project clearance letters have been ascertained from the PA Fish and Boat Commission and US Fish and Wildlife Service concerning the project.

d. Environmental Study Area

No sanctuaries and/or refugees are located within the project area.

(2) Water Quantity and Stream Flow

The ROW was reduced to widths of 50’ to 60’ within the boundary of the Schuylkill River floodway to minimize permanent floodway impacts, while providing the necessary area needed to complete construction activities and perform maintenance activities in the future. These impacts will not increase the flood risk in the vicinity of the project nor degrade water quality. Once construction activities are complete within the ROW, small trees and shrubs may be permitted to re-establish the area.

No significant impacts to water quantity and streamflow characteristics (a-f) are anticipated.

(3) Water Quality

No significant impacts to water quality (a-d) are anticipated. Riparian buffers will be left intact over the majority of the project area and hand clearing of trees will be required in and around tributaries to protect the low understory species and herbaceous layer. Mechanized clearing and grubbing will not be permitted within 50 feet of any stream top of bank. The proposed project will not degrade local or regional water quality. Stormwater outfall discharges at the power plant will be within established water quality limits. Waste water produced at the site will go to

the Birdsboro Treatment plant prior to discharge into Waters of the Commonwealth. A discussion of the project's consistency with the State antidegradation requirements (25 Pa. Code §105.14(b)(11) is provided below.

(4) Recreation

a. Game Species

Permanent impacts leading to a reduction in usage of the project area by game species are not anticipated. Deer and turkey thrive along utility rights of way.

b. Non-game Species

Permanent impacts leading to a reduction in usage of the project area by non-game species are not anticipated. Species using the area are likely already adapted to the forest edge since the project area is developed beyond the Schuylkill corridor. The area within and adjacent to the project already contains multiple other utility lines and other development, and therefore is already fragmented.

c. Fishing

No degradation to fishing is anticipated as a result of the proposed project since in-stream activities are not proposed. Access to bank side fishing spots will not be inhibited by permanent project related facilities. Additionally, there will be no impedances introduced into the watercourse that would limit angling activities from small watercraft.

d. Hiking

Existing trails may become clearer and compacted as inspection vehicles traverse the ROW periodically over the life of the line.

e. Observation

The opportunity for observation of wildlife may be increased through clearing of the right-of-way. Common game animals will be easier to spot along these areas where visibility has been increased.

f. Other

N/A

(5) Upstream and Downstream Properties

Impacts to upstream and downstream properties will be limited to the viewshed and are considered de minimus. The right-of-way and electric line will be visible to some limited stakeholders. The existing viewshed in the area is already comprised of existing overhead electric lines and a railroad.

a. Water Wells

No impacts to public and private water supply wells are anticipated as a result of construction activities associated with the project. The following activities have

the limited potential to affect water wells within 450 feet of electric line construction.

Trenching for the installation of Duct Bank: Electric line encased in concrete duct bank will be trenched approximately five feet below the ground's surface at select locations. Because this activity is within the soil horizon, it is not expected to impact groundwater resources. This activity is also limited in areal extent and bedrock is not expected to be encountered.

Manholes: There are a total of three manholes that are proposed to be constructed with the Transmission Line. The manholes will be constructed to allow access to the transmission line splice joints, repairs, and other work. These will be located along the underground portion of the Transmission Line. Manholes will extend below the trench depth by up to four feet and are not expected to encounter bedrock or the water table. These activities are extremely localized and not expected to impact groundwater quality.

Electric Utility Poles: A total of 31 electric transmission monopoles will be placed along the above ground alignment and connect to the combined cycle power generation facility. The poles will be drilled approximately 25 to 45 feet below ground surface. The installation of these poles is likely to encounter groundwater and may cause a short-term increase in turbidity in the immediate vicinity of the borings.

The subject area is located within the Piedmont Physiographic Province of Pennsylvania that is part of a large sedimentary basin. The underlying bedrock is composed of sedimentary rocks of the Triassic Age. No areas of exposed bedrock are reported from the subject area with its entirety overlain by soils.

The Brunswick Formation is mapped as underlying the transmission corridor. This formation consists predominantly of fine grained reddish-brown shale, mudstone, and siltstone that is interbedded with sandstone. The primary porosity and permeability of the formation is low. Groundwater primarily occurs within secondary porosity caused by joints and bedding planes. The groundwater in the corridor is expected to flow toward the Schuylkill River. Industrial pumping wells impact the flow direction locally. The small withdrawal rates associated with residential wells are not expected to have a significant impact on groundwater flow direction.

A total of seven wells are listed on the Pennsylvania Ground Water Information System (PAGWIS) as identified within 450 feet of the transmission line. Based on coordination with Robeson Township, municipal water is not available, so it is assumed that all Robeson residents rely on private water wells. PAGWIS listed residential private wells located along the transmission line corridor vary in depth from less than 30 feet to more than 200 feet with an average soil depth of 25 feet. Proposed construction activities within the soil zone are not expected to impact groundwater wells due to the low permeability cohesive soils that are mapped in the area. Thirty-four total parcels were identified within 450 feet of a proposed permit action associated with the project. Only wells within 450 feet of a monopole installation location and not separated from the work area by the Schuylkill River were considered for evaluation of potential impacts.

Residential wells in the region are reported to be between 97 and 300 feet deep with reported well yields up to 30 gpm.

The Arkema facility, located north of the Schuylkill River has large capacity industrial wells, which are expected to influence groundwater flow direction. These wells are located in the Arkema industrial facility and are between 312 and 353 feet deep with reported yields in excess of 201 gallons per minute (gpm).

Most construction activities are not expected to encounter groundwater. However, drilling up to 45 feet during caisson installation will be completed for the monopoles. These activities may encounter groundwater and may cause short term increases in turbidity in close proximity to the activities. Only extremely localized turbidity impacts, if any, are anticipated due to the low porosity of the Brunswick formation. Although, no impact to public and private water supply wells are anticipated as a result of construction activities, the Applicant suggests that the potable well owners be notified when drilling activities are occurring so owners can report any increased turbidity noted during this period.

Coordination with responsible officers/owners of public water supply wells and surface intakes has been conducted (Table 1 below). Tables 2 and 3 respectively provide a listing of additional public water supplies and potential private well owners located within 450 feet of a proposed permit action associated with the project. The Applicant will coordinate with these public water supplies prior to initiation of construction activities within DEP jurisdictional areas. The eight private parcel owners located within 450 feet of a monopole installation and not buffered from potential impacts by the Schuylkill River are denoted as planned for coordination in Table 3.

Table 1. PWS Coordination Status Table

PWS_ID	SYSTEM_NAME	AREA_CITY	RESPONSIBLE_OFFICIER	Phone #	ID	Coordination Sent (Date Sent - Method of Delivery)	Final Response Date
Groundwater Wells within 1.0-mile							
3060461	ST JOHNS UNITED CH OF CHRIST	ROBESON TWP		(610)582-8508	50239	Yes (3/21/2017 hardcopy)	n/a
3060477	SOUTHEND GUN CLUB INC	EXETER TWP	JOEL FRANCO, HEAD TRUSTEE	(610)582-4289	50246	Yes (3/21/2017 hardcopy)	n/a
3061211	ROBESON TOWNSHIP CONCESSION	ROBESON TWP	COLEEN EASTERDAY, MANAGER	(610)582-4636	50645	Yes (3/16/2017 email)	3/17/2017
3060899	GIBRALTAR PLAYGROUND	ROBESON TWP	ROBESON TOWNSHIP				
3060536	FORK AND ALE	UNION TWP	GARY FRY	(610)953-3213	50282	Yes (3/20/2017 email)	3/22/2017
3060061	KEYSTONE EAST MHP	EXETER TWP	MIKE BOISSON	(610)582-8738	50002	Yes (3/21/2017 hardcopy)	4/13/2017
3061056	ISLAND PIZZA	AMITY TWP	WILLIAM VANNEMAN	(610)404-7800	50522	Yes (3/13/2017 - email and 3/14/2017 hardcopy)	n/a
3061158	AYDIN DISPLAYS INC	AMITY TWP	ART MENGEL	(610)404-7400	50600	Yes (3/21/2017 hardcopy, 4/5/2017 and 4/11/2017 emails)	n/a
3061221	UNION MEADOWS PARK	UNION TOWNSHIP	MICHEAL MONTONDO, AUTH CHAIR	(610)385-3769	50650	Yes (3/13/2017 email)	3/15/2017
Surface Water Intakes within 2.0-miles							
3060010	BIRDSBORO MUNI WATER AUTH	BIRDSBORO BORO	AARON J. DURSO, MANAGER	(610)582-6030	2693	Yes (4/21/2017)	4/24/2017

Table 2. Additional PWS Groundwater Wells

PWS_ID	SYSTEM_NAME	AREA_CITY	RESPONSIBLE_OFFICIER	PHONE	ID
3060649	ALLURA CORP	EXETER TWP	JODY WENRICH	(610)582-8761	96478
3060570	ANGUS PUB	EXETER TWP		(610)582-5132	96463
3060678	ARKEMA INC	EXETER TWP	WILLIAM SMITH	(610)582-1551	Multiple
3060091	AVW INC	EXETER TWP	DONALD PEIFER, PRESIDENT	(610)582-2410	Multiple
3060611	BERKS POULTRY	EXETER TWP	CARL MILLWARD	(610)582-2726	Multiple
3060468	BLUE COAT INN			(610)582-1033	96453
3060009	EDDIE SMITH TRAILER TERRACE	EXETER TWP	EDDIE SMITH	(610)582-3940	Multiple
3060463	EXETER BIBLE CH	EXETER TWP	DAVE KLINE OR JIM SMITH	(610)582-4191	82503
3060897	HAHN CONSTRUCTION			(610)582-8785	96528
3061121	HILLCREST HALL	ROBESON TWP	NICHOLAS PHILLIPS	(610)582-5672	82904
3061214	PAGODA MOTORCYCLE CLUB	EXETER TWP	PETE RADER, TRUSTEE	(484)529-1870	83010
3060855	SENSIENT TECHNICAL COLORS	ROBESON TWP	JIM AMMEND	(610)582-8765	82709
3061031	SOUTHERN ROCK CAFE	EXETER TWP	RICH MOYER	(610)404-1965	96564
3060853	SUNNY SPOT GRILL		FAE I. ZELONIS	(610)582-3687	96506
3060480	SUNSET FAMILY RESTAURANT	EXETER TWP	WARDEH HOUIR	(610)582-1574	82512
3060929	VALLEY FORGE FLAG CO.	EXGTGR TOWNSHIP	MS MARY O'BOYLE PLANT MANAGER	(610)582-4239	96542
3060911	VFW POST 411	ROSESON TWP	ATTN COMMANDER	(610)582-4848	96534

Note: No additional PWS surface water intakes were identified within 2 miles of a permit action.

Table 3. Potential Private Groundwater Wells within 450’ of Project Permit Actions

PROPID	OWNER NAME	PARCEL LOCATION ADDRESS	MUNI	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP	Coordination Planned
43533406398756	EXETER TWP AUTH	400 HANOVER ST	EXETER	R D 3 FAIRLANE & DEMOSS ROADS	READING	PA	19606	Yes
43533518206080	FICK SCOTT F & STACEY E	211 DENNIS DR	EXETER	211 DENNIS DR	READING	PA	19606	Yes
43534405189169	M B INVESTMENTS	S CENTER RD	EXETER	2650 AUDUBON RD	AUDUBON	PA	19403	Yes
73532402982466	PLOW LAND AND TREE LLC	100 OLD RIVER RD	ROBESON	4339 MORGANTOWN RD	MOHNTON	PA	19540	Yes
73532402990678	WU CHIALIN	164 OLD RIVER RD	ROBESON	164 OLD RIVER RD	BIRDSBORO	PA	19508	No
73532402899791	BRUNK MATTHEW T & CRYSTAL L	174 OLD RIVER RD	ROBESON	174 OLD RIVER RD	BIRDSBORO	PA	19508	No
73532402991479	PIENTA MICHAEL	15 ROBESONON LAWN RD	ROBESON	68 BITTING RD	ALBURTIS	PA	18011	No
73532402991674	CONRAD BRIAN ASHLEY	OLD RIVER RD	ROBESON	1750 COTTON ST	READING	PA	19606	No
73532402992314	YOCOM DUSTIN A & KRAMMES MELISSA S	35 ROBESONON LAWN RD	ROBESON	35 ROBESONON LAWN RD	BIRDSBORO	PA	19508	No
73532402992652	SCHULER GLENN A & PAMELA A	154 OLD RIVER RD	ROBESON	154 OLD RIVER RD	BIRDSBORO	PA	19508	No
73532402993520	MILLARD DONALD S JR	OLD RIVER RD	ROBESON	115 GREEN RD	FORT HILL	PA	15540	No
73532402994407	MILLARD DONALD S JR	138 OLD RIVER RD	ROBESON	115 GREEN RD	FORT HILL	PA	15540	No
73532519711776	READINGER MICHAEL L	53 BOONETOWN RD	ROBESON	53 BOONETOWN RD	BIRDSBORO	PA	19508	No
73533405094037	KOHL STEPHEN E & HEATHER M	46 OLD RIVER RD	ROBESON	46 OLD RIVER RD	BIRDSBORO	PA	19508	Yes
73533405184989	SCHURR JENNIFER A	1921 MAIN ST	ROBESON	1921 MAIN ST	BIRDSBORO	PA	19508	Yes
73533405189905	CHERNESKY JOHN R	979 SCHUYLKILL RD	ROBESON	PO BOX 521 980 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533405190541	RAPAK PAUL E	1045 SCHUYLKILL RD	ROBESON	1045 SCHUYLKILL RD	BIRDSBORO	PA	19508	Yes
73533405191430	MORGANDALE MICHAEL S & LINDA C	1031 SCHUYLKILL RD	ROBESON	1031 SCHUYLKILL RD	BIRDSBORO	PA	19508	Yes
73533405197117	NANNEN PHILIP J & LAURA H	989 SCHUYLKILL RD	ROBESON	989 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533405199186	CHERNESKY JOHN R	980 SCHUYLKILL RD	ROBESON	PO BOX 521 980 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533405280925	CASCIANO BARRY M & FAITH L	968A SCHUYLKILL RD	ROBESON	968 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533405280992	CASCIANO BARRY M & FAITH L	968 SCHUYLKILL RD	ROBESON	968 SCHUYLKILL RD	BIRDSBORO	PA	19508	No

Table 3. Potential Private Groundwater Wells within 450’ of Project Permit Actions (continued)

PROPID	OWNER NAME	PARCEL LOCATION ADDRESS	MUNI	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP	Coordination Planned
73533405282809	CASCIANO BARRY M & FAITH L	952 SCHUYLKILL RD	ROBESON	968 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533405283813	ASPLEN RALPH W	938 SCHUYLKILL RD	ROBESON	222 VERNON RD	MORRISVILLE	PA	19067	No
73533405283853	YOHN MICHAEL A	944 SCHUYLKILL RD	ROBESON	944 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533405284788	AMENU MILLION	934 SCHUYLKILL RD	ROBESON	934 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533406286717	MAMMARELLA STEPHEN C & MARCIE L	920 SCHUYLKILL RD	ROBESON	920 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533406288667	WEINHOLD RODNEY LEE/MARJORIE E	890 SCHUYLKILL RD	ROBESON	890 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533406381745	GINIEWSKI STANLEY J JR & JUDITH E	876 SCHUYLKILL RD	ROBESON	876 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533406382508	SHANER JAMES D & PATRICIA L	866 SCHUYLKILL RD	ROBESON	866 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533406386449	MOTTA CARL B	OLD RIVER RD	ROBESON	181 TROXEL RD	BIRDSBORO	PA	19508	No
73533406481865	KEEHN DENNIS L & SUSAN M	800 SCHUYLKILL RD	ROBESON	800 SCHUYLKILL RD	BIRDSBORO	PA	19508	No
73533407679896	GRAND INVESTMENT CORP	OLD RIVER RD	ROBESON	PO BOX 264	BIRDSBORO	PA	19508	No
73533407683313	ROBESON ASSOCIATES INC	OLD RIVER RD	ROBESON	PO BOX 264	BIRDSBORO	PA	19508	No

b. Surface Water Intakes

The nearest surface water intakes serve Birdsboro, Union Township and Pottstown. The Birdsboro/Union intake is located approximately 2 miles away and upstream of project activities. According to Mr. Durso, no impacts to the Birdsboro Municipal Authority public water supply are anticipated as a result of the project. Pottstown owns and operates a surface water intake located approximately 6 miles downstream of project activities along the Schuylkill River. No impacts to this public water supply are expected due to the distance downstream, lack of in-stream work in the Schuylkill, and de minimus nature of the proposed work.

(6) Other Environmental Factors determined by Site Investigation.

The Armorcast site is currently undergoing remedial actions to render on-site soils and groundwater compliant with the non-residential Statewide Health Standard. Based on the investigations conducted to date, construction activities proposed on the parcel formerly occupied by Armorcast, are not anticipated to result in the spread of contamination to the aquifer or Schuylkill River. All work within this parcel will be governed by a Construction Monitoring and Waste Management Plan submitted that is included in this application package (see Requirement H). This plan will ensure on-site contaminants, if encountered, are not mobilized and transported into the aquifer or nearby Schuylkill River, as a result of the project.

C. Identify all environmental impacts on other adjacent land and water resources associated with the construction, modification or operation of the dam, reservoir, water obstruction, or encroachment in the area of the project.

No significant environmental impacts to adjacent land and water resources are anticipated as a result of the project.

D. Identify and evaluate the potential cumulative environmental impacts of this project and other potential or existing projects like it, and the impacts that may result through numerous piecemeal changes to the resource.

Cumulative impacts are calculated by taking into consideration the construction of the proposed electric generation facility, electric transmission line, natural gas pipeline, and waterline as one unit. Consideration is also given for projects in the past, present, and foreseeable future. Potential impacts to resources located within the limit of disturbance of these projects was considered in the early stages of project planning to determine the location which created the least overall impact.

As discussed in the alternatives analysis (Requirement S), limitations including environmental impacts, property availability, engineering constraints due to existing utilities, and exorbitant expense for alternate routes all contributed to the final determination of utility line placement. Methodologies were employed for all aspects of the project to provide the least impact to resources. Examples of these methodologies include placing the electric transmission line by helicopter to eliminate stream encroachment during construction and the use of horizontal

directional drilling (HDD) and conventional bores for installation of the natural gas pipeline and water line at select resource locations. These construction methods eliminate surface impact and render ecological function of wetland and stream resources unaltered. Consideration of permanent impacts was given the most weight for cumulative impact analysis; however, temporary, direct, indirect, and secondary impacts were considered during feasibility studies conducted early in project planning.

EXISTING AND FUTURE LAND USE

Overall, the cumulative analysis indicates that the project will not result in significant adverse impacts to the area due to the already disturbed and fragmented landscape. Existing conditions in the project area reflect changes from past and present activities. Land use within the vicinity of the power plant and electric transmission line footprint includes: commercial development, railroad right-of-way, existing transmission line right-of-way, residential development, roadways, and the Schuylkill River. Commercial warehouses, the Exeter Township Sewer Plant, Arkema, Inc, Birdsboro Wastewater Treatment Plan, and other facilities of a similar footprint are present. Throughout the proposed natural gas pipeline right-of-way, parcels are cleared for agricultural production, transportation corridors, and limited residential development. Pipeline installation is considered a complementary land use to agriculture since the land is protected from surface development and farmers can continue to use the land for crop production as they did prior to pipeline installation. The waterline alignment closely follows an existing transportation corridor. Project related alterations of the natural environment will have minimal impact to current and future regional development. Operators for the cumulative project footprint, Birdsboro Power, LLC, the Reading Area Water Authority, and DTE Appalachia Midstream, LLC, do not anticipate installation of ancillary facilities in the future to support the needs of the current project proposal. The power plant, gas line, water line, and electric line represent a complete buildout of the infrastructure required to accomplish project goals.

Other permitted projects in the vicinity include the Pagoda Motorcycle club; a permit (E06-652) was issued for the relocation of their existing club onto a previously vacant parcel. The project proposal permanently impacts 638 linear feet and 6,201 sq. ft. of watercourse along with 0.07 acre of permanent wetland fill. These permanent impacts were offset through the creation of a 0.27 acre constructed wetland near the center of the site. This parcel is routed with approximately 990 linear feet of the proposed natural gas pipeline and houses the Schuylkill River HDD exit pit. Wetland MB4 will sustain a temporary impact of 0.06 acre for the open trench placement of the natural gas pipeline. This resource was previously impacted by the Pagoda Motorcycle Club (PMC) but the area impacted by the pipeline was left untouched. PMC offset those impacts as stated above and the wetland creation site will not be disturbed by the pipeline project. Due to the temporary nature of the wetland impacts associated with the pipeline, it is believed that cumulative permanent impacts to wetland MB4 will not differ significantly upon completion of the pipeline project once the area of the crossing has been restored.

The Armorcast site is currently undergoing remedial actions to render on-site soils and groundwater compliant with the non-residential Statewide Health Standard. Based on the investigations conducted to date, construction activities proposed on the parcel formerly occupied by Armorcast, are not anticipated to

result in the spread of contamination to the aquifer or Schuylkill River. All work within this parcel will be governed by a Construction Monitoring and Waste Management Plan submitted with each application package. These plans will ensure on-site contaminants, if encountered, are not mobilized and transported into the aquifer or nearby Schuylkill River, as a result of the project. Additionally, DTE's pipeline installation activities will adhere to their Preparedness, Prevention, and Contingency (PPC) Plan and Control and Disposal Plan.

Please refer to the excerpt from Resource Report 1 (GAI Consultants, 2017) for additional discussion concerning past, present, and potential future projects in the region.

WATERS OF THE COMMONWEALTH

Cumulative impacts to waters of the Commonwealth will be minimized through proper implementation of avoidance, design, and mitigation measures. Adverse impacts, as a result of the proposed project, were evaluated in the earliest stages of project development to minimize or avoid encroachments to environmental resources. Total resource impacts proposed for all project activities are summarized in Table 1 in the project description under Requirement J of the application.

Adverse impacts to aquatic resources will be avoided. The electric transmission line poles were sited to avoid excavation impacts to wetlands and streams. Additionally, mechanized clearing and grubbing of the ROW is prohibited within the regulatory floodway of most watercourses. For the natural gas line and the water line, impacts to most sensitive aquatic resources (exceptional value wetlands, trout streams, and wetlands supporting T&E populations) are avoided through the use of trenchless technologies. Horizonal Directional Drilling (HDD) and conventional boring are technologies that allow for placement of the proposed natural gas pipeline and water line without disturbance to stream bed and banks and wetlands from construction equipment. To minimize the possible risk of inadvertent return (IR) associated with trenchless crossing, detailed investigations of subsurface conditions were conducted and used to design each HDD crossing in a manner that reduces the risk of an IR. An IR contingency plan has been prepared for the project that will minimize potential impacts to water resources and facilitate clean-up in the event an IR occurs. Careful design of each HDD and preparation of an IR contingency plan represent the best practicable impact avoidance and minimization efforts for trenchless resource crossings. Thus, water quality will be maintained throughout the project right-of-way at resource crossing locations where trenchless technologies are employed.

In areas where open trench installation of utility lines is proposed, measures will be implemented to ensure streambed materials are segregated and replaced to match pre-construction conditions at each crossing location. Permanent impacts are not anticipated within the top of bank of any watercourse crossed by the proposed project. No loss of stream channel is anticipated.

Adherence to approved project design plans will ensure there is no detectable impact to regional water quality. Successful implementation of erosion and sediment controls as approved by BCCD and DEP will be utilized to remove the risk of water quality impairment during project construction activities.

Riparian Impacts

Adverse impacts to riparian areas will be avoided by minimizing tree removal in floodways. In the case of the electric line, no mechanized clearing, grubbing, or equipment entry will be permitted within most regulatory floodways. The only proposed work at these locations will entail the cutting and removal of trees by hand. Stumps will be allowed to remain and re-sprout to enhance post construction stabilization of stream banks. Once construction of the line is complete, small trees and shrubs will be permitted to re-establish within the ROW. Vegetative maintenance of the ROW will be conducted via mechanical means and herbicide usage is not anticipated. Only a very small percentage of the Schuylkill River riparian forest will be converted from mature second growth to a successional state.

The cumulative project impact will not increase local or regional flood risk or degrade water quality measurably on a regional or resource basis. Individual stream segments may experience extremely localized de minimus water quality impacts during construction. These segments may be affected by clearing and grading of stream banks, in-stream trenching, trench dewatering, and back filling. Temporary minor modification to the benthic environment and riparian areas, and increased sedimentation and turbidity could be experienced. These impacts are minimized and avoided to the extent practicable through adherence to the approved project E&S plans.

Proposed ROWs were co-located with existing utility and transportation ROWs where possible to reduce the total number of new riparian encroachments. Temporary work spaces within riparian zones are not proposed as construction will take place within the permanent ROW at those locations. Permanent ROWs were reduced to minimum widths required for construction in riparian zones. Riparian buffer areas will be revegetated following construction in accordance with applicable E&S Plans.

Coordination Under the PA Scenic Rivers Act

Coordination with DCNR's Rivers Program Specialist under the PA Scenic Rivers Act indicates cumulative impacts are limited to visual impacts to the scenic nature of the river. Suggested mitigation measures were incorporated to the extent practicable. Most of the electric line ROW running parallel to the river will not be readily visible from the river since it will be buffered from view by at least 90' of mature forest that will remain in-tact between the river's edge and cleared ROW. An Aids to Navigation (ATON) Plan has been prepared and approved to ensure safe passage of watercraft during HDD activities associated with gas line installation. No significant in-stream impacts to the Schuylkill River are anticipated since construction of the electric line will not require access to the Schuylkill River and the pipeline crossing is proposed as an HDD. The only in-stream work proposed for the Schuylkill as part of the cumulative project will be the installation of the HDD telemetry wire used to guide the drill head. Please refer to Requirement U of the application package for a complete record of correspondence concerning the PA Scenic Rivers Act.

Groundwater

Public and private water supplies within proximity to permit actions have been documented in each respective application to ensure procedures are in place during construction to adequately protect potable water sources and their users. Please refer to Water Wells discussion above.

WETLAND IMPACTS

Field surveys were conducted within the footprint of proposed facilities to identify proposed alignments that, among other factors, avoided or minimized wetland impacts. The current proposed alignments minimize wetland impacts while maintaining engineering standards and safety. Similarly, as discussed above, a combination of trenchless technology and ROW width reductions were employed to minimize and avoid impacts to wetlands.

Permanent impacts are those areas affected by a water obstruction or encroachment that consist of both direct and indirect impacts that result from the placement or construction of a water obstruction or encroachment and include areas necessary for the operation and maintenance of the water obstruction or encroachment.

Temporary impacts are those areas affected during the construction of a water obstruction or encroachment that consists of both direct and indirect impacts located in, along or across, or projecting into a wetland that are restored upon completion of construction. This does not include areas that will be maintained as a result of the operation and maintenance of the water obstruction or encroachment.

Based on these definitions, construction of the electric line, gas line, and water line will result in 2.49 and 0.01 acres of cumulative permanent and temporary wetland impact respectively. The project will result in no net loss of wetlands, although there will be some permanent conversion and potential minor impacts to functions and values, which are discussed in more detail below

Permanent Wetland Conversion

Permanent wetland impacts are limited primarily to the conversion of palustrine forested (PFO) wetlands to palustrine scrub-shrub (PSS) and palustrine emergent (PEM) wetlands due to vegetative maintenance requirements associated with the ROW. No conversion impacts are proposed in EV wetlands. Small portions of two PSS wetlands will also be converted to PEM systems. Impacts to functions and value as a result of conversion are discussed in the "Wetland Functions and Values" section below. The table below lists all permanent conversion impacts associated with the proposed project. A total of 1.09 acres of PFO and PSS wetland will be converted to 0.8 acre of PSS and 0.29 acre of PEM.

Wetland Name	Project	Permanently Impacted Wetland Classification	Total Delineated Wetland Acreage	Wetland Impact Area (ft^2)	EV Status	Converted Wetland Classification	Converted Wetland Area (ft^2)	
							PSS	PEM
ARK4	Electric Line	PFO	0.13	871	No	PEM/PSS	871	0.0
CH7	Pipeline	PFO	0.09	745	No	PEM/PSS	452	293
CO2	Pipeline	PFO	0.37	802	No	PEM/PSS	753	49
KL1	Pipeline	PSS/PFO	10.64	15,076	No	PEM/PSS	11,276	3,800
LP2	Pipeline	PFO	6.18	22,777	No	PEM/PSS	16,929	5,848

Wetland Name	Project	Permanently Impacted Wetland Classification	Total Delineated Wetland Acreage	Wetland Impact Area (ft^2)	EV Status	Converted Wetland Classification	Converted Wetland Area (ft^2)	
MB12	Pipeline	PSS	0.19	1,815	No	PEM/PSS	1,271	544
MB33	Pipeline	PFO	5.59	5,025	No	PEM/PSS	3014	2011
MU7	Pipeline	PSS	0.02	435	No	PEM/PSS	282	153
						TOTAL	34,848	12,698

Exceptional Value (EV) Wetland Impacts

No permanent impacts to EV wetlands or loss of functions and values of EV wetlands are anticipated among the projects collectively. EV wetlands were avoided during utility line routing and through use of trenchless technologies. The open trench crossing of GF2 on the gas line project is the only EV resource that will have minor temporary impacts. Due to geologic conditions near the crossing, an open trench crossing is more environmentally protective than the originally proposed HDD crossing. The wetland will be restored to pre-construction conditions in accordance with the approved E&S plan and wetland restoration detail.

Wetland Functions and Values

Delineated wetlands were subjected to a functions and values assessment. Methodologies employed for this assessment were developed by the Regulatory Branch of the New England District of the USACE. This "Descriptive Approach" is widely applicable for any project where characterization of wetlands is necessary to secure a Section 404 permit regardless of geographic locale. A Wetland Function-Value Evaluation Form was prepared for each delineated wetland to document observed characteristics prior to construction. A discussion of potential impacts to functions and values commonly documented within the project area is provided below.

- **Groundwater Recharge/Discharge** - Subsurface placement of utility lines may impact groundwater discharge and recharge rates in wetlands. Proper placement of trench plugs in accordance with approved E&S plans will maintain these functions during and after construction.

  Conversion of a PFO system to PEM may cause the groundwater table to rise, as is common after forest clearing. The amount of conversion occurring in systems where this principal function occurs is anticipated to result in an insignificant change within those wetlands, as both PFO systems will experience less than 5% of their PFO cover being converted to PEM.

  Overall, cumulative impacts to groundwater recharge/discharge as a function will be limited to the temporary impairment during construction activities associated with each project, but no permanent impacts are anticipated.

- **Floodflow Alteration** - Grading activities in wetlands may temporarily impact floodflow alteration capacities. Impacts to this function will be

temporary and returned to pre-construction condition once the affected area has been restored to pre-construction grades and stabilized in accordance with approved E&S plans. Increased floodflow velocities may also be experienced until re-vegetated areas are permitted to mature into a thick ground cover. Conversion of PFO to PSS/PEM systems are unlikely to significantly impact the ability of the wetland to store flood waters, because contours will be restored to pre-construction condition. Overall, impacts to this function are anticipated to be temporary and limited to the construction period associated with each project. No permanent impacts are anticipated.

- **Fish and Shellfish Habitat** - No wetlands within the project area were observed to act as habitat to fish or shellfish, but instead were observed to provide indirect ecosystem services to fish and shellfish populations. These functions mainly include providing shaded streamside habitat, bank stabilization for abutting watercourses, and exporting food resources that sustain multiple trophic levels within the abutting watercourse. Impacts to streambank stabilization and production export are discussed below. Cumulative impacts to this function/value are anticipated to be insignificant as only a small portion of the riparian wetland area along streams will be impacted. Where conversion of PFO to PSS/PEM occurs, shaded habitat, previously provided by trees, will be reduced and water temperatures in these localized areas may rise. However, this conversion is not anticipated to impact the temperature of the watercourse overall, and sufficient shaded habitat will still be present for organisms to utilize. Therefore, the Project is not anticipated to have an adverse permanent impact on this function for wetlands it crosses.

  The watercourses that abut these wetlands, and in which the fish inhabit, will not be permanently impacted. Stream bed substrate will be segregated and stockpiled to be replaced in accordance with pre-construction contours and size distribution, allowing fish spawning habitat to be maintained and not impacted beyond construction. Dry crossing methods for watercourse crossings will minimize downstream mobilization of sediment and limit impacts to aquatic life. Construction will avoid seasonal in-stream construction restrictions to protect trout. Stream crossings will be trenched and backfilled in the same day further minimizing the temporary impact of stream crossings on aquatic life.

- **Sediment/Toxicant Retention and Nutrient Removal** – Removal of vegetation will temporarily impact these wetland functions. These functions are expected to be unchanged as a result of the proposed project once vegetation is allowed to re-establish. PFO conversion impacts will not appreciably diminish a wetland's ability to provide these ecosystem services. Conversion of PFO wetlands to PEM wetlands may increase species richness in the complex and allow a broader collective ability for nutrient uptake. Overall, these functions will be temporarily impacted during construction due to the loss of vegetation & disturbed soils; however, no permanent impacts are anticipated after restoration of pre-existing contours and revegetation occurs.

- **Production Export** – Temporary impacts to the amount of available food resources during construction activities may occur. Permanent impacts are unlikely as food sources (i.e. vegetation) will regrow once construction activities are completed. Where conversion of PFO to PSS/PEM occurs, food resources may become more diverse and improve the food resources available to organisms that inhabit and forage within wetlands. Cumulative impacts are anticipated to be temporary as soils and vegetation are disturbed during construction activities. No permanent impacts to this function are not anticipated.

- **Sediment/Shoreline Stabilization** – Clearing of wetland vegetation within the riparian zone of adjacent watercourses may cause decreased streambank stabilization during construction activities. Construction ROWs were reduced to the minimum widths necessary for installation of each line. Stream bed and banks will be restored to a stabilized condition so that this function in wetlands directly abutting streams is not permanently impacted. Cumulative impacts to this function are expected to be temporary and limited to the construction period of each project. Revegetation of riparian areas per the E&S Plan will ensure no permanent impacts to this function occur. No conversion impacts are proposed to wetlands performing this function.

- **Wildlife Habitat** - Temporary, short-term impacts may be unavoidable to non-mobile species in localized directly impacted areas of wetlands. The wetland will be restored upon completion of construction and use of the area is expected to be restored to pre-construction condition. More mobile species are expected to occupy adjacent undisturbed habitats during construction. Additionally, where conversion of PFO to PSS/PEM habitat occurs, forested habitat will be permanently lost; however, because only a small portion of the PFO wetlands impacted will be converted, organisms should be able to find suitable habitat nearby for nesting, spawning, rearing, and resting. The replacement of PFO habitat with PSS/PEM habitat may increase habitat diversity for local species. This may increase food resource diversity for the local ecosystem and may be beneficial for organisms that utilize this habitat.

- **Educational/Scientific Value and Uniqueness/Heritage** – Wetlands within the natural gas line project area were observed to be suitable for these functions. Only two of these, Wetlands KL1 and LP2 were determined to possess the “uniqueness/heritage” function as a primarily function/value. Both of these wetlands contain a diversity of wetland classes and surface water resources. This function will not be degraded in either of these wetlands as the proposed project will introduce further class diversity to the wetland complexes. A few wetlands, delineated within the natural gas pipeline’s project area, were determined to possess T&E populations or maintain the habitat required for those T&E species. These wetlands could be used as a reference site to establish familiarity of diagnostic characteristics of the species. No impacts are anticipated to these wetlands, since impacts will be avoided through trenchless technology. One wetland is located adjacent to an archeological site;

however, the archeological site was avoided during project design and this value will not be impacted. . These functions were considered suitable, although not primary functions, for Wetlands MB24, MB25, and MB33 along the natural gas pipeline. These wetlands are large PFO systems where little to no disturbance is proposed. Wetland MB24 will not be impacted by construction and impacts to Wetland MB25 will be avoided by utilizing trenchless technology for the crossing. Wetland MB33 will be crossed via typical trenching. The impact will result in the conversion of less than 2% of the delineated wetland being converted from PFO to PEM/PSS wetland. The impact will not disturb core PFO habitat, will not be visible from primary viewing locations, and the impact totals are minimal; therefore, it is not anticipated that the natural gas pipeline project will have a permanent impact on this wetland. Cumulative impacts to wetlands where these functions/values were considered suitable are considered insignificant and no permanent impacts are anticipated.

- **Endangered Species Habitat** – All rare, threatened, and endangered species habitats are avoided through the use of trenchless technologies. Capacity of delineated wetlands in the project area as habitat for threatened and endangered species will not be altered. Therefore, cumulative temporary or permanent impacts to this function are not anticipated.

Overall, the cumulative project will result in no net loss of wetlands. There will be minimal permanent conversion of vegetation cover type in wetlands. No net measurable change of individual or collective wetland functions or values is expected to result from cumulative project developments.

Mitigation Measures

Cumulative impacts to waters of the Commonwealth will be minimized through proper implementation of avoidance, design, and mitigation measures. Adverse impacts, as a result of the proposed project, were evaluated in the earliest stages of project development to minimize or avoid encroachments to environmental resources. Where construction ROWs for the electric line, water line and natural gas line cross water resources, they have been limited to the width necessary, in order to ensure proper and safe installation of each line. Adherence to E&S Controls, seasonal construction restrictions, and other measures, as discussed elsewhere, will ensure any impacts associated with construction of the projects are mostly temporary and insignificant.

The only permanent wetland impacts from the electric and natural gas lines result from conversion of PFO and PSS wetlands to PEM wetlands. Impacts associated with conversion have been discussed elsewhere. For the electric transmission line, the conversion of Wetland ARK4 was minimized by reducing the construction right-of-way and choosing the best possible alignment. Permanent wetland conversion impacts will be offset via a permittee-responsible mitigation (PRM) plan, which proposes to reforest 2.23 acres of exceptional value (EV-PEM) wetlands within the riparian corridor of Bieber Creek. An additional 1.55 acres of supporting upland riparian habitat will also be reforested under the plan. The complete PRM plan is available in Requirement T under the cover of the E06-717 permit application package.

HDDs will be utilized at four locations along the natural gas pipeline ROW to eliminate surficial disturbance to particularly large or sensitive resources. Clearing or occupation of the surficial ROW by construction equipment in areas utilizing HDD as a resource avoidance measure will not be permitted.

Conventional bores will be used to avoid EV wetland AC1 on the natural gas pipeline project and EV Wetland 3 and Hay Creek on the water line project.

DTE intends to implement FERC's Wetland and Waterbody Construction and Mitigation Procedures (May 2013) as a minimum standard during construction of the natural gas pipeline. Procedures listed in FERC's resources will be implemented to minimize effects on wetlands from project activities during the construction, post-construction restoration, and operation phases of the project. Approved Chapter 102 and 105 permits will be followed, where they are more stringent than the FERC.

THREATENED AND ENDANGERED SPECIES IMPACTS

Cumulative impacts to threatened and endangered species, were analyzed. Each project component completed and maintained a Pennsylvania Conservation Explorer receipt that depicts proposed routing.

Coordination with state and federal agencies has occurred for all aspects of the project. A determination of no impact or no adverse impact was returned by all agencies for all species provided conservation and avoidance measures are adhered to. Detailed information concerning coordination with all jurisdictional agencies with purview over T&E species is included in the project description and Requirements F and G of each application.

A list of species evaluated during the T&E review process for the proposed project includes:

- Bog Turtle (*Clemmys muhlenbergii*)
- Indiana Bat (*Myotis sodalis*)
- Northern Long-Eared Bat (*Myotis septentrionalis*)
- Eastern redbelly turtle (*Pseudemys rubriventris*)
- Migratory Birds
- Bald Eagle (*Haliaeetus leucocephalus*)
- Golden Eagle (*Aquila chrysaetos*)
- Northeastern Bulrush (*Scirpus ancistrochaetus*)
- Eastern Spadefoot (*Scaphiopus holbrookii)*
- Cattail Sedge (*Carex typhina*)
- Showy Goldenrod (*Solidago speciosa var speciosa*)

<u>Historic and Archaeological Resources</u>

Section 106 consultation with the PA SHPO, Tribes, and other identified consulting parties has been undertaken for the above ground and below ground cultural resources for each of the proposed project components. The SHPO has concurred that there is no adverse effect to cultural resources for the electric transmission line, water line, and power plant projects.

Potential effects to archaeological sites identified for the natural gas pipeline project have been avoided through design changes. The PHMC concurred that no further archaeological investigations are necessary for this project in a letter dated 9/19/2017. The Determination of Effects Report for above ground resources is currently under review with the PHMC and a finding of Historic Property Adversely Affected is anticipated as a result of visual effects to the NRHP Listed Oley Township Historic District. FERC will consult with the PHMC and other consulting parties to develop appropriate measures to mitigate the adverse effect on the historic district; therefore, no cumulative impact to Section 106 resources is anticipated for the project.

ANTIDEGRADATION CONSISTENCY

The basic concept of antidegradation is to promote the maintenance and protection of existing water quality for High Quality (HQ) and Exceptional Value (EV) waters, and protection of existing uses for all surface waters. The following sections are intended to demonstrate cumulative proposed project activities are consistent with Pennsylvania's antidegradation policy.

Special Protection Watersheds

A very small portion of the proposed project is sited in a special protection watershed. Bieber Creek (EV) is in vicinity of the proposed natural gas pipeline Tetco tie-in location at the northern terminus of the project. The limit of disturbance (LOD) in this watershed accounts for approximately 2.5% of the total LOD. No water obstruction or encroachments are proposed in Bieber Creek or any of its tributaries as a part of the project. Furthermore, no tree clearing is permitted within the watershed and the project's LOD is more than 250' away from Bieber Creek or its tributaries. Bioretention/infiltration facilities will be constructed to eliminate the net change in stormwater runoff rate, volume, and quality. Antidegradation best available combination of technologies (ABACT) practices proposed for this area include a 100' long rock construction entrance (RCE) and compost filter socks.

Exceptional Value (EV) Wetland Crossings

The proposed cumulative project crosses seven EV wetlands. The natural gas pipeline crosses six and RAWA's water line crosses one. No EV wetlands are delineated along the electric transmission line right-of-way (ROW). All EV wetland crossings are proposed as trenchless crossings except the GF2 crossing on the natural gas pipeline. The GF2 crossing is proposed as an open trench due to geologic conditions at this location. The permanent ROW and proposed LOD across GF2 were minimized to the extent practicable. No trees will be cleared and contours and hydrologic patterns will be returned to pre-construction conditions. ABACTs proposed near these crossings may include 100' RCEs (where applicable) and compost filter socks. Employment of ABACTs, minimization of surficial disturbance, and avoidance of these critical resources though HDD technology will ensure identified EV wetlands are protected.

Other Wetland and Watercourse Crossings

Typical permanent ROW and LODs were consistently minimized for every resource crossing associated with the proposed project. Requirement S (Alternatives Analysis) of the natural gas pipeline application discusses resource specific avoidance measures. HDD avoidance of palustrine forested (PFO) wetlands was also investigated as part of the alternatives analysis. HDD is not practical for the gas line wetland crossings at KL1, MB33, and LP2. Workspaces

were reduced to minimum practicable widths to ensure existing water quality use designations are preserved. LODs in riparian buffers were also minimized and will only be maintained as herbaceous cover only where necessary for the natural gas pipeline. In the case of the electric transmission line, vegetation will be allowed to regrow in riparian buffer areas in accordance with the vegetative maintenance plan. Riparian buffer loss is not expected to significantly impact water quality characteristics or cause any degradation of existing stream uses.

Point Source Discharges

No point source discharges are proposed in special protection waters (EV or HQ). Three existing stormwater outfalls (Schuylkill River) are proposed for repair as part of the application. These outfalls will be repaired to handle stormwater generated at the combined cycle powerplant. The following sections describe measures to be taken at the powerplant to ensure that stormwater effluent is as clean as possible and no degradation to existing use water quality occurs.

A. Good Housekeeping

Good housekeeping practices will be implemented throughout the site. Floors will be swept when needed. Wastes, including litter, wastewater, debris, or other materials, will be contained and covered within enclosed buildings or in the designated trash and recycling disposal locations. Wastes will be disposed of off-site as required in accordance with state and federal regulation and permits. Any spill or leaks of any chemical substances will be cleaned up and disposed of immediately with spill kit supplies staged throughout the Facility. Street sweeping of paved areas will occur in the event that excess sediment accumulates on the paved access road or parking areas due to winter sanding or other unforeseen reasons. The Oil/Water Separators will be inspected to check the level of water within the separator and measure the depth of bottom sludge and floating oils. No open or closed drums will be stored outdoors or uncovered.

B. Vehicle and Equipment Washing

No vehicle washing will occur at the site. Equipment washing, if necessary, will not enter any storm drainage system or surface waters.

C. Floor Drains

Floor drains within the Power Block are routed to an Oil/Water Separator, which separates and detains any oil, prior to being discharged to the municipal sewer system. Best Management Practices will be used to minimize the number of solids and oil that flow into the Oil/Water Separator. Facility personnel will be instructed to avoid spills and address small spills using sorbents to minimize runoff of oil into the Oil/Water Separator.

D. Roof Areas

Roof areas are newly constructed and clean. They are unlikely to accumulate or contribute pollutants to stormwater.

E. Spill Prevention Procedures

Spill prevention procedures include engineering controls, materials management procedures designed to minimize the potential for spills to occur during material handling, security measures and operation and maintenance procedures. In general, industrial materials and commodity products/chemicals are kept inside

buildings, which are locked when not in operation or the materials are contained in secure tanks on the secured property. All sensitive areas of the Facility are surrounded by chain link fencing. Tank truck loading/unloading procedures are conducted under the supervision of Facility personnel to ensure that proper procedures are followed.

Threatened and Endangered Species

HDD technologies are proposed as avoidance measures to ensure threatened and endangered species potentially inhabiting surface waters within the project are not impacted. Agency consultation has resulted in letters of no adverse effect for the project. Detailed information concerning threatened and endangered species in the project area is available under Requirements F and J of the joint permit application.

Antidegradation Best Available Combination of Technologies (ABACT)

The following is a list of common ABACTs to be employed throughout the project area during construction.

- Compost filter socks
- 100' Rock construction entrances
- Erosion control blankets
- Horizontal Directional Drilling
- Bored waterbody crossings

Consistency Determination

Based on the above project information, it is anticipated that the project will not have a significant impact to special protection watersheds or existing use water quality designations in vicinity of the project.

E. Identify and describe all other dams, water obstructions or encroachments which may or will be needed, in addition to those described in this application, to fulfill the purpose of the current project.

Additional water obstruction and encroachments are required for the natural gas pipeline and water line that will service the power plant. Utility line crossings of watercourses and wetlands associated with these lines will be permitted under a separate cover. A tabulation of anticipated impacts resulting from these crossings is provided in the project description section of the application package. Cumulative resource impacts associated with all aspects of the project are discussed generally in the previous section of this document. Please refer to each individual application for proposed resource specific water obstruction and encroachment details.

will be built in a manner that ensures public safety. At the state level, the PA Department of Labor and Industry sets regulations for the construction and operation of tanks containing flammable and combustible liquids. The PA Department of Environmental Protection (PaDEP) sets regulations to protect against air pollution and air emissions. Also, the PaDEP coordinates with the U.S. Environmental Protection Agency which has established regulations regarding pollution prevention and emergency planning and response. There are also Federal safety standards that the facility will be built to inclusive of, but not limited to, 29 OSHA 1910 General Industry Standards, Federal Aviation Administration regulation and National Fire Protection Association requirements.

Birdsboro Power, LLC is obtaining permits/approvals for construction and operation of their facility. A table listing anticipated permits and latest status is included in Appendix 1-H. The United States Fish and Wildlife Service (USFWS) responded on May 11, 2015, that the facility is not likely to adversely affect the federally-listed bog turtle (*Glyptemys muhlenbergii*). An updated clearance from the USFWS including the Long-eared bat (*Myotis septentrionalis*) listing was received on October 6, 2015 and is included in Appendix 1-I. An application was submitted to the DRBC for Approval of Water Use on May 19, 2016 and approval was issued on December 14, 2016. The PA SHPO provided clearance on November 25, 2015.

1.9 Cumulative Impacts

Cumulative impacts associated with the Project would result from the combined effect of construction and operation of the Project facilities with other construction projects in the vicinity of the Project. To evaluate the potential cumulative impacts, DTE considered the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions," per 40 CFR § 1508.7.

This analysis generally follows the methodology set forth in relevant guidance [Council on Environmental Quality, 1997; United States Environmental Protection Agency (EPA), 1999]. Under these guidelines, inclusion of other projects within the analysis is based on identifying commonalities of impacts from past, present, and potential projects to potential impacts that would result from the proposed Project. For an action to be included in the cumulative impact analysis, it must:

- impact a resource area potentially affected by the Project;
- cause this impact within the proposed Project area; or
- cause this impact within the resource-specific geographic boundary of where the Project will also have an impact; and
- cause this impact within the time span for the potential impact from the proposed Project.

Actions in the Project vicinity were evaluated for significance if they would generally occur within the same town, county, and/or watershed as the Project. Distant projects were eliminated from further evaluation because their impacts would not likely overlap with the Project's area of impact. The timing of selected projects, as the potential for cumulative effects is dependent on the duration of the impact. Present projects were considered to overlap with the Project in time of occurrence. Focus was placed on the resources identified in this Environmental Report, including groundwater, waterbodies, and wetlands; vegetation and wildlife; cultural resources; socioeconomics; geology and soils; land use, recreation, special interest areas, and visual resources; and air quality and noise. Regions of influence for analysis are described in more detail in Table 1.9-1.

Table 1.9-1

Region of Influence for Cumulative Impact Analysis

Environmental Resource	Area of Impact
Soils and Geology	Construction workspaces
Groundwater, Wetlands, Vegetation, Wildlife	Hydrologic Unit Code (HUC) 12 Watershed
Surface Water Resources	HUC 12 Watershed. For direct in-water work (e.g. dredging) include potential overlapping impacts from sedimentation, turbidity, and water quality
Cultural Resources	Overlapping impacts within the Area of Potential Effects
Land Use	One-mile wide corridor centered over the pipeline
Visual	0.25-mile and existing visual access points (e.g., road crossings)
Noise - Operations	Not applicable - No significant aboveground facilities are proposed, therefore no cumulative impacts for noise - operations are anticipated
Noise - Construction	0.25-mile from pipeline. 0.5-mile from HDD or direct pipe installation
Air Quality - Construction	0.25-mile from pipeline or aboveground facilities
Socioeconomics	Not applicable - No significant aboveground facilities are proposed, therefore no cumulative impacts for socioeconomics are anticipated
Environmental Justice	Not applicable - No significant aboveground facilities are proposed, therefore no cumulative impacts for environmental justice are anticipated

1.9.1 Scoping

DTE reviewed publically available sources for information on past, present, or potential projects, and contacted county and township planning entities (telephone memos included in Resource Report 8, Appendix 8-A). As mentioned in Section 1.1.1, the Birdsboro Facility is the primary purpose and need of the Project. The pipeline will be dedicated to the Birdsboro Facility and will provide 100 percent of the natural gas required to operate the Birdsboro Facility. The Birdsboro Facility is being included as a reasonably foreseeable project and is incorporated in the cumulative affect analysis for the Project since it is being constructed and operated by others as a separate project.

Projects considered in the cumulative analysis are presented in Table 1.9-2 and described below. A map showing the projects considered in the cumulative impacts analysis is included as Figure 1.9-1.

1.9.1.1 Federal and State

The Commission's eLibrary was used to research proposed natural gas and other Commission-regulated energy projects filed in Berks County, PA. There is one Commission-regulated project (Mariner II East Pipeline) located within Berks County, however it is located approximately seven miles southwest and is not within the Project's regions of influence.

The USACE Public Notices bulletin was reviewed for the Baltimore District. No projects were identified within the Project's regions of influence (USACE, 2016).

The PaDEP Pipeline Portal was also reviewed for recent news releases within the Project's regions of influence. No Projects were identified within the Project's regions of influence (PaDEP, 2016).

Table 1.9-2

Past, Present, and Reasonably Foreseeable Projects Identified within the Region of Influence

Project Name and Sponsor/ Proponent	Location (City/County) and Approximate Distance and Direction from the Project	Project Type	Description	Footprint/Layout and Anticipated Impacts	Permits/ Authorizations Required and Description of Environmental Review Required (if any)	Current Status and Schedule	Applicable Region of Influence
Energy Projects							
Birdsboro Power Plant Project Birdsboro Power, LLC	Birdsboro, Berks County, PA. Project is located directly abutting the Pipeline ROW.	Electric Power Generation	Birdsboro Power is constructing a 485 MW, natural gas-fired power plant in the Borough of Birdsboro. The facility is designed to generate electricity using a combustion turbine generator and a heat recovery steam generator that will provide steam to drive a steam turbine generator.	**Footprint:** 99-acre parcel. This parcel is an existing disturbed industrial site. **Anticipated Impacts:** impacts to the 99-acre area are expected to be minimal due to the site being an abandoned commercial site which has been previously disturbed.	• PaDEP Air Permit • BCCD-NPDES • Borough of Birdsboro - Land Use Permit • USFWS • PFBC • FAA • DRBC • SHPO • PGC • PADCNR	**Work Begin:** 2017 (estimate) **Completion Date:** Anticipated in-service April 2019	**Soils and Geology -** overlapping construction workspace. **Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030611 crossed by the proposed Project. **Surface Water Resources** - within HUC 12 watershed 020402030611. **Noise Construction** - within 0.25-mile of Pipeline ROW.
PennDOT Road and Bridge Improvement Projects							
Mill Race Bridge (PennDOT)	Mill Race Bridge on State Route 2047 over Monocacy Creek. Amity Township, Berks County, PA. Located 1.8 miles east of Pipeline ROW.	Bridge Replacement	This project involves the replacement/rehabilitation of the Mill Race Bridge on State Route 2047 over Monocacy Creek.	**Footprint:** Project footprint is estimated to be approximately 0.4-mile in length and encompass 0.17-acre (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Work Begin:** 9/25/2017 **Completion Date:** Not Specified	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030610 crossed by the proposed Project.
Blacksmith Road Bridge (PennDOT)	Blacksmith Road over Manatawny Creek in Amity Township, Berks County, PA. Located 2.7 miles southeast of Pipeline ROW.	Bridge Replacement	This project involves the replacement or rehabilitation of the bridge carrying Blacksmith Road over Manatawny Creek.	**Footprint:** Project footprint is estimated to be approximately 0.5-mile in length and encompass 0.18-acre (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Begin Work:** 1/1/2018 **Completion Date:** Not Specified	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030503 crossed by the proposed Project.
SR 562 Monocacy Creek (PennDOT)	SR 0562 over Monocacy Creek. Exeter Township, Berks County, PA. Located 1.29 miles west of Pipeline ROW.	Bridge Replacement/ Rehabilitation	This project involves a bridge replacement/rehabilitation on SR 0562 over Monocacy Creek.	**Footprint:** Project footprint is estimated to be approximately 0.3-mile in length and encompass 0.11-acre (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Begin Work:** 6/10/2019 **Completion Date:** Not Specified	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030503 crossed by the proposed Project.
2041 Box Culvert Replacement (PennDOT)	SR 2041 (Weavertown Road) over tributary to Monocacy Creek. Amity Township, Berks County, PA. Located 0.25 miles east of Pipeline ROW.	Road Construction	This project involves the replacement of a box culvert on State Route 2041 (Weavertown Road) over the tributary to Monocacy Creek.	**Footprint:** Project footprint is estimated to be approximately 0.3-mile in length and encompass 0.10-acre (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Begin Work:** 8/15/2016 **Completion Date:** 8/9/2017	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030610 crossed by the proposed Project. **Noise Construction** - within 0.25-mile of Pipeline ROW.

Table 1.9-2 (Continued)

Project Name and Sponsor/ Proponent	Location (City/County) and Approximate Distance and Direction from the Project	Project Type	Description	Footprint/Layout and Anticipated Impacts	Permits/ Authorizations Required and Description of Environmental Review Required (if any)	Current Status and Schedule	Applicable Region of Influence
PennDOT Road and Bridge Improvement Projects (continued)							
T-575 Fisher Mill Road Bridge Project (PennDOT)	Fisher Mill Road (T-575) over the Manatawny Creek. Oley Township, Berks County, PA. Located 0.53-mile east of Pipeline ROW.	Bridge Replacement/ Rehabilitation	This project involves the replacement/rehabilitation of a bridge carrying Fisher Mill Road (T575) over the Manatawny Creek in Oley Township including roadway approaches, guiderail, drainage and other miscellaneous construction.	**Footprint:** Project footprint is estimated to be approximately 0.4-mile in length and encompass 0.17-acre (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Begin Work:** 3/26/2018 **Completion Date:** 11/26/2018	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030503 crossed by the proposed Project.
SR 1026 Bridge Project (PennDOT)	SR 1026 over Pine Creek. Pike Township, Berks County, PA. Located 1.20 miles east of Pipeline ROW.	Bridge Replacement/ Rehabilitation	This project involves a bridge replacement/rehabilitation on SR 1026 over Pine Creek.	**Footprint:** Project footprint is estimated to be approximately 0.2-mile in length and encompass 0.10-acre (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Begin Work:** Not Specified **Completion Date:** Not Specified	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030501 crossed by the proposed Project.
SR 73/662 Corridor Safety (PennDOT)	SR 73 and 662. Oley Township, Berks County, PA. Located 0.28-mile west of Pipeline ROW.	Road Construction	This project involves construction of a roundabout at both intersections of State Route 73 and 662 in Oley Township, Berks County.	**Footprint:** Project footprint is estimated to be approximately 0.84-mile in length and encompass four acres (estimate).	Statewide Transportation Improvement Program. Environmental assessment not available.	**Begin Work:** 8/6/2018 **Completion Date:** 11/29/2019	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030503 crossed by the proposed Project. **Noise Construction** - within 0.25-mile of Pipeline ROW.
Commercial and Industrial							
River Run Meadows Apartments (Housing Development Corporation Mid-Atlantic)	190 Spring Grove Court in Robeson Township, Berks County, PA. Located four miles west of pipeline ROW.	Residential Development	Housing Development Corp. Mid-Atlantic will build River Run Meadows Apartments, a 58-unit complex covering roughly 52 acres on a wooded plot between Reading and Birdsboro off Route 724.	**Footprint:** 52-acre wooded site off Route 724 in Berks County.	This information is not publicly available.	**Begin Work:** Construction is expected in early 2017 **Completion Date:** Spring 2008	**Groundwater, Wetlands, Vegetation, Wildlife and Surface Water Resources** - within HUC 12 watershed 020402030606 crossed by the proposed Project.

Major highway or bridge projects currently planned within the Project area were reviewed using the PennDOT Transportation Improvement Program site, which shows highway and bridge projects on PA's Four and Twelve Year Transportation Program and Regional Transportation Improvement Plans. The Project crosses roads with planned infrastructure improvements, such as construction of a roundabout and replacement of a box culvert (PennDOT, 2016a). Five bridge replacement/rehabilitation projects under PA's Rapid Bridge Replacement Program were identified in Berks County starting in September 2017 through November 2019, however these are not located within the Projects regions of influence (PennDOT, 2016b).

1.9.1.2 Local Reviews

DTE contacted the county and local municipalities for information regarding planned developments within the Project area. One planned residential development was identified by representatives at the Robeson Township Office. The planned project is known as The River Run Meadows Apartments and is within the Project's regions of influence and is located approximately four miles west of the Project (Pedersen, 2016).

1.9.2 Potential Cumulative Impacts of the Proposed Action

1.9.2.1 Groundwater, Wetlands, Vegetation and Wildlife

Cumulative effects on groundwater resources are expected to be limited to areas that are affected by other projects located near the Project. Potential impacts would be avoided or minimized by the use of both standard and specialized construction techniques, including those specified in DTE's Spill Prevention, Control and Containment Plan.

The projects listed in Table 1.9-2 are all located within HUC watersheds crossed by the Project. Impacts to wetlands and waterbodies associated with the proposed Project are expected to be temporary in nature. DTE will obtain the permits required by the Clean Water Act Section 404, which seeks to avoid and minimize individual and cumulative impacts to federally-regulated wetlands and would be required for all development projects impacting wetlands and waterbodies. Should development projects result in the unavoidable loss of wetlands or steams, the USACE and PaDEP have comprehensive mitigation processes to offset and prevent net loss to resources. Therefore, DTE does not anticipate significant cumulative impacts to wetlands and waterbodies as a result of the proposed Project and/or other development projects in the Project area.

When projects are constructed in the same general location and timeframe, they could have a cumulative impact on local vegetation and wildlife communities. ROW clearing and grading and other construction activities associated with the Project would result in the removal of vegetation; alteration of wildlife habitat; displacement of wildlife; and other potential secondary effects such as increased population stress, predation, and the establishment of invasive plant species.

Cumulative impacts to vegetation would be associated with large-scale construction or development projects that would seek to clear significant areas of upland forest contiguous to the pipeline corridor. This would result in additional habitat fragmentation and would modify the vegetation classification from forest to either scrub-shrub or herbaceous classes. No such projects were identified during scoping. Additionally, development of areas adjacent to the pipeline corridor could result in the permanent loss of vegetation through the construction of residential developments, roadways and other impervious surfaces.

DTE initiated consultation regarding the Project with the PADCNR, PFBC, PGC and USFWS. DTE is working with the agencies to avoid adverse impacts to critical habitats and does not

anticipate the Project will have adverse impacts on critical habitat. DTE proposes tree clearing as allowable per consultation with USFWS to minimize or avoid potential impacts to these species.

At the time of filing, the Project is not anticipated to contribute impacts to wildlife when combined with other projects in the area.

1.9.2.2 Surface Water

The cumulative impacts on groundwater resources are expected to be temporary and limited to the construction phase of the Project. Potential impacts would be avoided or minimized by the use of both standard and specialized construction techniques, including those specified in DTE's Spill Prevention, Control, and Containment Plan (to be provided in subsequent filing).

The Project would not involve the construction of permanent diversions or dams and, therefore, would be expected to have only short-term temporary impacts on surface water quality. Temporary impacts on surface waters include disturbance of stream banks, removal of bank vegetation, and, in some instances, modification of flow during dry-crossing construction. The level of temporary impact of the proposed Project on surface waters would depend on precipitation events, sediment loads, stream area/velocity, channel integrity, and bed material.

Runoff from construction activities near waterbodies could also result in cumulative impacts, although this effect would be relatively minor and would be controlled by implementation of E&SC measures and by compliance with federal, state, and local requirements. All of the projects listed in Table 1.9-2 fall within the same HUC watershed but are typically located 0.25-mile or farther from the Project except for the Birdsboro Facility, the 2041 Box Culvert Replacement, and the SR 73/662 Corridor Safety projects. The construction of the Birdsboro Facility and the transportation projects are expected to be in compliance with all state and federal regulations as they pertain to the protection of surface water. Therefore, the pipeline is not anticipated to add to the impacts of the construction of the Birdsboro Facility as well as the transportation projects.

1.9.2.3 Cultural Resources

This Project, and other projects, are subject to National Historic Preservation Act Section 106 review and approval through delegated SHPOs, to avoid or minimize impacts and address any unavoidable impacts. Therefore, no cumulative impacts to cultural resources are anticipated.

1.9.2.4 Socioeconomics and Environmental Justice

No major aboveground facilities are proposed as part of this Project, therefore, no significant cumulative impacts for socioeconomics or economic justice are anticipated.

1.9.2.5 Soils and Geology

Potential cumulative impacts associated with geologic mineral resources may include disruption or loss of access to potential resources at mining facilities or reserves. Given that no active mining is within 0.25-mile of the Project, no anticipated cumulative impacts to mineral resources are expected.

Soil impacts will occur only during the construction period and/or post-construction monitoring period. Depending on soil conditions, these impacts may include loss of excavated soil from water and wind erosion, soil compaction from construction equipment, and mixing of topsoil and subsoil. The existing ROW crosses several properties currently being used for agricultural purposes. DTE has committed to specialized construction techniques to protect topsoil within the workspace areas and that soil productivity is maintained post-construction. The likelihood of cumulative impacts on soils is minimal and would be limited to development or construction

activities directly adjacent to the ROW that could increase the erosion potential or affect soils in agricultural or residential areas. All projects listed in Table 1.9-2 are not immediately adjacent to the Project expect for the Birdsboro Facility. The Birdsboro Facility is located within an existing disturbed industrial site. Project activities at this location will be contained with the existing site, therefore impacts are not expected to result.

1.9.2.6 Land Use and Visual Resources

Actions included in Table 1.9-2 would result in both temporary disturbances and permanent conversions of land uses. These actions may also result in temporary or permanent impacts to visual resources, including the presence of large construction vehicles and changes to the viewshed resulting from permanent buildings/structures. Portions of the permanent ROW will be located within the Birdsboro Facility, therefore land use will remain industrial in this location and no cumulative impacts are expected. No new aboveground structures will be constructed as part of the identified projects within 0.25-mile of the new pig launcher and meter site at the TETCO interconnect. The new pig receiver will be located within the Birdsboro Facility, therefore no additional changes to the viewshed will occur. The 2041 Box Culvert Replacement project is located approximately 0.29-mile east of the pipeline with construction having begun in August 2016 and expected to be completed by August 2017. The project involves the replacement of a box culvert over an unnamed tributary of Monocacy Creek. Since the project includes only the replacement of existing structures, no changes to the viewshed are anticipated. The SR 73/662 Corridor project involves the construction of a roundabout at the intersection of Route 73 and 662 in Oley Township. No changes to the viewshed are expected due to construction taking place within the existing PennDOT ROW. No major aboveground facilities are proposed as part of the Project.

Based on the anticipated impacts of the Project, along with state and local regulation of proposed actions in the Project area, it is anticipated that cumulative impacts on land use and visual resources would be insignificant.

1.9.2.7 Air Quality and Noise

All projects included in Table 1.9-2 would involve the use of heavy equipment that would generate emissions of air contaminants, fugitive dust, and noise during construction. Construction of these projects would result in temporary air emissions, but these emissions are not likely to significantly affect long-term air quality in the region. During construction, elevated levels of ambient pollutants are likely to occur in the immediate vicinity of the projects. Because pipeline construction moves through an area quickly, air emissions associated with construction of the pipeline would be intermittent and short term.

No significant aboveground facilities are proposed, therefore no cumulative impacts for air quality - operation are anticipated.

All of the projects listed in Table 1.9-2 would produce construction noise, however construction noise would be temporary to noise receptors in the vicinity and cumulative construction noise impacts are anticipated to be minimal.

No significant aboveground facilities are proposed, therefore no cumulative impacts for noise operations are anticipated.

1.9.3 Conclusions

Few development or construction projects are proposed, in progress, or recently constructed in the regions of influence of the Project, and many of these would be subject to permit requirements not unlike that of the proposed Project which will further minimize impacts to the

human and natural environment. In addition, DTE plans to implement specialized construction techniques to comply with the Commission's Plan and Procedures and carefully develop resource protection and mitigation plans through consultations with regulatory agencies designed to minimize and control environmental impacts for the Project as a whole. Therefore, the Project's contribution to cumulative impacts is anticipated to be minimal or insignificant.

1.10 References

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