



WETLAND IDENTIFICATION & DELINEATION AND PHASE 1 BOG TURTLE HABITAT ASSESSMENT REPORT

**Eisenhower Drive Extension Project
York and Adams Counties, Pennsylvania**

JMT Project #: 02-0308-012

Submitted to:
PennDOT District 8-0

Revised April 18, 2019



TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	3
II.	INTRODUCTION.....	5
III.	WETLAND AND WATERCOURSE DELINEATION	5
A.	METHODOLOGY.....	6
a.	RECORDS RESEARCH.....	6
b.	FIELD INVESTIGATIONS	6
1.	Hydrophytic Vegetation	7
2.	Wetland Hydrology	8
3.	Hydric Soils	8
4.	Watercourse Identification	8
c.	FUNCTIONS AND VALUES ASSESSMENT	9
B.	RESULTS OF INVESTIGATION.....	9
a.	RECORDS RESEARCH.....	9
1.	Threatened and Endangered Species.....	9
2.	Aquatic Resources.....	10
3.	Historic Land Use.....	10
b.	SOIL CHARACTERISTICS	12
c.	WATER AND WETLAND HABITAT DESCRIPTIONS	14
IV.	PHASE 1 BOG TURTLE HABITAT ASSESSMENT	33
A.	PURPOSE OF STUDY.....	33
B.	SURVEY METHODOLOGY	33
C.	BOG TURTLE RANGE, HABITAT, AND ECOLOGY	33
D.	RESULTS AND DISCUSSION.....	34
V.	SUMMARY	43
VI.	REFERENCES	45

LIST OF TABLES

Table 1: Wetland Indicator Descriptions Under Natural Conditions.....	7
Table 2: Soils Series Units within the Eisenhower Drive Extension Project.....	13
Table 3: Summary of Identified Streams within the Eisenhower Drive Extension Project.....	15
Table 4: Summary of Delineated Wetlands within the Eisenhower Drive Extension Project	21
Table 5: Summary of Phase 1 Bog Turtle Survey Results.....	42



LIST OF APPENDICES

- A. Professional Qualifications**
- B. Figures**
- C. Wetland Determination Data Forms**
- D. PNDI Environmental Review Receipt and Bog Turtle Habitat Evaluation Field Forms**
- E. Site Photographs**
- F. Wetland Functional Assessment Data Forms and Key**



I. EXECUTIVE SUMMARY

This report presents the results of a wetland identification and delineation study and Phase 1 bog turtle habitat assessment conducted by Johnson, Mirmiran, and Thompson (JMT) on behalf of PennDOT Engineering District 8-0, for the proposed extension of Eisenhower Drive in York and Adams Counties, Pennsylvania. The overall study area for the proposed project is located within Penn Township and Hanover Borough in York County, and McSherrystown Borough and Conewago, Mount Pleasant, and Union Townships in Adams County. This report presents the results of initial fieldwork conducted in the Plum Creek corridor in 2016, as well as fieldwork completed throughout additional portions of the overall study area in 2017. Delineations of streams initially identified during this work were conducted in 2018 along a more defined preferred alignment corridor. The purpose of the proposed project is to facilitate safe and efficient intermodal travel within the project study area to meet both current and future transportation needs, and to provide a functional and modern roadway that maximizes current design criteria and promotes multi-modal transportation alternatives.

The wetland identification and delineation was conducted in mid-November through December of 2016, November of 2017, and late October and December of 2018. Wetlands were delineated using a combination of secondary data analysis and field verification. Fieldwork for the wetland identification and delineation was conducted in accordance with the *U.S. Army Corps of Engineers Wetland Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (2012). Seventeen palustrine wetlands (WET-1 through WET-17) and sixteen watercourses (WUS-1 through WUS-11, WUS-2A, WUS-3A, WUS-4A, WUS-8A, and WUS-8B) were identified within the study area. Both palustrine emergent (PEM) and palustrine forested (PFO) wetlands were identified. Hydrologic sources were variable and included groundwater springs and seeps, a seasonally high groundwater table, surface runoff from adjacent agricultural fields and other uplands, and high flows from adjacent watercourses. The wetlands vary in size and provide groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, streambank stabilization, and wildlife habitat functions.

Plum Creek (WUS-2) is a perennial stream classified as a Warm Water Fishery (WWF) and a Migratory Fishery (MF) by the Pennsylvania Department of Environmental Protection's (PADEP), PA Code Title 25, Chapter 93 *Water Quality Standards*. The unnamed tributaries to Plum Creek (WUS-1, WUS-2A, WUS-3, WUS-3A, WUS-4, and WUS-4A) identified within the study area are also considered WWFs and MFs. Plum Creek and its tributaries are located in the western and central portions of the study area. Three unnamed tributaries to the South Branch Conewago Creek (WUS-5 through WUS-7) were identified in the southwestern portion of the study area. The remainder of the streams (WUS-8 through WUS-11, WUS-8A, and WUS-8B) are unnamed tributaries to Slagles Run and are located in the eastern portion of the study area. All of the additional tributaries within the study area are also classified as WWFs and MFs. According to the Pennsylvania Fish and Boat Commission (PFBC), no stocked trout streams occur in the vicinity of the study area, and no streams are listed as Approved Trout Waters, Class A wild trout streams, or as streams supporting natural trout reproduction. No natural trout reproducing streams occur downstream of the project area. Therefore, no in-stream work restrictions related to fisheries are anticipated for the proposed project. Any impacts to wetlands and waters within the study area will require a permit from the Pennsylvania Department of Environmental Protection (PADEP) and the U.S. Army Corps of Engineers (USACE).



Because York and Adams Counties are known to support populations of the bog turtle (*Glyptemys muhlenbergii*), JMT also conducted a Phase 1 bog turtle habitat assessment in accordance with methodologies outlined in the U.S. Fish and Wildlife Service (USFWS) *Guidelines for Bog Turtle Surveys, Bog Turtle Northern Population Recovery Plan, April 2006*. The habitat assessment was conducted by a USFWS/PFBC-recognized PA Qualified Bog Turtle Surveyor. Two wetlands (WET-2, WET-8) identified within the study area were determined to consist of marginal potential bog turtle habitat; therefore, additional surveys (i.e., Phase 2) and/or avoidance of direct and indirect impacts to these wetlands will be required.



II. INTRODUCTION

This Wetland Identification and Delineation and Phase 1 Bog Turtle Habitat Assessment Report has been prepared for engineering and environmental studies being performed for the extension of Eisenhower Drive in York and Adams Counties, Pennsylvania. The Pennsylvania Department of Transportation (PennDOT) Engineering District 8-0 has proposed the extension to facilitate safe and efficient intermodal travel within the project study area to meet both current and future transportation needs, and to provide a functional and modern roadway that maximizes current design criteria and promotes multi-modal transportation alternatives.

The overall study area for the proposed project is located within Penn Township and Hanover Borough in York County, and McSherrystown Borough and Conewago, Mount Pleasant, and Union Townships in Adams County. The study area occurs within the McSherrystown and Hanover, PA 7.5 Minute USGS Quadrangles (**Figure 1 in Appendix B**), and is generally bordered by S.R. 116 to the south, Bender and Chapel Roads to the west, and Carlisle Street to the east. This report presents the results of initial fieldwork conducted in the Plum Creek corridor of Conewago Township in 2016, as well as field work completed throughout additional portions of the overall study area in 2017, which were based around alternative roadway alignment corridors. Delineations of streams initially identified during this work were conducted in 2018 along a more defined preferred alignment corridor.

The study area occurs within primarily rural portions of Adams County, with dominant surrounding land uses represented by agricultural fields and riparian woodlands. Concentrated areas of development occur in the southern and eastern portions of the study area, and include high-density residential, commercial, and industrial properties. The topography in the study area is generally flat with gentle slopes adjacent to the stream valleys.

Wetland delineation and habitat assessment fieldwork for the Eisenhower Drive Extension Project was completed in two periods. The first survey area was investigated in 2016 and consisted of the approximately one-mile long segment of Plum Creek located to the south of Chapel Road and north and east of Centennial Road, with a corridor spanning approximately 1,500 feet across along this length. Additional fieldwork was completed in 2017 within several alternative roadway alignment corridors in the study area. These alternate corridors were approximately 125 feet wide, with wetland surveys extending at least 300 feet from each side of the corridor in order to complete a Phase 1 Bog Turtle Habitat Survey. Finally, streams that were identified during preliminary fieldwork were delineated within the preferred alignment corridor in 2018.

III. WETLAND AND WATERCOURSE DELINEATION

Investigations were conducted on November 17 and 18, December 7, 8, 21, and 27, 2016, November 8, 9, 13, and 14, 2017, and October 31 and December 21, 2018 by JMT, to identify and delineate the extent and location of jurisdictional waters and wetlands within the project study area pursuant to the federal Clean Water Act (Section 404), the PA Clean Streams Law, the PA Dam Safety and Encroachments Act, and the PA Flood Plain Management Act. The EPA/Corps of Engineers joint memorandum: *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States* (December 02, 2008), Code of Federal Regulations (33 CFR Parts 320-330) and Chapter 105 of PA Code Title 25, Dam Safety and Waterway Management Rules and Regulations define wetlands and watercourses and provide regulatory jurisdictional guidance on water obstructions and encroachments. Jurisdictional wetlands are defined as those areas satisfying the technical criteria contained in the *Corps of*



Engineers Wetlands Delineation Manual, Technical Report Y-87-1, United States Waterway Experiment Station, Vicksburg, Mississippi 1987 (Delineation Manual) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0*, Technical Report (April 2012). Professional qualifications of the individuals involved in the preparation of this report are provided in **Appendix A**.

A. METHODOLOGY

a. RECORDS RESEARCH

Prior to conducting the field investigations, JMT requested a search of the Pennsylvania Natural Diversity Inventory (PNDI). The PNDI is a database that retains information on threatened and endangered species and their potential geographic locations. This information is accessed on the Pennsylvania Natural Heritage Partnership web site. This database will return any threatened or endangered species with the potential to occur within or near the project area. The database houses information supplied by the following agencies: the PA Department of Conservation & Natural Resources (PADCNR), Bureau of Forestry, the PA Fish & Boat Commission (PFBC), US Fish and Wildlife Service (USFWS) and the PA Game Commission (PGC). The PA Code Title 25, Chapter 93 *Water Quality Standards* was also investigated.

In addition to habitat information and in accordance with the Delineation Manual, the 7.5' USGS McSherrystown and Hanover-PA topographic quadrangles, the National Wetlands Inventory (NWI) web-based Interactive Mapper, FEMA flood maps, and the Web Soil Survey of Adams and York Counties (USDA, 2017) were reviewed to identify areas with topographical configurations, mapped wetlands and/or hydric soils, which may suggest the presence of wetlands. **Figure 2** in **Appendix B** shows the location of the study area on the Soil Survey, **Figures 3a-3b** in **Appendix B** details the location on NWI maps, and **Figures 4a-4e** in **Appendix B** show the study area on the FEMA flood map series.

Finally, historic aerial photographs obtained through the Penn Pilot program (PGS, 2016 and 2017) and Pennsylvania Spatial Data Access (PASDA, 2017) were compared with recent aerial imagery to track land cover and land use changes overtime within and adjacent to the study area. The historic aerials included photographs from 1937, 1957, and 1971 (see **Figures 5a-5e** in **Appendix B**), and were compared with Google Earth images from the early 1990's through present day.

b. FIELD INVESTIGATIONS

As mentioned above, fieldwork for the proposed project was completed in two periods. The overall project study area and the wetland survey areas investigated in 2016 and 2017 are depicted on **Figure 6** in **Appendix B**.

The on-site, "routine" level, wetland identification and delineation methodology, contained in the U.S. Army Corps of Engineers (USACE) Delineation Manual (USACE, 1987) was followed. The on-site field investigation involved inspection of the study area to identify areas that satisfy the three wetland parameters (i.e., criteria): a predominance of hydrophytic (wetland) vegetation, wetland hydrology, and hydric soils. In order to make a determination that an area is a wetland, the Delineation Manual requires that, under normal



(typical) circumstances, a minimum of one primary wetland indicator be confirmed for each of the three wetland parameters. A failure to confirm or account for all three parameters must result in a finding that the area under evaluation is a non-wetland under normal circumstances. When applicable, site characteristics were evaluated based on the potential for problematic wetland situations, as described in the *Eastern Mountains and Piedmont Regional Supplement*. Data from representative wetland and upland sample plots were recorded on Wetland Determination Data Forms (**Appendix C**). In accordance with the Delineation Manual, the following wetland delineation criteria and primary field indicators were used:

1. Hydrophytic Vegetation

Vegetation in the study area was initially characterized to plant community type based on guidance provided in the *Eastern Mountains and Piedmont Regional Supplement*. Within a plant community, sample plots were established. When possible, 30-foot radius circular sample plots for the tree and woody vine strata, 15-foot radius circular plots for the shrub/sapling stratum, and 5-foot radius circular plots for the herbaceous stratum were used. Larger or smaller plot sizes were used as conditions dictated.

Dominant plant species were then assigned a wetland indicator classification according to the *U.S. Army Corps of Engineers (USACE) National Wetland Plant List (NWPL)* (Lichvar et al., 2016). The indicator status is based on a species frequency of occurrence in wetlands. The wetland indicator rating and the corresponding frequency of occurrence are explained in **Table 1**.

Table 1. Wetland Indicator Descriptions Under Natural Conditions.

OBL	Obligate Wetland	Plants that occur almost always (more than 99% of the time) in wetlands
FACW	Facultative Wetland	Plants that occur usually (67-99% of the time) in wetlands
FAC	Facultative	Plants with similar likelihood (34-66% of the time) of occurring in wetlands/non-wetlands
FACU	Facultative Upland	Plants that may occur (1-33% of the time) in wetlands, but are usually in non-wetlands
UPL	Obligate Upland	Plants that occur rarely (less than 1% of the time) in wetlands under natural conditions
NI	Not Included	Only genus information known and/or cannot assign accurate indicator status



Once the dominant plant species are determined, the procedure for using the hydrophytic vegetation indicators is as follows:

- Step 1: Apply Indicator 1 (Rapid Test for Hydrophytic Vegetation; if not met proceed to Step 2)
- Step 2: Apply Indicator 2 (Dominance Test, if not met proceed to Step 3),
- Step 3: Apply Indicator 3 (Prevalence Test; if not met proceed to Step 4),
- Step 4: Apply Indicator 4 (Morphological Adaptations).

When more than 50 percent of the dominant species in a plant community are determined to have an indicator status of OBL, FACW, and/or FAC, hydrophytic vegetation is determined to be present. If none of the indicators are satisfied, then hydrophytic vegetation is absent unless indicators of hydric soil and wetland hydrology are present and the site meets the requirements for a problematic wetland (see Chapter 5 of the *Eastern Mountains and Piedmont Regional Supplement*).

2. Wetland Hydrology

In each plant community, indicators of wetland hydrology and hydric soils were investigated following the *Eastern Mountain and Piedmont Regional Supplement*. Wetland hydrology means that water is present at or above the surface for a prolonged period (in consecutive days) during the growing season. Prolonged duration of seasonally inundated or saturated areas is longer than 12.5 percent of the growing season. Primary indicators of wetland hydrology include direct observation of inundation or saturation at the surface, recorded stream gauge data (where available); water marks or sediment deposits on objects and vegetation (i.e., water-stained leaves), water-carried debris drift lines, oxidized rhizospheres on living roots, etc. Secondary indicators of hydrology include drainage patterns, stressed plants, microtopographic relief, sparsely vegetated concave surfaces, etc. Some vegetative physiological adaptations, such as tree buttressing, shallow rooting, and multiple stems may also indicate wetland hydrology. Any observed wetland hydrologic field indicators were then noted on the data forms provided in **Appendix C**. Factors such as the depth of water or depth to free water in the soil excavation pit were also noted.

3. Hydric Soils

Soils were investigated in the field using a soil auger and/or sharpshooter shovel. The exposed soils were divided into distinct layers based on color, mottling, and structural and textural differences. Color (chroma) was determined by comparison with standard soil color chips contained in the *Munsell Soil Color Charts* (Munsell, 2009). Since hydric soils are saturated to the surface for periods of sufficient duration during the growing season to create oxygen-free conditions in the upper layer, indicators of oxygen-free conditions develop. Following the guidelines outlined in the *Eastern Mountain and Piedmont Regional Supplement*, observations were made for hydric soil indicators (e.g., depleted or gleyed matrix, redox depletions or concentrations). Soil characteristics of each layer and any hydrologic indicators were recorded on the data forms provided in **Appendix C**.

4. Watercourse Identification

Watercourses were identified as channels or surface water conveyances featuring defined bed and banks, natural or artificial, hydrologically sorted substrate material, and the presence of an Ordinary High Water



Mark (OWM). These aquatic resources are regulated as Waters of the Commonwealth of Pennsylvania under Chapter 105 of the Pennsylvania Code Title 25, and as Waters of the U.S. (WUS) under the Federal Clean Water Act. The USACE in its Regulatory Guidance Letter 07-01, *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States* (December 02, 2008), and *Corps and EPA Responses the Rapanos Decision* (December 02, 2008), established the basic guidance for determining what will be regulated as WUS.

Roadside ditches and other stormwater management features that either meet the definition of a wetland or possess an OHWM and are determined to be Relatively Permanent Waters (RPWs), which for the purposes of this report exhibit perennial or intermittent flow, are also regulated as Waters of the Commonwealth and WUS. For wetlands located in roadside ditches or stormwater management features to be regulated as WUS, they must either generate RPW flow or abut a regulated tributary. Typically, roadside ditches or other stormwater management features that satisfy the definitions of Waters of the Commonwealth and WUS, but were constructed in uplands and are not relocated natural watercourses, are eligible for PADEP Chapter 105 Waiver #6 and are non-reporting for the USACE under the PASPGP-5.

c. FUNCTIONS AND VALUES ASSESSMENT

A functional assessment was conducted on each identified wetland habitat in the project area. The assessment, presented in narrative format, describes the biotic and abiotic functional parameters of the identified wetland habitats. The assessment was based on parameters as outlined in the USACE *The Highway Methodology Workbook Supplement: Wetland Functions and Values: A Descriptive Approach* (USACE, 1999). Abiotic parameters included the following wetland functions: groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, production export, and sediment/shoreline stabilization. Biotic wetland functions and values include fish and shellfish habitat, wildlife habitat, recreation, education/scientific value, uniqueness/heritage, visual quality/aesthetics, and endangered species habitat.

Each function was assessed in terms of its suitability within the wetland being evaluated. This assesses the effectiveness or the “physical or biological ability” of a wetland to perform a particular function or maintain a value. A list of rationales was given to surveyed wetlands for each suitable function and/or value recorded. Principal function(s)/value(s) were assigned to each wetland assessed. A Wetland Function-Value Evaluation Form and key is provided in **Appendix F**.

B. RESULTS OF INVESTIGATION

a. RECORDS RESEARCH

1. Threatened and Endangered Species

The PNDI search from March 18, 2018 revealed potential impacts to threatened or endangered and/or special concern species and resources within the study area (**see Appendix D**). A potential impact was identified for Shumard's oak (*Quercus shumardii*), a state endangered species under the jurisdiction of the PADCNr; therefore, additional coordination will be required to determine whether the proposed project may



impact this species. Since Adams and York Counties are known to support populations of the bog turtle, a Phase 1 Bog Turtle Habitat Assessment was completed, the results of which are presented later in this report.

2. Aquatic Resources

The study area lies within the Plum Creek-South Branch Conewago Creek and Headwaters South Branch Conewago Creek HUC-12 subwatersheds, both of which are subbasins of the Susquehanna River drainage basin. The NWI maps (**Figures 3a-3b in Appendix B**) revealed multiple riverine systems within the study area, including Plum Creek (R5UBH), and intermittent tributaries (R4SBC) to Plum Creek, the South Branch Conewago Creek, and Slagles Run. Several NWI-mapped palustrine wetlands were also identified along the main stream corridors in the study area, consisting of emergent (PEM5A) and forested (PFO1A, PFO1/SS1A) habitat types. The Plum Creek corridor occurs within a FEMA-designated 100-year floodplain (**Figures 4a-4b in Appendix B**) with base flood elevations ranging from approximately 518 to 524 feet. The northern-most portion of an unnamed tributary to Slagles Run in the eastern portion of the study area (**Figure 4d in Appendix B**) is within a FEMA-designated 100-year floodplain, with base flood elevations ranging from approximately 522 to 537 feet.

Plum Creek (WUS-2) is a perennial stream that flows from south to north within the western portion of the study area, and is designated as a Warm Water Fishery (WWF) and a Migratory Fishery (MF) in the Chapter 93 *Water Quality Standards*. Warm Water Fishery indicates “maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.” Migratory Fishery indicates “passage, maintenance and propagation of anadromous and catadromous fishes and other fishes which ascend to flowing waters to complete their life cycle.” All unnamed tributaries to Plum Creek within the study area are also considered WWFs and MFs.

Direct tributaries to the South Branch Conewago Creek were identified in the southwestern portion of the study area. An unnamed tributary to Slagles Run (WUS-8) is a perennial stream that flows in a northerly direction, forming another primary stream corridor within the eastern portion of the study area. All of these watercourses and their tributaries in the study area are designated as WWFs and MFs in the Chapter 93 *Water Quality Standards*.

According to the Pennsylvania Fish and Boat Commission (PFBC), no stocked trout streams occur in the vicinity of the study area, and no streams are listed as Approved Trout Waters, Class A wild trout streams, or as streams supporting natural trout reproduction. In addition, no natural trout reproducing streams occur downstream of this portion of the project area. Therefore, no in-stream restrictions based on trout designations are anticipated.

3. Historic Land Use

A review of historic aerial imagery revealed that agricultural land uses have dominated the majority of the study area and immediate vicinities since at least the 1930's; however, residential and commercial/industrial development has increased since that time (see **Figures 5a-5e in Appendix B**). Although the majority of lands near project alternatives remain in agricultural use today, residential properties and other developed lands have encroached into the study area in the last few decades. One of the most significant changes to the overall study area involves the growth of large commercial industries since the late 1950's; however,



these developed lands largely occur outside of the alternative alignment corridors. Following are analyses of land use changes in the study area. Aquatic resources that were delineated for the proposed project (e.g., WET-2, WUS-1) are discussed for reference.

Lands within and surrounding the Plum Creek corridor primarily include maintained agricultural fields, residential communities, and municipal/industrial properties that have existed since the early 1900's. The Sacred Heart Basilica, located in the northern portion of the Plum Creek corridor, has remained intact since the early 1900's. Residential communities to the east of the church are visible through imagery from as early as 1937 and appear unchanged. The south-central portion of the corridor, where present-day Tiffany Court and the surrounding residential communities are located, have experienced the most residential development in the direct vicinity of the Plum Creek corridor, as these lands were undeveloped until the early 1990's. Intermittent tributaries to Plum Creek (WUS-4 and WUS-4A) are likely man-made features that were altered following construction of the aforementioned residential developments. Although a few residential properties were located along the main roads in the southwestern portion of the corridor by 1971, construction of the larger residential developments to the east of the intersection of Centennial and Chapel Road did not progress until the early 1990's. A potential wetland and stream complex is visible in the 1937 and 1957 aerial imagery in the south-central portion of the project area east of Plum Creek, corresponding to the area where WET-2 was delineated during the field investigation (see **Figures 5c-5d in Appendix B**). The Hanover Wastewater Treatment Facility and Wilke Engineuity Inc. are now operating within the vicinity of this area, with WET-2 located slightly northwest of these facilities. Despite increased development and continued agricultural pressure, the overall flow and drainage patterns of Plum Creek have remained largely intact since the early 1930's.

In the southcentral and southwest portions of the study area, historic images reveal sparse vegetation along the edges of the agricultural fields and residential properties along Centennial Road and Sunday Drive; today, crop fields and maintained lawns dominate this portion of the study area. The present-day stream that bisects the agricultural fields in the south-central portion of the study area (WUS-1) was not observed until 1957, suggesting that this drainageway is man-made and has been altered over time. WET-7, in the southwest portion of the study area, may have been present since at least the 1930's, and the woods to the east of the wetland have remained unchanged. WUS-7, which feeds WET-7, is also visible on aerial imagery from 1937 and appears largely unchanged based on current field investigations.

In the central portion of the study area, Church Street and the surrounding agricultural lands appear largely unchanged over the last few decades. Large crop fields are present to the south of WUS-3 and to the east of WET-4 and extend east to Oxford Avenue; residential development has yet to encroach the central portion of the study area. A few residential properties along Church Street and the eastern end of Edgemoor Road have been present since the 1930's. The fenced pasture that surrounds WET-8 does not appear on historic imagery, so it was likely added in recent decades to protect the wetland area that surrounds the springhead system which flows west beneath Church Street to WUS-3. Large woodlands in the center of the study area appear to have remained intact since at least 1937, particularly surrounding stream corridors. The majority of the agricultural fields located to the east and west of Plum Creek still exist today, with minor increases in riparian and other vegetative buffer strips observed overtime.

In the eastern portion of the study area, review of historic imagery revealed large agricultural fields with little residential development until the 1990's, where small residential communities developed at the western



corner of Kindig Lane and Oxford Avenue. Today, there are a number of commercial lots present along Kindig Lane that were built throughout the 1980's and 1990's. Located at the center of Kindig Lane is the Clarks Distribution Center, one of the most prominent developed properties in the study area. The Clarks Building was built around 2011, and takes up a large portion of what was once maintained agricultural fields. Other small business have populated the southern side of Kindig Lane since the 1970's, but much of what is located to the north of the Clarks Building remains unchanged. WUS-8, the unnamed tributary to Slagles Run was observed in historic imagery and is visible from the 1930's as a mostly unchanged stream network. What was once large agricultural fields just to the east of WUS-8 are now used as recreational fields and have small facilities on-site. However, much of the land coverage to the north and northeast of the Clarks Distribution Center has preserved its agricultural use.

b. SOIL CHARACTERISTICS

The project study area lies in the Piedmont Lowland Section of the Piedmont Province (W. D. Sevon, 2000). The dominant topographic forms of this section are broad, moderately dissected, karst valleys separated by broad, low hills. It is underlain primarily by Ordovician and Cambrian aged bedrock of the Conestoga Formation, which consists of limestone, shale, conglomeratic limestone, and phyllite. A large majority of the study area is underlain by Cambrian aged bedrock from the Kinzers Formation, which consists of shale, limestone, and sandy limestone. The predominant soils within the study area are described below as obtained from the *Web Soil Survey of Adams and York Counties* shown in **Figure 2** in **Appendix B**, and as provided in **Table 2**.



Table 2: Soils Series Units within the Eisenhower Drive Extension Project Study Area, Adams and York Counties, Pennsylvania

Soil Mapping Symbol	Soil Mapping Unit	Hydric Status
CkA	Clarksburg silt loam, 0 to 3 percent slopes	Predominately Non-hydric (5% hydric inclusions)
CkB	Clarksburg silt loam, 3 to 8 percent slopes	Predominately Non-hydric (5% hydric inclusions)
CnA	Conestoga silt loam, 0 to 3 percent slopes	Not hydric
CnB	Conestoga silt loam, 3 to 8 percent slopes	Not hydric
CnC	Conestoga silt loam, 8 to 15 percent slopes	Not hydric
Dy	Dunning silty clay loam	Predominately Hydric (85% rating)
Pa	Penlaw silt loam	Not Hydric
ReB	Readington silt loam, 3 to 8 percent slopes	Not Hydric
Uc	Urban land	Not Hydric
UeB	Urban land-Conestoga complex, 0 to 8 percent slopes	Not Hydric

Clarksburg silt loams (CkA, CkB):

These soils feature moderate to high depths, are moderately well drained, and are typically found on valley flats. The soil is formed from residuum weathered from limestone. Depth to paralithic bedrock ranges from 60 to 99 inches and depth to a fragipan may range from 20 to 36 inches. Depth to the water table is typically 18 to 36 inches. Permeability is typically moderately low to moderately high and available water capacity is low. These soils are classified as containing hydric inclusions (hydric rating = 5%).

Conestoga silt loams (CnA, CnB, CnC):

These soils feature moderate to high depths, are well drained, and are typically found on convex slopes of hillsides. The soil is formed from residuum weathered from limestone and/or schist. Depth to paralithic bedrock is variable and may range from 60 to 99 inches. Depth to the water table is typically greater than



80 inches. Permeability is typically moderately high to high and available water capacity is moderate. All Conestoga silt loams within the project area are listed as non-hydric.

Dunning silty clay loams (Dy):

These soils are deep and very poorly drained, and are typically found on floodplains. The soil is formed from recent alluvium derived from limestone. Depth to the nearest restrictive feature is typically greater than 80 inches, and the depth to the water table is 0 to 6 inches. Permeability is moderately low to moderately high and available water capacity is high. These soils are listed as predominantly hydric (hydric rating = 85%).

Penlaw silt loams (Pa):

These soils feature moderate depths, are somewhat poorly drained, and are typically found in swale-type landforms. The soil is formed from colluvium derived from limestone, sandstone, and shale. Depth to a fragipan ranges from 15 to 30 inches, and depth to paralithic bedrock ranges from 40 to 72 inches. Depth to the water table is typically 6 to 18 inches. Permeability is moderately low to moderately high and available water capacity is low. These soils are classified as non-hydric.

Readington silt loams (ReB):

These soils feature moderate depths, are moderately well drained, and are typically found on hillslopes. The soil is formed from colluvium derived from shale and siltstone. Depth to a fragipan ranges from 20 to 36 inches, and depth to lithic bedrock ranges from 40 to 60 inches. Depth to the water table is typically 18 to 36 inches. Permeability is very low and available water capacity is moderate. These soils are classified as non-hydric.

Urban land (Uc):

Urban land substrates refer to pavement, buildings, and other artificially covered areas. These soils are classified as non-hydric.

Urban land-Conestoga complex (UeB):

These soils consist of a mix of Urban land components (e.g., man-made impervious surfaces) and Conestoga complex soils, which are deep, well drained soils that occur on hillsides. This soil is formed from residuum weathered from schist and/or limestone. Depth to lithic bedrock ranges from 60 to 99 inches. Depth to the water table is more than 80 inches. Permeability is moderately high to high and available water capacity is moderate. These soils are classified as non-hydric.

c. WATER AND WETLAND HABITAT DESCRIPTIONS

Study area wetlands found to be potentially jurisdictional were identified and delineated. For the purposes of the preliminary investigation, identified watercourses were mapped using a combination of PADEP eMapPA stream files and approximate centerlines noted in the field. Subsequent to advancements in the project design, watercourses were delineated in 2018 within an approximately 200-foot wide corridor along the preferred roadway alignment. Following are brief descriptions of each identified wetland and watercourse. Photographs are provided in **Appendix E**. The delineated wetland and watercourse boundaries, approximate stream centerlines (for non-delineated sections of watercourses), and photograph locations are shown on **Figures 7-12d** in **Appendix B**. Please see **Table 3** and **Table 4** below for summaries of the watercourses and wetlands, respectively.



Watercourses

**Table 3: Summary of Identified Watercourses within the Eisenhower Drive Extension
Project Study Area, Adams and York Counties, Pennsylvania**

Stream ID	Stream Name	Stream Type as per 25 PA Code §87.1	25 PA Code §93 Stream Designation	Primary Source	Average Width (ft)	Bank Height (ft)	Substrate	Latitude and Longitude (center of stream length in study area)
WUS-1	Trib to Plum Creek	Intermittent	WWF, MF	Surface Runoff/ Roadway Drainage	3-5	1-3	silt and gravels	39°48'18.6" N 77°02'13.9" W
WUS-2	Plum Creek	Perennial	WWF, MF	Natural Channel	20-25	3-5	silt, gravels, cobble rock, boulders	39°48'35.6" N 77°02'15.6" W
WUS-2A	Trib to Plum Creek	Intermittent	WWF, MF	Surface Runoff/ Constructed Channel	3	1-2	silt, gravels	39°48'30.0" N 77°02'11.8" W
WUS-3	Trib to Plum Creek	Intermittent	WWF, MF	Natural Channel	12-15	1-2	silt, gravels, and cobble rock	39°48'55.8" N 77°02'04.0" W
WUS-3A	Trib to Plum Creek	Intermittent	WWF, MF	Natural Channel	3-4	1	silt, pebble, and gravels	39°48'54.9" N 77°02'07.2" W
WUS-4	Trib to Plum Creek	Intermittent	WWF, MF	Surface Runoff	3-6	1	silt, gravels, and cobble rock	39°48'28.8" N 77°02'08.5" W
WUS-4A	Trib to Plum Creek	Intermittent	WWF, MF	Surface Runoff	1-3	1	sand, silt, gravels, and cobble rock	39°48'27.9" N 77°02'07.4" W
WUS-5	Trib to South Branch Conewago Creek	Intermittent	WWF, MF	Surface Runoff/ Roadway Drainage	2	0.5	silt, pebble, and gravels	39°47'54.1" N 77°03'11.7" W
WUS-6	Trib to South Branch Conewago Creek	Intermittent	WWF, MF	Surface Runoff/ Roadway Drainage	2.5	1	silt, pebble, and gravels	39°47'54.5" N 77°03'07.2" W
WUS-7	Trib to South Branch Conewago Creek	Intermittent	WWF, MF	Natural channel	5-7	2-3	silt, pebble, and gravels	39°48'06.6" N 77°02'47.7" W
WUS-8	Trib to Slagles Run	Perennial	WWF, MF	Natural Channel	12-15	2-4	silt, sand, gravels, and cobble rock	39°49'03.5" N 77°00'40.3" W
WUS-8A	Trib to Slagles Run	Intermittent	WWF, MF	Floodplain oxbow channel	5-6	0.5	silt, gravels, boulder (artificially placed)	39°48'45.3" N 77°00'17.1" W
WUS-8B	Trib to Slagles Run	Intermittent	WWF, MF	Natural Channel	4-6	2	silt/sand, gravels	39°48'58.9" N 77°00'31.1" W
WUS-9	Trib to Slagles Run	Perennial	WWF, MF	Natural Channel	10-12	1-2	silt, pebble, gravels, and cobble rock	39°48'43.9" N 77°00'18.9" W
WUS-10	Trib to Slagles Run	Intermittent	WWF, MF	Natural Channel	1-2	0.5	silt and gravels	39°48'51.8" N 77°00'22.3" W
WUS-11	Trib to Slagles Run	Intermittent	WWF, MF	Surface Runoff	5 to 8	2-4	silt	39°49'17.3" N 77°00'50.8" W

Waters of the U.S. 1 (WUS-1)

Waters of the U.S. 1 (WUS-1) is an unnamed tributary to Plum Creek located in the southwestern portion of the study area (see **Photos 1-4** in **Appendix E**; **Figures 8a, 8f, and 8g** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/5) crosses beneath Centennial Road in the southern portion of the



study area and flows north between agricultural fields, bisecting a PEM/PFO wetland (WET-1, see description below) before reaching its confluence with Plum Creek. Based on a review of historic aerial imagery (PennPilot), a large portion of WUS-1 appears to have been man-made between Centennial Road and the forested area to the north. The streambanks associated with WUS-1 were dominated by a variety of herbaceous and woody vegetation, including reed canarygrass (*Phalaris arundinacea*, FACW), ash-leaf maple (*Acer negundo*, FAC), silver maple (*Acer saccharinum*, FACW), northern red oak (*Quercus rubra*, FACU), ground ivy (*Glechoma hederacea*, FACU), giant foxtail (*Setaria faberi*, UPL), common milkweed (*Asclepias syriaca*, FACU), poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*, FACU), multiflora rose (*Rosa multiflora*, FACU), and goldenrod (*Solidago* sp.). The canopy cover associated with WUS-1 was approximately 50 percent. The stream width was approximately 3 to 5 feet and the water depth observed during field investigations was 1 to 6 inches. The stream substrate was dominated by silt and gravels. A FEMA-designated 100-year floodplain encompasses the northern portion of WUS-1 within the forested area.

Waters of the U.S. 2 (WUS-2)

Waters of the U.S. 2 (WUS-2) is a perennial stream (Cowardin classification = R5UB1/3) that generally flows in a northerly direction through the western portion of the study area and is known as Plum Creek (see **Photos 5-7 in Appendix E; Figures 8a-8f in Appendix B**). The streambanks associated with WUS-2 were dominated by a variety of herbaceous and woody vegetation, including red maple (*Acer rubrum*, FAC), Norway maple (*Acer platanoides*, UPL), black walnut (*Juglans nigra*, FACU), black cherry (*Prunus serotina*, FACU), northern red oak, ash-leaf maple, multiflora rose, poison ivy, Japanese honeysuckle, reed canarygrass, and nodding wild rye (*Elymus canadensis*, FACU). Overall, canopy cover was approximately 60 percent within the WUS-2 stream corridor. Portions of the streambanks were heavily incised within the stream corridor, and were lined with rip-rap in several areas. The stream width was approximately 20 to 25 feet and water depth ranged from 6 inches to over 2 feet in the stream corridor. The substrate was composed of a mix of silt, gravel, and cobble rock with occasional small boulders. Plum Creek is located within a FEMA designated 100-year floodplain.

Waters of the U.S. 2A (WUS-2A)

Waters of the U.S. 2A (WUS-2A) is a short, unnamed tributary to Plum Creek that drains into WUS-2 in the western portion of the study area (see **Photos 74-75 in Appendix E; Figures 8a and 8d in Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) flows north and consists of a channel that connects an NPDES outfall pipe associated with the nearby water treatment plant to Plum Creek. The streambanks were approximately 1 to 2 feet in height, and a vegetated berm was observed between Plum Creek and WUS-2A. Overall, the canopy cover associated with WUS-2A was 20 percent. The stream width was approximately 8 feet at the outfall pipe and 3 feet in the remainder of the channel, and the water depth was approximately 2 to 6 inches. The stream substrate was dominated by silt and features sparse gravels. WUS-2A is located within a FEMA designated 100-year floodplain area.

Waters of the U.S. 3 (WUS-3)

Waters of the U.S. 3 (WUS-3) is an unnamed tributary to Plum Creek located in the northern portion of the study area (see **Photos 8-9 in Appendix E; Figures 8a-8b in Appendix B**). This intermittent stream



(Cowardin classification = R4SB3/5) generally flows west and then north towards its confluence with Plum Creek. The streambanks associated with WUS-3 were dominated by a variety of herbaceous and woody vegetation, including ash-leaf maple, black walnut, ash (*Fraxinus* sp.), honey-locust (*Gleditsia triacanthos*, FAC), multiflora rose, ground ivy, Japanese honeysuckle, grape (*Vitis* sp.), garlic mustard (*Alliaria petiolata*, FACU), and grasses. Overall, the canopy cover associated with WUS-3 was approximately 85 percent. The stream width was approximately 12 to 15 feet and the water depth was approximately 2 to 8 inches. The stream substrate was dominated by silt, gravel, and cobble. WUS-3 is located within a FEMA designated 100-year floodplain area.

Waters of the U.S. 3A (WUS-3A)

Waters of the U.S. 3A (WUS-3A) is an unnamed tributary to Plum Creek that drains into WUS-3 located in the northern portion of the study area (see **Photo 50** in **Appendix E**; **Figures 10** and **10a** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) generally flows northwest, connecting WET-9 to WUS-3. The streambanks associated with WUS-3A were dominated by a variety of herbaceous and woody vegetation, including multiflora rose and Japanese honeysuckle. Overall, the canopy cover associated with WUS-3A was 60 percent. The stream width was approximately 3 to 4 feet and the water depth was approximately 1 to 3 inches. The stream substrate was dominated by silt, pebble, and gravel. WUS-3A is located within a FEMA designated 100-year floodplain area.

Waters of the U.S. 4 (WUS-4)

Waters of the U.S. 4 (WUS-4) is an unnamed tributary to Plum Creek located in the western portion of the study area, to the north and west of Tiffany Court (see **Photos 10-11** in **Appendix E**; **Figures 8a** and **8d** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) flows in a westerly direction towards its confluence with Plum Creek. Stormwater runoff associated with the residential properties to the east and south is conveyed into WUS-4 through twin pipes at its eastern end. The streambanks associated with WUS-4 were dominated by a variety of herbaceous and woody vegetation, including ash-leaf maple, ash, multiflora rose, Japanese honeysuckle, grape, garlic mustard, and grasses. Overall, the canopy cover associated with WUS-4 was approximately 50 percent. The stream width was approximately 3 to 6 feet and the water depth ranged from approximately 2 to 6 inches. The stream substrate was dominated by silt, gravel, and cobble rock. A FEMA-designated 100-year floodplain encompasses the westernmost portion of WUS-4 within the vicinity of Plum Creek.

Waters of the U.S. 4A (WUS-4A)

Waters of the U.S. 4A (WUS-4A) is a small unnamed tributary to Plum Creek that drains into WUS-4 in the western portion of the study area (see **Photo 12** in **Appendix E**; **Figures 8a** and **8d** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) flows in a northwesterly direction towards its confluence with WUS-4, and is located to the west of the Tiffany Court residential area. The canopy cover was approximately 80 percent, and was primarily dominated by ash-leaf maple and green ash (*Fraxinus pennsylvanica*, FACW). The stream width was approximately 1 to 3 feet and the water depth ranged from approximately 1 to 3 inches. The stream substrate was a mix of sand, silt, gravel, and cobble rock. WUS-4A is located within a FEMA designated 100-year floodplain area.



Waters of the U.S. 5 (WUS-5)

Waters of the U.S. 5 (WUS-5) is an unnamed tributary to the South Branch Conewago Creek located in the southwestern portion of the study area, to the south of Hanover Road (Route 116) (see **Photo 39** in **Appendix E; Figures 9 and 9b** in **Appendix B**). This narrow intermittent stream (Cowardin classification = R4SB3/4) flows in a westerly direction towards its confluence with the South Branch Conewago Creek. The streambanks associated with WUS-5 were dominated by a variety of herbaceous and woody vegetation, including Japanese honeysuckle, Canada thistle (*Cirsium arvense*, FACU), and grasses. The stream width was approximately 2 feet and the water depth ranged from approximately 0.5 to 1 inch. The stream substrate was dominated by silt, pebble, and gravel. A FEMA-designated 100-year floodplain encompasses the westernmost portion of WUS-5 within the vicinity of the South Branch Conewago Creek.

Waters of the U.S. 6 (WUS-6)

Waters of the U.S. 6 (WUS-6) is an unnamed tributary to the South Branch Conewago Creek located in the southwestern portion of the study area, to the north of Hanover Road (see **Photos 40-41** in **Appendix E; Figures 9 and 9b** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) flows in a westerly direction towards its confluence with the South Branch Conewago Creek. WUS-6 emanates from a pipe on an adjacent residential property and an additional crosspipe from under Route 116 connects to WUS-6 at its western end. The streambanks associated with WUS-6 were dominated by a variety of herbaceous and woody vegetation, including Japanese honeysuckle, Fuller's teasel (*Dipsacus fullonum*, FACU), common milkweed, evening primrose (*Oenothera parviflora*, FACU), and Canada thistle. The stream width was approximately 2.5 feet and the water depth ranged from approximately 0.5 to 2 inches. The stream substrate was dominated by silt, pebble, and gravel. A FEMA-designated 100-year floodplain encompasses the westernmost portion of WUS-6 within the vicinity of the South Branch Conewago Creek.

Waters of the U.S. 7 (WUS-7)

Waters of the U.S. 7 (WUS-7) is an unnamed tributary to the South Branch Conewago Creek located in the southwestern portion of the study area, to the west of Sunday Drive (see **Photo 42** in **Appendix E; Figures 9 and 9a** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) flows in a westerly direction through the north end of woodlands towards its confluence with the South Branch Conewago Creek and emanates from a pipe beneath Sunday Drive. WUS-7 continues west past WET-7 between large agricultural fields. The streambanks associated with WUS-7 were dominated by a variety of herbaceous and woody vegetation, including red oak and shagbark hickory (*Carya ovata*, FACU). Overall, the canopy cover associated with WUS-7 was approximately 15 percent. The stream width was approximately 5 to 7 feet and the water depth ranged from approximately 2 to 3 inches. The stream substrate was dominated by silt, pebble, and gravel. A FEMA-designated 100-year floodplain encompasses the westernmost portion of WUS-7 within the vicinity of the South Branch Conewago Creek.

Waters of the U.S. 8 (WUS-8)

Waters of the U.S. 8 (WUS-8) is an unnamed tributary to Slagles Run located in the eastern portion of the study area, to the north and south of Kindig Lane (see **Photos 53, 58, 64, and 76** in **Appendix E; Figures 11, 11b-11c, 12, and 12a-12c** in **Appendix B**). This perennial stream (Cowardin classification = R3SB3/4)



flows in a northerly direction towards its confluence with Slagles Run. Small fish were observed throughout WUS-8 during field investigations. Streambanks associated with WUS-8 were dominated by a variety of herbaceous and woody vegetation, including Morrow's honeysuckle (*Lonicera morrowii*, FACU), garlic mustard, Japanese hops (*Humulus japonicus*, FACU), ash-leaf maple, silver maple, Norway maple, and black cherry. Overall, the canopy cover associated with WUS-8 ranged from approximately 50 to 75 percent. The stream width was approximately 12 to 15 feet and the water depth ranged from approximately 6 to 12 inches. The stream substrate was dominated by silt, sand, gravel, and sparse cobble. The streambanks of WUS-8 are heavily eroded and are approximately 2 to 4 feet throughout. The northern portion of WUS-8 is located within a FEMA designated 100-year floodplain.

Waters of the U.S. 8A (WUS-8A)

Waters of the U.S. 8A (WUS-8A) is an unnamed tributary to Slagles Run that drains into WUS-8 located in the eastern portion of the study area (see **Photos 55-56** in **Appendix E**; **Figures 11** and **11b** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) consists of a braided channel system in a low-lying area to the north of WUS-8. Several beaver dams and natural dams within WUS-8 and WUS-8A serve to divert flow into the system. The streambanks associated with WUS-8A were dominated by a variety of herbaceous and woody vegetation, including Morrow's honeysuckle, Japanese honeysuckle, ash-leaf maple, Eastern poison ivy (*Toxicodendron radicans*, FAC), and silver maple. Overall, the canopy cover associated with WUS-8A was approximately 75 percent. The stream width in the main channel was approximately 5 to 6 feet and the water depth ranged from approximately 1 to 4 inches. The stream substrate was dominated by silt and gravel, and has been stabilized by large boulders at its western end.

Waters of the U.S. 8B (WUS-8B)

Waters of the U.S. 8B (WUS-8B) is an unnamed tributary to Slagles Run that drains into WUS-8 located in the eastern portion of the study area (see **Photos 76-77** in **Appendix E**; **Figures 12** and **12b** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) consists of an oxbow channel in a low-lying area to the north of WUS-8 and north of the Clarks Building. Multiple beaver dams and natural debris dams were observed in WUS-8 that serve to divert flow into WUS-8B. The streambanks were moderately incised (bank heights of 2 feet) and were dominated by a variety of herbaceous and woody vegetation, including ash-leaf maple, Osage-orange (*Maclura pomifera*, UPL), multiflora rose, Japanese honeysuckle, and grasses. Overall, the canopy cover associated with WUS-8B was approximately 50 percent. The stream width averaged approximately 4 to 6 feet and the water depth was approximately 4 to 12 inches. The stream substrate was dominated by a mix of silt, sand, and gravels, with the upstream end choked with gravel deposition.

Waters of the U.S. 9 (WUS-9)

Waters of the U.S. 9 (WUS-9) is an unnamed tributary to Slagles Run that drains into WUS-8, and is located in the eastern portion of the study area to the north of Kindig Lane (see **Photos 57-58** in **Appendix E**; **Figures 11** and **11b** in **Appendix B**). This perennial stream (Cowardin classification = R2SB3/4) flows in a northerly direction towards its confluence with WUS-8. The streambanks associated with WUS-9 were dominated by a variety of herbaceous and woody vegetation, including Morrow's honeysuckle, Japanese honeysuckle, and silver maple. Overall, the canopy cover associated with WUS-9 was approximately 75



percent. The stream width was approximately 10 to 12 feet and the water depth ranged from approximately 2 to 5 inches. The stream substrate was dominated by silt, pebble, gravel, and cobble.

Waters of the U.S. 10 (WUS-10)

Waters of the U.S. 10 (WUS-10) is an unnamed tributary to Slagles Run that drains into WUS-8, and is located in the eastern portion of the study area to the west of recreational soccer fields (see **Photo 61** in **Appendix E; Figures 11 and 11c** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB3/4) flows in a westerly direction from WET-11 towards its confluence with WUS-8. The streambanks associated with WUS-10 were dominated by a variety of herbaceous and woody vegetation, including silver maple, ash-leaf maple, mulberry (*Morus* sp.), Japanese stiltgrass (*Microstegium vimineum*, FAC), and watercress (*Nasturtium officinale*, OBL). Overall, the canopy cover associated with WUS-10 was approximately 90 percent. The stream width was approximately 1 to 2 feet and the water depth ranged from approximately 0 to 3 inches. The stream substrate was dominated by silt and gravel.

Waters of the U.S. 11 (WUS-11)

Waters of the U.S. 11 (WUS-11) is an unnamed tributary to Slagles Run located in the eastern portion of the study area, along a narrow woodline located west of WUS-8 (see **Photo 70** in **Appendix E; Figures 12 and 12c** in **Appendix B**). This intermittent stream (Cowardin classification = R4SB4) flows in a northerly direction from the Whisler property. The streambanks associated with WUS-11 were dominated by a variety of herbaceous and woody vegetation, including Morrow's honeysuckle, Japanese privet (*Ligustrum japonicum*, UPL), garlic mustard, ash-leaf maple, and green ash. Overall, the canopy cover associated with WUS-11 was approximately 75 percent. The stream width was approximately 5 to 8 feet and the water depth ranged from approximately 5 to 8 inches. The stream substrate was dominated by silt. The streambanks of WUS-11 are heavily eroded and are approximately 2 to 4 feet in height throughout. WUS-11 is located within a FEMA designated 100-year floodplain.



Wetlands

Table 4: Summary of Delineated Wetlands within the Eisenhower Drive Extension Project Study Area, Adams and York Counties, Pennsylvania

Wetland ID	Cowardin Class	Acreage Within Study Area	Primary Hydrology Sources	Dominant Vegetation ¹	Latitude and Longitude (wetland center)
WET-1	PFO/PEM	3.843 acres	high water table, surface runoff, high flows from WUS-1	reed canarygrass, red maple, green ash, ash-leaf maple, Eastern poison ivy, skunk cabbage	39°48'27.7" N 77°02'17.0" W
WET-2	PFO/PEM	5.057 acres	groundwater seeps, surface runoff, piped drainage	reed canarygrass, ash-leaf maple, green ash, silky dogwood, multiflora rose	39°48'25.1" N 77°02'01.3" W
WET-3	PEM	0.047 acre	high water table, surface runoff, high flows from WUS-3	reed canarygrass, arrow-leaf tearthumb	39°49'05.6" N 77°02'20.2" W
WET-4	PEM	6.437 acres	high water table, surface runoff	reed canarygrass	39°48'45.4" N 77°02'13.9" W
WET-5	PEM	0.060 acre	small seep, surface runoff, high flows from Plum Creek	reed canarygrass	39°49'03.2" N 77°02'20.0" W
WET-6	PFO	8.229 acres	small seep, high water table, surface runoff	green ash, oaks, ash-leaf maple, multiflora rose, skunk cabbage	39°48'34.7" N 77°02'10.0" W
WET-7	PEM	0.352 acre	high water table, surface runoff, high flows from WUS-7	reed canarygrass	39°48'06.3" N 77°02'45.8" W
WET-8	PEM	0.144 acre	groundwater spring, surface runoff	reed canarygrass	39°48'58.0" N 77°01'49.5" W
WET-9	PEM	0.025 acre	small seep, surface runoff	reed canarygrass	39°48'54.5" N 77°02'07.0" W
WET-10	PEM	0.050 acre	high water table, surface runoff perched on clays	reed canarygrass	39°48'55.4" N 77°02'05.3" W
WET-11	PEM	0.026 acre	small seep, surface runoff	reed canarygrass	39°48'51.5" N 77°00'20.9" W
WET-12	PFO	0.184 acre	high water table, surface runoff	reed canarygrass, Japanese stiltgrass, green ash, black gum	39°48'54.2" N 77°00'24.4" W
WET-13	PEM	0.524 acre	high water table, surface runoff	reed canarygrass, broadleaf cattail	39°49'01.3" N 77°00'40.4" W
WET-14	PEM	0.012 acre	high water table, surface/roadway runoff	broadleaf cattail	39°48'39.6" N 77°00'49.9" W
WET-15	PEM	0.104 acre	high water table, surface runoff perched on clays	reed canarygrass	39°49'07.1" N 77°00'41.4" W
WET-16	PEM	0.051 acre	high water table, surface runoff perched on clays	reed canarygrass	39°49'03.0" N 77°00'36.8" W
WET-17	PEM	0.865 acre	high water table, surface runoff	reed canarygrass	39°49'18.4" N 77°00'18.2" W

¹ Species listed in this section were the dominant plants observed in each wetland as a whole, and did not always match exactly with dominant species on Wetland Determination Data Forms from the sample plots.



Wetland 1 (WET-1)

Wetland 1 (WET-1) is located in the southwestern portion of the study area, and consists of a mixed PFO/PEM wetland approximately 3.84 acres in size (see **Photos 13-17** in **Appendix E**; **Figures 8a** and **8f** in **Appendix B**). The PEM portion of the wetland is approximately 0.34 acres and occurs within a silted-in portion of the WUS-1 channel embedded between agricultural fields to the east and west. WUS-1 continues to flow northward into the PFO wetland area, which is approximately 3.51 acres in size. A large portion of WET-1 corresponds to an NWI-mapped PFO1A wetland (**Figure 3** in **Appendix B**). Hydrology is supplied by a seasonally high groundwater table, surface runoff, and flows conveyed by the intermittent WUS-1 channel.

The DP-1-WET sample plot was taken at the northern end of the PEM portion of WET-1. Vegetation within the DP-1-WET sample plot was dominated by reed canarygrass, and additional species observed included broad-leaf cattail (*Typha latifolia*, OBL), dark-green bulrush (*Scirpus atrovirens*, OBL), blue vervain (*Verbena hastata*, FACW), and goldenrod. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-1-WET featured a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 0 and 6 inches in depth, and a 10 YR 5/2 matrix with 10 YR 6/8 redoxymorphic features between 6 and 18 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). The PEM wetland area displayed indicators of high water table, saturation, drainage patterns, geomorphic position, and the FAC-Neutral Test, thus fulfilling the hydrology parameter. Based on these reasons, the emergent portion of WET-1 was delineated as a jurisdictional wetland.

The DP-1A-WET sample plot was taken within the PFO portion of WET-1. Vegetation within the DP-1A-WET sample plot was dominated by green ash, red maple, northern spicebush (*Lindera benzoin*, FAC), multiflora rose, smooth alder (*Alnus serrulata*, OBL), garlic mustard, jewelweed (*Impatiens capensis*, FACW), skunk cabbage (*Symplocarpus foetidus*, OBL), thyme-leaf speedwell (*Veronica serpyllifolia*, FAC), and Eastern poison ivy. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-1A-WET featured a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 0 and 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). The PFO wetland area displayed hydrology indicators of surface water, surface soil cracks, drainage patterns, geomorphic position, and the FAC-Neutral Test, thus fulfilling the hydrology parameter. Based on these reasons, the forested portion of WET-1 was delineated as a jurisdictional wetland.

WET-1 has some effectiveness at performing the functions/values of floodflow alteration, sediment/toxicant retention, nutrient removal, sediment stabilization, and wildlife habitat. The principal functions/values performed by WET-1 are sediment/toxicant retention and nutrient removal. The main channel within the wetland and the hydric soils throughout can retain excessive stormwater and floodwaters prior to reaching Plum Creek. WET-1 also traps sediments and nutrients and filters pollutants from stormwater runoff associated with adjacent agricultural fields and residential development. Finally, the mix of emergent and forested habitats and associated stream provide moderate habitat for a variety of wildlife species. See the



Wetland Function-Value Evaluation Form for WET-1 in **Appendix F**.

Wetland 2 (WET-2)

Wetland 2 (WET-2) is located in the southwestern portion of the study area, and consists of a mixed PFO/PEM wetland approximately 5.06 acres in size (see **Photos 18-23** in **Appendix E**; **Figures 8a** and **8d-8e** in **Appendix B**). The forested portion of the wetland is approximately 4.62 acres, while the emergent portion is a small (0.44 acre) area that cuts across the center of the wetland. A large portion of WET-2 corresponds to an NWI-mapped PFO1/SS1A wetland (**Figure 3** in **Appendix B**). Wetland hydrology is supplied by groundwater springs and seeps, conveyed drainage channels from up-slope properties, and surface runoff, generally flowing in a northwesterly direction through the wetland prior to draining into Plum Creek.

Vegetation within the DP-2-WET sample plot was dominated by ash-leaf maple, silky dogwood (*Cornus amomum*, FACW), multiflora rose, reed canarygrass, Virginia wild rye (*Elymus virginicus*, FACW), a grass species, and poison ivy. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-2-WET featured a 10 YR 4/2 matrix with 10 YR 4/6 redoxymorphic features between 0 and 16 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). WET-2 displayed hydrology indicators of surface water, water marks, water-stained leaves, drainage patterns, geomorphic position, and the FAC-Neutral Test, thus fulfilling the hydrology parameter. Based on these reasons, WET-2 was delineated as a jurisdictional wetland.

WET-2 has some effectiveness at performing the functions/values of groundwater discharge, floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions/values performed by WET-2 are sediment/toxicant retention, nutrient removal, and wildlife habitat. This wetland can retain excessive stormwater and floodwaters prior to reaching Plum Creek. WET-2 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields, residential properties, and industrial development. Finally, the mix of emergent and forested habitats with both wet and dry areas provide moderate habitat for a variety of wildlife species. WET-2 also exhibits characteristics of marginal potential bog turtle habitat, which is discussed later in this report. See the Wetland Function-Value Evaluation Form for WET-2 in **Appendix F**.

Wetland 3 (WET-3)

Wetland 3 (WET-3) is a small (0.05 acre) PEM wetland located in the northwestern portion of the study area (see **Photos 24-25** in **Appendix E**; **Figures 8a-8b** in **Appendix B**). WET-3 consists of a low-lying fringe wetland associated with an unnamed tributary to Plum Creek (WUS-3). Wetland hydrology is supplied by a seasonally high groundwater table, surface runoff, and high flows from WUS-3.

Vegetation within the DP-3-WET sample plot was dominated by reed canarygrass and arrow-leaf tearthumb (*Persicaria sagittata*, OBL). The hydrophytic vegetation parameter was met by the Rapid Test and since greater than 50% of the dominant plant species were FAC or wetter.



The soil sample from DP-3-WET featured a 10 YR 4/1 matrix with 5 YR 5/6 redoximorphic features between 3 and 14 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). WET-3 displayed hydrology indicators of surface water, high water table, saturation, drainage patterns, geomorphic position, and the FAC-Neutral Test, thus fulfilling the hydrology parameter. Based on these reasons, WET-3 was delineated as a jurisdictional wetland.

WET-3 has some effectiveness at performing the functions/values of groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, sediment stabilization, and wildlife habitat. The principal functions/values performed by WET-3 are sediment/toxicant retention, nutrient removal, and sediment stabilization. Surface waters are slowed by dense vegetation within this wetland during storm events. WET-3 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and developed properties. The vegetated portion of the wetland channel provides minor streambank stabilization along WUS-3. The overall value of these functions is minor due to the small size of the wetland. See the Wetland Function-Value Evaluation Form for WET-3 in **Appendix F**.

Wetland 4 (WET-4)

Wetland 4 (WET-4) is located in the western portion of the study area, and consists of a large PEM wetland approximately 6.44 acres in size (see **Photos 26-29** in **Appendix E**; **Figures 8a-8d** in **Appendix B**). A large portion of WET-4 corresponds to an NWI-mapped PEM5A wetland (**Figure 3** in **Appendix B**). Wetland hydrology is supplied by a seasonally high groundwater table, surface runoff, and occasional high flows from Plum Creek and its nearby tributaries. In addition, surface waters may become perched above a fine clay layer within a large portion of this wetland.

Vegetation within the DP-4-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met by the Rapid Test and since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-4-WET featured a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 2 and 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). A fine clay layer was observed beginning below 12 inches in depth, which could act as an impermeable layer within the soil profile. Wetland hydrology indicators of surface water, drainage patterns, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-4 was delineated as a jurisdictional wetland.

WET-4 has some effectiveness at performing the functions of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-4 are sediment/toxicant retention, nutrient removal, and wildlife habitat. This wetland can retain excessive stormwater and floodwaters prior to reaching Plum Creek. WET-4 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and developed properties. Finally, the large emergent wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-4 in **Appendix F**.



Wetland 5 (WET-5)

Wetland 5 (WET-5) is a small (0.06 acre) PEM wetland located in the western portion of the study area (see **Photos 30-32** in **Appendix E**; **Figures 8a-8b** in **Appendix B**). WET-5 consists of a depressional wetland adjacent to the western side of Plum Creek. Wetland hydrology is supplied by a small spring seep, seasonally high groundwater table, surface runoff, and high flows from Plum Creek.

Vegetation within the DP-5-WET sample plot was dominated by reed canarygrass, and also included broad-leaf cattail and halberd-leaf tearthumb (*Persicaria arifolia*, OBL). The hydrophytic vegetation parameter was met by the Rapid Test and since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-5-WET featured a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 6 and 18 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, drainage patterns, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-5 was delineated as a jurisdictional wetland.

WET-5 has some effectiveness at performing the functions/values of groundwater discharge, floodflow alteration, nutrient removal, sediment/toxicant retention, sediment stabilization, and minor wildlife habitat. The principal functions/values performed by WET-5 are groundwater discharge, sediment/toxicant retention, and nutrient removal. A small groundwater spring/seep is present adjacent to Plum Creek. Surface waters are slowed by dense vegetation within this wetland during storm events. WET-5 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and developed properties. Dense vegetation within WET-5 provides minor streambank stabilization. The overall value of these functions is minor due to the small size of the wetland. See the Wetland Function-Value Evaluation Form for WET-5 in **Appendix F**.

Wetland 6 (WET-6)

Wetland 6 (WET-6) is located in the western portion of the study area, and consists of a large PFO wetland approximately 8.23 acres in size (see **Photos 33-36** in **Appendix E**; **Figures 8a** and **8c-8d** in **Appendix B**). This wetland is contiguous with the emergent WET-4 to the north. A large portion of WET-6 corresponds to an NWI-mapped PFO1A wetland (**Figure 3** in **Appendix B**). Wetland hydrology is supplied by a small groundwater spring seep, seasonally high groundwater table, surface runoff, and occasional high flows from Plum Creek and its nearby tributaries.

Vegetation within the DP-6-WET sample plot was dominated by green ash, burr oak (*Quercus macrocarpa*, FAC), ash-leaf maple, multiflora rose, silky dogwood, small-spike false nettle (*Boehmeria cylindrica*, FACW), skunk cabbage, and poison ivy. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-6-WET featured a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 2 and 15 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, water marks, sediment deposits, water-stained leaves, drainage patterns, geomorphic position, microtopographic



relief, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-6 was delineated as a jurisdictional wetland.

WET-6 has some effectiveness at performing the functions/values of groundwater discharge, floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-6 are sediment/toxicant retention and wildlife habitat. This wetland can retain excessive stormwater and floodwaters prior to reaching Plum Creek. WET-6 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and residential properties. Finally, the large forested wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-6 in **Appendix F**.

Wetland 7 (WET-7)

Wetland 7 (WET-7) is located in the southwestern portion of the study area, and consists of a PEM wetland approximately 0.35 acre in size (see **Photos 43-44** in **Appendix E**; **Figures 9** and **9a** in **Appendix B**). This wetland is fed by WUS-7 from the east, and is situated within a vegetated portion of the WUS-7 channel and adjacent depressional area. Wetland hydrology is supplied by a seasonally high groundwater table, overland runoff and drainage from adjacent agricultural fields, and occasional high flows from WUS-7.

Vegetation within the DP-7-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-7-WET featured a 10 YR 3/2 matrix between 0 and 2 inches in depth, a 10 YR 5/1 matrix with 5 YR 4/6 redoxymorphic features between 2 and 14 inches in depth, and a 10 YR 5/2 matrix with 10 YR 5/6 redoxymorphic features between 14 and 16 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, drainage patterns, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-7 was delineated as a jurisdictional wetland.

WET-7 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, sediment/shoreline stabilization and wildlife habitat. The principal functions performed by WET-7 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to continuing down WUS-7. WET-7 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and residential properties. Finally, the emergent wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-7 in **Appendix F**.

Wetland 8 (WET-8)

Wetland 8 (WET-8) is located in the central portion of the study area, and consists of a small PEM wetland approximately 0.15 acre in size (see **Photos 45-47** in **Appendix E**; **Figures 10** and **10b** in **Appendix B**). WET-8 consists of a depressional, spring-fed wetland surrounded by a fenced pasture. The wetland occurs just east of Church Street and drains directly into WUS-3, which flows beneath Church Street and continues further west. Wetland hydrology is primarily supplied by the groundwater spring system, and is supplemented



by overland runoff and drainage from adjacent agricultural fields.

Vegetation within the DP-8-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-8-WET featured a 10 YR 4/3 matrix 0 and 2 inches in depth, a 10 YR 5/1 matrix with 10 YR 4/6 redoxymorphic features between 2 and 10 inches in depth, and a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 10 and 18 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-8 was delineated as a jurisdictional wetland.

WET-8 has some effectiveness at performing the functions/values of groundwater discharge, floodflow alteration, nutrient removal, sediment/toxicant retention, wildlife habitat, and marginal potential endangered species habitat. This wetland is fed by a groundwater spring system. The principal functions performed by WET-8 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-3. WET-8 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and residential properties. The small wetland provides moderate habitat for a variety of wildlife species and includes marginal potential bog turtle habitat; however, the occurrence of the species in WET-8 is currently unknown. See the Wetland Function-Value Evaluation Form for WET-8 in **Appendix F**.

Wetland 9 (WET-9)

Wetland 9 (WET-9) is located in the north-central portion of the study area, and consists of a small PEM wetland approximately 0.02 acre in size (see **Photos 48-49** in **Appendix E**; **Figures 10** and **10a** in **Appendix B**). WET-9 consists of a depressional wetland along the southern side of WUS-3, draining into the stream via a small tributary (WUS-3A). Wetland hydrology is supplied by a small groundwater seep, seasonally high groundwater table, and overland runoff from adjacent agricultural fields.

Vegetation within the DP-9-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-9-WET featured a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 0 and 18 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-9 was delineated as a jurisdictional wetland.

WET-9 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-9 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-3 and WUS-3A. WET-9 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and residential



properties. Finally, the small wetland provides marginal habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-9 in **Appendix F**.

Wetland 10 (WET-10)

Wetland 10 (WET-10) is located in the north-central portion of the study area, and consists of a small PEM wetland approximately 0.05 acre in size (see **Photos 51-52** in **Appendix E**; **Figures 10** and **10a** in **Appendix B**). WET-10 consists of a depressional wetland located just east of WET-9 and on the southern side of WUS-3. Wetland hydrology is supplied by a seasonally high groundwater table, overland runoff from adjacent agricultural fields, and occasional high flows from WUS-3. Episaturated soils were observed atop a dense clay-dominated soil layer within the wetland.

Vegetation within the DP-10-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-10-WET featured a 10 YR 4/3 matrix between 0 and 3 inches in depth and a 10 YR 5/1 matrix with 5 YR 4/6 redoxymorphic features between 3 and 14 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-10 was delineated as a jurisdictional wetland.

WET-10 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-10 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-3. WET-10 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields and residential properties. Finally, the small wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-10 in **Appendix F**.

Wetland 11 (WET-11)

Wetland 11 (WET-11) is located in the eastern portion of the study area, and consists of a small PEM wetland approximately 0.03 acre in size (see **Photos 59-61** in **Appendix E**; **Figures 11** and **11c** in **Appendix B**). WET-11 consists of a depressional wetland located east of WUS-8 and west of large, recreational fields. Wetland hydrology is supplied by a small seep and overland runoff.

Vegetation within the DP-11-WET sample plot was dominated by reed canarygrass and tussock sedge. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-11-WET featured a 10 YR 4/2 matrix with 5 YR 4/6 redoxymorphic features between 0 and 6 inches in depth and a 10 YR 5/1 matrix with 10 YR 6/6 redoxymorphic features between 6 and 14 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized



rhizospheres on living roots, geomorphic position, microtopographic relief, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-11 was delineated as a jurisdictional wetland.

WET-11 has some effectiveness at performing the functions/values of groundwater discharge, floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-11 are sediment/toxicant retention and nutrient removal. Hydrology for WET-11 is fed by a small seep within the wetland. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-8 and WUS-10. WET-11 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. Finally, the wetland provides marginal habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-11 in **Appendix F**.

Wetland 12 (WET-12)

Wetland 12 (WET-12) is located in the eastern portion of the study area, and consists of a small PFO wetland approximately 0.18 acre in size (see **Photos 62-63** in **Appendix E**; **Figures 11** and **11c** in **Appendix B**). WET-12 consists of a depressional wetland located east of WUS-8 and to the north of the Clarks building. Wetland hydrology is supplied by a seasonally high groundwater table, and overland runoff.

Vegetation within the DP-12-WET sample plot was dominated by green ash, dark-green bulrush, and Japanese stiltgrass (*Microstegium vimineum*, FAC). The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-12-WET featured a 10 YR 4/1 matrix between 0 and 5 inches in depth and a 10YR 4/1 matrix with 7.5 YR 4/6 redoxymorphic features between 5 and 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, geomorphic position, microtopographic relief, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-12 was delineated as a jurisdictional wetland.

WET-12 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-12 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-8. WET-12 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. Finally, the wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-12 in **Appendix F**.

Wetland 13 (WET-13)

Wetland 13 (WET-13) is located in the eastern portion of the study area, and consists of a small PEM wetland approximately 0.52 acre in size (see **Photos 65-66** in **Appendix E**; **Figures 12** and **12a** in **Appendix B**). WET-13 consists of a depressional wetland located west of WUS-8 and to the north of the Clarks building, and appears to be a former altered pond that has since silted in and established dense vegetation. Wetland



hydrology is supplied by a seasonally high groundwater table and overland runoff.

Vegetation within the DP-13-WET sample plot was dominated by reed canarygrass and ash-leaf maple. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-13-WET featured a 10 YR 4/2 matrix between 0 and 2 inches in depth and a 10 YR 4/1 matrix with 5 YR 4/6 redoxymorphic features between 2 and 16 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, geomorphic position, microtopographic relief, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-13 was delineated as a jurisdictional wetland.

WET-13 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-13 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-8. WET-13 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. Finally, the wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-13 in **Appendix F**.

Wetland 14 (WET-14)

Wetland 14 (WET-14) is located in the southeastern portion of the study area, and consists of a small PEM wetland approximately 0.01 acre in size (see **Photo 67** in **Appendix E**; **Figures 11** and **11a** in **Appendix B**). WET-14 consists of a depressional wetland located west of the Clarks building at the corner of Oxford Avenue and Kindig Lane. Wetland hydrology is supplied by a seasonally high groundwater table and overland and roadway runoff.

Vegetation within the DP-14-WET sample plot was dominated by broad-leaf cattail and rice cut-grass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-14-WET featured a 10 YR 2/1 matrix between 0 and 2 inches in depth, a 10 YR 3/2 matrix with 7.5 YR 4/6 redoxymorphic features between 2 and 8 inches in depth, and a 10 YR 7/8 and 10 YR 4/1 matrix between 8 and 14 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F6 (Redox Dark Surface). Wetland hydrology indicators of surface water, high water table, saturation, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-14 was delineated as a jurisdictional wetland.

WET-14 has some effectiveness at performing the functions/values of sediment/toxicant retention and nutrient removal. The principal functions performed by WET-14 are sediment/toxicant retention and nutrient removal. WET-14 traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. See the Wetland Function-Value Evaluation Form for WET-14 in **Appendix F**.



Wetland 15 (WET-15)

Wetland 15 (WET-15) is located in the eastern portion of the study area, and consists of a small PEM wetland approximately 0.10 acre in size (see **Photos 68-69** in **Appendix E**; **Figures 12** and **12a** in **Appendix B**). WET-15 consists of a depressional wetland located east of WUS-8, situated between a large agricultural field and a riparian woodland. Wetland hydrology is supplied by a seasonally high groundwater table and surface runoff perched atop a dense clay layer.

Vegetation within the DP-15-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-15-WET featured a 10 YR 4/2 matrix between 0 and 3 inches in depth, a 10 YR 4/2 matrix with 5 YR 4/6 redoxymorphic features between 3 and 6 inches in depth, and a 10 YR 4/2 matrix with 5YR 4/6 redoxymorphic features between 6 and 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, oxidized rhizospheres on living roots, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-15 was delineated as a jurisdictional wetland.

WET-15 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-15 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-8. WET-15 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. Finally, the wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-15 in Appendix F.

Wetland 16 (WET-16)

Wetland 16 (WET-16) is located in the eastern portion of the study area, and consists of a small PEM wetland approximately 0.05 acre in size (see **Photos 71-72** in **Appendix E**; **Figures 12** and **12a** in **Appendix B**). WET-16 consists of a depressional wetland located east of WUS-8 and adjacent to a large agricultural field, just south of WET-15. Wetland hydrology is supplied by a seasonally high groundwater table and surface runoff perched atop a dense clay layer.

Vegetation within the DP-16-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-16-WET featured a 10 YR 4/2 matrix with 5 YR 4/6 redoxymorphic features between 0 and 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, high water table, saturation, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-16 was delineated as a jurisdictional wetland.



WET-16 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-16 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching WUS-8. WET-16 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. Finally, the wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-16 in **Appendix F**.

Wetland 17 (WET-17)

Wetland 17 (WET-17) is located in the eastern portion of the study area, and consists of a small PEM wetland approximately 0.87 acre in size (see **Photo 73** in **Appendix E**; **Figures 12** and **12d** in **Appendix B**). WET-17 consists of a depressional wetland channel located north of Radio Road and west of the Gettysburg Railroad (CSX) line. Wetland hydrology is supplied by a seasonally high groundwater table and runoff from the adjacent agricultural fields, and saturated soils perched atop a dense clay layer.

Vegetation within the DP-17-WET sample plot was dominated by reed canarygrass. The hydrophytic vegetation parameter was met since greater than 50% of the dominant plant species were FAC or wetter.

The soil sample from DP-17-WET featured a 10 YR 4/1 matrix between 0 and 6 inches in depth and a 10 YR 4/1 matrix with 10 YR 5/6 redoxymorphic features between 6 and 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Wetland hydrology indicators of surface water, drainage patterns, geomorphic position, and the FAC-Neutral Test were observed, thus fulfilling the hydrology parameter. Based on these reasons, WET-17 was delineated as a jurisdictional wetland.

WET-17 has some effectiveness at performing the functions/values of floodflow alteration, nutrient removal, sediment/toxicant retention, and wildlife habitat. The principal functions performed by WET-17 are sediment/toxicant retention and nutrient removal. This wetland can retain excessive stormwater and floodwaters prior to reaching watercourses downstream. WET-17 also traps sediments and nutrients and filters potential pollutants from stormwater runoff associated with adjacent agricultural fields. Finally, the wetland provides moderate habitat for a variety of wildlife species. See the Wetland Function-Value Evaluation Form for WET-17 in **Appendix F**.

Stormwater Management Features

The study area contains several roadside drainage areas and other depressional stormwater features; however, with the exception of any aforementioned watercourses or wetlands, these features lack a continuous OHWM and RPW flow and do not meet the definition of a wetland. Aboveground stormwater features in the study area consist primarily of roadside grass swales and depressions with stormwater inlets.

Uplands

Upland habitats within the study area consisted of agricultural fields, maintained lawns, fallow fields, woodlands, and riparian areas. Vegetation within upland habitats in the study area was highly variable and



included ash-leaf maple, Norway maple, black walnut, black cherry, northern red oak, northern white oak (*Quercus alba*, FACU) shagbark hickory, multiflora rose, giant foxtail, goldenrod, giant ragweed (*Ambrosia trifida*, FAC), Fuller's teasel, garlic mustard, ground ivy, Japanese honeysuckle, and Eastern poison ivy. The underlying soils within the majority of the study area are mapped as Clarksburg silt loam (CkA), Conestoga silt loam (CnA, CnB), Dunning silty clay loam (Dy), Penlaw silt loam (Pa), and Urban land-Conestoga complex (UeB). The Dunning silty clay loams and Clarksburg silt loams are listed as predominantly hydric and as containing hydric inclusions, respectively, while the remainder of the soils are listed as non-hydric. Remnant hydric soil indicators were observed within some of the upland sample plots. Please see the attached Wetland Determination Data Forms in **Appendix C** for additional details on the upland sample plots associated with wetlands. Two additional sample plots (DP-A-UPL and DP-B-UPL) were recorded along the floodplain of Plum Creek and one additional plot in the floodplain of WUS-8 (DP-C-UPL), and were determined to occur in uplands.

IV. PHASE 1 BOG TURTLE HABITAT ASSESSMENT

A. PURPOSE OF STUDY

The bog turtle was listed as a federally threatened species on November 4, 1997 (USFWS, 1997), under the provisions of the Endangered Species Act of 1973, as amended, and the *Bog Turtle* (*Clemmys muhlenbergii*) *Northern Population Recovery Plan* was completed on May 15, 2001 (USFWS, 2001). This species is also classified as endangered in the state of Pennsylvania. Since this project is located within a county containing known populations of bog turtles, the USFWS requires that surveys for the bog turtle (Phase 1 Bog Turtle Habitat Survey) be completed to determine if potential habitat occurs in the vicinity of or within the proposed project limits.

B. SURVEY METHODOLOGY

Analysis of aerial photography, the Web Soil Survey of York and Adams Counties and USFWS National Wetlands Inventory mapping were reviewed. In addition, the entire wetland survey area, as described earlier in this report, was also traversed on foot during the field investigations. Searches were conducted on foot to determine if there were any wetlands that could be classified as potential bog turtle habitats. The Phase 1 Bog Turtle Habitat Assessment was conducted by Craig Patterson Nein (JMT Environmental Scientist, PA Qualified Bog Turtle Surveyor). See **Table 3** below for a summary of the Phase 1 Bog Turtle Survey results. Copies of the USFWS/PFBC Bog Turtle Habitat Field Data Sheets are included in **Appendix D**.

C. BOG TURTLE RANGE, HABITAT, AND ECOLOGY

The bog turtle is one of the smallest turtles in North America, and occurs in two geographically distinct populations. The northern population ranges from seven states in the eastern U.S. from Massachusetts south to Maryland (Conant, 1975; USFWS, 2001). In Pennsylvania, bog turtle populations are known to occur in Adams, Berks, Bucks, Carbon, Chester, Cumberland, Delaware, Franklin, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill, and York counties (USFWS, 2001; USACE, 2008a; USACE, 2008b). Historic populations in Crawford and Mercer Counties in the western portion of the state are believed to be extirpated. Major threats to the species include habitat loss, alteration, and fragmentation,



collection of animals for the illegal pet trade, and the succession of open-canopy areas and spread of non-native and native invasive plant species (USFWS, 2001).

Bog turtles tend to occur in small populations in suitable wetland habitats, which typically include herbaceous sedge meadows and fens that may be bordered by shrubby or wooded components (Lee and Norden, 1996; USFWS, 2001). These wetlands are often small (< 1.0 ha) and may be impacted by both developmental and agricultural pressures (Chase et al., 1989; Lee and Norden, 1996). Occupied bog turtle wetlands typically feature spring-fed pockets of shallow water, a substrate of soft mud, dominant vegetation of low grasses and sedges, and interspersed wet and dry pockets of microhabitat (Chase et al., 1989). Bog turtles rely on this microhabitat diversity to support their varied life history functions, such as nesting, basking and thermoregulation, foraging, and overwintering (USFWS, 2001; Ernst and Lovich, 2009). Persistent groundwater-fed hydrology is a critical component of suitable bog turtle habitat, which in turn promotes the development of soft, mucky soil conditions preferred by the species (USFWS, 2001). Although bog turtles depend on open canopy habitat for many of their ecological functions, they also use more densely vegetated areas for overwintering and other functions, and have been observed in a variety of habitats, including upland locations, when dispersing between suitable wetlands (Carter et al., 1999, 2000; Morrow et al., 2001a, 2001b; Pittman and Dorcas, 2009). The use of stream corridors for movement by the species has also been reported (e.g., Somers et al., 2007); therefore, the spatial relationship of streams to adjacent wetlands should be considered in the design of projects that may potentially impact bog turtles.

Common vegetation in occupied wetlands includes cattails (*Typha latifolia*, *T. angustifolia*), tussock sedge (*Carex stricta*), other sedge species (*Carex* spp., *Cyperus* spp., *Dulichium* spp.), rushes (*Juncus* sp.), bulrushes (*Scirpus* spp.), spikerushes (*Eleocharis* spp.), spotted jewelweed (*Impatiens capensis*), alders (*Alnus* spp.), skunk cabbage (*Symplocarpus foetidus*), arrow-leaved tearthumb (*Persicaria sagittata*), rice cut-grass (*Leersia oryzoides*), and other open canopy wetland species (USFWS, 2001). Wetlands that support bog turtles may also be colonized aggressively by invasive native and non-native plants such as reed canarygrass (*Phalaris arundinacea*) and multiflora rose (*Rosa multiflora*) (USFWS, 2001).

Bog turtles are active during the warmer months (spring to fall), and they typically emerge from overwintering during March to late April, depending on the regional location. Mating may occur from spring emergence through June, egg-laying from June through July, with hatching from August through September (USFWS, 2001). In Pennsylvania, Ernst (1977) reported that bog turtles were active from late March through late September. According to a radiotelemetry and thermoregulation study by Pittman and Dorcas (2009), bog turtles tend to spend the majority of their active time in shallow mud conditions, often within 10 cm of the surface. In Pennsylvania and New Jersey, bog turtles typically enter an overwintering location between late September and October, where they stay until mid-April (Ernst et al., 1989; Shiels, 1998).

D. RESULTS AND DISCUSSION

JMT's investigation determined that 17 palustrine wetlands exist within the wetland survey area. **Table 3** below gives a summary of the bog turtle Phase 1 survey results. The boundaries of the delineated wetlands and approximate centerlines of intermittent and perennial streams are depicted on mapping in **Appendix B (Figures 7-12c)**.



Wetland 1 (WET-1)

Wetland 1 (WET-1) is an approximately 3.84 acre PFO/PEM wetland located in the southwestern portion of the study area (see **Photos 13-17** in **Appendix E**; **Figures 8a** and **8f** in **Appendix B**). This wetland occurs to the west of Plum Creek, and is bordered by agricultural fields and riparian forests. The narrow PEM portion (0.34 acre) of WET-1 is situated within a vegetated segment of an intermittent stream (WUS-1), which flows north into the larger PFO (3.51 acres) wetland area. No persistent groundwater springs or seeps were observed in WET-1, as surface waters were restricted to flows within the intermittent stream channel at 1 to 5 inches in depth. Mucky soils were limited to a small portion of the PEM wetland area that had silted in within the main channel, and could be probed from 3 to 6 inches in depth. The remainder of the PEM area and the entire forested portion of the wetland featured hard-bottomed soils.

Vegetation in the PEM portion of WET-1 was dominated by reed canarygrass and also included sparse cattails and sedges, while the forested wetland area was dominated by green ash, red maple, ash-leaf maple, oaks (*Quercus* sp.), multiflora rose, skunk cabbage (florets observed at the surface), garlic mustard, and Japanese honeysuckle. Subsurface structural characteristics (e.g., tunnels, root mats) were not observed within the wetland. In addition, both potential nesting and overwintering habitat were highly limited. Due largely to the lack of persistent groundwater sources and limited mucky soil substrates, it was determined that WET-1 does not contain potential bog turtle habitat.

Wetland 2 (WET-2)

Wetland 2 (WET-2) is an approximately 5.06 acre PFO/PEM wetland located in the southwestern portion of the study area (see **Photos 18-23** in **Appendix E**; **Figures 8a** and **8d-8e** in **Appendix B**). WET-2 is primarily bordered by fallow fields to the west and developed lands to the east and south. This wetland is situated to the east of Plum Creek, and consists of a man-made/altered drainage channel running along the southwestern portion of WET-2, as well as groundwater-fed areas. The main drainage channel emanates from a culvert conveying water from the Hanover Wastewater Treatment Facility to the south of the wetland. Groundwater spring seeps were observed within and immediately adjacent to the PEM portion (0.44 acre) of the wetland, which converges with the drainage channel in the center of the wetland and continues to flow northwest towards Plum Creek. Surface water was observed at a depth of 1 to 3 inches in small depressions and rivulets, and 2 to 6 inches in the main drainage channel. Approximately 35 percent of the PEM and 10 percent of the larger PFO wetland areas featured mucky soils at depths of 3 to 12 inches and 3 to 8 inches, respectively. The majority of WET-2 featured hard-bottomed soil substrates. Outside of the concentrated groundwater-fed/drainage areas, a large portion of WET-2 featured drier forest with scattered, hard-bottomed depressions that seasonally collect surface water (i.e., vernal pools).

Vegetation within WET-2 was dominated by reed canarygrass, silky dogwood, multiflora rose, green ash, ash-leaf maple, goldenrod, and bush honeysuckle (*Lonicera* sp.). Additional vegetation observed included broad-leaf cattail, shallow sedge (*Carex lurida*), New York ironweed (*Vernonia noveboracensis*), rice cutgrass (*Leersia oryzoides*), and red maple. Subsurface structural characteristics (e.g., tunnels, root mats) were concentrated within the PEM portion of the wetland and adjacent forested areas with groundwater hydrology components. For these reasons, WET-2 was determined to contain marginal potential bog turtle habitat. A Phase 2 Bog Turtle Survey is recommended for suitable habitat within WET-2 if the proposed project has the potential to impact this wetland. Based on the field investigation, JMT recommends inclusion



of approximately 1.91 acres of WET-2 in the Designated Survey Area (DSA) for potential Phase 2 Surveys (**Figure 13** in **Appendix B**).

Wetland 3 (WET-3)

Wetland 3 (WET-3) is an approximately 0.05 acre PEM wetland located in the northwestern portion of the study area (see **Photos 24-25** in **Appendix E**; **Figures 8a-8b** in **Appendix B**). This wetland is bordered primarily by riparian forests, agricultural fields, mowed fields, and developed lands. WET-3 is a low-lying fringe wetland associated with an unnamed tributary to Plum Creek (WUS-3). No persistent groundwater springs or seeps were observed. Surface water was restricted to the vegetated portion of the wetland within the intermittent stream channel at a depth of 1 to 4 inches. Mucky soils were limited to a small portion (5 percent) of the wetland, consisting of shallow mineral soil (3 to 5 inches) atop rocky substrate in the vicinity of the stream channel. The remainder of the wetland upslope from the tributary featured hard-bottomed soils.

Vegetation within WET-3 was dominated by reed canarygrass and arrow-leaf tearthumb, and also included sparse rushes (*Juncus* sp.). Subsurface structural characteristics (e.g., tunnels, root mats) were highly limited within this small wetland. Due largely to the lack of persistent groundwater sources and limited mucky soil substrates, it was determined that WET-3 does not contain potential bog turtle habitat.

Wetland 4 (WET-4)

Wetland 4 (WET-4) is an approximately 6.44 acre PEM wetland located in the western portion of the study area to the east of Plum Creek (see **Photos 26-29** in **Appendix E**; **Figures 8a-8d** in **Appendix B**). This wetland is bordered by agricultural fields to the north and east, the Plum Creek corridor to the west, and woodlands to the south. The southern portion of WET-4 is contiguous with a forested wetland (WET-6). A hard-bottomed, excavated drainage ditch runs along the western side of WET-4, which has impacted the hydrology within the wetland. No persistent groundwater springs or seeps were observed. The wetland contains shallow drainage patterns that flow north towards an outlet into an intermittent tributary to Plum Creek (WUS-3). Surface water was observed at a depth of 2 to 8 inches within the excavated channel and 1 to 3 inches in small depressions and drainages. No mucky soils were observed; thus, the entire wetland was determined to be hard-bottomed. A fine clay layer was identified within the soil profile beginning at approximately 12 inches, which may contribute to wetland conditions by perching surface waters.

Vegetation within WET-4 was dominated by reed canarygrass, and also included goldenrod, giant ragweed, and very sparse sedges (*Carex* sp.) and rushes (*Juncus* sp.). Subsurface structural characteristics (e.g., tunnels, root mats) were highly limited within this wetland. Although this wetland includes a large area of open-canopy emergent habitat, persistent groundwater springs and seeps and mucky soils were absent in WET-4. For these reasons, it was determined that WET-4 does not contain potential bog turtle habitat.

Wetland 5 (WET-5)

Wetland 5 (WET-5) is an approximately 0.06 acre PEM wetland located in the western portion of the study area (see **Photos 30-32** in **Appendix E**; **Figures 8a-8b** in **Appendix B**). This small wetland lies adjacent to the western side of Plum Creek, and is bordered by agricultural fields and riparian forests. One small



spring seep discharges out of the base of the slope below the agricultural field to the west; however, this seep is immediately adjacent to Plum Creek, and only at a slightly higher elevation relative to the main stream channel. Surface water at a depth of 2 to 6 inches was observed in the small pool associated with the groundwater seep. Mucky soils were observed at a depth of 3 to 12 inches, and were limited to the groundwater seep area adjacent to the stream (approximately 15 percent of the wetland area). The remainder of the wetland upslope from the seep featured hard-bottomed mineral soils that could not be probed below the surface.

Vegetation within WET-5 was dominated by reed canarygrass, and also included a patch of broad-leaf cattail and halberd-leaf tearthumb within the groundwater seep area. A berm covered with giant ragweed and Japanese hops is located between the drier reed canarygrass-dominated portion of the wetland and Plum Creek. The majority of the wetland lacked subsurface structural features (e.g., tunnels, root mats), although the small groundwater seep area included mucky soil substrates. This small wetland features limited nesting habitat for bog turtles. Although WET-5 does contain one small groundwater seep with mucky soil substrates, this area is situated immediately adjacent to Plum Creek and is heavily influenced by stream flooding, creating an unstable hydrologic environment at the surface. For these reasons, it was determined that WET-5 does not contain potential bog turtle habitat.

Wetland 6 (WET-6)

Wetland 6 (WET-6) is an approximately 8.23 acre bottomland PFO wetland located in the western portion of the study area to the east of Plum Creek (see **Photos 33-36** in **Appendix E; Figures 8a** and **8c-8d** in **Appendix B**). This wetland is bordered by agricultural fields to the east, a residential development to the south, the Plum Creek riparian corridor to the west, and is contiguous with an emergent wetland (WET-4) to the north. One small groundwater spring seep area was observed in the southern portion of the wetland; however, the remainder of the surface water observed in WET-6 was characterized by scattered vernal pool features in depressional areas. Surface water was observed at a depth of 1 to 2 inches in small depressions and at a depth of 1 to 5 inches in larger vernal pools and drainages. Deep mucky soils were observed at a depth of 3 to 24 inches, but were only observed in the small area associated with the groundwater spring seep (less than 1 percent of the total wetland area). The upwelling from this spring drains northward along a low-lying channel that is entirely hard-bottomed. The remainder of this forested wetland featured hard-bottomed soils, including all other depressional areas that were holding water during the survey.

Vegetation within WET-6 was dominated by green ash, ash-leaf maple, oaks (*Quercus* sp.), poison ivy, multiflora rose, privet (*Ligustrum* sp.), and skunk cabbage (florets observed at soil surface). Additional species were sparsely scattered within the wetland and included sedges (*Carex* sp.), jewelweed (*Impatiens capensis*), silky dogwood, red maple, and sphagnum moss. Subsurface structural features (e.g., tunnels, rootmats) were lacking throughout the wetland. Although one small spring with mucky soils was observed, the vast majority of the wetland lacked the hydrology, soils, and vegetation suitable for bog turtles. For these reasons, it was determined that WET-6 does not contain potential bog turtle habitat.

Wetland 7 (WET-7)

Wetland 7 (WET-7) is an approximately 0.35-acre PEM wetland located in the western portion of the study area to the west of Sunday Drive (see **Photos 43-44** in **Appendix E; Figures 9** and **9a** in **Appendix B**).



This wetland is surrounded primarily by agricultural fields, with woodlands occurring further east. WET-7 is a depressional wetland that has formed within a drainage between two agricultural fields and a portion of an unnamed tributary to South Branch Conewago Creek (WUS-7). The high water table was affected by a recent rain event and overland runoff and drainage from the adjacent agricultural fields. Surface water was restricted to the main channel at a depth of 1 to 5 inches. Portions of the wetland featured stream baseflow, but contained no persistent groundwater springs or seeps. Mucky soils were limited to a small portion (5 percent) of the wetland, consisting of shallow mineral soils 3 to 5 inches in depth. The remainder of the wetland upslope from the tributary featured hard-bottomed soils.

Vegetation within WET-7 was dominated by reed canarygrass and false nettle. Additional vegetation observed included sparse cattails, sedges, and rushes. Subsurface structural features (e.g., tunnels, rootmats) that would provide overwintering habitat were lacking throughout the wetland. Although the vegetation criterion was met, the wetland lacked sources of perennial groundwater hydrology and mucky soil substrates were minimal. For these reasons, it was determined that WET-7 does not contain potential bog turtle habitat.

Wetland 8 (WET-8)

Wetland 8 (WET-8) is an approximately 0.15-acre PEM wetland located in the central portion of the study area (see **Photos 45-47** in **Appendix E**; **Figures 10** and **10b** in **Appendix B**). This small, spring-fed wetland lies east of Church Street and is bordered by a large, fenced pasture. This wetland feeds into WUS-3, which continues to the west of the wetland. A spring upwelling in the eastern portion of the wetland provides the primary hydrology within WET-8. Additional small groundwater springs and seeps converge with the main channel in the center of the wetland and continue west. Surface water was observed at a depth of 1 to 2 inches in small depressions and rivulets, and 2 to 6 inches in the spring upwelling. Mucky soils were observed at a depth of 3 to 20 inches (majority 6 to 8 inches) in approximately 35% of the wetland. The remainder of the wetland featured hard-bottomed soils.

Vegetation within WET-8 was dominated by reed canarygrass and also included watercress and sedges (*Carex* sp.). Although marginal, nesting and overwintering habitat occur within WET-8. Based primarily on the perennial groundwater spring and observed mucky substrates, WET-8 was determined to contain marginal potential bog turtle habitat. A Phase 2 Bog Turtle Survey is recommended for suitable habitat within WET-8 if the proposed project has the potential to impact this wetland. Because this wetland is small, JMT recommends inclusion of the entire wetland (approximately 0.15 acre) in the Designated Survey Area (DSA) for potential Phase 2 Surveys (**Figure 14** in **Appendix B**).

Wetland 9 (WET-9)

Wetland 9 (WET-9) is an approximately 0.02-acre PEM wetland located in the north-central portion of the study area adjacent to the riparian corridor of WUS-3 (see **Photos 48-49** in **Appendix E**; **Figures 10** and **10a** in **Appendix B**). Aside from the riparian woodlands, this small wetland is bordered by agricultural fields. WET-9 lies in a depression adjacent to the large agricultural field to the south and drains into an unnamed tributary to WUS-3 (WUS-3A). Surface water at a depth of 1 to 4 inches was observed within a small seep channel. Mucky soils were observed at a depth of 3 to 8 inches (majority 3 to 5 inches), and were limited to



the seep channel adjacent to the stream (approximately 15 percent of the wetland area). The remainder of the wetland featured hard-bottomed mineral soils.

Vegetation within WET-9 was dominated by reed canarygrass, Japanese honeysuckle, and blackberry (*Rubus* sp.), and also included sparse silky dogwood. The majority of the wetland lacked subsurface structural features (e.g., tunnels, root mats), and little to no suitable nesting habitat was observed. Although WET-9 does contain a small seep, mucky substrates were minimal, and the wetland lacked structural features for overwintering and nesting. For these reasons, it was determined that WET-9 does not contain potential bog turtle habitat.

Wetland 10 (WET-10)

Wetland 10 (WET-10) is an approximately 0.05-acre PEM wetland located in the north-central portion of the study area to the east of WET-9 and adjacent to the riparian corridor of WUS-3 (see **Photos 51-52** in **Appendix E; Figures 10 and 10a** in **Appendix B**). This small wetland is bordered by agricultural fields and the riparian woodland corridor. Surface water at a depth of 1 inch was observed within small depressions. This wetland contained hydrology perched atop a layer of clay-dominated soils. No persistent perennial groundwater springs or seeps were observed. No mucky soils were observed; thus, the entire wetland was determined to be hard-bottomed.

Vegetation within WET-10 was dominated by reed canarygrass, and also included silky dogwood and blackberry (*Rubus* sp.). Subsurface structural characteristics (e.g., tunnels, root mats) were not observed within the wetland. In addition, both potential nesting and overwintering habitat were highly limited. For these reasons, it was determined that WET-10 does not contain potential bog turtle habitat.

Wetland 11 (WET-11)

Wetland 11 (WET-11) is an approximately 0.03-acre PEM wetland located in the eastern portion of the project area to the east of WUS-8 (see **Photos 59-61** in **Appendix E; Figures 11 and 11c** in **Appendix B**). This wetland is bordered by recreational fields to the east and woodlands to the north, south, and west of WET-11 is a small seep wetland located at the headwaters of a narrow stream (WUS-10) that flows into the adjacent forested uplands and eventually to WUS-8. Surface water at a depth of 0 to 3 inches was observed within the seep channel. Shallow, mucky soils were limited to a small portion (5 percent) of the wetland at 3 to 5 inches in depth, and were underlain by hard-bottomed rocky substrate in the vicinity of the seep/stream channel. The remainder of the wetland upslope from the channel featured hard-bottomed soils.

Vegetation within the WET-11 sample plot was dominated by reed canarygrass and tussock sedge. Additional species within the wetland included thistle (*Cirsium* sp.), mountain mint (*Pycnanthemum* sp.), monkey flower (*Mimulus ringens*, OBL), and New York ironweed. Subsurface structural characteristics (e.g., tunnels, root mats) were highly limited within this wetland and mucky soil substrates were minimal. For these reasons, it was determined that WET-11 does not contain potential bog turtle habitat.



Wetland 12 (WET-12)

Wetland 12 (WET-12) is an approximately 0.18-acre PFO wetland located in the eastern portion of the project area to the east of WUS-8 (see **Photos 62-63** in **Appendix E**; **Figures 11** and **11c** in **Appendix B**). This wetland is embedded within forested lands to the east of the Clarks building. No persistent perennial groundwater springs or seeps were observed. Surface water was observed at a depth of 1 to 3 inches within small depressions and drainages. No mucky soils were observed; thus, the entire wetland was determined to be hard-bottomed.

Vegetation within WET-12 was dominated by Japanese stiltgrass, reed canarygrass, green ash, and black gum, and also included dark green bulrush and multiflora rose. No subsurface structural features (e.g., tunnels, root mats) were observed within this wetland, and overwintering and nesting habitat were lacking. For these reasons, it was determined that WET-12 does not contain potential bog turtle habitat.

Wetland 13 (WET-13)

Wetland 13 (WET-13) is an approximately 0.52-acre PEM wetland located in the eastern portion of the project area to the west of WUS-8 and north of the Clarks building (see **Photos 65-66** in **Appendix E**; **Figures 12** and **12a** in **Appendix B**). This wetland is bordered by agricultural fields to the west and south and riparian woodlands to the north and east. WET-13 appeared to be an altered pond basin with surface connection to WUS-8 from a channel flowing north. No persistent perennial groundwater springs or seeps were observed. Surface water was observed at a depth of 0 to 4 inches within the old basin. Shallow, mucky soils were limited to a small portion (1 percent) of the wetland and were only observed at a depth of 3 to 4 inches. The remainder of the wetland featured almost entirely hard-bottomed soils.

Vegetation within WET-13 was dominated by reed canarygrass, broad-leaf cattail, and box elder, and also included sparse sedges. No subsurface structural features (e.g., tunnels, root mats) were observed within this wetland. Little to no overwintering habitat and no ideal nesting habitat for bog turtles was present. For these reasons, it was determined that WET-13 does not contain potential bog turtle habitat.

Wetland 14 (WET-14)

Wetland 14 (WET-14) is an approximately 0.01-acre PEM wetland located in the eastern portion of the study area to the southwest of the Clarks building at the corner of Kindig Lane and Oxford Avenue (see **Photo 67** in **Appendix E**; **Figures 11** and **11a** in **Appendix B**). This wetland runs along the toe of the roadway fill slope and is bordered by agricultural fields to the north and east and residential communities to the south and west. No persistent perennial groundwater springs or seeps were observed. Surface water was observed at a depth of 1 to 2 inches from small depressions within the wetland. No mucky soils were observed; thus, the entire wetland was determined to consist of hard-bottomed soils.

Vegetation within WET-14 was dominated by broad-leaf cattail and rice cutgrass. No subsurface structural features (e.g., tunnels, root mats) were observed within this wetland. Little to no overwintering habitat and no ideal nesting habitat for bog turtles was present within the wetland. For these reasons, it was determined that WET-14 does not contain potential bog turtle habitat.



Wetland 15 (WET-15)

Wetland 15 (WET-15) is an approximately 0.10 acre PEM wetland located in the eastern portion of the study area to the east of WUS-8, situated between a large agricultural field and a riparian woodland (see **Photos 68-69** in **Appendix E**; **Figures 12** and **12a** in **Appendix B**). No persistent perennial groundwater springs or seeps were observed. Surface water was observed at a depth of 1 to 2 inches from small depressions within the wetland. No mucky soils were observed; thus, the entire wetland was determined to consist of hard-bottomed soils. This wetland contained hydrology perched atop a layer of clay-dominated soils beginning at approximately 6 inches from the surface.

Vegetation within WET-15 was dominated by reed canarygrass and false nettle, and fringed by box elder, silver maple, and green ash. No subsurface structural features (e.g., tunnels, root mats) were observed within this wetland. Little to no overwintering habitat and no ideal nesting habitat for bog turtles was present within the wetland. For these reasons, it was determined that WET-15 does not contain potential bog turtle habitat.

Wetland 16 (WET-16)

Wetland 16 (WET-16) is an approximately 0.05 acre PEM wetland located in the eastern portion of the study area to the east of WUS-8, situated between a large agricultural field and a riparian woodland (see **Photos 71-72** in **Appendix E**; **Figures 12** and **12a** in **Appendix B**). No persistent perennial groundwater springs or seeps were observed. Surface water was observed at a depth of 1 to 2 inches from small depressions within the wetland. No mucky soils were observed; thus, the entire wetland was determined to consist of hard-bottomed soils. This wetland contained hydrology perched atop a layer of clay-dominated soils beginning at approximately 4 inches from the surface.

Vegetation within WET-16 was dominated by reed canarygrass and fringed by silver maple. No subsurface structural features (e.g., tunnels, root mats) were observed within this wetland. Little to no overwintering habitat and no ideal nesting habitat for bog turtles was present within the wetland. For these reasons, it was determined that WET-16 does not contain potential bog turtle habitat.

Wetland 17 (WET-17)

Wetland 17 (WET-17) is an approximately 0.87 acre wetland ditch located in the eastern portion of the project area to the north of Radio Road (see **Photo 73** in **Appendix E**; **Figures 12** and **12d** in **Appendix B**). This wetland is bordered by agricultural fields to the east and west. No persistent perennial groundwater-fed sources were observed. Surface water was observed at a depth of 0.5" inch from small puddles and depressions within the wetland. No mucky soils were observed; thus, the entire wetland was determined to consist of hard-bottomed soils. Evidence of flooding was observed from bent vegetation resulting from recent stormwater flows.

Vegetation within WET-17 was dominated by reed canary grass and also included blue vervain and sparse trees. No subsurface structural features (e.g., tunnels, root mats) were observed within this wetland. Little to no overwintering habitat and no ideal nesting habitat for bog turtles was present within the wetland. For these reasons, it was determined that WET-17 does not contain potential bog turtle habitat.



Table 5: Summary of Phase 1 Bog Turtle Survey Results for the Eisenhower Drive Extension Project Study Area, Adams and York Counties, Pennsylvania

Wetland ID	Wetland Size (approximate acres)	Wetland Type and Amount (% or acres)	Extent of Mucky Soils (by Wetland Type)	Survey Effort (person-hours)	Potential Bog Turtle Habitat?
WET-1	3.843	PEM – 10% PFO – 90%	PEM – 5% PFO – 0%	4.5	No
WET-2	5.057	PEM – 10% PFO – 90%	PEM – 35% PFO – 10%	5.0	Yes
WET-3	0.047	PEM – 100%	PEM – 5%	0.5	No
WET-4	6.437	PEM – 100%	PEM – 0%	4.0	No
WET-5	0.060	PEM – 100%	PEM – 15%	1.0	No
WET-6	8.229	PFO – 100%	PFO – 1%	4.5	No
WET-7	0.352	PEM – 100%	PEM – 5%	0.5	No
WET-8	0.144	PEM – 100%	PEM- 35%	0.5	Yes
WET-9	0.025	PEM – 100%	PEM – 15%	0.5	No
WET-10	0.050	PEM – 100%	PEM – 0%	0.5	No
WET-11	0.026	PEM – 100%	PEM – 5%	0.5	No
WET-12	0.184	PFO – 100%	PFO – 0%	0.5	No
WET-13	0.524	PEM – 100%	PEM – 1%	1.0	No
WET-14	0.012	PEM – 100%	PEM – 0%	0.5	No
WET-15	0.104	PEM – 100%	PEM – 0%	0.5	No
WET-16	0.051	PEM – 100%	PEM – 0%	0.5	No
WET-17	0.865	PEM – 100%	PEM – 0%	1.0	No



A review of the PNDI Receipt obtained on March 18, 2018 did not identify any known conflicts with the bog turtle in the vicinity of the Eisenhower Drive Extension Project study area. However, two wetlands (WET-2, WET-8) within the wetland survey area were determined to contain potential bog turtle habitat. A Phase 2 Bog Turtle Survey is recommended if the proposed project has the potential to result in any direct or indirect impacts to either of these wetlands.

According to the USFWS Guidelines for Bog Turtle Surveys (USFWS, 2006), Phase 2 surveys should focus on the areas of the wetland that meet the soils, hydrology, and vegetation criteria for bog turtles. These areas are referred to as Designated Survey Areas (DSAs), and include portions of the wetland that encompass the three criteria for bog turtle habitat; thus, not all three criteria may be present in all portions of the DSA. Based on the field investigation and assessment of the potential habitat, JMT recommends inclusion of approximately 1.91 acres within the DSA of WET-2 (**Figure 13 in Appendix B**) and the entirety of WET-8 (0.15 acre, **Figure 14 in Appendix B**) for the purposes of Phase 2 Surveys. The remainder of the wetland area in WET-2 lacks all three criteria for suitable bog turtle habitat, and are dominated by hard-bottomed forested lands.

V. SUMMARY

JMT has completed a wetland identification and delineation and Phase 1 bog turtle habitat assessment in the established wetland survey area for the proposed Eisenhower Drive Extension Project in Adams and York Counties, Pennsylvania. The overall wetland survey area consisted of locations investigated in two different periods. The first survey area was investigated in 2016 and consisted of the approximately one-mile long segment of Plum Creek located to the south of Chapel Road and north and east of Centennial Road, with a corridor spanning approximately 1,500 feet across along this length. Additional fieldwork was completed in 2017 within several alternative roadway alignment corridors in the study area. These alternate corridors were approximately 125 feet wide, with wetland surveys extending at least 300 feet from each side of the corridor in order to complete the Phase 1 Bog Turtle Habitat Survey. Seventeen (17) palustrine wetlands (WET-1 through WET-17) were identified and delineated within the study area. Any temporary or permanent impacts to these resources would require permits from the PADEP and USACE.

Sixteen (16) watercourses were also identified within the study area. Watercourses were initially identified during 2016 and 2017 fieldwork. Subsequent to advancements in the project design, watercourses were delineated in 2018 within an approximately 200-foot wide corridor along the preferred roadway alignment. Plum Creek (WUS-2) is a perennial stream classified as a Warm Water Fishery and Migratory Fishery by the PA Code Title 25, Chapter 93 *Water Quality Standards*. Six unnamed tributaries to Plum Creek (WUS-1, WUS-2A, WUS-3, WUS-3A, WUS-4, and WUS-4A) were also identified, all of which consist of intermittent stream channels. Three unnamed tributaries to the South Branch Conewago Creek (WUS-5, WUS-6, and WUS-7) were identified in the southwestern portion of the study area, and are also classified as WWFS and MFs. WUS-8 is an unnamed tributary to Slagles Run that forms another primary stream corridor in the eastern portion of the study area, and is a perennial stream also classified as a WWF and MF. Additional tributaries identified in the WUS-8 corridor included WUS-8A, WUS-8B, WUS-9, WUS-10, and WUS-11. Permits from the PADEP and USACE will be required for any temporary or permanent impacts to these watercourses.



According to the Pennsylvania Fish and Boat Commission (PFBC), no stocked trout streams occur in the vicinity of the study area, and no streams are listed as Approved Trout Waters, Class A wild trout streams, or as streams supporting natural trout reproduction. In addition, no natural trout reproducing streams occur downstream of this portion of the project area. Therefore, no in-stream restrictions based on trout designations are anticipated.

Activities conducted within jurisdictional waters including wetlands, require permits from state and federal regulatory agencies. Activities or obstructions to wetlands located within stormwater management facilities, qualify for a waiver from the PADEP under 105.12(a)(6). Activities or obstructions within streams or floodways (not including wetlands) with a drainage area of less than 100 acres qualify for a waiver from the PADEP under 105.12(a)(2). Due to the size of the drainage areas in the study area, no watercourses identified would qualify for a waiver from PADEP.

Wetland and waterways investigations of this type reflect the current state of conditions. The delineation is often based on professional judgment, experience and the information and techniques available. A determination of jurisdictional areas and their boundaries, especially in highly disturbed and variable conditions of a developed area, can only be conducted through a consultation with the USACE and/or PADEP.

The Phase 1 bog turtle habitat assessments for the seventeen delineated wetlands were completed on November 17 and 18, December 7, 8, 21, and 27, 2016, and on November 8, 9, 13, and 14, 2017 by a PA Qualified Bog Turtle Surveyor, during which it was determined that WET-2 and WET-8 contained marginal potential bog turtle habitat. All other wetlands lacked the combination of hydrology, soils, and vegetation to be considered potential bog turtle habitat, and/or were heavily prone to flooding from adjacent watercourses. A Phase 2 Bog Turtle Survey is recommended for WET-2 and WET-8 if the proposed project has the potential to result in direct or indirect impacts to either of these wetlands.



VI. REFERENCES

- Carter, S. L., C. A. Haas, and J. C. Mitchell. 1999. Home range and habitat selection of bog turtles in southwestern Virginia. *The Journal of Wildlife Management* (1999): 853-860.
- Carter, S. L., C. A. Haas, and J. C. Mitchell. 2000. Movements and activity of Bog Turtles (*Clemmys muhlenbergii*) in Southwestern Virginia. *Journal of Herpetology* 34 (1): 75-80.
- Chase, J. D., K. R. Dixon, J. E. Gates, D. Jacobs, and G. J. Taylor. 1989. Habitat characteristics, population size, and home range of the Bog Turtle, *Clemmys muhlenbergii*, in Maryland. *Journal of Herpetology* 23(4): 356-362.
- Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*, Joint EPA/Army Memorandum, December 02, 2008 (revision of original dated June 6, 2007).
- Cowardin, Lewis M., et al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Office of Biological Services, 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 Waterways Experiment Station, Vicksburg, Miss.
- Ernst, C. H. 1977. Biological notes on the bog turtle, *Clemmys muhlenbergii*. *Herpetologica* (1977): 241-246.
- Ernst, C. H., R. T. Zappalorti, and J. E. Lovich. 1989. Overwintering sites and thermal relations of hibernating bog turtles, *Clemmys muhlenbergii*. *Copeia* 1989.3 (1989): 761-764.
- Ernst, C. H., and J. E. Lovich. 2009. *Turtles of the United States and Canada*. JHU Press.
- Geyer, A. R. and J. P. Wilshusen. 1982. *Engineering Characteristics of the Rocks of Pennsylvania*, Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Environmental Geology Report 1.
- Lee, D. S., and A. W. Norden. 1996. The distribution, ecology, and conservation needs of Bog Turtles, with special emphasis on Maryland. *The Maryland Naturalist* 40(1-4): 7-46.
- 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.
- Morrow, J.L., J.H. Howard, S.A. Smith, and D. Poppel. 2001a. Home range and movements of the Bog Turtle (*Clemmys muhlenbergii*) in Maryland. *Journal of Herpetology* 35(1):68-73.
- Morrow, J.L., J.H. Howard, S.A. Smith, and D. Poppel. 2001b. Habitat selection and habitat use by the Bog



Turtle (*Clemmys muhlenbergii*) in Maryland. *Journal of Herpetology* 35:545-552.

Munsell. 2009. *Munsell Soil Color Charts*. Munsell Color, Grand Rapids, MI.

Pennsylvania Department of Environmental Protection (PADEP). 2014. *Chapter 93: Water Quality Standards*. Pennsylvania Code Title 25. Harrisburg, Pennsylvania.

Pennsylvania Department of Environmental Protection (PADEP). 2014. *Chapter 105: Dam Safety and Waterway Management*. Pennsylvania Code Title 25. Harrisburg, Pennsylvania.

Pennsylvania Fish & Boat Commission (PFBC). 2016. *Class A Wild Trout Waters*. (<http://fishandboat.com/classa.pdf>)

Pennsylvania Fish & Boat Commission (PFBC). July 2016. *Pennsylvania Wild Trout Waters (Natural Reproduction)* (http://fishandboat.com/trout_repro.pdf)

Pennsylvania Geological Survey (PGS). 2016. *Penn Pilot: Historic Aerial Photographs of Pennsylvania*. (<http://www.pennpilot.psu.edu/>)

Pittman, S. E., and M. E. Dorcas. 2009. Movements, habitat use, and thermal ecology of an isolated population of bog turtles, *Glyptemys muhlenbergii*. *Copeia* 4: 781-790.

Sevon, W. D., 2000. *Physiographic Province of Pennsylvania*, Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, Map 13.

Shiels, A. L. 1999. *Bog Turtles: Slipping Away*. Pennsylvania Fish and Boat Commission, 1999.

Somers, A. B., J. Mansfield-Jones, and J. Braswell. 2007. In stream, streamside, and under stream bank movements of a Bog Turtle, *Glyptemys muhlenbergii*. *Chelonian Conservation and Biology* 6(2): 286-288.

U.S. Army Corps of Engineers. 1999. *The Highway Methodology Workbook Supplement: Wetland Functions and Values: A Descriptive Approach*. U.S. Army Corps of Engineers New England Division. 39 pp. NAEPP-360-1-30A.

U.S. Army Corps of Engineers, Baltimore District. 2008a. Revision to the Pennsylvania State Programmatic General Permit (PASPGP-3) Bog Turtle Habitat Clearance Process. Special Public Notice #08-22. April 22, 2008.

U.S. Army Corps of Engineers, Baltimore District. 2008b. Revision to the Pennsylvania State Programmatic General Permit (PASPGP-3) Bog Turtle Habitat Clearance Process and Nationwide Permit Regional Condition. Special Public Notice #08-69. October 20, 2008.

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.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 1997. *Hydric Soils of Pennsylvania*. www.statlab.iastate.edu:80/soils/hydric/pa.html.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2016. *Web Soil Survey of Adams County, Pennsylvania*.

U.S. Department of Homeland Security, Federal Emergency Management Agency. 2016. *Flood Map Service Center*. <https://msc.fema.gov/portal>

U.S. Fish and Wildlife Service. 1997. Final rule to list the northern population of the bog turtle as threatened and the southern population as threatened due to similarity of appearance. Federal Register November 4, 1997. 62 CFR 59605 59623.

U.S. Fish and Wildlife Service. May 2001. Bog Turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan.

U.S. Fish and Wildlife Service. April, 2006. Guidelines for Bog Turtle Surveys (Revised).

U.S. Fish and Wildlife Service. 2016. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. <http://www.fws.gov/wetlands/>

U.S. Geological Survey. *McSherrystown, PA 7.5 Minute Quadrangle Maps*. Scale 1:24,000. Northeastern Topographic Series V-1. Reston, VA: U.S. Department of the Interior, USGS.



Appendix A

Professional Qualifications

Pennsylvania Department of Transportation

Consultant Qualifications Package

Resumes



Please include a brief resume of key persons within your firm: (Note: Please use the "copy and paste" capabilities of your word processing program to duplicate this template for each resume included with the submission)

Resume # _____



Name Craig Patterson Nein

Title Environmental Scientist

Primary Responsibilities

Resource Delineation, Endangered Species, Permitting, NEPA Documentation

Years Experience: **With This Firm** 3 **With Other Firms** 8

Education

Institution	Degree(s)	Year	Specialization
University of Mary Washington	BS	2004	Environmental Science
Towson University	MS	2012	Biology

Active Registration

Year first registered _____

Disciplines _____

Other Experience and Qualifications

Mr. Nein has over eight years of experience in the natural resources field. He has held positions with the Maryland Department of Natural Resources, the Department of the Interior (US Fish & Wildlife Service), Towson University, and the Maryland Conservation Corps prior to joining JMT. His areas of expertise include wetlands, endangered species (specifically the bog turtle (*Glyptemys muhlenbergii*)), and habitat assessments. Mr. Nein also has experience in the preparation of environmental permit applications and NEPA documents, including Chapter 105/Section 404 permitting, NPDES permitting, and portions of environmental impact statements. Mr. Nein is recognized by state and federal agencies as a Qualified Bog Turtle Surveyor in the states of Pennsylvania and Maryland. Other experience includes assistance with Phase I archaeological investigations and ambient noise monitoring. Some of his project specific experience includes:

PTC MP 53 – 57 Total Reconstruction, Allegheny County, PTC, Plum Borough and Monroeville, PA: Environmental Scientist. Mr. Nein assisted with the delineation of wetlands and Waters of the U.S. along the 4 mile project corridor of the PA Turnpike. He prepared a complete Wetland Identification and Delineation Report that was accepted by PTC without comments. Mr. Nein compiled extensive environmental data and information on the project area and prepared an Environmental Overview Document (EOD). Mr. Nein also assisted with the collection of ambient noise measurements in the field and the preparation of a Preliminary Technical Noise Report.

S.R. 0216, Section 015 Blooming Grove Road Bridge Replacement, PennDOT District 8-0, Codorus and Manheim Townships, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. He conducted a Phase 1 Bog Turtle Habitat Assessment for the delineated wetlands and prepared a Wetland Identification and Delineation Report and Phase 1 Bog Turtle Habitat Assessment Report. Mr. Nein also led a Phase 2 Bog Turtle Survey to determine the presence/probable absence of the species within wetlands with potential habitat in the vicinity of the project area, and submitted a Phase 2 Bog Turtle Survey Report to the USFWS in order to obtain project clearance. Mr. Nein is also assisting with the preparation of a CE BRPA document.

Pennsylvania Department of Transportation

Consultant Qualifications Package

Resumes



S.R. 0216, Section 016 Sticks Road Bridge Replacement, PennDOT District 8-0, Codorus Township, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. He conducted a Phase 1 Bog Turtle Habitat Assessment for the delineated wetlands and prepared a Wetland Identification and Delineation Report and Phase 1 Bog Turtle Habitat Assessment Report. Mr. Nein also led a Phase 2 Bog Turtle Survey to determine the presence/probable absence of the species within wetlands with potential habitat in the vicinity of the project area, and submitted a Phase 2 Bog Turtle Survey Report to the USFWS in order to obtain project clearance. Mr. Nein also prepared a Joint Permit Application for impacts to waterways and wetlands.

S.R. 2001, Section A15 Bunola River Road Bridge Replacement, PennDOT District 11-0, Forward, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. Mr. Nein assisted with the preparation of a Wetland Identification and Delineation Report. He also completed a GP-11 permit application for encroachments to Perry Mill Run.

S.R. 2118, Section A02 Ripple Road Bridge Replacement, PennDOT District 11-0, White Oak, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. Mr. Nein assisted with the preparation of a Wetland Identification and Delineation Report. He also assisted with the completion of a GP-11 permit application for encroachments to Long Run and adjacent tributaries.

Bog Turtle Construction Monitoring – Pipe Maintenance Project, Carroll County Dept. of Public Works, Union Mills, MD: Environmental Scientist. Mr. Nein acted as the Qualified Bog Turtle Surveyor on site during a maintenance project that involved the re-grouting of a structurally deficient culvert in Carroll County, Maryland. He attended a Pre-Construction Meeting with county contractors and Maryland Department of Natural Resources (MD DNR) staff to discuss the nature of the project and to highlight the importance of the bog turtle monitoring activities. Mr. Nein provided bog turtle monitoring services during all phases of the project to ensure that no bog turtles were harmed as a result of the construction project. Following the completion of the project, Mr. Nein prepared a construction monitoring report for Carroll County to submit to MD DNR.

RCN Ranavirus Study, Maryland Department of Natural Resources, MD: Seasonal Biologist. Mr. Nein acted as the lead field biologist on a study investigating the distribution of *Ranavirus* in amphibian breeding ponds. Compiled known wood frog (*Lithobates sylvaticus*) breeding ponds in Maryland and conducted site randomization to select study ponds. Verified breeding at study ponds and assisted with collection of larval amphibian samples for disease analysis. Assisted with development of study protocol manual, permitting, site monitoring, GIS, and database management.

Bog Turtle Site Prioritization Project, U.S. Fish and Wildlife Service (USFWS), MD: Fish and Wildlife Biologist. Mr. Nein led an effort conducting a site prioritization project for bog turtle sites in Maryland. Compiled population and recruitment data for all known bog turtle sites in Maryland and ranked sites based on standardized criteria. Assisted USFWS staff with GIS work, reporting, and presentation of project methodology at regional recovery meeting. The results of the site prioritization are being used by state and federal personnel to help guide survey efforts, monitoring, management, and restoration at bog turtle sites in Maryland.

Pennsylvania Department of Transportation

Consultant Qualifications Package

Resumes



Please include a brief resume of key persons within your firm: (Note: Please use the "copy and paste" capabilities of your word processing program to duplicate this template for each resume included with the submission)

Resume # _____



Name Grace Erisman

Title Environmental Scientist

Primary Responsibilities

Resource Delineation, Permitting, NEPA Documentation

Years Experience: **With This Firm** 4 months **With Other Firms** None

Education

Institution	Degree(s)	Year	Specialization
<u>Salisbury University</u>	<u>BS</u>	<u>2015</u>	<u>Earth Science/Geography</u>

Active Registration

Year first registered _____

Disciplines _____

Other Experience and Qualifications

Ms. Erisman has 4 months of experience in the natural resources field. She has also held positions with Salisbury University and participated in extensive research on Amazonian deforestation and coastal processes of the Eastern Shore prior to joining JMT. She has completed a variety of GIS projects, sedimentology and stratigraphy labs, environmental hazard reports, as well as participated in field studies research throughout Maryland, Pennsylvania, and the Colorado Plateau. Ms. Erisman also has experience in assisting with the delineation of wetlands and Waters of the U.S. as well as the preparation of environmental permit applications and NEPA documents. Some of her project-specific experience includes:

Eisenhower Drive Extension Project, Conewago Township, Adams County, PA: Environmental Scientist. Ms. Erisman assisted with the delineation of wetlands and waters along the proposed Eisenhower Drive Extension area and in preparing a complete Wetland Identification and Delineation Report. She also compiled extensive environmental data and information on the project area.

S.R. 0001, Group 03S, Sections RC1 and RC2 Improvement Project, Bensalem and Middletown Townships, Bucks County, PA: Environmental Scientist. Ms. Erisman assisted with the preparation of a CE Reevaluation. She has also assisted with the preparation of a JPA.

S.R. 3023, Section 011 Bridge Rehabilitation Project, PennDOT District 8-0, Martic and Conestoga Townships, Lancaster County, PA: Environmental Scientist. Ms. Erisman assisted with the preparation of a CE BRPA document. She also completed a Section 4(f) *De Minimis* Use Section 2002 No Adverse Use Historic Properties document.

S.R. 1003, Section 022 Bridge Replacement Project, PennDOT District 8-0, Jonestown Borough and Swatara Township, Lebanon County, PA: Environmental Scientist. Ms. Erisman is assisting with the preparation of a CE BRPA document. She is also completing a Section 4(f) Applicability Involving Temporary Occupancy document.



Appendix B Figures

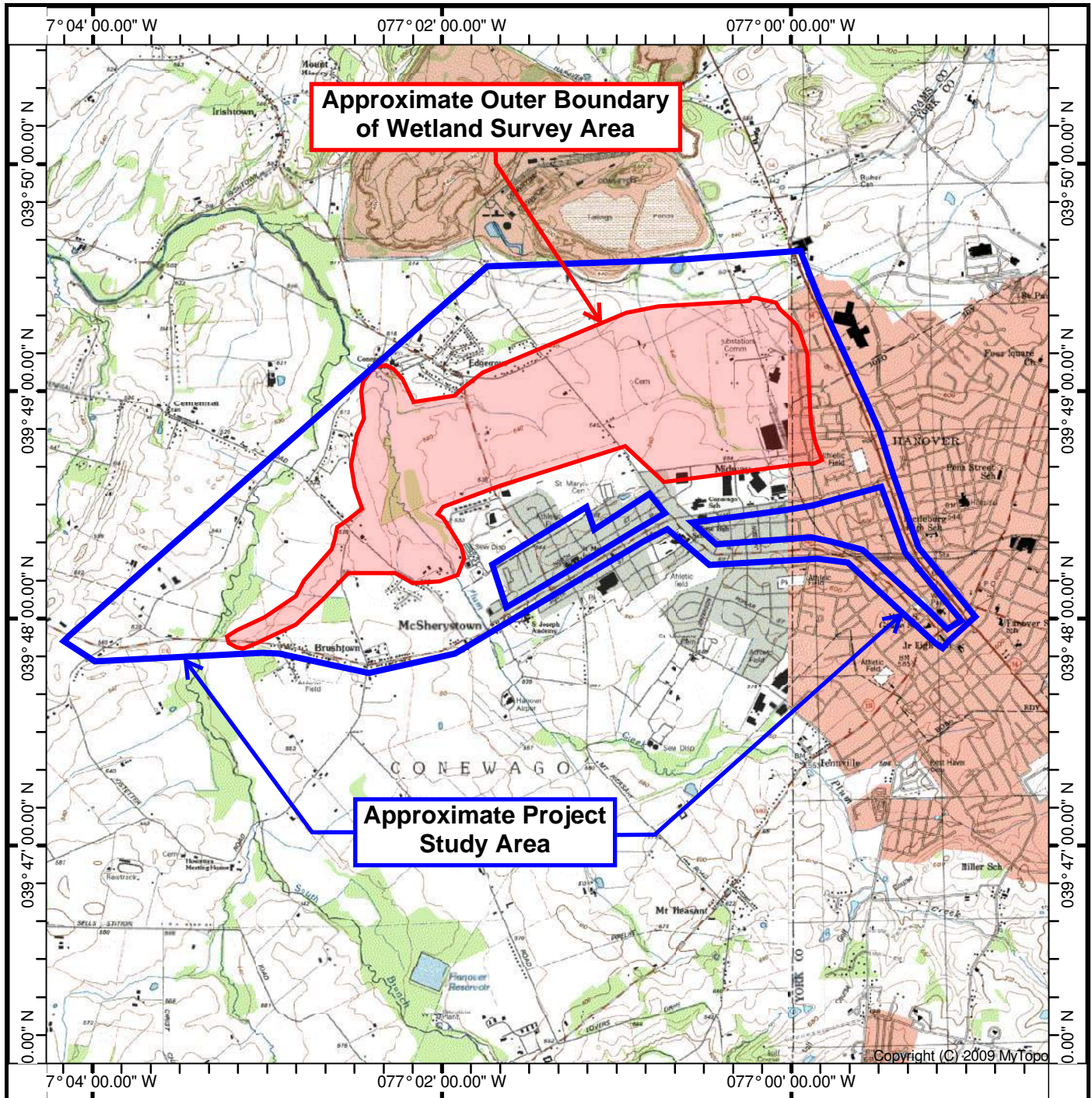
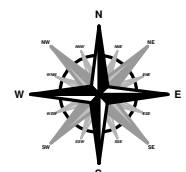
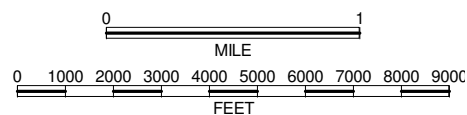


Figure 1: Project Location Map

**Eisenhower Drive Project
York & Adams Counties, PA**



SCALE 1:48000











MAP LEGEND

Area of Interest (AOI)







Area of Interest (AOI)

Soils







Soil Rating Polygons

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available

Soil Rating Lines

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available






Soil Rating Points

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Adams County, Pennsylvania
Survey Area Data: Version 13, Oct 3, 2017

Soil Survey Area: York County, Pennsylvania
Survey Area Data: Version 11, Oct 4, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 23, 2013—Feb 22, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CkA	Clarksburg silt loam, 0 to 3 percent slopes	5	270.1	20.7%
CkB	Clarksburg silt loam, 3 to 8 percent slopes	5	25.8	2.0%
CnA	Conestoga silt loam, 0 to 3 percent slopes	0	217.2	16.6%
CnB	Conestoga silt loam, 3 to 8 percent slopes	0	219.6	16.8%
CnC	Conestoga silt loam, 8 to 15 percent slopes	0	3.3	0.3%
Dy	Dunning silty clay loam	85	160.1	12.2%
Pa	Penlaw silt loam	0	270.7	20.7%
ReB	Readington silt loam, 3 to 8 percent slopes	0	10.6	0.8%
Uc	Urban land	0	1.4	0.1%
UeB	Urban land-Conestoga complex, 0 to 8 percent slopes	0	94.1	7.2%
Subtotals for Soil Survey Area			1,272.8	97.4%
Totals for Area of Interest			1,307.2	100.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CkA	Clarksburg silt loam, 0 to 3 percent slopes	5	2.2	0.2%
CnA	Conestoga silt loam, 0 to 3 percent slopes	0	2.6	0.2%
CnB	Conestoga silt loam, 3 to 8 percent slopes	0	6.5	0.5%
Uc	Urban land	0	1.0	0.1%
UeB	Urban land-Conestoga complex, 0 to 8 percent slopes	0	22.0	1.7%
Subtotals for Soil Survey Area			34.4	2.6%
Totals for Area of Interest			1,307.2	100.0%

Rating Options—Hydric Rating by Map Unit*Aggregation Method: Percent Present**Component Percent Cutoff: None Specified**Tie-break Rule: Lower*

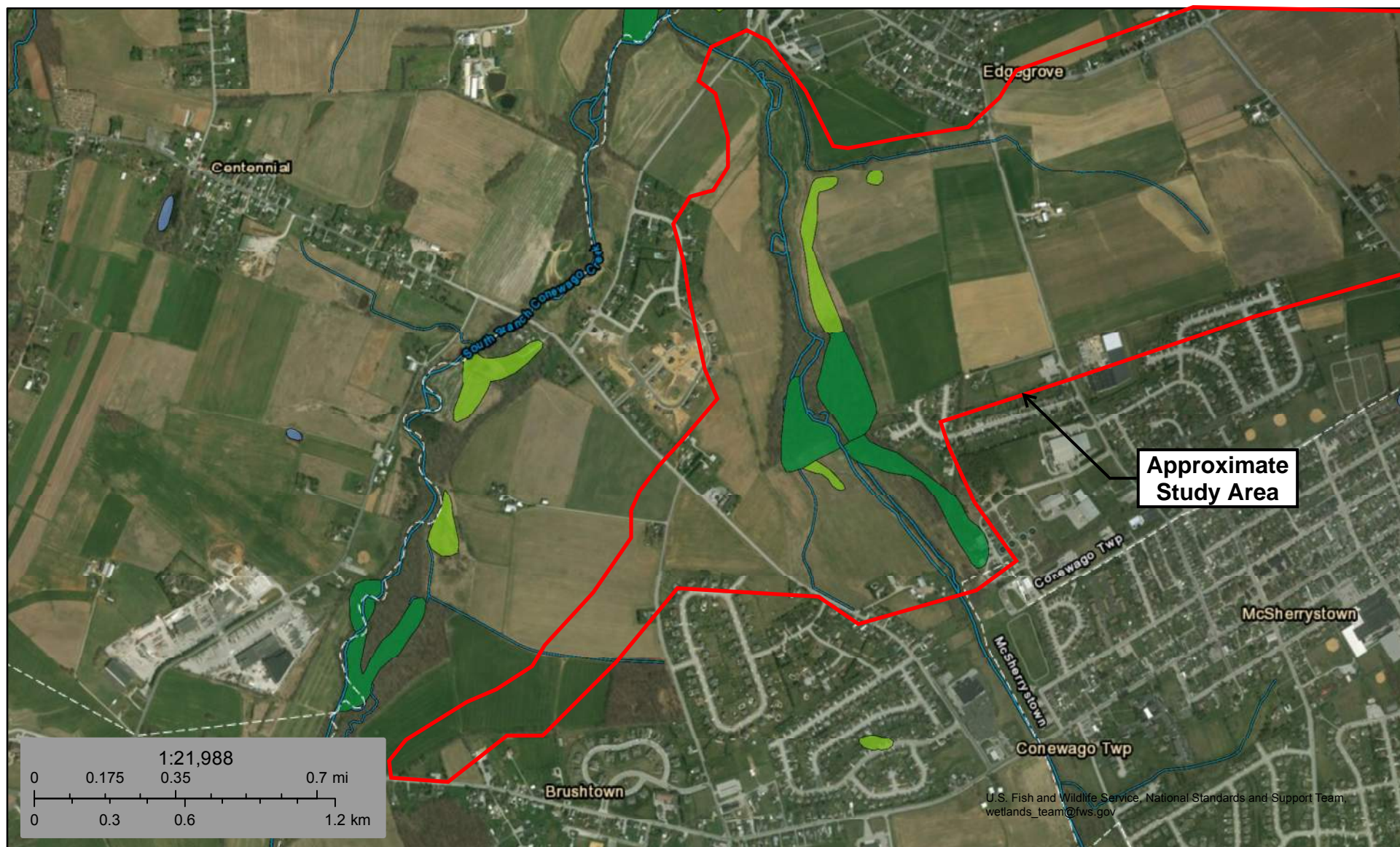


U.S. Fish and Wildlife Service

National Wetlands Inventory

Figure 3a. NWI Map

Eisenhower Drive Extension Project



January 16, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Figure 3b. NWI Map
Eisenhower Drive Extension Project



January 16, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Figure 4a. FEMA FIRM Map, Eisenhower Drive Extension Project

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Pennsylvania State Plane south zone (FIPSZONE 3702). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMVC-3, #502
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was provided in a digital format by the PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey. This information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated April 2003.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A)------(A)** Cross section line
- (25)------(25)** Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 18
- 5000-foot grid values; Pennsylvania State Plane coordinate system, south zone (FIPSZONE 3702); Lambert Conformal Conic

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)

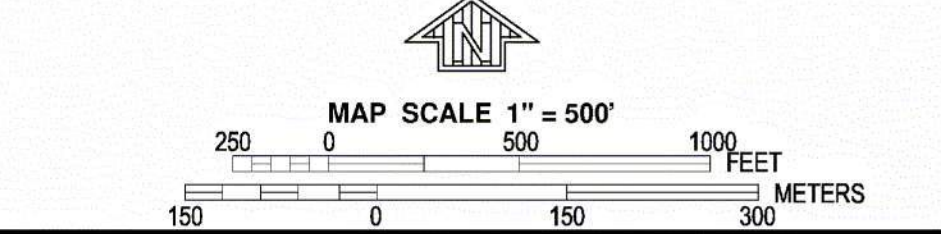
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 18, 2009
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



Approximate Study Area

NFIP

PANEL 0283D

FIRM

FLOOD INSURANCE RATE MAP

ADAMS COUNTY, PENNSYLVANIA

(ALL JURISDICTIONS)

PANEL 283 OF 430
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONEWAGO, TOWNSHIP OF	421248	0283	D
MOUNT PLEASANT, TOWNSHIP OF	421258	0283	D
OXFORD, TOWNSHIP OF	420003	0283	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
42001C0283D

EFFECTIVE DATE
FEBRUARY 18, 2009

Federal Emergency Management Agency

Figure 4b. FEMA FIRM Map, Eisenhower Drive Extension Project

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Pennsylvania State Plane south zone (FIPSZONE 3702). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMVC-3 #5202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was provided in a digital format by the PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey. This information was photogrammetrically compiled at a scale of 1:2400 from aerial photography dated April 2003.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A No Base Flood Elevations determined.
- ZONE AE Base Flood Elevations determined.
- ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently deteriorated. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone boundary
- Zone D boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- Cross section line
- Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid ticks, zone 18

5000-foot grid values; Pennsylvania State Plane coordinate system, south zone (FIPSZONE 3702); Lambert Conformal Conic

Bench mark (see explanation in Notes to Users section of this FIRM panel)

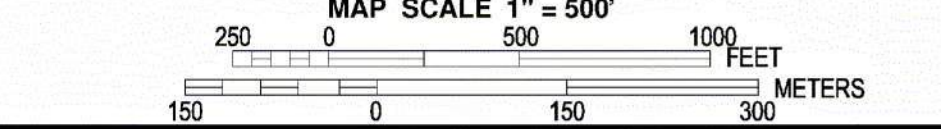
MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 18, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NFIP

PANEL 0291D

FIRM

FLOOD INSURANCE RATE MAP

ADAMS COUNTY,

PENNSYLVANIA

(ALL JURISDICTIONS)

PANEL 291 OF 430
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONEWAGO, TOWNSHIP OF	421248	0291	D
MOUNT PLEASANT, TOWNSHIP OF	421258	0291	D
UNION, TOWNSHIP OF	421261	0291	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
42001C0291D

EFFECTIVE DATE
FEBRUARY 18, 2009

Federal Emergency Management Agency

Figure 4c. FEMA FIRM Map, Eisenhower Drive Extension Project

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Pennsylvania State Plane south zone (FIPSZONE 3702). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was provided in a digital format by the PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey. This information was photogrammetrically compiled at a scale of 1:2400 from aerial photography dated April 2003.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

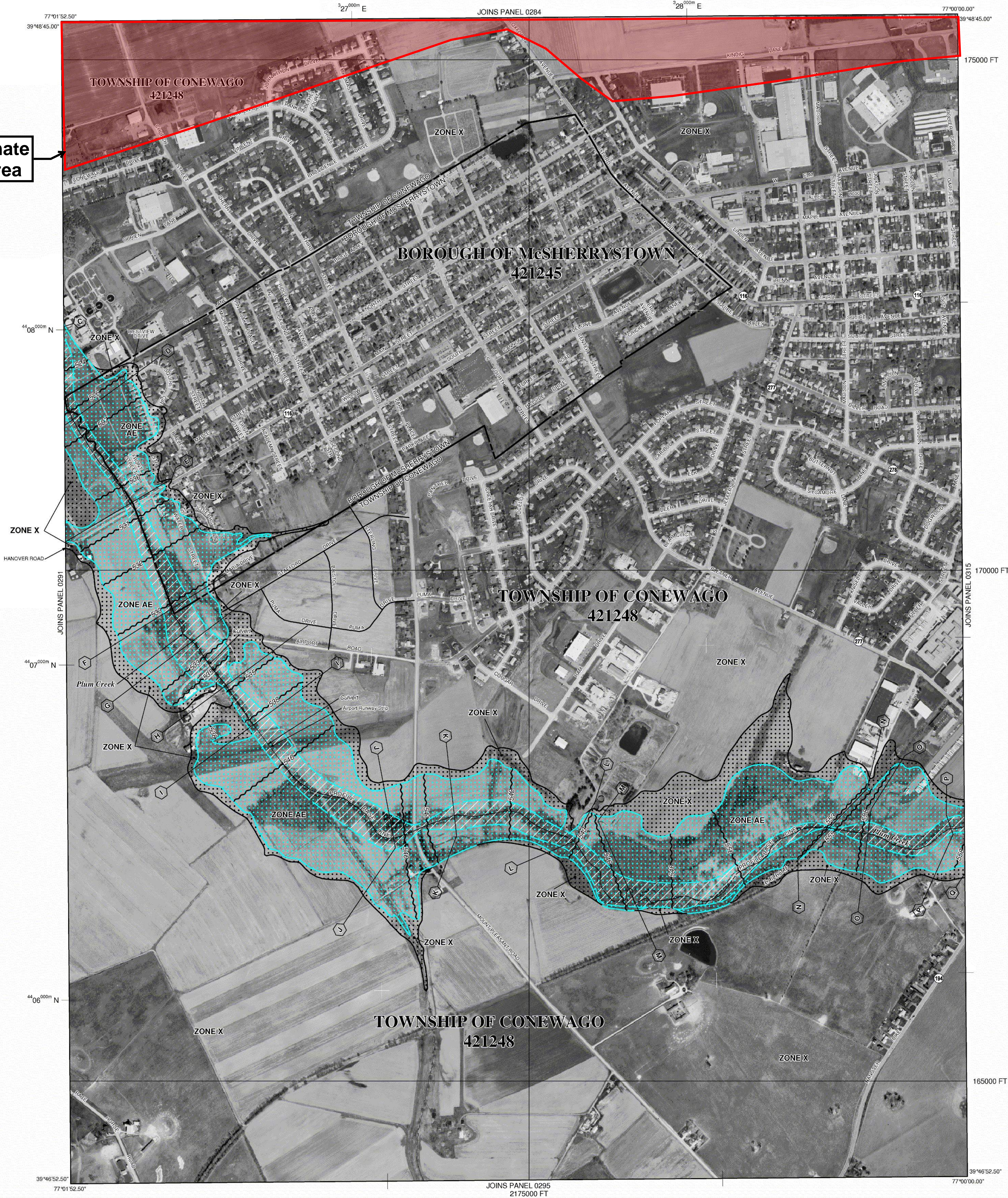
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.

Approximate Study Area



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AD, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A No Base Flood Elevations determined.
- ZONE AE Base Flood Elevations determined.
- ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid ticks, zone 18

5000-foot grid values: Pennsylvania State Plane coordinate system, south zone (FIPSZONE 3702), Lambert Conformal Conic

Bench mark (see explanation in Notes to Users section of this FIRM panel)

MAP REPOSITORIES

Refer to Map Repositories list on Map Index

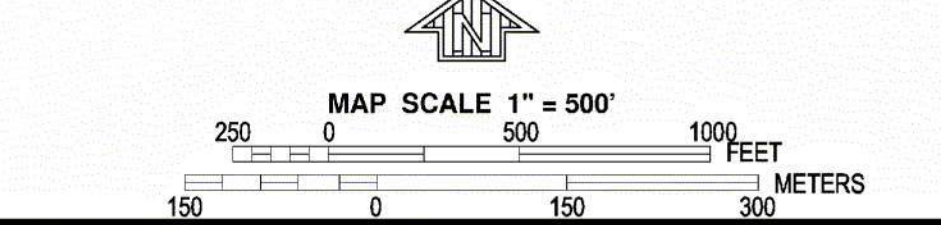
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

February 18, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NFIP

PANEL 0292D

FIRM

FLOOD INSURANCE RATE MAP

ADAMS COUNTY,

PENNSYLVANIA

(ALL JURISDICTIONS)

PANEL 292 OF 430

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONEWAGO, TOWNSHIP OF	421248	0292	D
MCSherrystown, BOROUGH OF	421245	0292	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

42001C0292D

EFFECTIVE DATE

FEBRUARY 18, 2009

Federal Emergency Management Agency

Figure 4d. FEMA FIRM Map, Eisenhower Drive Extension Project

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Pennsylvania State Plane south zone (FIPSZONE 3702). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA/NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was provided in a digital format by the PA/MA/PA Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey. This information was photogrammetrically compiled at a scale of 1:2400 from aerial photography dated April 2003.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A No Base Flood Elevations determined.
- ZONE AE Base Flood Elevations determined.
- ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

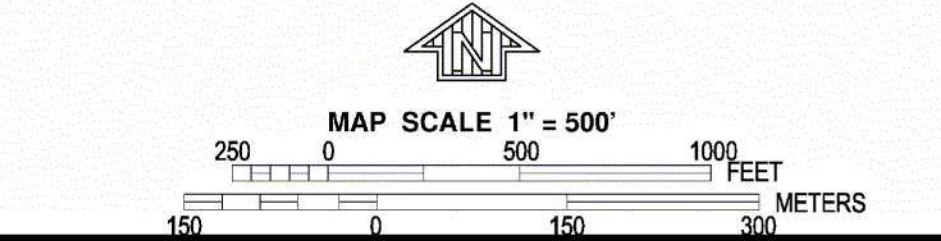
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 18
- 5000-foot grid values; Pennsylvania State Plane coordinate system, south zone (FIPSZONE 3702), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile
- MAP REPOSITORIES
- Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- February 18, 2009
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0284D

FIRM

FLOOD INSURANCE RATE MAP

ADAMS COUNTY,

PENNSYLVANIA

(ALL JURISDICTIONS)

PANEL 284 OF 430
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BERWICK, TOWNSHIP OF	421160	0284	D
CONEWAGO, TOWNSHIP OF	421248	0284	D
OXFORD, TOWNSHIP OF	420003	0284	D

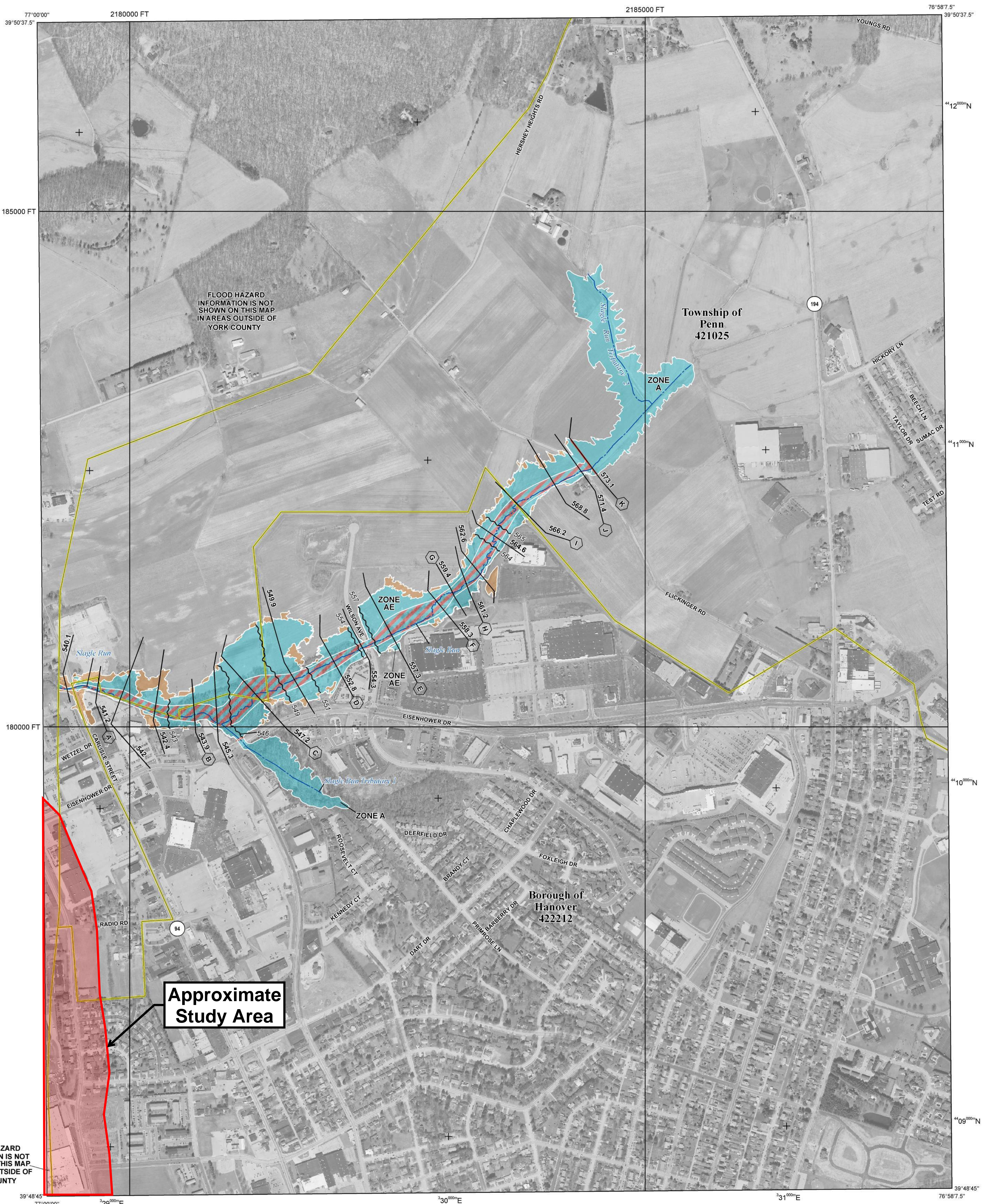
Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
42001C0284D

EFFECTIVE DATE
FEBRUARY 18, 2009

Federal Emergency Management Agency

Figure 4e. FEMA FIRM Map, Eisenhower Drive Extension Project






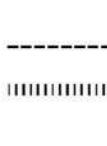
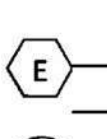



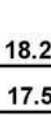
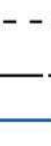
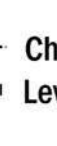
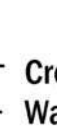

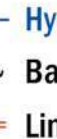



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone Aa, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway
		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
OTHER AREAS OF FLOOD HAZARD		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee See Notes. <i>Zone X</i>
		Areas of Minimal Flood Hazard <i>Zone X</i>
		Area of Undetermined Flood Hazard <i>Zone D</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
		Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
		Coastal Transect
		Coastal Transect Baseline
OTHER FEATURES		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

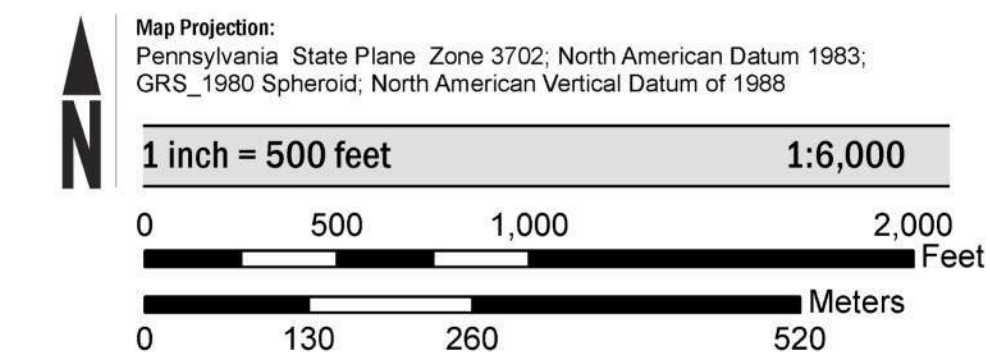
For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-736-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

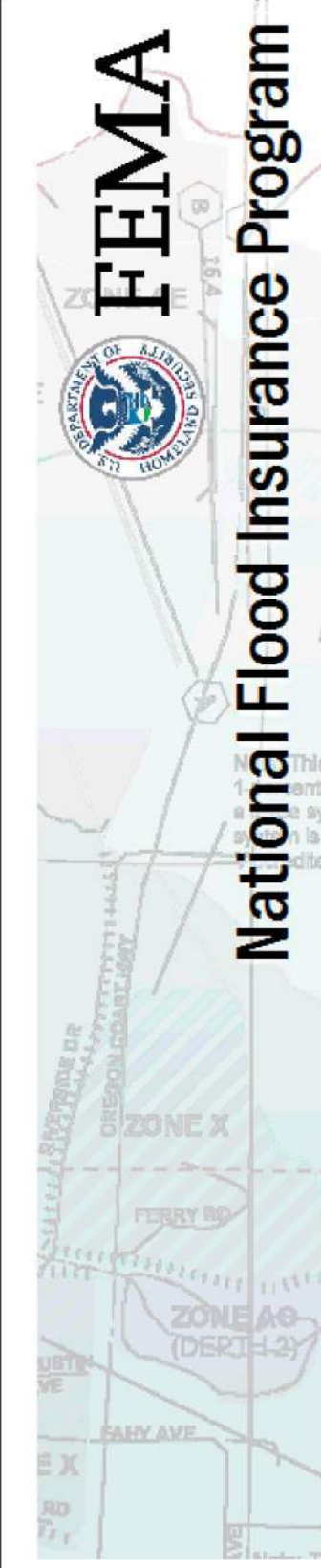
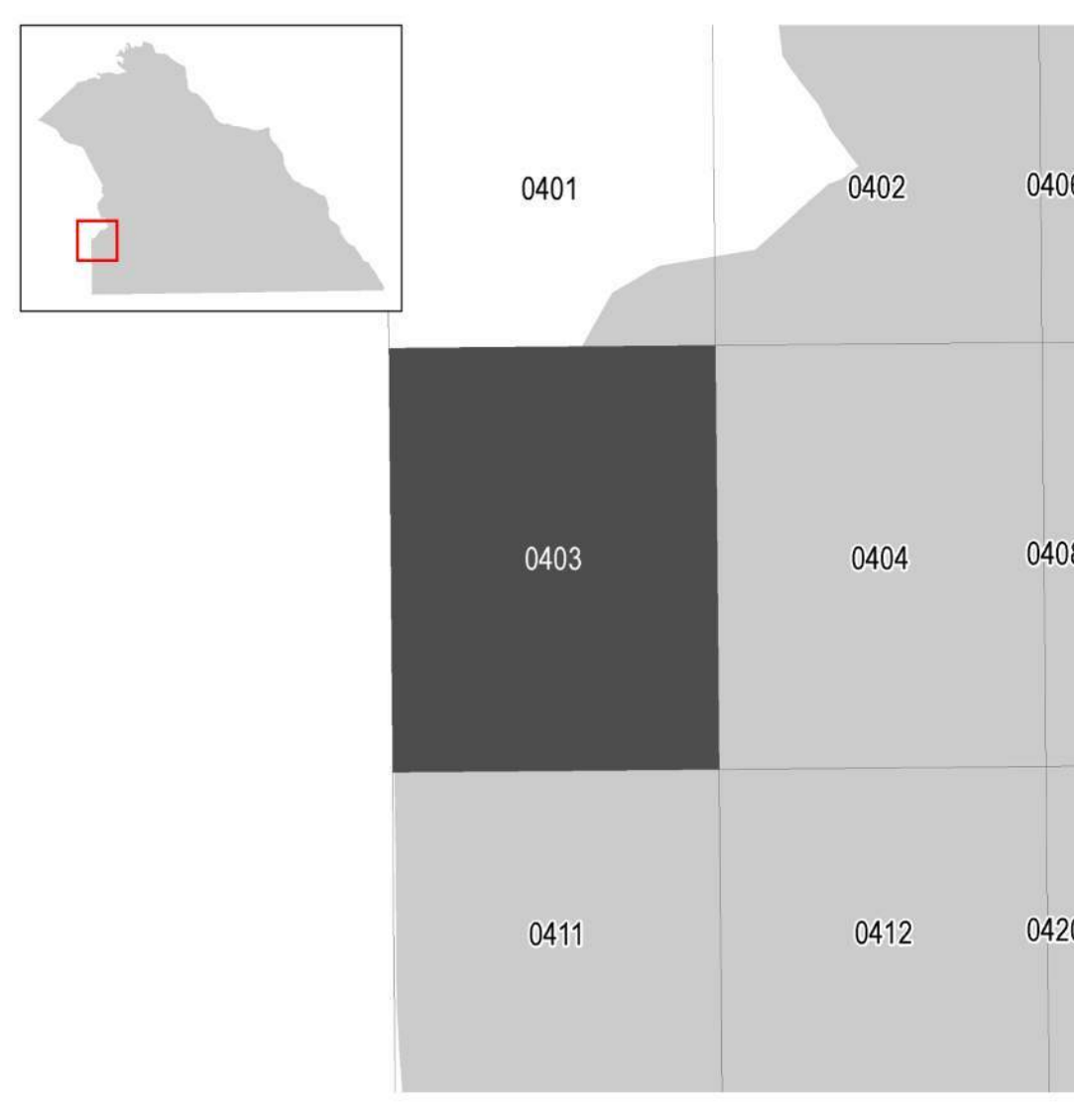
For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

Base map information shown on this FIRM was provided in digital format by multiple agencies. York County Planning Commission provided digital format of base transportation and political boundaries dated 2011. The United States Geological Survey (USGS) provided 7.5- Minute Series Topographic Maps, Dated 1989. Pennsylvania Department of Conservation and Natural Resources, PAMAP provided the ortho imagery for York County, dated 2008.

SCALE



PANEL LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

YORK COUNTY, PENNSYLVANIA
(All Jurisdictions)

PANEL 403 OF 701



Panel Contains:

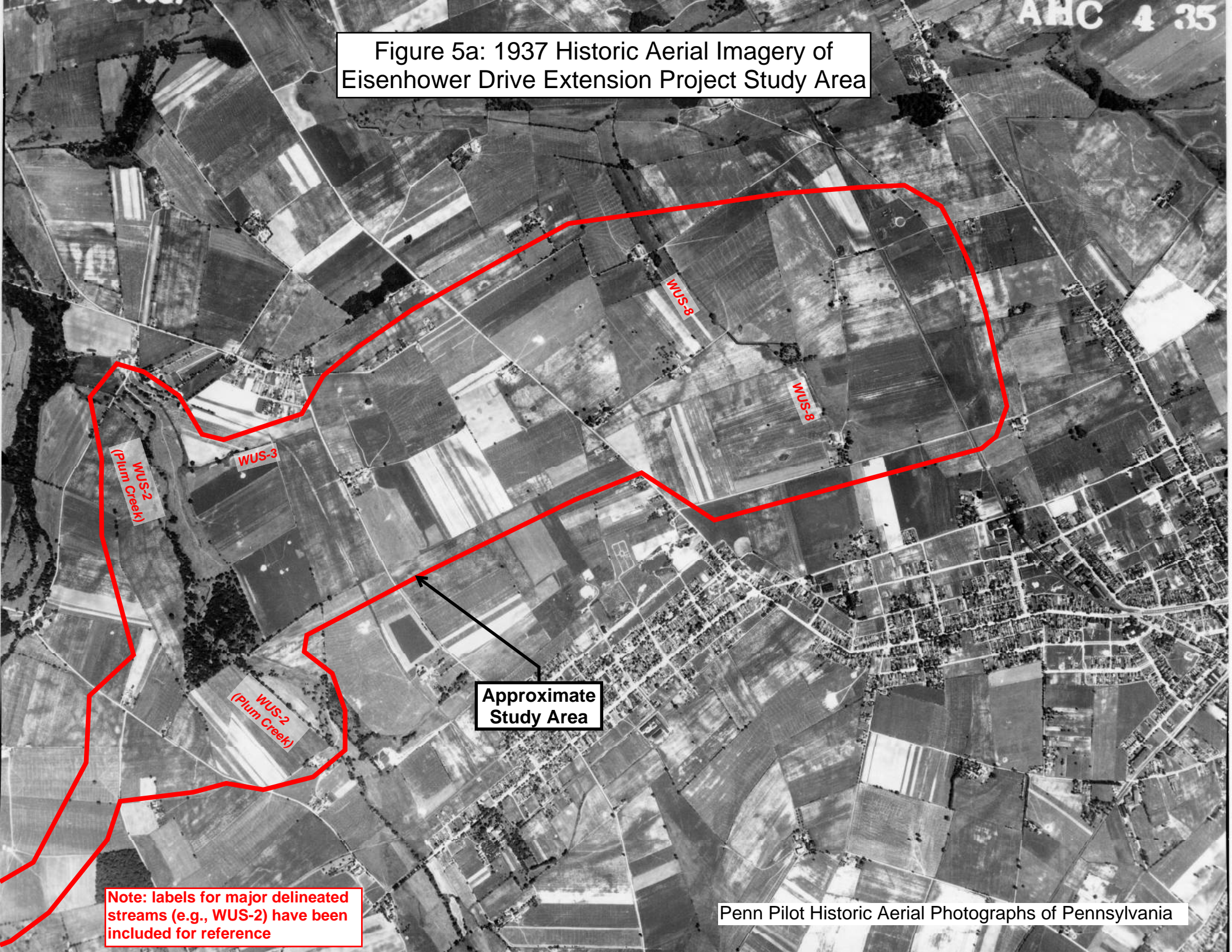
COMMUNITY	NUMBER	PANEL	SUFFIX
HANOVER, BOROUGH OF	422212	0403	F
PENN. TOWNSHIP OF	421025	0403	E

VERSION NUMBER
2.3.2.2

MAP NUMBER
42133C0403F

MAP REVISED
DECEMBER 16, 2015

Figure 5a: 1937 Historic Aerial Imagery of
Eisenhower Drive Extension Project Study Area



Note: labels for major delineated streams (e.g., WUS-2) have been included for reference

Approximate
Study Area

8-23-57

AHC-2R-9

Figure 5b: 1957 Historic Aerial Imagery of
Eisenhower Drive Extension Project Study Area

Approximate
Study Area

WUS-2
(Plum Creek)

WUS-3

WUS-2
(Plum Creek)

Note: labels for major delineated
streams (e.g., WUS-2)
have been
included for reference

9-25-57

AHC-6R-28



Figure 5c: 1957 Historic Aerial Imagery of Eisenhower Drive Extension Project Study Area

Note: labels for major delineated streams (e.g., WUS-2) have been included for reference

8-13-71

AHC-3MM-220

Figure 5d: 1957 Historic Aerial Imagery of
Eisenhower Drive Extension Project Study Area



Approximate
Study Area

WUS-2
(Plum Creek)

WUS-3

WUS-2
(Plum Creek)

Note: labels for major delineated
streams (e.g., WUS-2) have been
included for reference

CFL210.35

157633

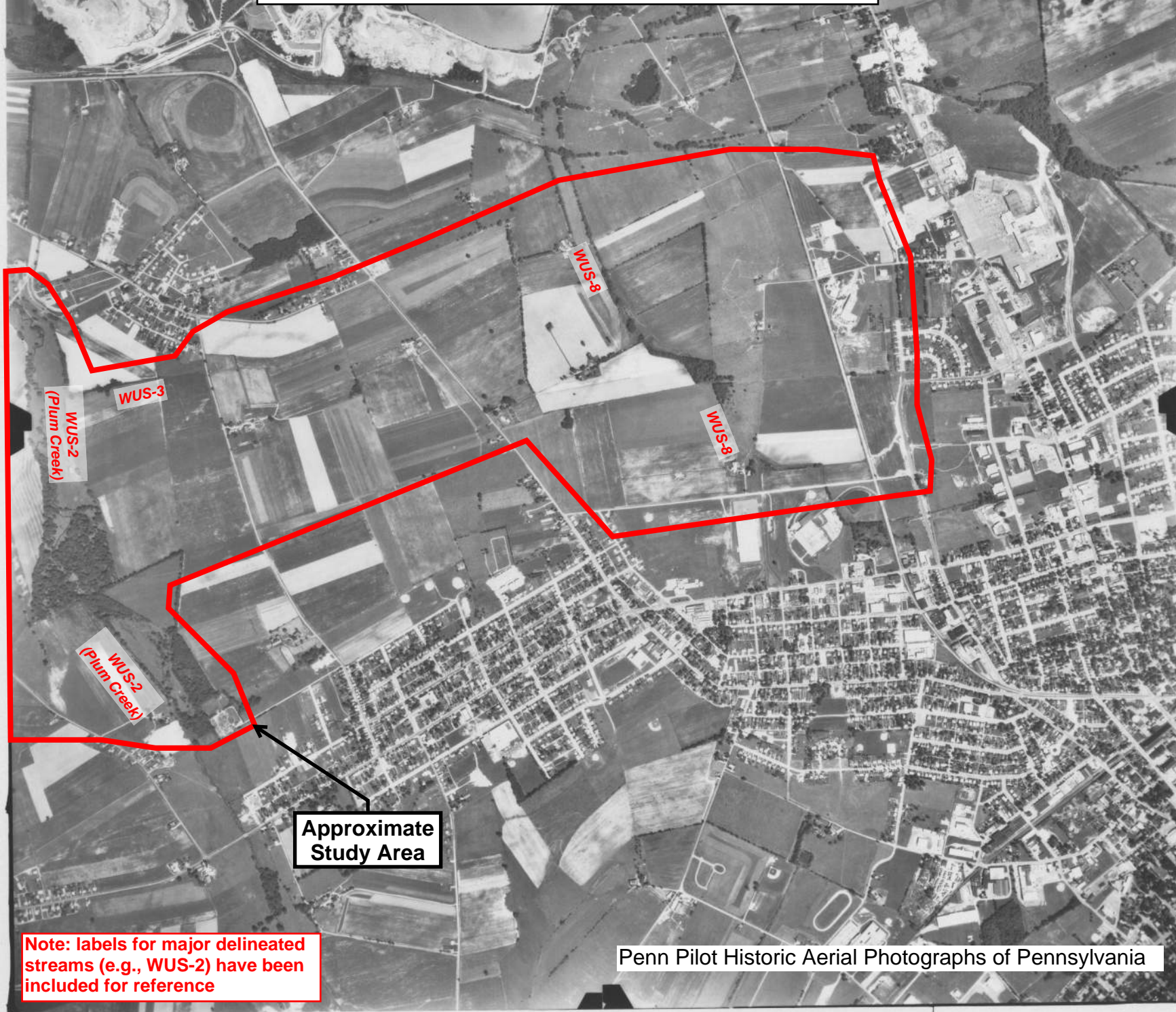
757633

GFL210.35

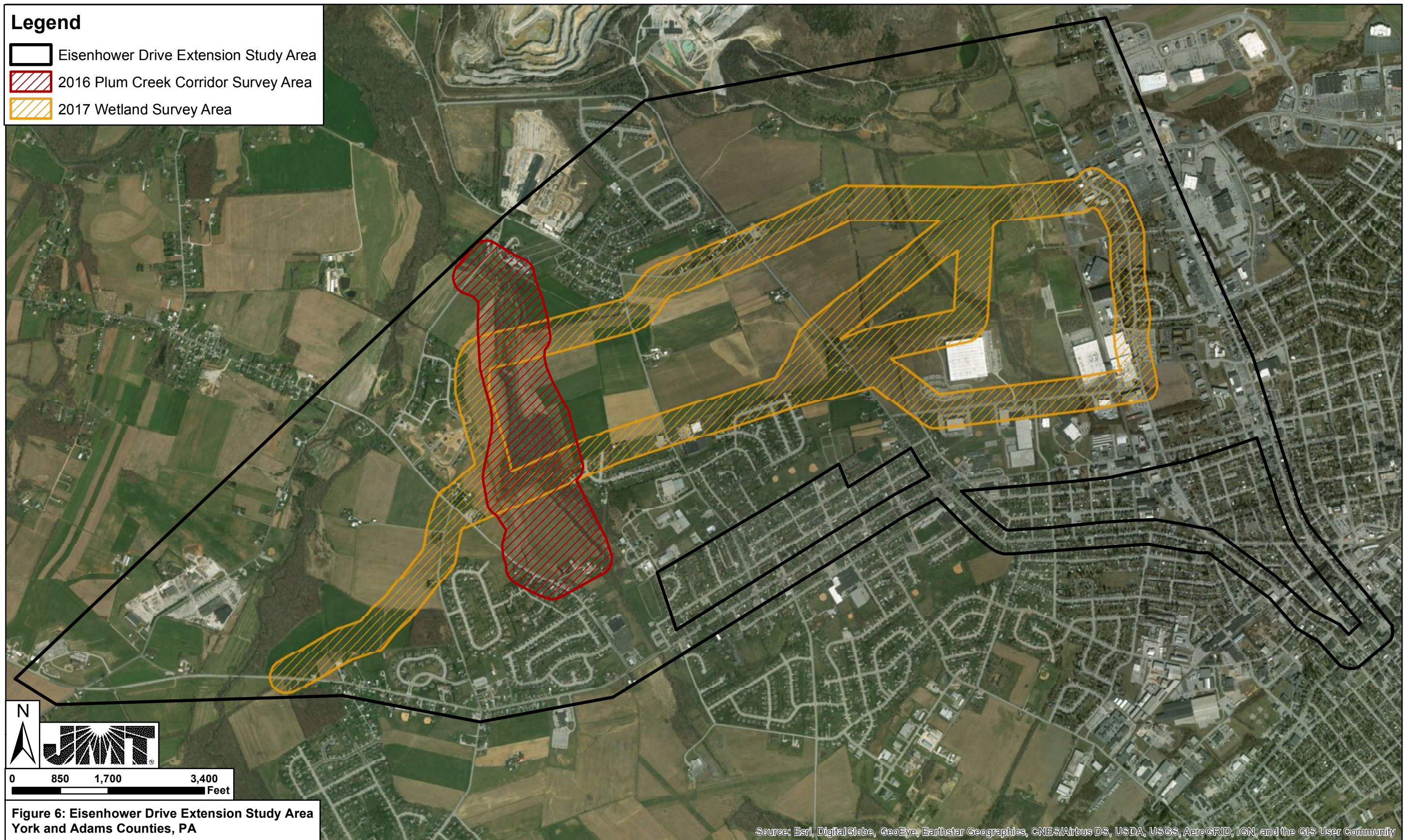
8-13-71

AHC-3MM-199

Figure 5e: 1971 Historic Aerial Imagery of
Eisenhower Drive Extension Project Study Area



Note: labels for major delineated streams (e.g., WUS-2) have been included for reference



Legend

- ① Map Figure Number
- Eisenhower Drive Extension Study Area
- Roads
- Streams
- 2016 Plum Creek Corridor Survey Area
- 2017 Wetland Survey Area

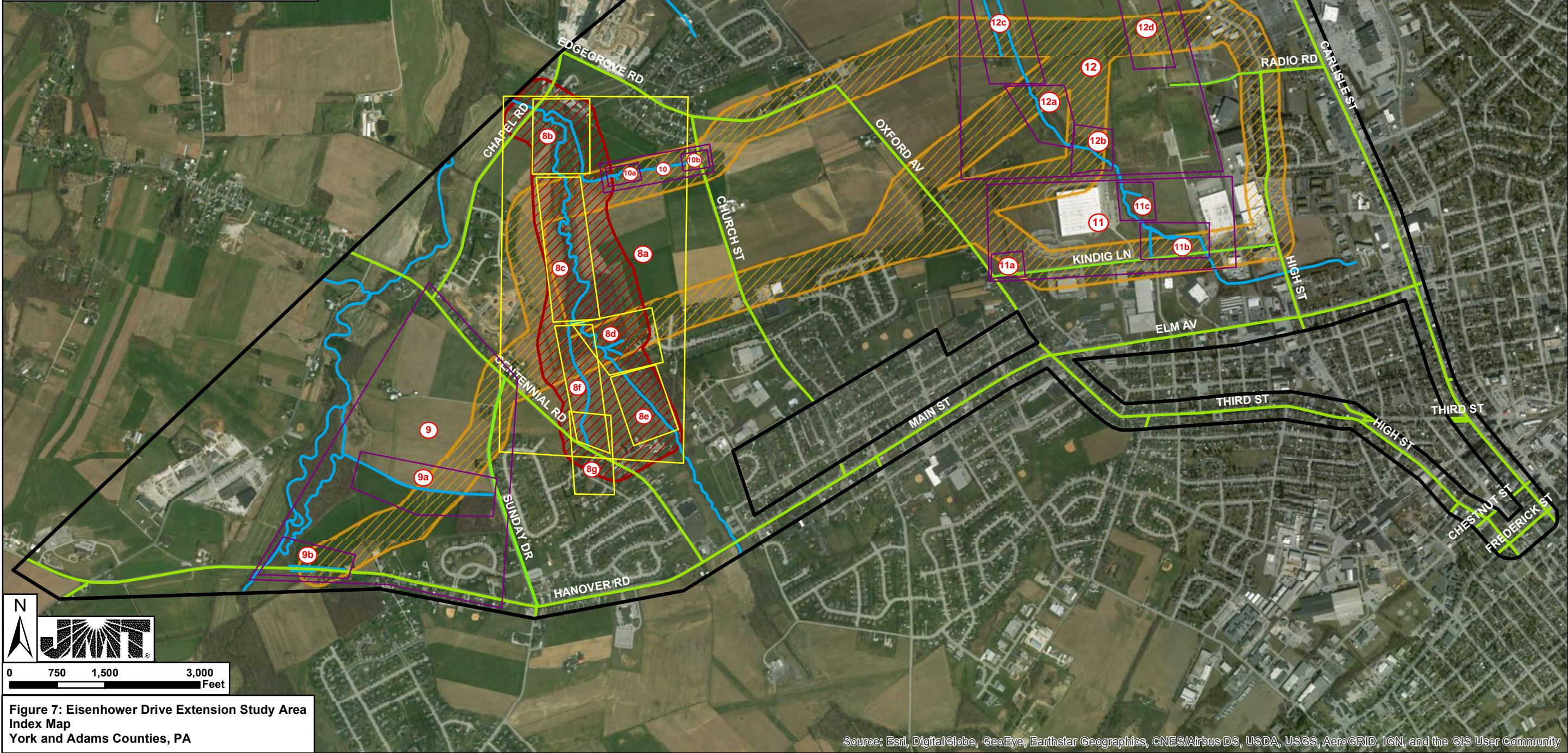
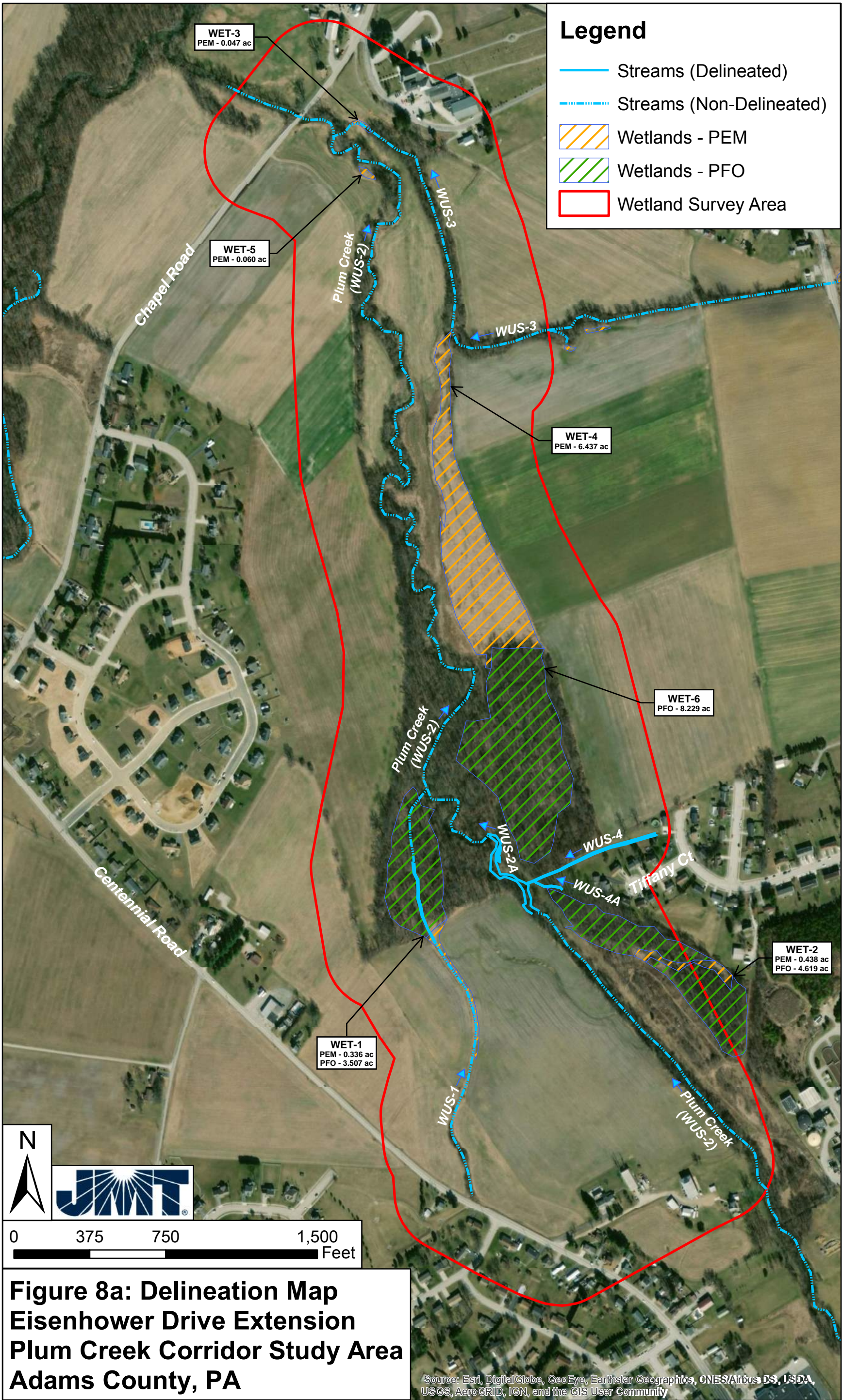
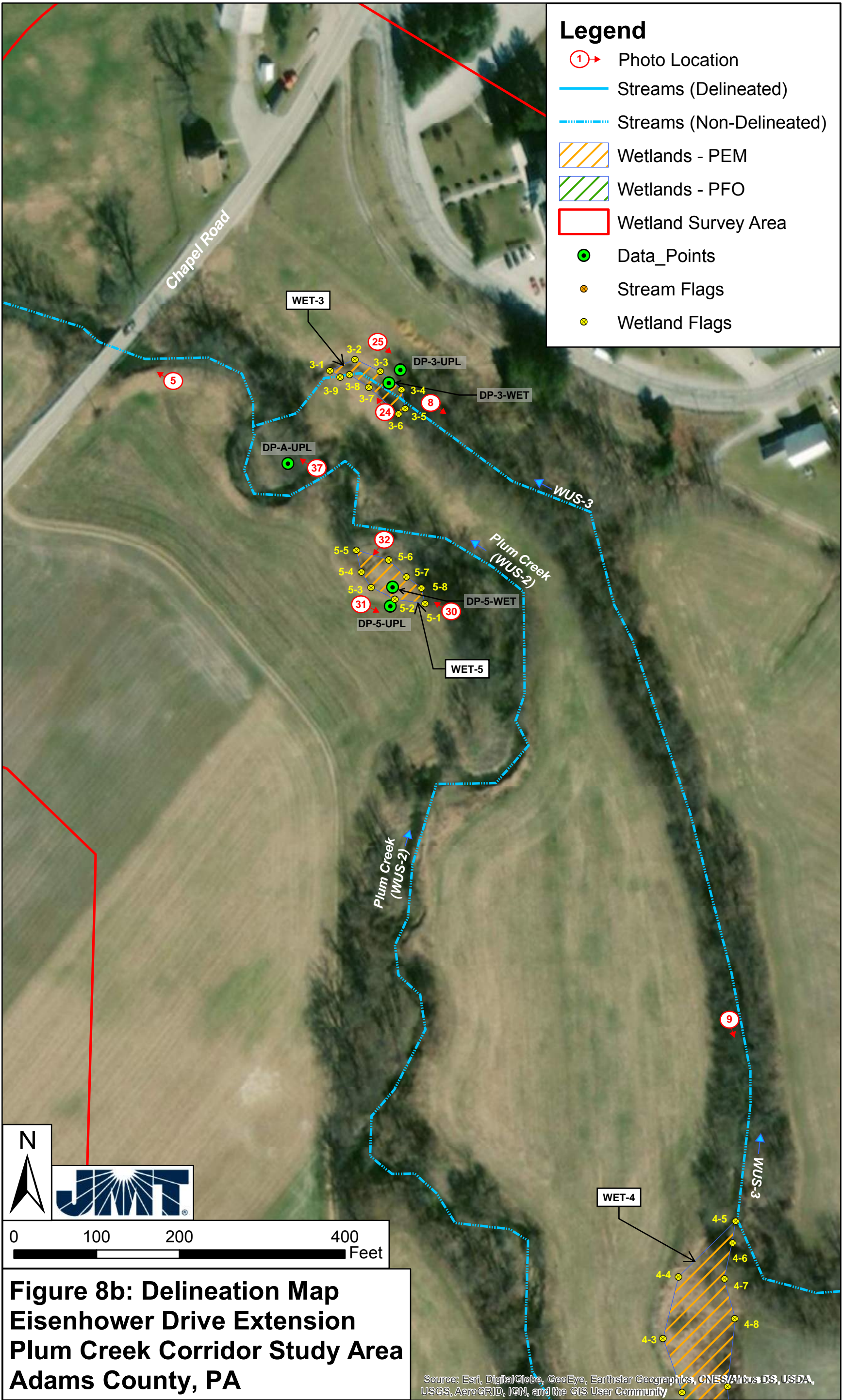
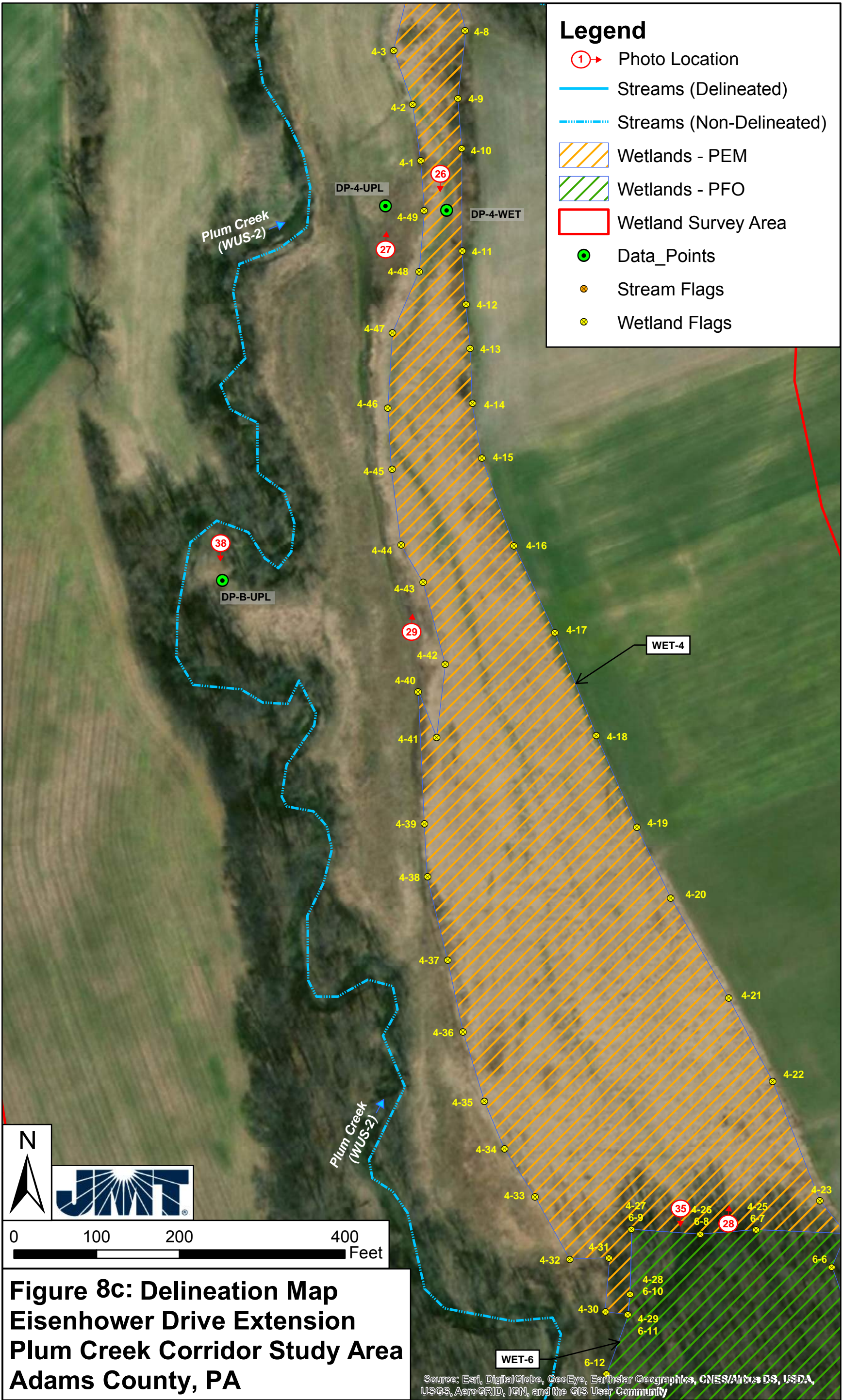


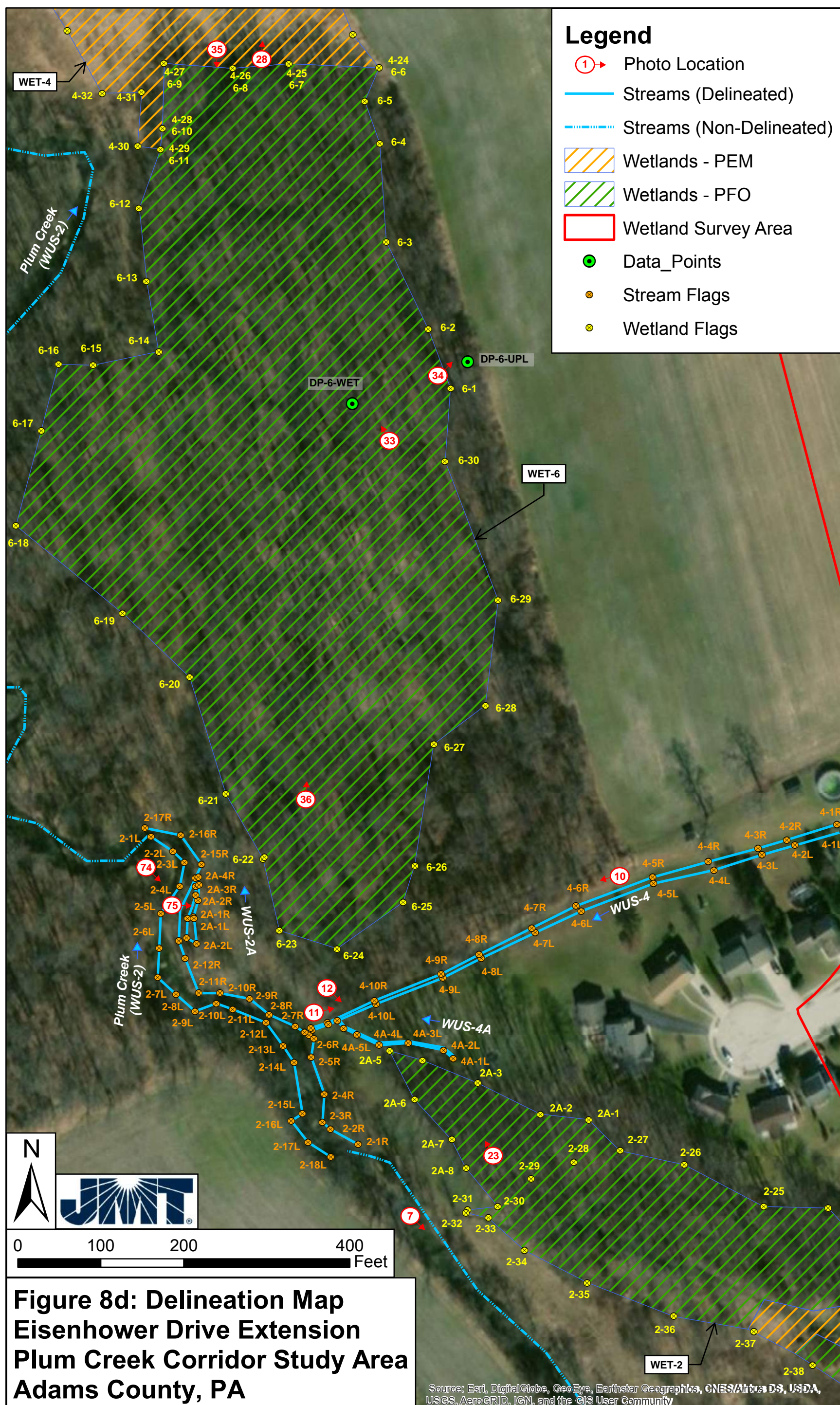
Figure 7: Eisenhower Drive Extension Study Area
Index Map
York and Adams Counties, PA

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





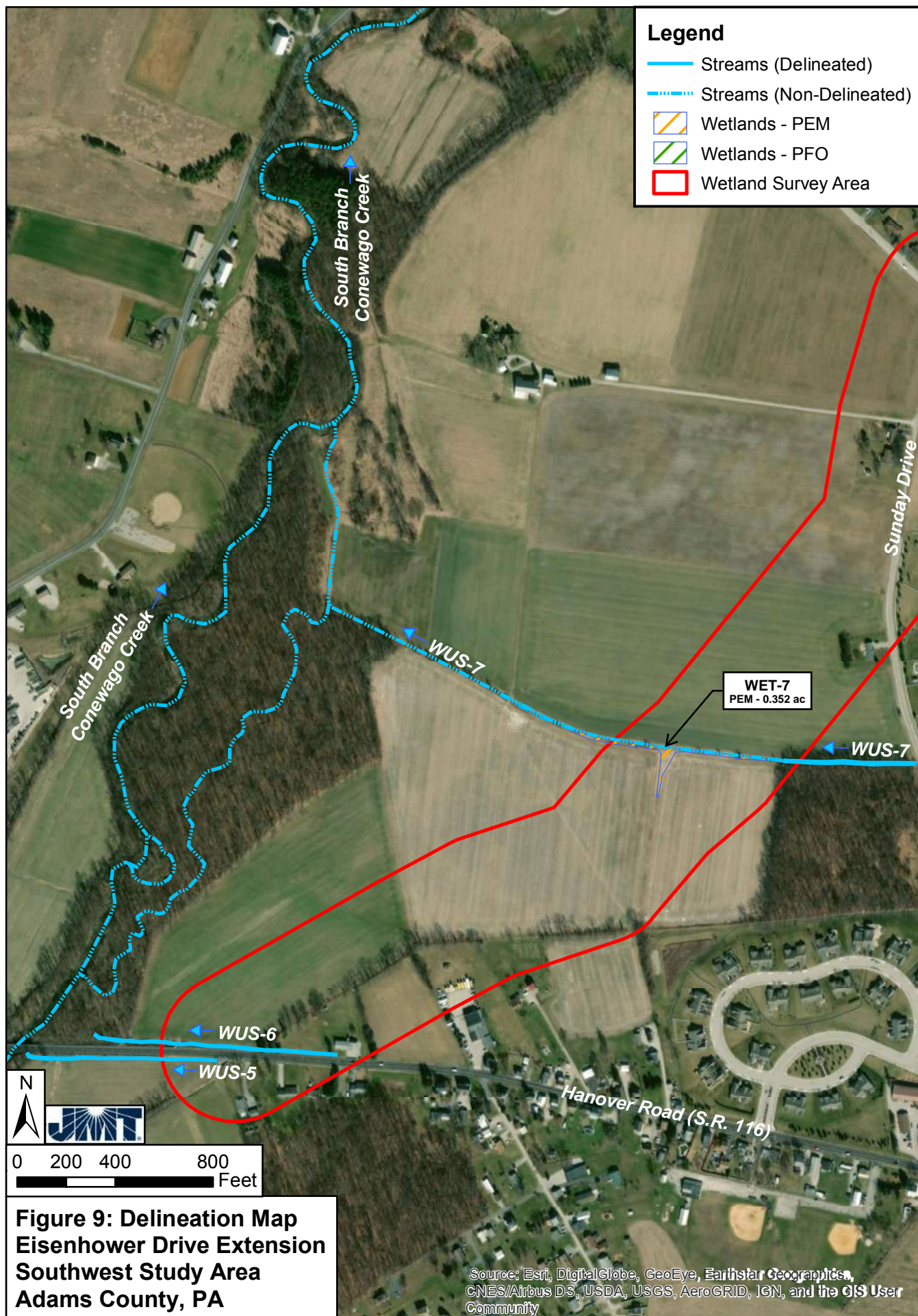


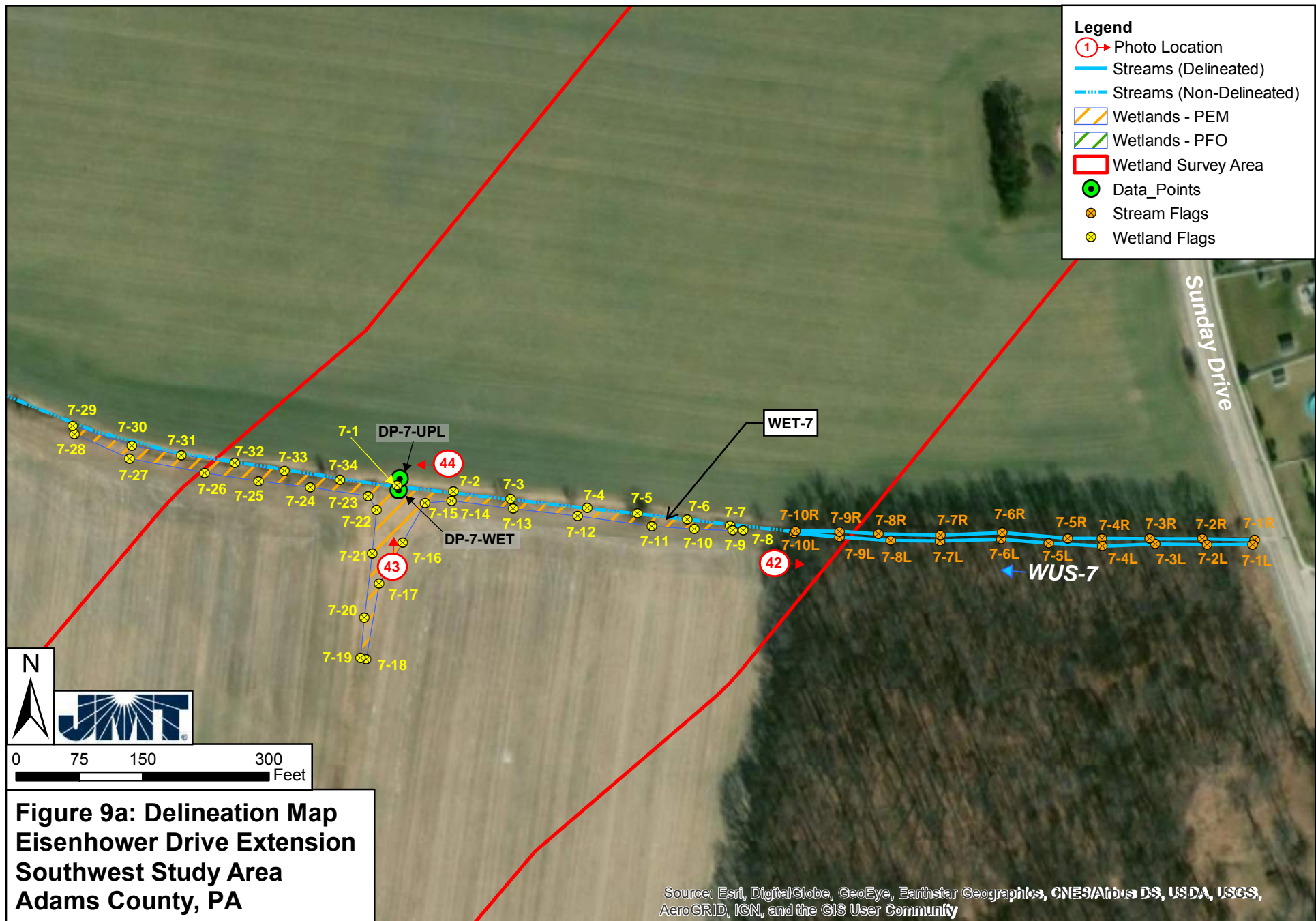


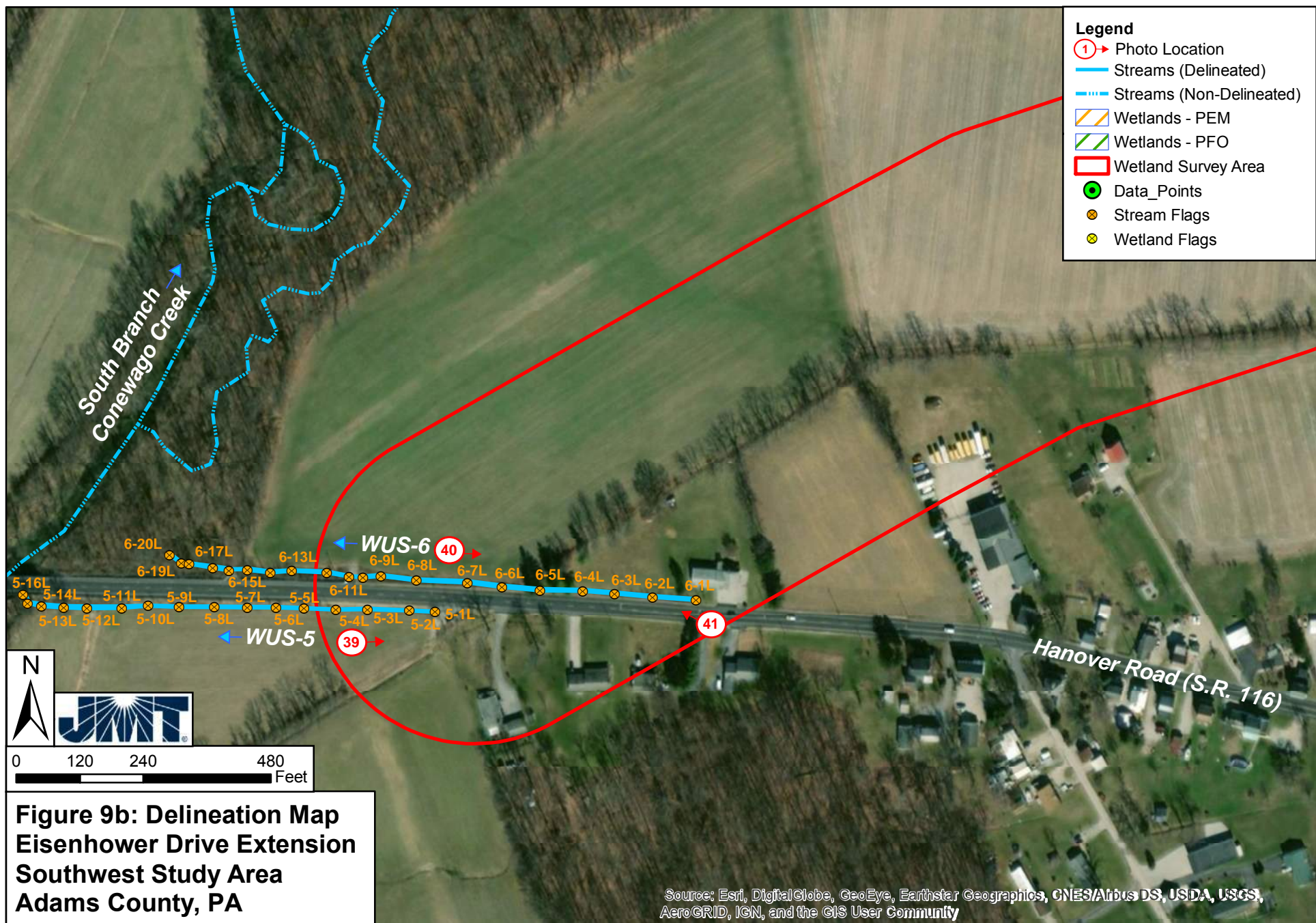


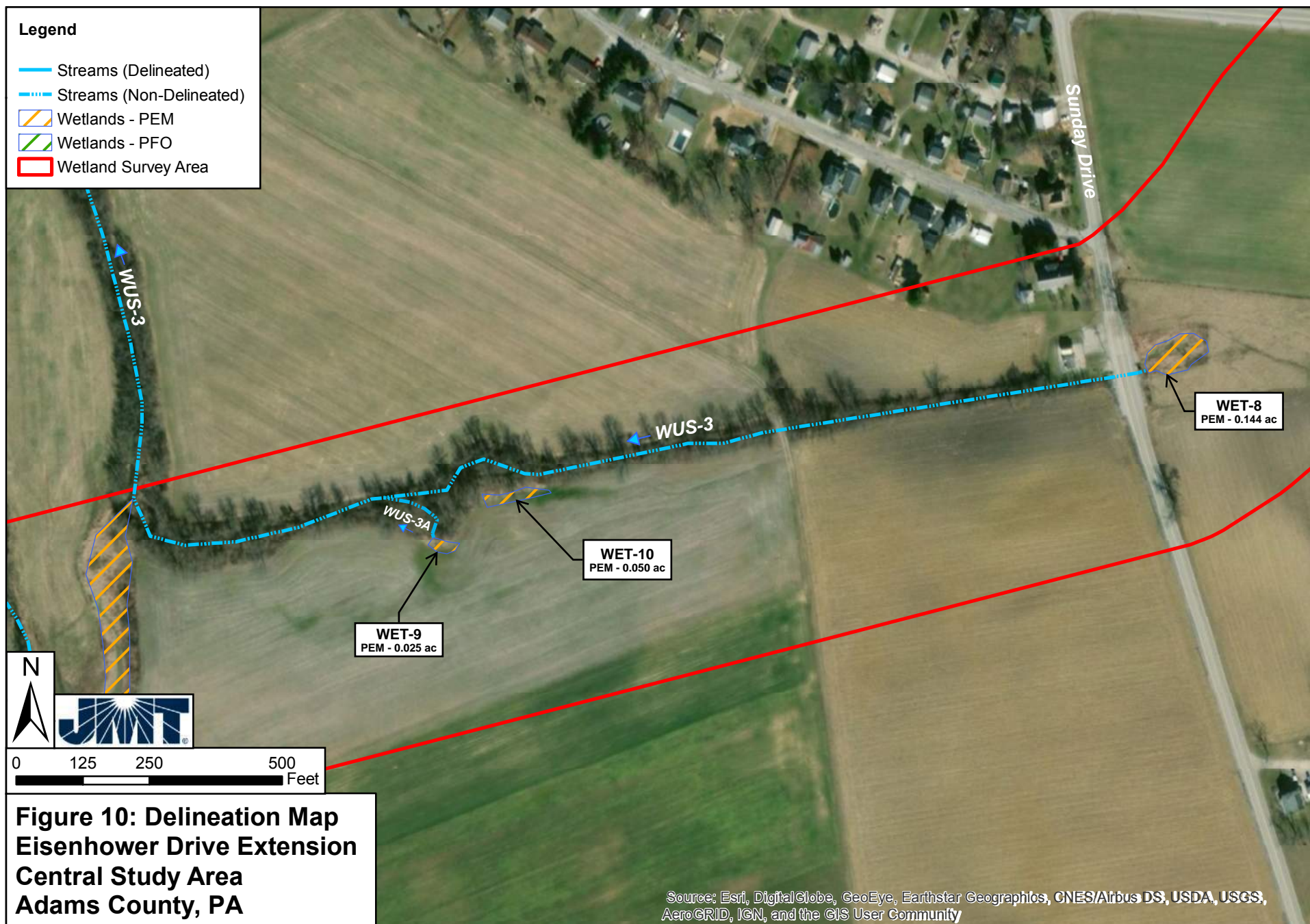


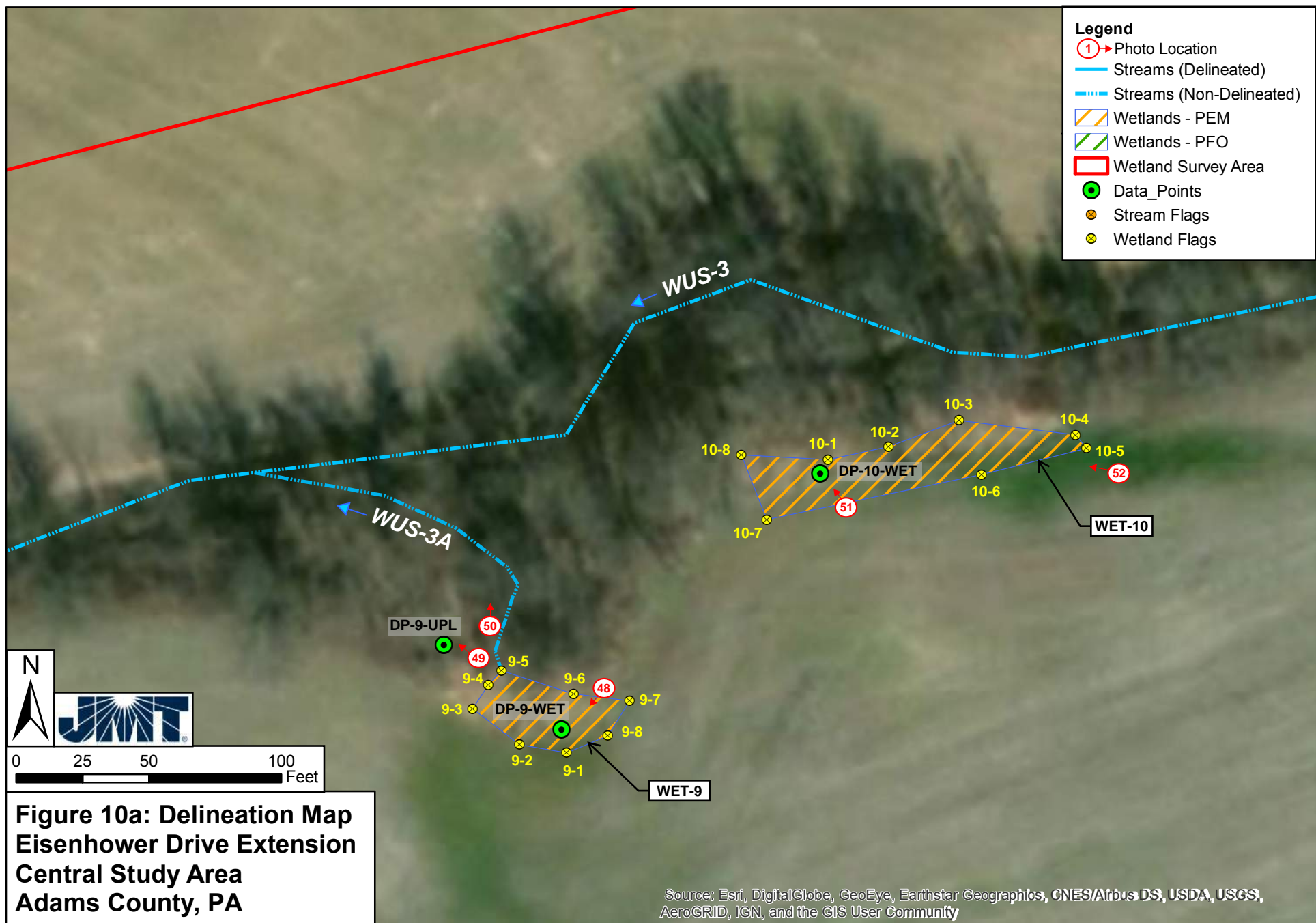


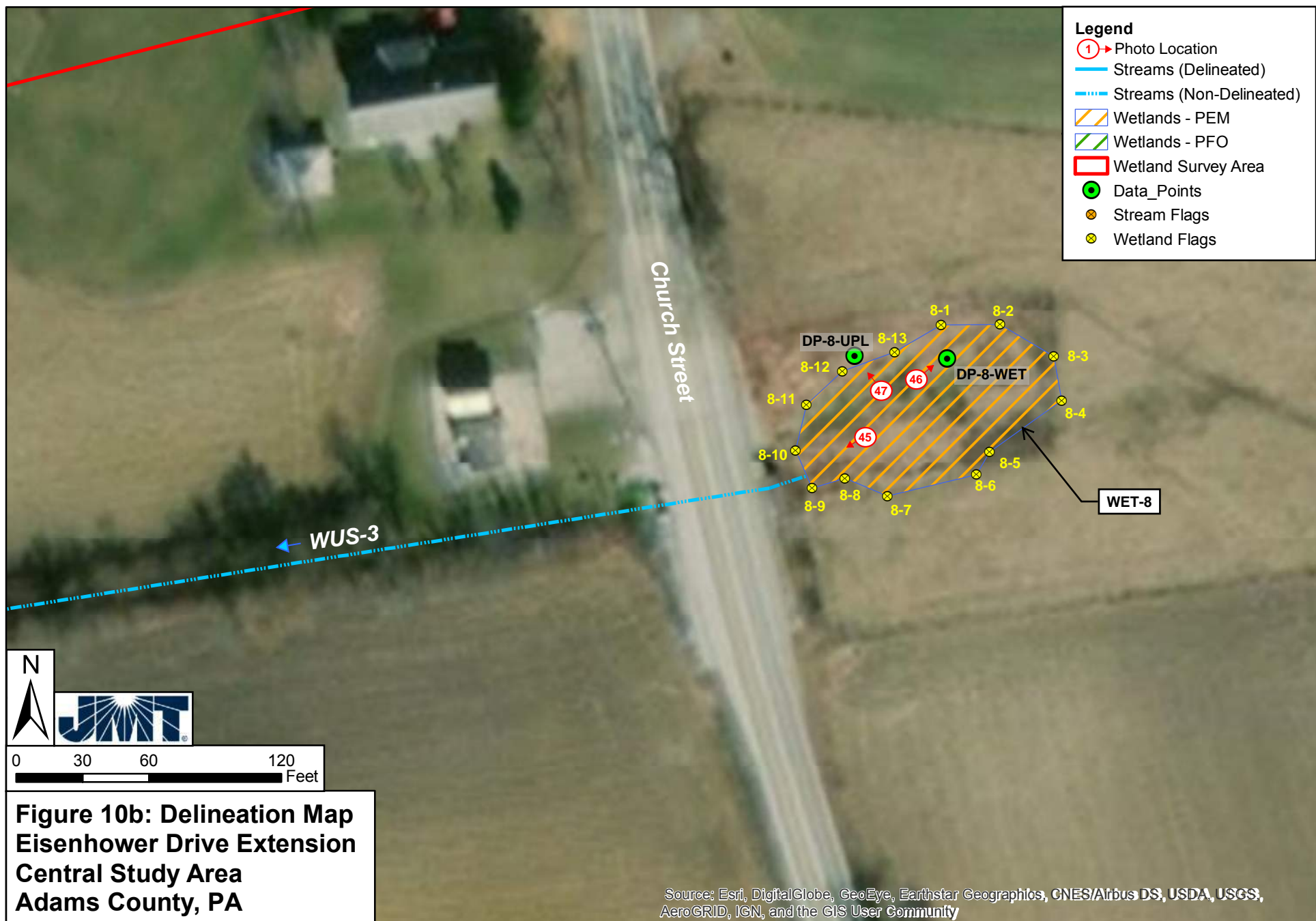


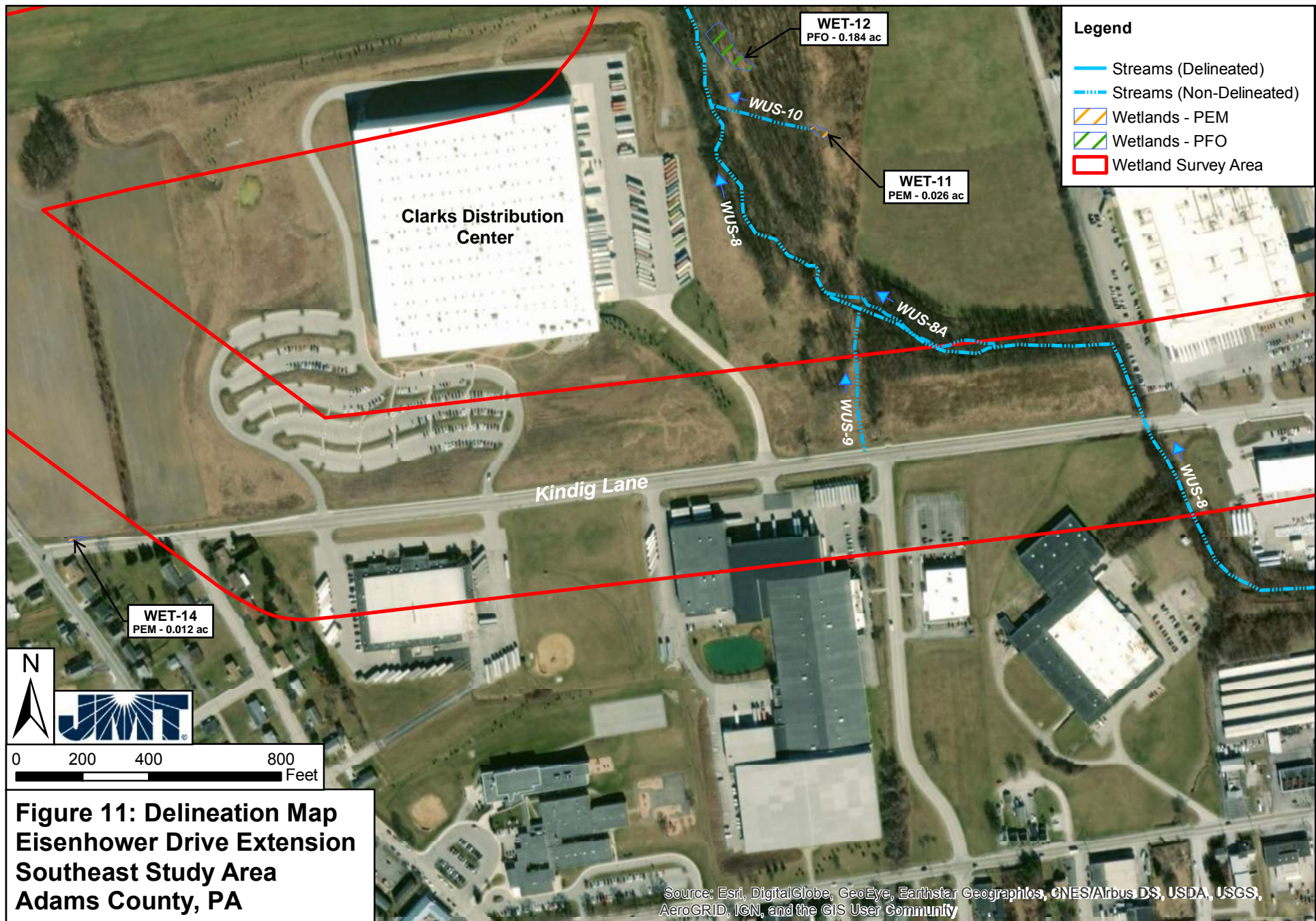


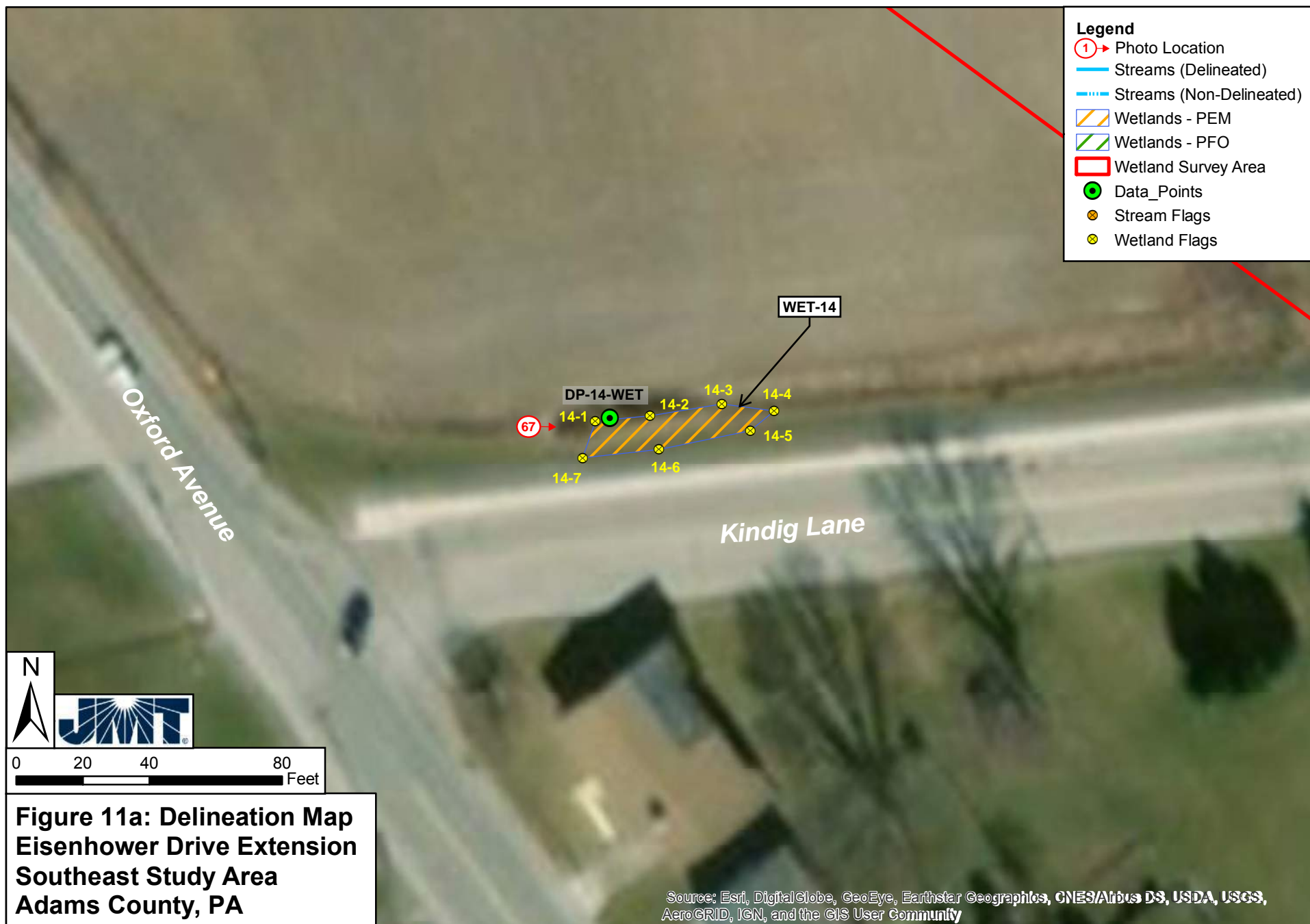


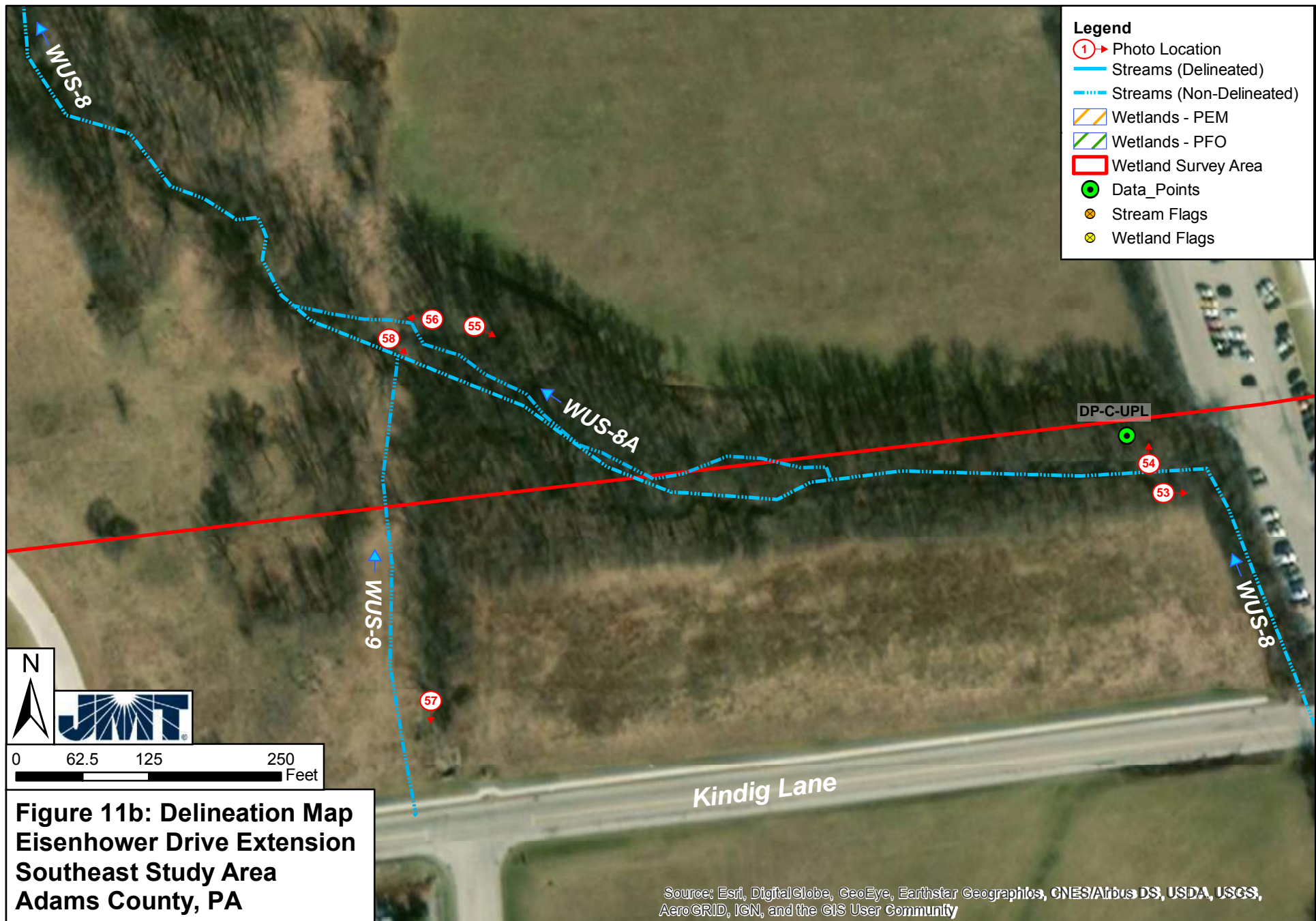


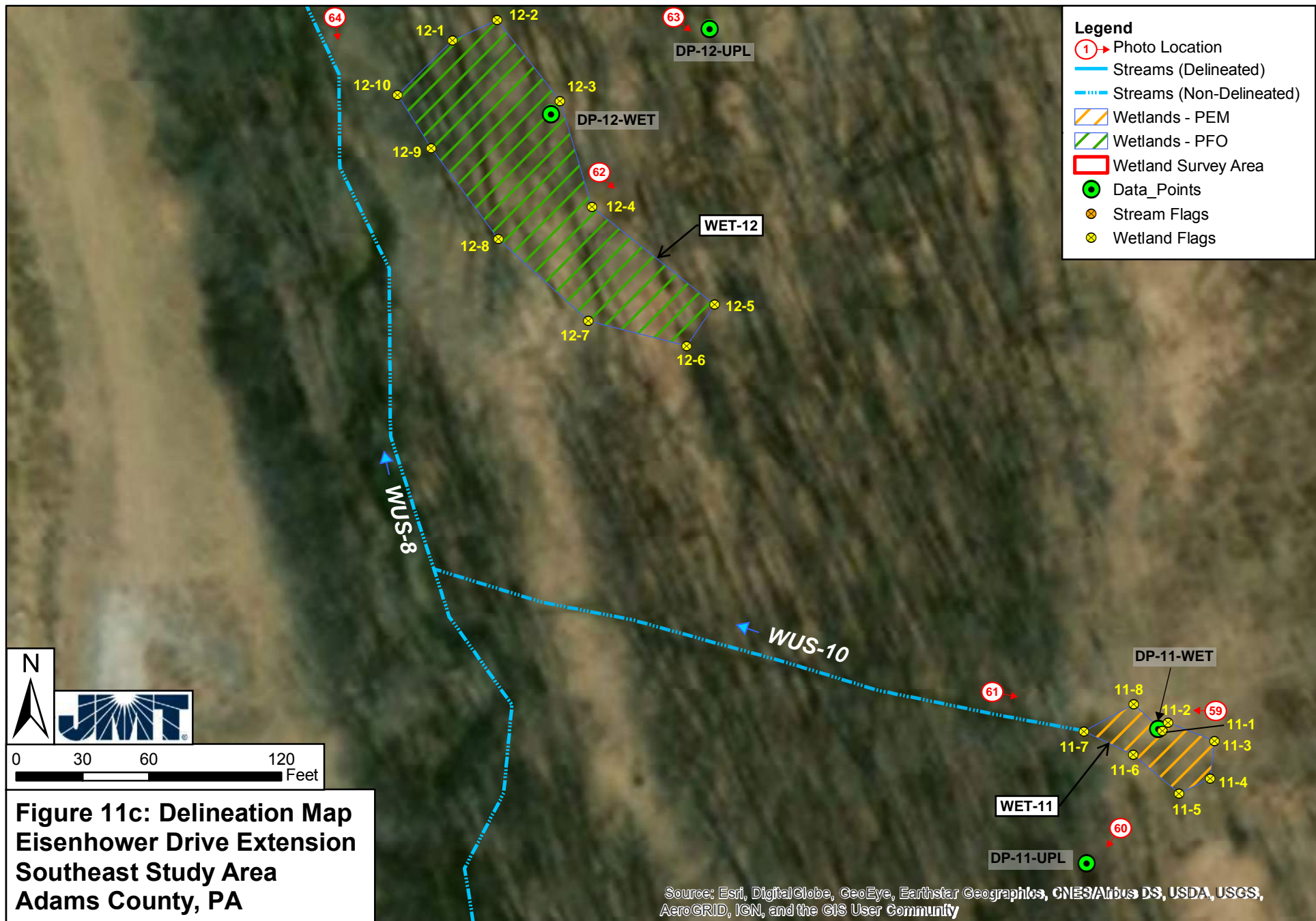


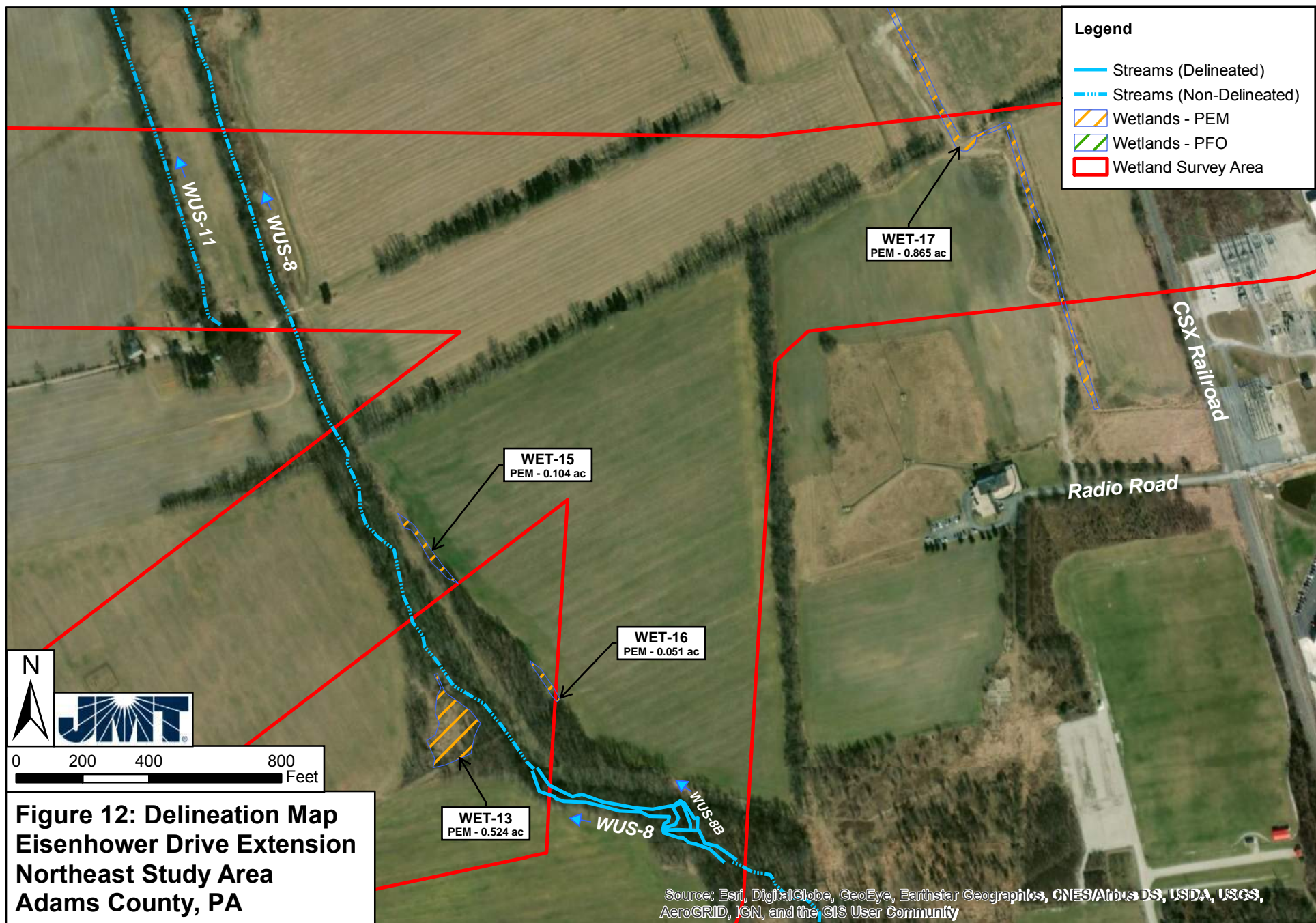


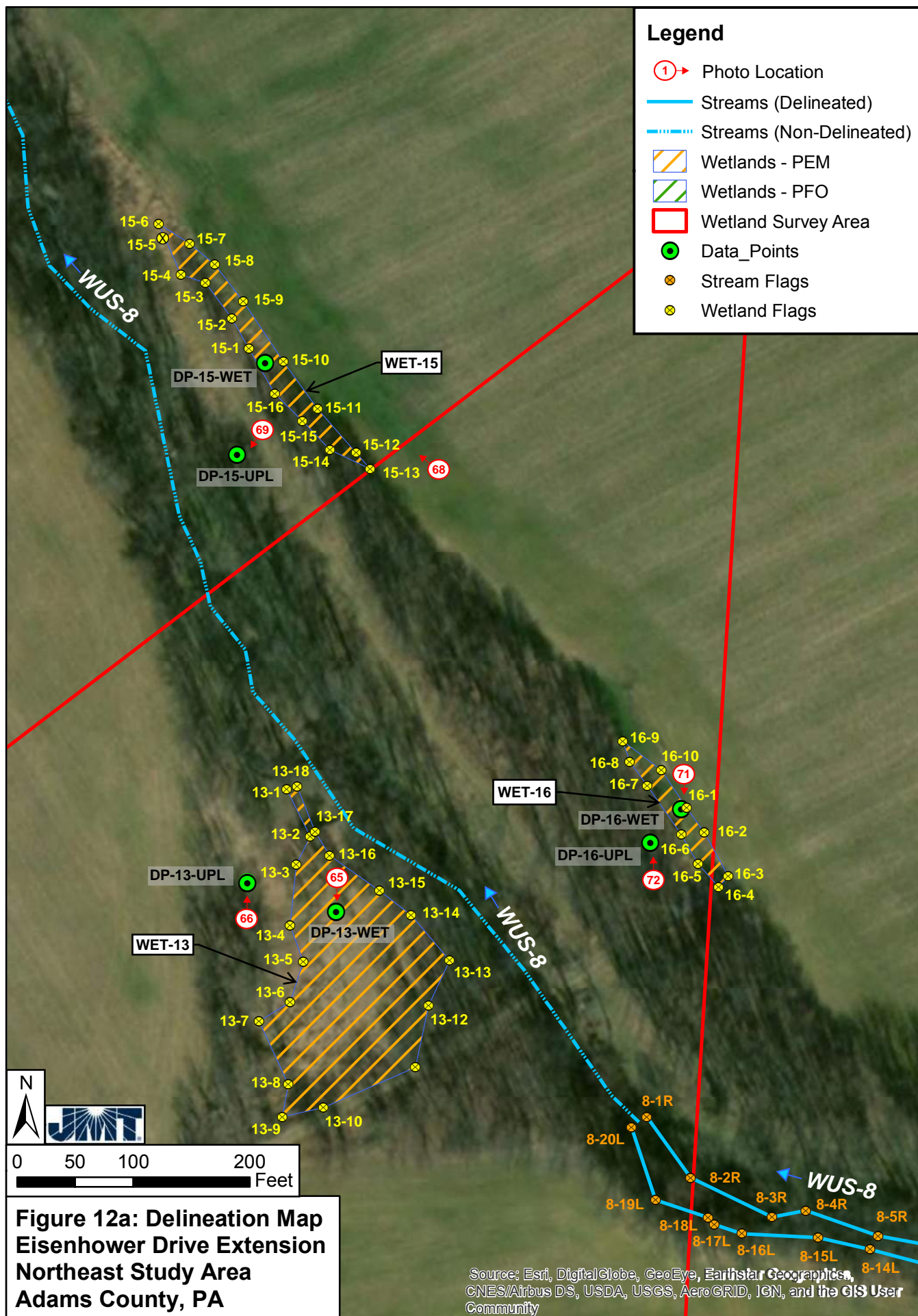


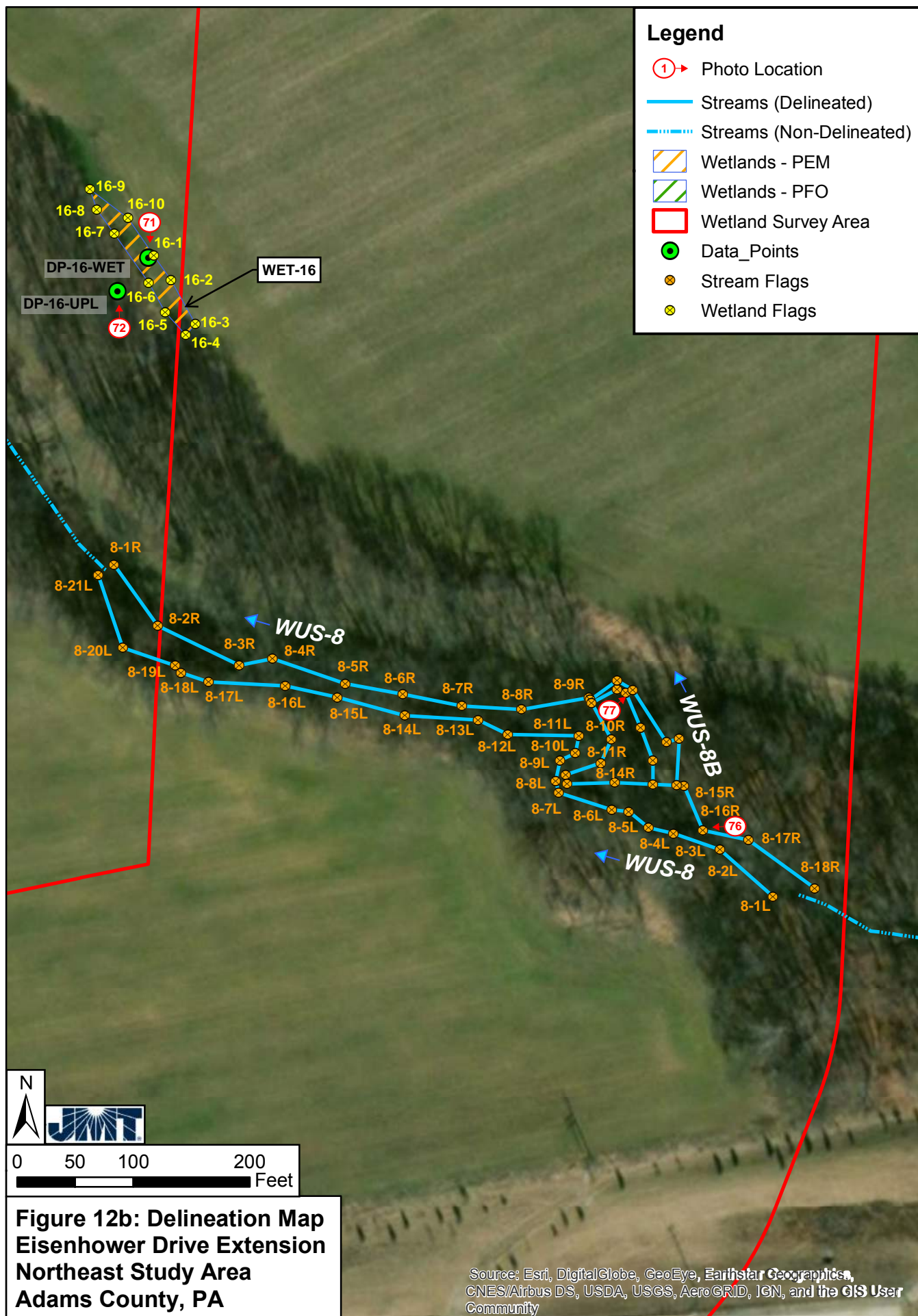












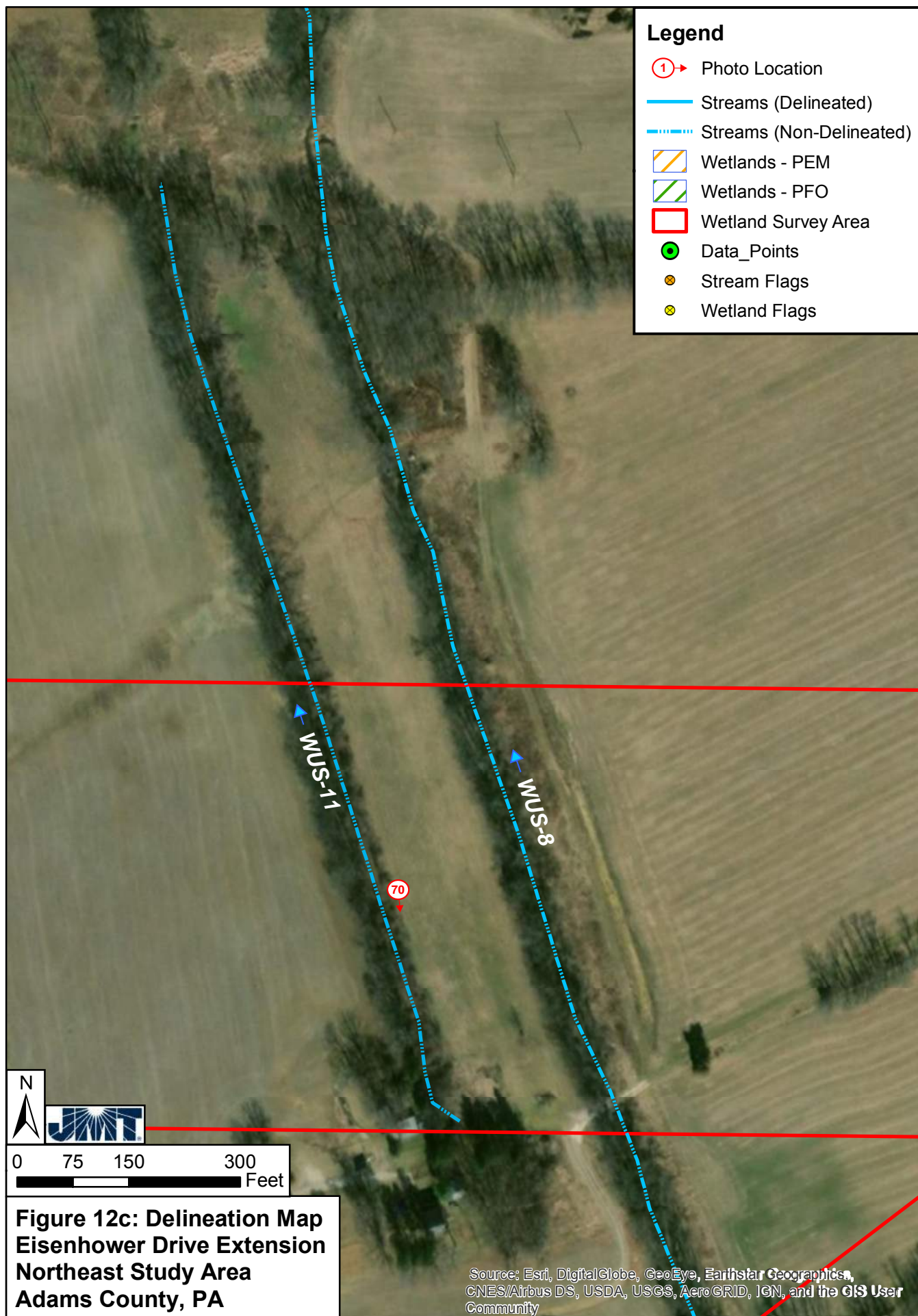




Figure 13: Bog Turtle Designated Survey Area Map

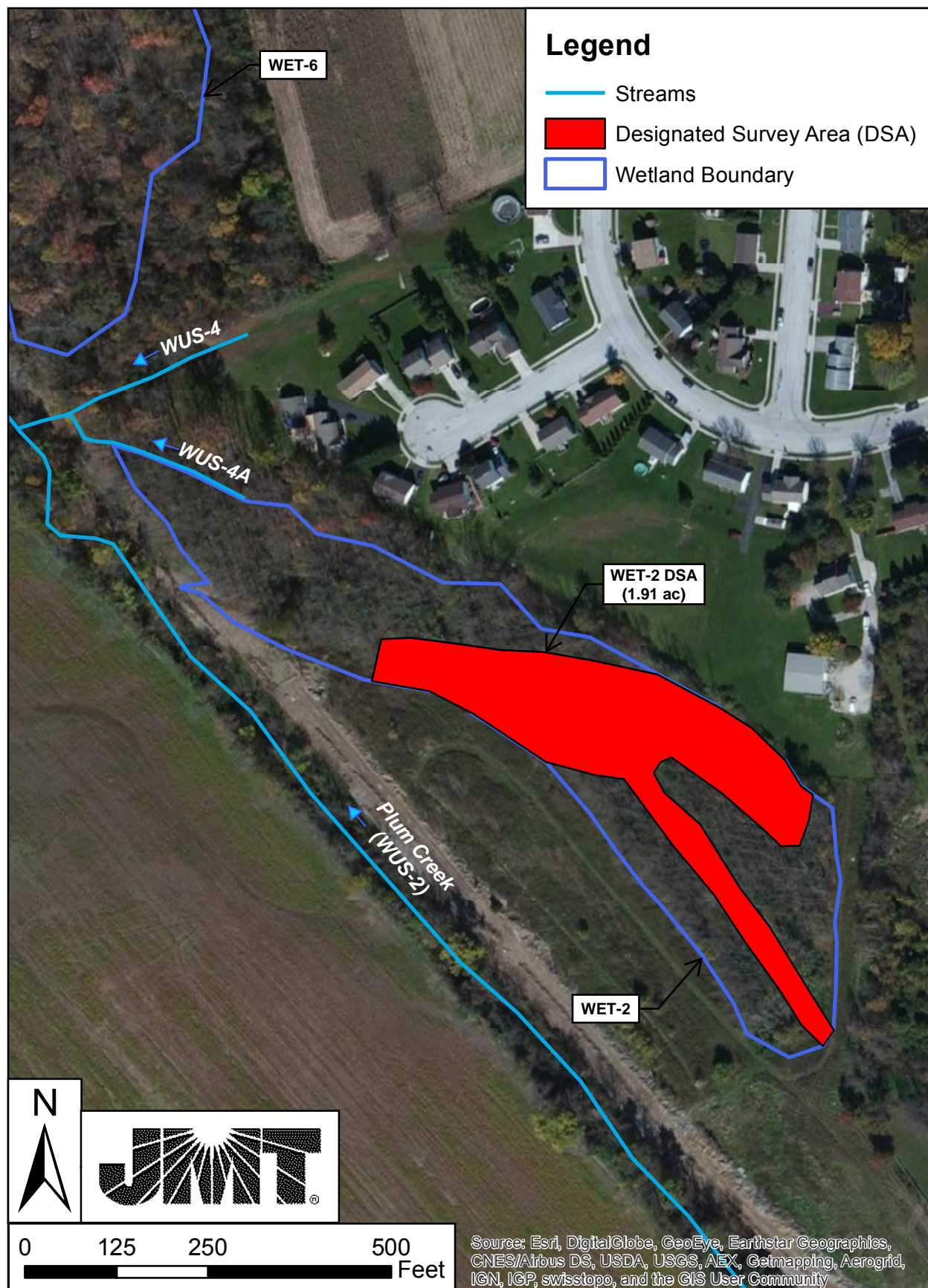
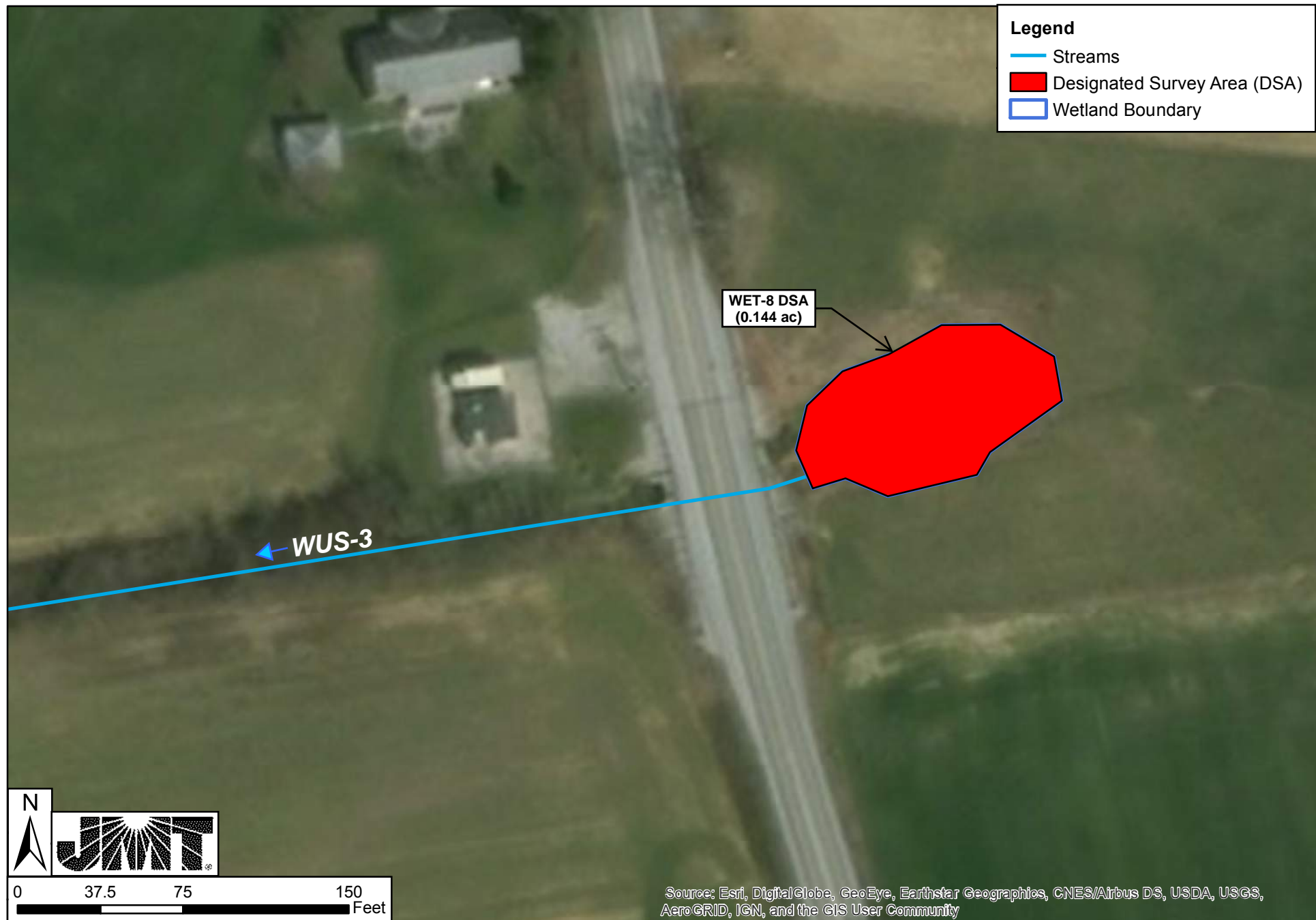


Figure 14: Bog Turtle Designated Survey Area Map





Appendix C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/17/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-1-WET
 Investigator(s): Craig Neln (CPN), Grace Erlsman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Slightly Concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 25" N Long: -77° 02' 16" W Datum: WGS84
 Soil Map Unit Name: Penslaw Silt Loam - Pa NWI classification: PFO1A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Wetland data point located within northern end of PEM depressional channel, which continues north into forested part of wetland.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>7"</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>4"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: No surface water observed within PEM portion of wetland during survey date. Surface water observed within forested portion of channel, which was delineated at a later date (see DP-WET-1A). Hydrology supplied by seasonally high groundwater table and surface runoff. Flags for PEM portion of wetland: WET 1-1 to WET 1-18. Functions/Values: floodflow alteration, sediment/toxicant retention, nutrient removal, and minor wildlife habitat.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-1-WET

Tree Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: 15' radius)				
1. Acer negundo	5	Y	FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
5 = Total Cover				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.
50% of total cover: 2.5 20% of total cover: 1				
Herb Stratum (Plot size: 15' radius)				
1. Phalaris arundinacea	70	Y	FACW	
2. Typha latifolia	10	_____	OBL	
3. Solidago sp.	3	_____	NI	
4. Verbena hastata	5	_____	FACW	
5. Unidentified herb	10	_____	NI	
6. Scirpus atrovirens	10	_____	OBL	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
108 = Total Cover				
50% of total cover: 54 20% of total cover: 21.6				
Woody Vine Stratum (Plot size: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to narrow wetland area.				

SOIL

Sampling Point: DP-1-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/17/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-1-UPL
 Investigator(s): Craig Neih (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): None Slope (%): <1
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 18" N Long: -77° 02' 14" W Datum: WGS84
 Soil Map Unit Name: Penlaw Silt Loam - Pa NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Drainage way between agricultural fields in the southern portion of the project area. Low-lying agricultural drainage dominated by Phalaris arundinacea but did not satisfy soil or hydrology indicators.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: Only one secondary hydrology indicator was met. Therefore, the hydrology parameter was not satisfied.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-1-UPL

Tree Stratum (Plot size: 15' radius)	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: 15' radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Shrub Stratum (Plot size: 15' radius)				
1. <i>Rosa multiflora</i>	5	Y		FACU
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
				5 _____ = Total Cover
				50% of total cover: 2.5 20% of total cover: 1
Herb Stratum (Plot size: 15' radius)				
1. <i>Phalaris arundinacea</i>	90	Y		FACW
2. <i>Solidago altissima</i>	5			FACU
3. <i>Dipsacus fullonum</i>	2			FACU
4. <i>Cirsium arvense</i>	3			FACU
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
				100 _____ = Total Cover
				50% of total cover: 50 20% of total cover: 20
Woody Vine Stratum (Plot size: 15' radius)				
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 _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
☐ 1 - Rapid Test for Hydrophytic Vegetation
☐ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

No hydrophytic vegetation indicators were met. Plot sizes adjusted due to drainage size.

SOIL

Sampling Point: DP-1-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/27/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-1A-WET
 Investigator(s): Craig Nelin (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): Slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 30" N Long: 77° 02' 18" W Datum: WGS84
 Soil Map Unit Name: Penlaw silt loam - Pa NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Data point is located in the forested area associated with WET-1 to the north and east of agricultural fields and to the west of Plum Creek, approximately 30 feet west of the drainage tributary (WUS-1).	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1-6"</u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u>		
Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: <u>Google Earth 2016, Web Soil Survey of Adams County</u>		
Remarks: Surface water observed was restricted to the drainage channel that cuts through the wetland. Water table and saturated soils were not observed in the soil pit. Flags for PFO area were placed for WET 1-19 to WET 1-39, tying into PEM portion of wetland. Functions/Values: floodflow alteration, sediment/toxicant retention, nutrient removal, wildlife habitat.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-1A-WET

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Acer rubrum</i>	20	Y	FAC
2. <i>Fraxinus pennsylvanica</i>	40	Y	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
60 = Total Cover			
50% of total cover: 30 20% of total cover: 12			

Sapling Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Rosa multiflora</i>	5	Y	FACU
2. <i>Lindera benzoin</i>	10	Y	FAC
3. <i>Alnus serrulata</i>	5	Y	OBL
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
20 = Total Cover			
50% of total cover: 10 20% of total cover: 4			

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Symplocarpus foetidus</i>	5	Y	OBL
2. <i>Alliaria petiolata</i>	10	Y	FACU
3. <i>Veronica serpyllifolia</i>	5	Y	FAC
4. <i>Carex</i> sp.	2	_____	NI
5. <i>Boehmeria cylindrica</i>	3	_____	FACW
6. Unidentified grass species	5	Y	NI
7. <i>Impatiens capensis</i>	5	Y	FACW
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
35 = Total Cover			
50% of total cover: 17.5 20% of total cover: 7			

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Toxicodendron radicans</i>	10	Y	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
10 = Total Cover			
50% of total cover: 5 20% of total cover: 2			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

Hydrophytic vegetation indicator was met.

SOIL

Sampling Point: DP-1A-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/27/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-1A-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 5
 Subregion (LRR or MLRA): MLRA 148 Lat: 39°48' 29" N Long: 77°02' 19" W Datum: WGS84
 Soil Map Unit Name: Penlaw silt loam - Pa NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Upland point is located on the slope east of agricultural fields and west of forested portion of WET-1.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), If available: Google Earth 2016, Web Soil Survey of Adams County	
Remarks: No wetland hydrology indicators were met.	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-1A-UPL

Tree Stratum (Plot size: 15' radius)		Absolute % Cover	Dominant Species?	Indicator Status
1.	<i>Carya ovata</i>	40	Y	FACU
2.	<i>Prunus serotina</i>	15	Y	FACU
3.	<i>Acer negundo</i>	15	Y	FAC
4.				
5.				
6.				
		70	= Total Cover	
50% of total cover: 35		20% of total cover: 14		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is $\leq 3.0^1$
- ☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

<u>Sapling Stratum</u> (Plot size: <u>15' radius</u>)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	
50% of total cover:			20% of total cover:	

Shrub Stratum (Plot size: 15' radius)				
1.	<i>Prunus serotina</i>	10	Y	FACU
2.	<i>Ligustrum vulgare</i>	3		FACU
3.	<i>Rosa multiflora</i>	5	Y	FACU
4.				
5.				
6.				
		18	= Total Cover	
50% of total cover:		9	20% of total cover: 3.6	

<u>Herb Stratum</u> (Plot size: 5' radius)			
1.	Allium canadense	3	FACU
2.	Carex sp.	2	NI
3.	Unidentified grass species	2	NI
4.	Alliaria petiolata	10	Y FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		17	= Total Cover
50% of total cover:		8.5	20% of total cover: 3.4

Woody Vine Stratum (Plot size: 15' radius)				
1.	<i>Lonicera japonica</i>	20	Y	FACU
2.				
3.				
4.				
5.				
		20	= Total Cover	
50% of total cover: 10		20% of total cover: 4		

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

No hydrophytic vegetation indicators were met.

SOIL

Sampling Point: DP-1A-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/17/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-2-WET
 Investigator(s): Craig Nelin (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly Concave Slope (%): <2%
 Subregion (LRR or MLRA): MLRA 148 Lat: 39°48'23" N Long: -77°02'01" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PFO1/SS1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>		
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>		

Remarks:

PFO wetland with small PEM component east of Plum Creek and west of developed properties. A man-made/alterd drainage channel flows along the southern portion of the wetland.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No Depth (inches): 1-6"
 Water Table Present? Yes X No Depth (inches): 15"
 Saturation Present? Yes X No Depth (inches): 12"
 (includes capillary fringe)

Wetland Hydrology Present? Yes X No

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

Google Earth 2016, Web Soil Survey of Adams County.

Remarks:

Hydrology supplied by groundwater springs/seeps, conveyed drainage from upslope properties, and surface runoff.

Flags: WET 2-1 to WET 2-39.

Functions/Values: groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat.

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-2-WET

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Acer negundo</i>	60	Y	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
60 = Total Cover			
50% of total cover: 30 20% of total cover: 12			

Sapling Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Cornus amomum</i>	50	Y	FACW
2. <i>Rosa multiflora</i>	20	Y	FACU
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
70 = Total Cover			
50% of total cover: 35 20% of total cover: 14			

Herb Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Phalaris arundinacea</i>	10	Y	FACW
2. <i>Elymus virginicus</i>	10	Y	FACW
3. <i>Agrimonia parviflora</i>	5	_____	FACW
4. <i>Solidago</i> sp.	5	_____	NI
5. Unidentified grass species	15	Y	NI
6. <i>Allium canadense</i>	3	_____	FACU
7. <i>Carex</i> sp.	5	_____	NI
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
53 = Total Cover			
50% of total cover: 26.5 20% of total cover: 10.6			

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Toxicodendron radicans</i>	10	Y	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
10 = Total Cover			
50% of total cover: 5 20% of total cover: 2			

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: 82.5% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

Hydrophytic vegetation indicator was met.

SOIL

Sampling Point: DP-2-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/18/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-2-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <1%
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 24" N Long: -77° 02' 00" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Southeastern section of study area located west of WET-2. Remnant hydric soils are present but hydrology/vegetation parameters were not met.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: No hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-2-UPL

Tree Stratum (Plot size: <u>30'</u> radius)	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: <u>15'</u> radius)			
1. <u>Acer negundo</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>5</u> = Total Cover			
50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>			
Shrub Stratum (Plot size: <u>15'</u> radius)			
1. <u>Rosa multiflora</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. <u>Rubus allegheniensis</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			
Herb Stratum (Plot size: <u>5'</u> radius)			
1. <u>Salidago altissima</u>	<u>85</u>	<u>Y</u>	<u>FACU</u>
2. <u>Dipsacus fullonum</u>	<u>5</u>	_____	<u>FACU</u>
3. <u>Unidentified grass</u>	<u>15</u>	_____	<u>NI</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>105</u> = Total Cover			
50% of total cover: <u>52.5</u> 20% of total cover: <u>21</u>			
Woody Vine Stratum (Plot size: <u>30'</u> radius)			
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:	<u>1</u> (A)
Total Number of Dominant Species Across All Strata:	<u>4</u> (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>25%</u> (A/B)
Prevalence Index worksheet:	
Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	
Hydrophytic Vegetation Indicators:	
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 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 <u>X</u>	

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

No hydrophytic vegetation indicators were met.

SOIL

Sampling Point: DP-2-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/18/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-3-WET
 Investigator(s): Craig Nein (CPN) and Grace Erlsman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 05" N Long: -77° 02' 20" W Datum: WGS84
 Soil Map Unit Name: Conestoga silt loam, 8 to 15% - CnC NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Hydic Soil Present? Yes <u>X</u> No <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Remarks: Small PEM wetland at northern end of the project area associated with a tributary to Plum Creek located in a low depressional area adjacent to hillslope. The wetland includes a silted in portion of the tributary that supports emergent vegetation.			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1-2"</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>8"</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>6"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: <u>Google Earth 2016, Web Soil Survey of Adams County</u>		
Remarks: Hydrology supplied by tributary to Plum Creek, seasonally high groundwater table, and surface runoff. Flags: WET 3-1 to WET 3-9. Functions/Values: groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, streambank stabilization, and minor wildlife habitat.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-3-WET

Tree Stratum (Plot size: 15' radius)	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: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____
Shrub Stratum (Plot size: 15' radius)				
1. <i>Phalaris arundinacea</i>	80	Y		FACW
2. <i>Persicaria sagittata</i>	30	Y		OBL
3. <i>Juncus</i> sp.	5			NI
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				115 = Total Cover
50% of total cover: 57.5				20% of total cover: 23
Herb Stratum (Plot size: 15' radius)				
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: 15' radius)				
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 _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____	(A) _____ (B) _____

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
☒ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland

SOIL

Sampling Point: DP-3-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/18/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-3-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conwago Township
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): No relief Slope (%): 8-10
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 05" N Long: -77° 02' 19" W Datum: WGS84
 Soil Map Unit Name: Conestoga silt loam, 8 to 15% - CnC NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Upland plot on grassy hillslope located upslope from WET-3 to the north.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were observed.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-3-UPL

Tree Stratum (Plot size: <u>15' radius</u>)	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: <u>15' radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>15' radius</u>)				
1. <u>Allium canadense</u>	5	_____	_____	FACU
2. <u>Cirsium arvense</u>	10	_____	_____	FACU
3. <u>Setaria viridis</u>	40	_____	_____	UPL
4. <u>Taraxacum officinale</u>	5	_____	_____	FACU
5. <u>Glechoma hederacea</u>	25	_____	_____	FACU
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
85 = Total Cover				
50% of total cover: 42.5 20% of total cover: 17				
Woody Vine Stratum (Plot size: <u>15' radius</u>)				
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: 0 (A)
 Total Number of Dominant Species Across All Strata: 2 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
 ___ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
No hydrophytic vegetation indicators were met.

SOIL

Sampling Point: DP-3-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/7/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-4-WET
 Investigator(s): Craig Neln (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 52" N Long: -77° 02' 16" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: A large emergent wetland located east of Plum Creek adjacent to agricultural fields.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>0-3"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>20"</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>18"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: Multiple hydrology indicators were met. Hydrology supplied by seasonally high groundwater table and surface runoff, as well as hydrology perched above a fine clay layer. Flags: WET 4-1 to WET 4-49 Functions/Values: floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-4-WET

Tree Stratum (Plot size: <u>30'</u> radius)	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: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____
Herb Stratum (Plot size: <u>15'</u> radius)				
1. <u>Phalaris arundinacea</u>	<u>90</u>	<u>Y</u>	<u>FACW</u>	
2. <u>Ambrosia trifida</u>	<u>5</u>		<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
				<u>95</u> = Total Cover
50% of total cover: <u>47.5</u>				20% of total cover: <u>19</u>
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____

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

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 _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____	(A) _____ (B) _____

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☒ 1 - Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0¹
- ☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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 _____

SOIL

Sampling Point: DP-4-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/7/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-4-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0
 Subregion (LRR or MLRA): MLRA 148 Lat: 39°48' 54" N Long: -77°02' 17" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: <u>Upland plot located to the west of WET-4 and adjacent to an excavated drainage channel.</u>	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: <u>Google Earth 2016, Web Soil Survey of Adams County.</u>	
Remarks: <u>No hydrology indicators were met.</u>	

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-4-UPL

Tree Stratum (Plot size: <u>30'</u> radius)	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: <u>15'</u> radius)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Shrub Stratum (Plot size: <u>15'</u> radius)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: <u>5'</u> radius)			
1. <i>Setaria faberi</i>	60	Y	UPL
2. <i>Solidago</i> sp.	5		NI
3. Unidentified plant sp.	10		NI
4. <i>Ambrosia trifida</i>	5		FAC
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
80 = Total Cover			
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>			
Woody Vine Stratum (Plot size: <u>30'</u> radius)			
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: 0 (A)

 Total Number of Dominant Species Across All Strata: 1 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0¹
- ☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

No hydrophytic vegetation indicators were met.

SOIL

Sampling Point: DP-4-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/7/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-5-WET
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 03" N Long: -77° 02' 19" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Hydic Soil Present? Yes <u>X</u> No <u> </u>	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Remarks: Small emergent wetland located adjacent to Plum Creek, in depressional area adjacent to agricultural fields and upland berm next to stream.			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1-4"</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>3"</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>2"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: Multiple hydrology indicators were met. Recent rains contributed to surface water/soil saturation in upper portion of wetland. Hydrology supplied by small spring/seep, seasonally high groundwater table, surface runoff, and high flows from Plum Creek. Flags: WET 5-1 to WET 5-8. Functions/Values: floodflow alteration, sediment/toxicant retention, nutrient removal, streambank stabilization, and minor wildlife habitat (small mammals observed).		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-5-WET

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: 1 (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 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.
Sapling Stratum (Plot size: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	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.
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	Herb Stratum (Plot size: 10' radius)
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	70 Y FACW 15 OBL 15 OBL
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: 10' radius)				
1. Phalaris arundinacea	70	Y	FACW	Woody Vine Stratum (Plot size: 30' radius)
2. Typha latifolia	15		OBL	
3. Persicaria arifolia	15		OBL	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	100 = Total Cover 50% of total cover: 50 20% of total cover: 20
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
4. _____	_____	_____		

SOIL

Sampling Point: DP-5-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/8/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-5-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <1
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 02" N Long: -77° 02' 20" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Upland plot located on terrace above WET-5 adjacent to agricultural field.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-5-UPL

Tree Stratum (Plot size: <u>30'</u> radius)	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: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <i>Phalaris arundinacea</i>	25	Y	FACW	
2. <i>Setaria faberi</i>	30	Y	UPL	
3. <i>Plantago lanceolata</i>	10		UPL	
4. Unidentified grass species	15		NI	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
				80 = Total Cover
50% of total cover: 40				20% of total cover: 16
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
				_____ = Total Cover
50% of total cover: _____				20% of total cover: _____

Remarks: (Include photo numbers here or on a separate sheet.)
 No hydrophytic vegetation indicators were met.

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 _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____	(A) _____ (B) _____

 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
 ___ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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

SOIL

Sampling Point: DP-5-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/21/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-6-WET
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional floodplain Local relief (concave, convex, none): Slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 34" N Long: 77° 02' 10" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>		
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>		
Remarks: Large bottomland, hardwood PFO wetland located to the east of Plum Creek. Contiguous with PEM wetland (WET-4) to the north.			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators</u> (minimum of one is required; check all that apply)		<u>Secondary Indicators</u> (minimum of two required)	
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1-4"</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>4"</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>3"</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.			
Remarks: Multiple hydrology indicators were met. Hydrology supplied by seasonally high groundwater table, groundwater spring/seep, surface runoff, and occasional high flows from Plum Creek and tributaries. Recent rainfall within last 3-4 days. Most surface waters frozen during time of survey. Flags: WET 6-1 to WET 6-30. Functions/Values: groundwater discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat.			

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-6-WET

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <i>Fraxinus pennsylvanica</i>	20	Y	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. <i>Quercus macrocarpa</i>	15	Y	FAC	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
35 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				
Sapling Stratum (Plot size: 15' radius)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: 15' radius)				
1. <i>Acer negundo</i>	5	Y	FAC	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.
2. <i>Rosa multiflora</i>	10	Y	FACW	
3. <i>Cornus amomum</i>	5	Y	FACW	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
20 = Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No _____
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Herb Stratum (Plot size: 5' radius)				
1. <i>Boehmeria cylindrica</i>	10	Y	FACW	Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.
2. <i>Impatiens capensis</i>	5	_____	FACW	
3. <i>Sphagnum</i>	5	_____	OBL	
4. Unidentified grass sp.	3	_____	NI	
5. <i>Symplocarpus foetidus</i>	10	Y	OBL	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
33 = Total Cover				
50% of total cover: <u>16.5</u> 20% of total cover: <u>6.6</u>				
Woody Vine Stratum (Plot size: 30' radius)				
1. <i>Toxicodendron radicans</i>	10	Y	FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
10 = Total Cover				
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				

SOIL

Sampling Point: DP-6-WET

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

[illegible]¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

Indicators for Problematic Hydric Soils³:

- ___ 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)**

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/21/2016
 Applicant/Owner: PennDOT 8-0 State: Sampling Point: DP-6-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 36" N Long: 72° 02' 08" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Upland plot east of WET-6, adjacent to a large agricultural field. Hydric soil was observed, but there was a lack of hydrology and vegetation indicators.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u> </u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u> </u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Saturation (A3) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u> </u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u> </u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u> </u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>20"</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>20"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met. The water table was observed in the pit at 20". Water table observed to be below the clay layer in the soil profile.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-6-UPL

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Quercus rubra</i>	30	Y	FACU
2. <i>Quercus alba</i>	25	Y	FACU
3. <i>Carya ovata</i>	25	Y	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
80 = Total Cover			
50% of total cover: 40 20% of total cover: 16			

Sapling Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Rosa multiflora</i>	25	Y	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
25 = Total Cover			
50% of total cover: 12.5 20% of total cover: 5			

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Alliaria petiolata</i>	15	Y	FACU
2. <i>Allium canadense</i>	5	Y	FACU
3. Undentified grass sp.	2		NI
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
22 = Total Cover			
50% of total cover: 11 20% of total cover: 4.40			

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Lonicera japonica</i>	35	Y	FACU
2. <i>Toxicodendron radicans</i>	5		FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
40 = Total Cover			
50% of total cover: 20 20% of total cover: 8			

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is $\leq 3.0^1$
- ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

No hydrophytic vegetation indicators were met.

SOIL

Sampling Point: DP-6-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/21/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-A-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): Very slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 04" N Long: 77° 02' 21" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: <small>An elevated stream-side terrace along the eastern side of Plum Creek to the south of Chapel Road.</small> The area is located adjacent to large bends in Plum Creek. The confluence of a tributary (WUS-3) drains into Plum Creek northeast of DP-A-UPL, south of Chapel Road.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2016, Web Soil Survey of Adams County.	
Remarks: Only one secondary hydrology indicator was marginally met; therefore, the wetland hydrology parameter was not satisfied.	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-A-UPL

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Acer rubrum</i>	20	Y	FAC
2. <i>Acer negundo</i>	30	Y	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
50 = Total Cover			
50% of total cover: 25 20% of total cover: 10			

Sapling Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Herb Stratum (Plot size: 10' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Alliaria petiolata</i>	10		FACU
2. <i>Ambrosia trifida</i>	25	Y	FAC
3. Unidentified grass sp.	5		NI
4. <i>Elymus canadensis</i>	15	Y	FACU
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
55 = Total Cover			
50% of total cover: 27.5 20% of total cover: 11			

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0¹
- ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

Hydrophytic vegetation indicator was met.

SOIL

Sampling Point: DP-A-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 12/27/2016
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-B-UPL
 Investigator(s): Craig Nein (CPN) and Grace Erisman (GE) Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Streamside terrace Local relief (concave, convex, none): None Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 49" N Long: 77° 02' 19" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: The upland point is located along the eastern portion of Plum Creek and south of a large set of bends in the creek. The data point was taken in an area with abundant herbaceous vegetation against a wooded riparian corridor along Plum Creek.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: <u>Google Earth 2016, Web Soil Survey of Adams County.</u>		
Remarks: Only one secondary hydrology indicator was met. Therefore, the hydrology parameter was not satisfied.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-B-UPL

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <i>Juglans nigra</i>	25	Y	FACU	
2. <i>Acer negundo</i>	10	Y	FAC	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
		35 = Total Cover		
50% of total cover: 17.5		20% of total cover: 7		
Sapling Stratum (Plot size: 15' radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
		_____ = Total Cover		
50% of total cover: _____		20% of total cover: _____		
Shrub Stratum (Plot size: 15' radius)				
1. <i>Rosa multiflora</i>	10	Y	FACU	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
		10 = Total Cover		
50% of total cover: 5		20% of total cover: 2		
Herb Stratum (Plot size: 5' radius)				
1. <i>Phalaris arundinacea</i>	40	Y	FACW	
2. <i>Alliaria petiolata</i>	25	Y	FACU	
3. <i>Ambrosia trifida</i>	15		FAC	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
		80 = Total Cover		
50% of total cover: 40		20% of total cover: 16		
Woody Vine Stratum (Plot size: 30' radius)				
1. <i>Vitis</i> sp.	5		NI	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
		5 = Total Cover		
50% of total cover: 2.5		20% of total cover: 1		

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% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

No hydrophytic vegetation indicators were met.

SOIL

Sampling Point: DP-B-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/08/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-7-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 06" N Long: 77° 02' 46" W Datum: WGS84
 Soil Map Unit Name: Penlaw silt loam - Pa NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: Emergent wetland situated west of Sunday Drive. Wetland fed by WUS-7 coming from the east. Wetland consists of depressional areas adjacent to agricultural fields.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>0-3"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>10"</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>8"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology is fed by WUS coming from the east. Overland runoff and drainage from adjacent agricultural fields. Water table affected by recent rain events. Seasonally high water table present. Flags: WET 7-1 to WET 7-34.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-7-WET

Tree Stratum (Plot size: <u>10' Radius</u>)	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: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>10' Radius</u>)				
1. <i>Phalaris arundinacea</i>	95	Yes	FACW	
2. <i>Boehmeria cylindrica</i>	1	No	FACW	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
96 = Total Cover				
50% of total cover: ⁴⁸ _____ 20% of total cover: ^{19.2} _____				
Woody Vine Stratum (Plot size: <u>10' Radius</u>)				
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 _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:
☒ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
Hydrophytic vegetation indicator was met.

SOIL

Sampling Point: DP-7-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Remarks
	Color (moist)		%	Color (moist)	%		
0-2	10YR 3/2	100				Silt loam	
2-14	10YR 5/1	95	5YR 4/6	5	C	M,PL	Silty clay loam
14-16	10YR 5/2	90	10YR 5/6	10	C	M	Silty clay loam Small to medium rock fragments (30%)

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:			Indicators for Problematic Hydric Soils ³ :		
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)			
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)			
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)			
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)			
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)				
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)				
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)				
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)				

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/08/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-7-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conecago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 06" N Long: 72° 02' 46" W Datum: WGS84
 Soil Map Unit Name: Penlaw silt loam - Pa NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot located north of DP-7-WET in a small vegetative strip adjacent to a soybean field. Hydrophytic vegetation indicator satisfied from dominant FAC species, but no wetland hydrology indicators were met.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ ___ Inundation Visible on Aerial Imagery (B7) ___ ___ Water-Stained Leaves (B9) ___ ___ Aquatic Fauna (B13) ___		<u>Secondary Indicators (minimum of two required)</u> ___ 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 <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-7-UPL

Tree Stratum (Plot size: <u>5' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
	<u>80</u>	= Total Cover		
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				
Sapling Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
	_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
	<u>25</u> = Total Cover			
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Setaria pumila</u>	60	Yes	FAC	
2. <u>Phalaris arundinacea</u>	5	No	FACW	
3. <u>Grass sp.</u>	15	No	NI	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
	<u>80</u> = Total Cover			
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				
Woody Vine Stratum (Plot size: <u>5' Radius</u>)				
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 _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 _____ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
 _____ 3 - Prevalence Index is ≤3.0¹
 _____ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small area.

SOIL

Sampling Point: DP-7-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/08/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-8-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 58" N Long: 77° 01' 49" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: Emergent, spring-fed wetland east of Church Street, surrounded by a fenced pasture.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>0-6"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>At surface</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>At surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Water table observed in springhead but no high water table present in the pit. Hydrology is supplied by a groundwater spring system, overland/agricultural runoff, and a seasonally high groundwater table. Flags: WET 8-1 to WET 8-13.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-8-WET

Tree Stratum (Plot size: <u>10' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 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.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>10' Radius</u>)				
1. Phalaris arundinacea	90	Yes	FACW	
2. Xanthium strumarium	5	No	FAC	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.				

SOIL

Sampling Point: DP-8-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/08/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-8-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conecago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <1
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 58" N Long: 72° 01' 50" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Upland plot within vegetated area north of WET-8 and west/south of fenced pasture.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-8-UPL

Tree Stratum (Plot size: <u>10' Radius</u>)	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: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>10' Radius</u>)				
1. <i>Phalaris arundinacea</i>	25	Yes		FACW
2. <i>Oenothera biennis</i>	5	No		FACU
3. <i>Cirsium</i> sp.	50	Yes		NI
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
80 = Total Cover				
50% of total cover: ⁴⁰ 20% of total cover: ¹⁶				
Woody Vine Stratum (Plot size: <u>10' Radius</u>)				
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 _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____	(A) _____ (B) _____

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
 ___ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

No hydrophytic vegetation indicators were met. Plot sizes adjusted due to small area.

SOIL

Sampling Point: DP-8-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/08/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-9-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 54" N Long: 77° 02' 07" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: Emergent wetland along the southern side of WUS-3.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>1"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>At surface</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>At surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Flags: WET 9-1 to WET 9-7. Hydrology supplied by small seep, seasonally high water table, and overland runoff.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-9-WET

Tree Stratum (Plot size: <u>10' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 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.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>10' Radius</u>)				
1. <u>Phalaris arundinacea</u>	95	Yes	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.				

SOIL

Sampling Point: DP-9-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/08/2017
Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-9-UPL
Investigator(s): CPN, GE Section, Township, Range: Conecago Township
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <3
Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 55" N Long: 77° 02' 08" W Datum: WGS84
Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot in riparian woodlands to the northwest of WET-9.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-9-UPL

Tree Stratum (Plot size: <u>15' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer negundo</u>	25	Yes	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20%</u> (A/B)
2. <u>Juglans nigra</u>	25	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
50 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Rubus phoenicolasius</u>	25	Yes	FACU	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.
2. <u>Rosa multiflora</u>	5	No	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
30 = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Herb Stratum (Plot size: <u>15' Radius</u>)				Hydrophytic Vegetation Present? Yes _____ No ^X _____
1. <u>Alliaria petiolata</u>	15	Yes	FACU	
2. <u>Phytolacca americana</u>	5	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
20 = Total Cover				
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Woody Vine Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Vitis sp.</u>	20	Yes	NI	
2. _____				
3. _____				
4. _____				
5. _____				
20 = Total Cover				
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				

Remarks: (Include photo numbers here or on a separate sheet.)
No hydrophytic vegetation indicators were met. Plot sizes adjusted due to small area.

SOIL

Sampling Point: DP-9-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/09/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-10-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Very slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 55" N Long: 77° 02' 06" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: Small, emergent wetland located east of WET-9, to the south of WUS-3. See the DP-9-UPL datasheet for conditions representative of uplands around WET-10.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>1"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>1"</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>At surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology perched atop a layer of clay-dominated, epi-saturated soils. Flags: WET 10-1 to WET 10-8.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-10-WET

Tree Stratum (Plot size: <u>5' Radius</u>)	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: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Phalaris arundinacea</u>	95	Yes	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>5' Radius</u>)				
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 _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
☒ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)

Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.

SOIL

Sampling Point: DP-10-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-11-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 51" N Long: 77° 0' 21" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Remarks: Small wetland to the east of WUS-8 and west of recreational fields.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0-3"</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>At surface</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0-6"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology is supplied by a small seep in the wetland. Water table was not observed in the auger pit, but was observed within the seep channel. Flags: WET 11-1 to WET 11-8.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-11-WET

Tree Stratum (Plot size: <u>10' Radius</u>)	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: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>10' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>10' Radius</u>)				
1. <i>Phalaris arundinacea</i>	45	Yes	FACW	
2. <i>Pycnanthemum</i> sp.	5	No	NI	
3. <i>Carex stricta</i>	20	Yes	OBL	
4. <i>Mimulus ringens</i>	3	No	FACW	
5. <i>Cirsium</i> sp.	5	No	NI	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
78 = Total Cover				
50% of total cover: ³⁹ 20% of total cover: ^{15.6}				
Woody Vine Stratum (Plot size: <u>10' Radius</u>)				
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 _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:
☒ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.

SOIL

Sampling Point: DP-11-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-11-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conecago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <2
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 51" N Long: 77° 0' 21" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot located south of WET-11 and adjacent to a large fallow field.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ ___ Inundation Visible on Aerial Imagery (B7) ___ ___ Water-Stained Leaves (B9) ___ ___ Aquatic Fauna (B13) ___		<u>Secondary Indicators (minimum of two required)</u> ___ 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 <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-11-UPL

Tree Stratum (Plot size: <u>30' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer saccharinum</u>	20	Yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80%</u> (A/B)
2. <u>Acer negundo</u>	35	Yes	FAC	
3. <u>Morus alba</u>	10	No	UPL	
4. <u>Prunus serotina</u>	10	No	FACU	
5. _____				
6. _____				
75 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>37.5</u> 20% of total cover: <u>15</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Crataegus sp.</u>	2	Yes	NI	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.
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
2 = Total Cover				Hydrophytic Vegetation Present? Yes <u>x</u> No _____
50% of total cover: <u>1</u> 20% of total cover: <u>.4</u>				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Microstegium vimineum</u>	85	Yes	FAC	
2. <u>Allium sp.</u>	3	No	NI	
3. <u>Ligustrum vulgare</u>	1	No	FACU	
4. _____				Hydrophytic Vegetation Present? Yes <u>x</u> No _____
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				Hydrophytic Vegetation Present? Yes <u>x</u> No _____
11. _____				
89 = Total Cover				
50% of total cover: <u>44.5</u> 20% of total cover: <u>17.8</u>				
Woody Vine Stratum (Plot size: <u>30' Radius</u>)				
1. <u>Lonicera japonica</u>	5	Yes	FACU	
2. <u>Toxicodendron radicans</u>	10	Yes	FAC	Hydrophytic Vegetation Present? Yes <u>x</u> No _____
3. _____				
4. _____				
5. _____				
15 = Total Cover				
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>				

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

SOIL

Sampling Point: DP-11-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-12-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 54" N Long: 77° 0' 25" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Remarks: Wetland located to the east of WUS-8 past the north end of the Clarks building.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1-2"</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>7"</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>5"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology is supported by a seasonally high water table and overland runoff. Flags: WET 12-1 to WET 12-10.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-12-WET

Tree Stratum (Plot size: <u>10' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Fraxinus pennsylvanica</u>	45	Yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
<u>45</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>				
Sapling Stratum (Plot size: <u>10' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>10' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Microstegium vimineum</u>	65	Yes	FAC	
2. <u>Phalaris arundinacea</u>	5	No	FACW	
3. <u>Scirpus atrovirens</u>	20	Yes	OBL	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
<u>90</u> = Total Cover				
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				
Woody Vine Stratum (Plot size: <u>10' Radius</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.

SOIL

Sampling Point: DP-12-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-12-UPL
Investigator(s): CPN, GE Section, Township, Range: Conecago Township
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <3
Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 54" N Long: 77° 0' 23" W Datum: WGS84
Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot located in woodlands to the east of WET-12.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes _____ No <u>X</u>	Depth (inches): _____	
Water Table Present? Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? Yes <u>X</u> No _____	Depth (inches): <u>15"</u>	
(includes capillary fringe)		Wetland Hydrology Present? Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met. Saturation is not checked as an indicator because the depth was greater than 12".		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-12-UPL

Tree Stratum (Plot size: <u>30' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Maclura pomifera</u>	55	Yes	UPL	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20%</u> (A/B)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
55 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>27.5</u> 20% of total cover: <u>11</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Rubus phoenicolasius</u>	10	Yes	FACU	
2. <u>Ligustrum vulgare</u>	5	Yes	FACU	
3. <u>Prunus serotina</u>	5	Yes	FACU	
4. _____				
5. _____				
6. _____				
20 = Total Cover				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.
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Microstegium vimineum</u>	90	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
90 = Total Cover				Hydrophytic Vegetation Present? Yes _____ No ^x _____
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				
Woody Vine Stratum (Plot size: <u>30' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met.				

SOIL

Sampling Point: DP-12-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
 Applicant/Owner: PennDOT 8-0 State: PA Sampling Point: DP-13-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 01" N Long: 77° 00' 40" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Hydic Soil Present? Yes <u>X</u> No _____	Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: Depressional emergent wetland located north of the Clarks building and west of WUS-8.			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>1"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>13" in the pit</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>11"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Surface water, a high water table, and saturation were met through observation of the entire wetland. Hydrology is supplied by a seasonally high groundwater table and collection of surface runoff. Flags: WET 13-1 to WET 13-18.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-13-WET

Tree Stratum (Plot size: <u>15' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer negundo</u>	25	Yes	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
<u>25</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Rosa multiflora</u>	2	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
<u>2</u> = Total Cover				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.
50% of total cover: <u>2</u> 20% of total cover: <u>.4</u>				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Phalaris arundinacea</u>	80	Yes	FACW	
2. <u>Typha latifolia</u>	15	No	OBL	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
<u>95</u> = Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No _____
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				

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

Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.

SOIL

Sampling Point: DP-13-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-13-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Very slightly concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 02" N Long: 77° 0' 41" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Upland plot to the west of WET-13, adjacent to a large agricultural field.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-13-UPL

Tree Stratum (Plot size: <u>15' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Juglans nigra</u>	20	Yes	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25%</u> (A/B)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
<u>20</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>10</u> 20% of total cover: <u>11</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Setaria faberi</u>	20	Yes	UPL	
2. <u>Ambrosia trifida</u>	25	Yes	FAC	
3. <u>Grass sp.</u>	40	Yes	NI	
4. <u>Solidago sp.</u>	5	No	NI	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
<u>90</u> = Total Cover				
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				
Woody Vine Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to narrow area.				

SOIL

Sampling Point: DP-13-UPL

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 4/4	100					Silt loam	
2-8	10YR 4/4	95					Silt loam	
	10YR 5/8	5						
8-16	10YR 4/4	75					Silt loam	
	10YR 5/8	25						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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 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 Soils³:

- ☐ 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)

³Indicators 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: Hydric soil indicator was not met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/14/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-14-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 39" N Long: 77° 0' 50" W Datum: WGS84
 Soil Map Unit Name: Conestoga silt loam - CnA NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: Depressional emergent wetland located west of the Clarks building at the corner of Oxford Avenue and Kindig Lane.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>.5"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>5"</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>3"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology is supplied by a high water table and overland/roadway runoff. Flags: WET 14-1 to 14-7.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-14-WET

Tree Stratum (Plot size: <u>5' Radius</u>)	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: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <i>Typha latifolia</i>	55	Yes	OBL	
2. <i>Leersia oryzoides</i>	40	Yes	OBL	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>5' Radius</u>)				
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 _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
☒ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.

SOIL

Sampling Point: DP-14-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/14/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-15-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 07" N Long: 77° 0' 41" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: Depressional, emergent wetland to the east of WUS-8 and situated between a large agricultural field and a riparian woodland.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>1-2"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>4"</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>2"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Surface runoff perched atop a clay soil layer. Flags: WET 15-1 to WET 15-16. High water table and saturation met through episaturated conditions.		

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP-15-WET

Tree Stratum (Plot size: <u>5' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 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.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. Phalaris arundinacea	90	Yes	FACW	
2. Boehmeria cylindrica	3	No	FACW	
3. Carex sp.	2	No	NI	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.				

SOIL

Sampling Point: DP-15-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/2	100					Silt loam	
3-6	10YR 4/2	95	5YR 4/6	5	C	M, PL	Silt loam	
6-12	10YR 4/2	95	5YR 4/6	5	C	M, PL	Clay	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.							² Location: PL=Pore Lining, M=Matrix.	
Hydric Soil Indicators:							Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Dark Surface (S7)			<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)		
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)			<input type="checkbox"/> Coast Prairie Redox (A16)		
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)			<input type="checkbox"/> (MLRA 147, 148)		
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)			<input type="checkbox"/> Piedmont Floodplain Soils (F19)		
<input type="checkbox"/> Stratified Layers (A5)			<input checked="" type="checkbox"/> Depleted Matrix (F3)			<input type="checkbox"/> (MLRA 136, 147)		
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)			<input type="checkbox"/> Redox Dark Surface (F6)			<input type="checkbox"/> Very Shallow Dark Surface (TF12)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Depleted Dark Surface (F7)			<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Redox Depressions (F8)					
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)			<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)					
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)			³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
<input type="checkbox"/> Sandy Redox (S5)			<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)					
<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)					
Restrictive Layer (if observed):								
Type: _____						Hydric Soil Present? Yes <u>X</u> No _____		
Depth (inches): _____								
Remarks: Hydric soil indicator was met.								

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/14/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-15-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conecago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <1
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 06" N Long: 77° 0' 42" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot to the west of WET-15 in woodland area.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ ___ Inundation Visible on Aerial Imagery (B7) ___ ___ Water-Stained Leaves (B9) ___ ___ Aquatic Fauna (B13) ___		<u>Secondary Indicators (minimum of two required)</u> ___ 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 <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-15-UPL

Tree Stratum (Plot size: <u>15' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer saccharinum</u>	15	Yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>40%</u> (A/B)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
15 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Rubus phoenicolasius</u>	35	Yes	FACU	
2. <u>Rubus sp.</u>	10	Yes	NI	
3. _____				
4. _____				
5. _____				
6. _____				
45 = Total Cover				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.
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Microstegium vimineum</u>	35	Yes	FAC	
2. <u>Setaria faberi</u>	10	Yes	UPL	
3. <u>Phytolacca americana</u>	5	No	FACU	
4. <u>Galium mollugo</u>	10	Yes	FACU	
5. <u>Alliaria petiolata</u>	5	No	FACU	
6. <u>Cirsium arvense</u>	5	No	FACU	
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
70 = Total Cover				Hydrophytic Vegetation Present? Yes _____ No ^x _____
50% of total cover: <u>35</u> 20% of total cover: <u>14</u>				
Woody Vine Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
No hydrophytic vegetation indicators were met.				

SOIL

Sampling Point: DP-15-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/14/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-16-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <3
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 03" N Long: 77° 0' 37" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: Depressional, emergent wetland to the south of WET-15 and east of WUS-8, adjacent to a large agricultural field.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>1-2"</u> Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>3"</u> Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>2"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology is supplied by a seasonal water table and surface runoff perched atop a dense clay layer. Flags: WET 16-1 to WET 16-10. High water table and saturation hydrology indicators were met through episaturated conditions.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-16-WET

Tree Stratum (Plot size: <u>5' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 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.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Phalaris arundinacea</u>	95	Yes	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
95 = Total Cover				
50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.				

SOIL

Sampling Point: DP-16-WET

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/14/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-16-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conecago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <1
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 02" N Long: 77° 0' 37" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot located just west of WET-16.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ ___ Inundation Visible on Aerial Imagery (B7) ___ ___ Water-Stained Leaves (B9) ___ ___ Aquatic Fauna (B13) ___		<u>Secondary Indicators (minimum of two required)</u> ___ 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 <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-16-UPL

Tree Stratum (Plot size: <u>15' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer saccharinum</u>	50	Yes	FACW	
2. <u>Fraxinus pennsylvanica</u>	40	Yes	FACW	
3. _____				
4. _____				
5. _____				
6. _____				
		90 = Total Cover		
50% of total cover: <u>45</u>		20% of total cover: <u>18</u>		
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
		_____ = Total Cover		
50% of total cover: _____		20% of total cover: _____		
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
		_____ = Total Cover		
50% of total cover: _____		20% of total cover: _____		
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Alliaria petiolata</u>	10	Yes	FACU	
2. <u>Rosa multiflora</u>	5	No	FACU	
3. <u>Grass sp.</u>	10	Yes	NI	
4. <u>Geum canadense</u>	3	No	FACU	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
		28 = Total Cover		
50% of total cover: <u>14</u>		20% of total cover: <u>5.6</u>		
Woody Vine Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Toxicodendron radicans</u>	10	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
		10 = Total Cover		
50% of total cover: <u>5</u>		20% of total cover: <u>2</u>		

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

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

 Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

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

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators 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.)
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to narrow area.

SOIL

Sampling Point: DP-16-UPL

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/14/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-17-WET
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Slightly concave Slope (%): <5
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 49' 13" N Long: 77° 0' 16" W Datum: WGS84
 Soil Map Unit Name: Dunning silty clay loam - Dy NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: Wetland located within a depressional channel between an upland area and a large agricultural field.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No _____ Depth (inches): <u>1-2"</u> Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>0-4"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: Multiple wetland hydrology indicators were met. Hydrology supplied by a seasonally high water table and overland/agricultural runoff. Saturated soils are perched atop a dense clay layer (episaturation observed throughout wetland)		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-17-WET

Tree Stratum (Plot size: <u>5' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 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.
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				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.
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Phalaris arundinacea</u>	85	Yes	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
85 = Total Cover				
50% of total cover: <u>42.5</u> 20% of total cover: <u>17</u>				
Woody Vine Stratum (Plot size: <u>5' Radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland.				

SOIL

Sampling Point: DP-17-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 4/1	100					Silt loam	Small rock fragments (5%)
6-12	10YR 4/1	95	10YR 5/6	5	C	M	Silt loam	Small rock fragments (5%)

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:			Indicators for Problematic Hydric Soils ³ :		
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)			
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)			
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)			
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)			
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)				
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N,	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N,				
MLRA 147, 148)	MLRA 136)				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)				
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)				
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)				

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Eisenhower Drive Extension City/County: Hanover/Adams Sampling Date: 11/13/2017
 Applicant/Owner: PennDOT District 8-0 State: PA Sampling Point: DP-C-UPL
 Investigator(s): CPN, GE Section, Township, Range: Conewago Township
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): <1
 Subregion (LRR or MLRA): MLRA 148 Lat: 39° 48' 45" N Long: 77° 0' 11" W Datum: WGS84
 Soil Map Unit Name: Penlaw silt loam - Pa NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks: Upland plot located northeast of WUS-8 on the north side of Kindig Lane.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> ___ 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 <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Google Earth 2017, Web Soil Survey of Adams County.		
Remarks: No wetland hydrology indicators were met. Sample plot is representative of the forested upland floodplain of WUS-8 stream corridor.		

VEGETATION (Five Strata) – Use scientific names of plants.

 Sampling Point: DP-C-UPL

Tree Stratum (Plot size: <u>15' Radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Fraxinus pennsylvanica</u>	15	No	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>16.7%</u> (A/B)
2. <u>Acer negundo</u>	65	Yes	FAC	
3. _____				
4. _____				
5. _____				
6. _____				
80 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>				
Sapling Stratum (Plot size: <u>15' Radius</u>)				
1. _____				
2. _____				
3. _____				
4. _____				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: <u>15' Radius</u>)				
1. <u>Lonicera morrowii</u>	40	Yes	FACU	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.
2. <u>Ligustrum vulgare</u>	10	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
50 = Total Cover				Hydrophytic Vegetation Present? Yes _____ No ^X _____
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				
Herb Stratum (Plot size: <u>5' Radius</u>)				
1. <u>Alliaria petiolata</u>	15	Yes	FACU	
2. <u>Ligustrum vulgare</u>	10	Yes	FACU	
3. <u>Allium canadense</u>	5	No	FACU	
4. _____				Remarks: (Include photo numbers here or on a separate sheet.) No hydrophytic vegetation indicators were met. Plot sizes reduced due to narrow area.
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				Woody Vine Stratum (Plot size: <u>15' Radius</u>)
11. _____				
30 = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
1. <u>Lonicera japonica</u>				
2. <u>Toxicodendron radicans</u>				
45 = Total Cover				Hydrophytic Vegetation Present? Yes _____ No ^X _____
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>				

SOIL

Sampling Point: DP-C-UPL

[illegible]



Appendix D

PNDI Environmental Review Receipt and Bog Turtle Habitat Evaluation Field Forms

1. PROJECT INFORMATION

Project Name: **Eisenhower Drive Extended**

Date of Review: **3/18/2018 11:40:34 PM**

Project Category: **Transportation, Roads, New construction/ New alignment**

Project Area: **3,635.72 acres**

County(s): **Adams; York**

Township/Municipality(s): **CONEWAGO; HANOVER; MCSHERRYSTOWN; MOUNT PLEASANT; OXFORD; PENN; UNION**

ZIP Code: **17331; 17340; 17344**

Quadrangle Name(s): **HANOVER; MC SHERRYSTOWN**

Watersheds HUC 8: **Lower Susquehanna**

Watersheds HUC 12: **Headwaters South Branch Conewago Creek; Plum Creek-South Branch Conewago Creek**

Decimal Degrees: **39.811941, -77.023242**

Degrees Minutes Seconds: **39° 48' 42.9874" N, 77° 1' 23.6710" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

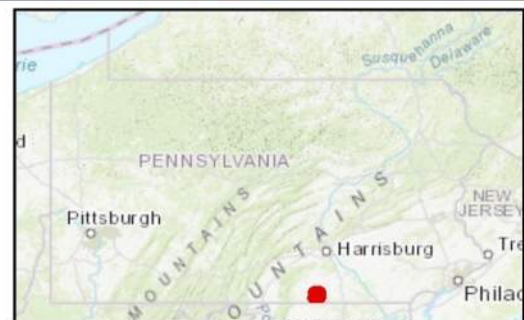
Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 must comply with the bog turtle habitat screening requirements of the PASPGP.

Eisenhower Drive Extended

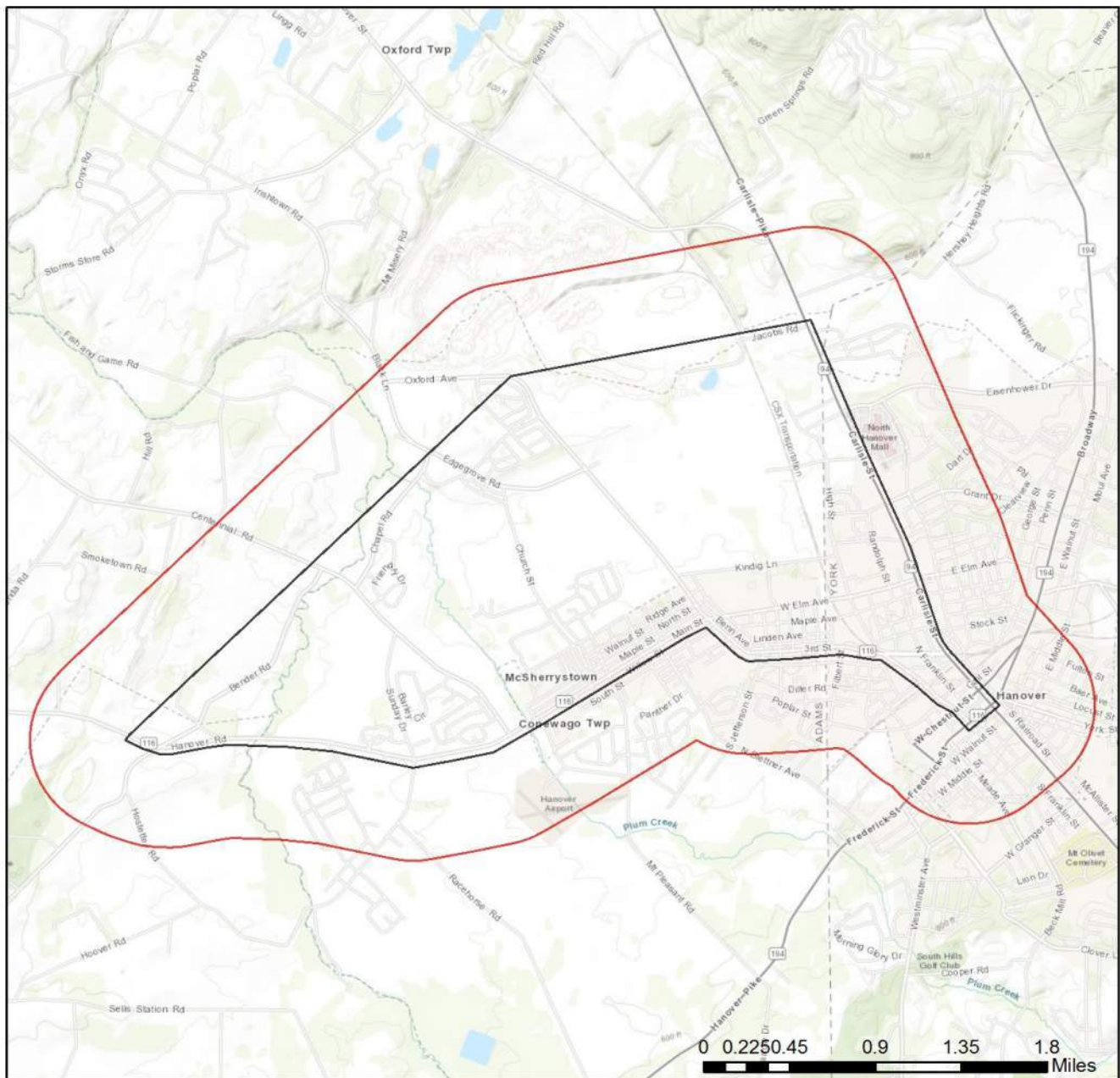


- Project Boundary
- Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

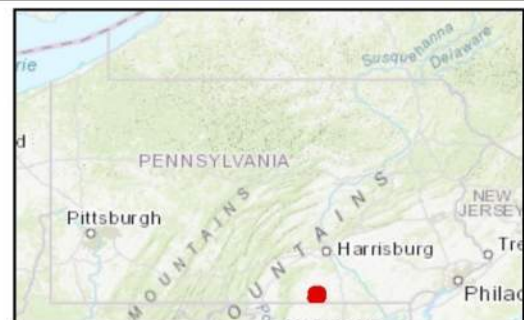


Eisenhower Drive Extended



- Project Boundary
- Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,



RESPONSE TO QUESTION(S) ASKED

Q1: Will the entire project area (including any discharge), plus a 300 feet buffer around the project area, all occur in or on an existing building, parking lot, driveway, road, road shoulder, street, runway, paved area, railroad bed, maintained (periodically mown) lawn, crop agriculture field or maintained orchard?

Your answer is: No

Q2: The proposed project is in the range of the Indiana bat. Describe how the project will affect bat habitat (forests, woodlots and trees) and indicate what measures will be taken in consideration of this. Round acreages up to the nearest acre (e.g., 0.2 acres = 1 acre).

Your answer is: The project will affect 1 to 39 acres of forests, woodlots and trees.

Q3: Is tree removal, tree cutting or forest clearing of 40 acres or more necessary to implement all aspects of this project?

Your answer is: No

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here:

<https://conservationexplorer.dcnr.pa.gov/content/survey-protocols>)

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Quercus shumardii	Shumard's Oak	Endangered	Endangered	Fruits September - October

PA Fish and Boat Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.

** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found [here](#). This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).

***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

Check-list of Minimum Materials to be submitted:

____ Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.

____ A map with the project boundary and/or a basic site plan (particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)

In addition to the materials listed above, USFWS REQUIRES the following

____ **SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.

____ Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)

____ Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <https://conservationexplorer.dcnr.pa.gov/content/resources>.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.



USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Eisenhower Drive Extension Project
Project type: New Roadway Construction
Applicant/Landowner Name: Penn DOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Canewaga Twp
PNDI # PNDI-602909 Potential conflict with USFWS species? • Y • ~~N~~

ACTION AREA²

Action area size: 205.33 ac Does the Phase 1 survey include all wetlands in the action area? • ~~Y~~ • ~~N~~³

WETLAND ID: WET-1 PHOTOS TAKEN: • ~~Yes~~ • No WETLAND SIZE: 3.843 acres
Wetland size estimation – If actual acreage is not known at time of investigation, check one:
• < 0.1 acre • 0.1-0.5 acre • > 0.5 to < 1 acre • 1-2 acres • ~~2-4~~ acres • 5+ acres • 10+ acres

WETLAND LOCATION: Lat 39.807684° N Long -77.038041° W
(approximate center of wetland) GPS Datum (check one): • NAD 27 • ~~NAD 83~~ • WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 12/27/2016 Time In: 10:00 AM Time Out: 2:30 PM
Last precipitation: • < 24 hours • ~~1-7 days~~ • > 1 week • unknown Drought conditions? • Y • ~~N~~ • Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?
• ~~none of it~~ – the entire wetland is within the property boundaries (skip next 2 questions)
• some of it – _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?
• none of it • all of it • part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?
• all of it • part of it (at least _____ acres) • none of it

Are there any wetlands located off-site and close enough to be affected by this project? • Y • N • ~~Unknown~~
If yes, *could* they be potential bog turtle habitat? • Y • N • ~~Unknown~~

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Agricultural fields, forested riparian corridors,
residential properties

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: • ~~PEM~~ 10 • PSS _____ • ~~PFO~~ 90 • POW _____

• ~~Y~~ • N Are there any signs of disturbance to hydrology (ditching, filling, ponds, roads, etc.)? If yes, describe
Ditching / alteration of stream between Ag fields in PEM portion
• ~~Y~~ • N Are there any signs of disturbance to vegetation (mowing, pasturing, burning, etc.)? If yes, describe
Maintenance of Ag. fields adjacent to wetland ditch / watercourse
in PEM portion.

PEM Wetland drainage between large agricultural fields continues
into larger forested portion of wetland as a stream that
drains into Plum Creek.

Contact info: cnera@jmt.com, 717-241-6252

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Ersenhower Drive Extension Project
Project type: New Roadway Construction
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Twp
PNDI# PNDI-602909 Potential conflict with USFWS species? • Y • ~~N~~

ACTION AREA²

Action area size: 205.33 ac Does the Phase 1 survey include all wetlands in the action area? ~~Y~~ • N³

WETLAND ID: WET-2 PHOTOS TAKEN: ~~Yes~~ • No WETLAND SIZE: 5.057 acres
Wetland size estimation - If actual acreage is not known at time of investigation, check one:
• < 0.1 acre • 0.1-0.5 acre • > 0.5 to < 1 acre • 1-2 acres • 2-4 acres ~~5+~~ acres • 10+ acres

WETLAND LOCATION: Lat 39.806975°N Long -77.033685°W
(approximate center of wetland) GPS Datum (check one): • NAD 27 ~~NAD 83~~ • WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/18/2016 Time In: 9:00 AM Time Out: 2:00 PM
Last precipitation: • < 24 hours ~~1-7 days~~ • > 1 week • unknown Drought conditions? • Y • N • ~~Unknown~~
How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
~~None~~ of it - the entire wetland is within the property boundaries (skip next 2 questions)
• some of it - _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
• none of it • all of it • part of it (_____ % or _____ acres of the off-site portion)

How much of the off-site portion of this wetland is visible (e.g., from the subject property or from a public road)?
• all of it • part of it (at least _____ acres) • none of it

Are there any wetlands located off-site and close enough to be affected by this project? • Y • N ~~Unknown~~
If yes, could they be potential bog turtle habitat? • Y • N ~~Unknown~~

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Forested floodplains, agricultural fields, high-density residential properties, industrial (sub-station)

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ~~X~~PEMA 10 • PSS _____ ~~X~~PFO 90 • POW _____

~~Y~~ • N Are there any signs of disturbance to hydrology (ditching, filling, ponds, roads, etc.)? If yes, describe
Drainage from adjacent developed properties, excavated/alterd ditch
~~Y~~ • N Are there any signs of disturbance to vegetation (mowing, pasturing, burning, etc.)? If yes, describe
limited mowing of pathways within/adjacent to wetland

- Wetland consists of concentrated wet areas and large portions of primarily dry areas.
- Drainage channel and groundwater-fed wetland areas drain towards Plum Creek to the northwest of wetland.

Project Name Ershenower Drive Extension ProjectWetland WE-2 (cont)Hydrology

- ☒ Y • ☒ N Springs or seeps • ☒ visible or • ☒ likely? Watercress present? • ☒ Yes ☒ No
☒ Y • ☒ N Spring houses in or adjacent to wetland?
☒ Y • ☒ N Saturated soils present? If yes, year-round? ☒ Likely • ☒ Unlikely • ☒ Unknown
☒ Y • ☒ N Water visible on surface? Check all that apply: ☒ Small puddles/depressions (1-2" deep)
☒ Y • ☒ N ☒ Rivulets (1-3" deep) • ☒ larger pools/ponds (2-6" deep) → main channel
☒ Y • ☒ N Evidence of flooding? If yes, describe indicators _____

Very dry period, but groundwater-fed portions of wetland maintained saturated soils

Soils Mapping Unit (optional): Dy = Dunning silty clay loamField observations confirm mapped type? ☒ YES • ☒ NO • ☒ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ?	How much of it (PEM) is mucky?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	• <10% • 10-29% • <input checked="" type="checkbox"/> 30-49% • 50-70% • >70% <u>35%</u>	<u>3</u> to <u>12</u> "	<u>3-8"</u> • <u>3-5"</u> • <u>6-8"</u> • 9-11" • ≥12"
Non-mucky ⁶ ?	How much of it (PEM) is non-mucky?	Mucky soils observed in portions of main channel as well as groundwater-fed PEM/PFO areas,	
<input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	• <10% • 10-29% • 30-49% • <input checked="" type="checkbox"/> 50-70% • >70% <u>65%</u>		

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ?	How much of it is mucky?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	• <10% • <input checked="" type="checkbox"/> 10-29% • 30-49% • 50-70% • >70% <u>10%</u>	<u>3</u> to <u>8</u> "	<u>3-5"</u> • <u>6-8"</u> • 9-11" • ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- ☒ sedges • ☒ rushes • skunk cabbage • ☒ cattail • sweet flag • jewelweed • sphagnum moss
☒ sensitive fern • ☒ rice cutgrass • tearthumb • ☒ reed canary grass • ☒ Phragmites • purple loosestrife
☒ alder • ☒ dogwood • ☒ red maple • willow • poison sumac • ☒ multiflora rose

Additional dominant species: Green ash, box elder, new york ironweed, bush honeysuckle, blue vervain, goldenrod

moderate diversity of vegetative/subsurface structure in suitable habitat areas
sparse sphagnum

HerptilesWere any bog turtles observed? • ☒ YES⁷ ☒ NO If yes, how many? _____Other herptiles • observed • previously observed: none observed

Additional Comments/Observations: (use additional sheets if necessary)

Marginal potential habitat → a portion of the wetland contains groundwater-fed hydrology and suitable soils.

INVESTIGATOR'S OPINION

- ☒ YES • ☒ NO • ☒ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
☒ YES • ☒ NO • ☒ UNSURE The soils criterion⁸ for bog turtle habitat is met.
☒ YES • ☒ NO • ☒ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
☒ YES • ☒ NO • ☒ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Hem
Investigator's Name (print)

Craig Patterson Hem
Investigator's Signature

11/18/2016
Date

Contact info: chern@gmt.com, 717-241-6252

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Ersenhower Drive Extension Project
Project type: New Roadway Construction
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Canewaga Twp
PNDI # PNDI-602909 Potential conflict with USFWS species? • ☒ Y • ☒ N

ACTION AREA²

Action area size: 205.33 Does the Phase 1 survey include all wetlands in the action area? • ☒ Y • ☒ N³

WETLAND ID: WET-3 PHOTOS TAKEN: ☒ Yes • ☒ No WETLAND SIZE: 0.047 acres
Wetland size estimation – If actual acreage is not known at time of investigation, check one:
☒ < 0.1 acre • ☐ 0.1-0.5 acre • ☐ > 0.5 to < 1 acre • ☐ 1-2 acres • ☐ 2-4 acres • ☐ 5+ acres • ☐ 10+ acres

WETLAND LOCATION: Lat 39.818223°N Long -77.038954°W
(approximate center of wetland) GPS Datum (check one): • ☐ NAD 27 • ☒ NAD 83 • ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/18/2016 Time In: 2:15 PM Time Out: 2:45 PM
Last precipitation: • ☐ < 24 hours • ☒ 1-7 days • ☐ > 1 week • ☐ unknown Drought conditions? • ☐ Y • ☒ N • ☒ Unknown
Dry period overall

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?
• ☒ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
• ☐ some of it – _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?
• ☐ none of it • ☐ all of it • ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?
• ☐ all of it • ☐ part of it (at least _____ acres) • ☐ none of it

Are there any wetlands located off-site and close enough to be affected by this project? • ☐ Y • ☒ N • ☒ Unknown
If yes, *could* they be potential bog turtle habitat? • ☐ Y • ☒ N • ☒ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag Fields, Woodlands, Municipal (church),

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 • ☐ PSS _____ • ☐ PFO _____ • ☐ POW _____

• ☒ Y • ☒ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

• ☒ Y • ☒ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe
Potential mowing upslope of the wetland

- All observed surface water observed within vegetated wetland portion of watercourse, with primarily rocky substrate

Project Name Ernsenhawer Drive Extension Project Wetland WET-3 (con't)

Hydrology

- ☒ Y • ☒ N Springs or seeps • ☒ visible or • ☒ likely? Watercress present? • ☒ Yes • ☒ No
 • ☒ Y • ☒ N Spring houses in or adjacent to wetland? Saturated soils restricted to within stream channel portion of wetland
 • ☒ Y • ☒ N Saturated soils present? If yes, year-round? • ☒ Likely • ☒ Unlikely • ☒ Unknown
 • ☒ Y • ☒ N Water visible on surface? Check all that apply: • ☒ small puddles/depressions (" deep)
 • ☒ rivulets (" deep) • ☒ larger pools/ponds (" deep) within channel = 1-4 inches
 • ☒ Y • ☒ N Evidence of flooding? If yes, describe indicators drainage pattern, matted vegetation

Soils Mapping Unit (optional): Dy = Dunning silty clay loam
 Field observations confirm mapped type? • ☒ YES • ☒ NO • ☒ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ?	How much of it (PEM) is mucky?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	<input checked="" type="checkbox"/> <10% • <input checked="" type="checkbox"/> 10-29% • <input checked="" type="checkbox"/> 30-49% <input checked="" type="checkbox"/> 50-70% • <input checked="" type="checkbox"/> >70% <u>59%</u>	<u>3</u> to <u>5</u> "	<input checked="" type="checkbox"/> 3-5" • <input checked="" type="checkbox"/> 6-8" • <input checked="" type="checkbox"/> 9-11" • <input checked="" type="checkbox"/> ≥12"
Non-mucky ⁶ ?	How much of it (PEM) is non-mucky?	- 'mucky' soils shallow, highly limited, restricted to within vegetated wetland portion of watercourse	
<input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	<input checked="" type="checkbox"/> <10% • <input checked="" type="checkbox"/> 10-29% • <input checked="" type="checkbox"/> 30-49% <input checked="" type="checkbox"/> 50-70% • <input checked="" type="checkbox"/> >70% <u>95%</u>		

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ?	How much of it is mucky?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
• <input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	<input checked="" type="checkbox"/> <10% • <input checked="" type="checkbox"/> 10-29% • <input checked="" type="checkbox"/> 30-49% <input checked="" type="checkbox"/> 50-70% • <input checked="" type="checkbox"/> >70%	<u> </u> to <u> </u> "	• <input checked="" type="checkbox"/> 3-5" • <input checked="" type="checkbox"/> 6-8" • <input checked="" type="checkbox"/> 9-11" • <input checked="" type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- sparse
 • sedges • ☒ rushes • skunk cabbage • cattail • sweet flag • jewelweed • sphagnum moss
 • sensitive fern • rice cutgrass • ☒ reed canary grass • ☒ Phragmites • purple loosestrife
 • alder • dogwood • red maple • willow • poison sumac • multiflora rose •

Additional dominant species:

Herptiles

Were any bog turtles observed? • ☒ YES⁷ • ☒ NO If yes, how many?
 Other herptiles • observed • previously observed: none observed

Additional Comments/Observations: (use additional sheets if necessary)

Small fringe wetland associated with Tributary to Plum Creek, lack of persistent groundwater sources / mucky soils

INVESTIGATOR'S OPINION

- ☒ YES • ☒ NO • ☒ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
 • ☒ YES • ☒ NO • ☒ UNSURE The soils criterion⁸ for bog turtle habitat is met.
 • ☒ YES • ☒ NO • ☒ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
 • ☒ YES • ☒ NO • ☒ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Kern
 Investigator's Name (print)

Craig Patterson Kern
 Investigator's Signature

11/18/2016
 Date

Contact info: cnern@jmt.com, 712-741-6252

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Essenhawer Drive Extension Project
Project type: New Roadway Construction
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrytown Township/Municipality: Conewago Twp
PNDI # PNDI-602909 Potential conflict with USFWS species? • Y ~~N~~

ACTION AREA²

Action area size: 205.33 ac Does the Phase 1 survey include all wetlands in the action area? ~~Y~~ • N³

WETLAND ID: WET-4 PHOTOS TAKEN: ~~Y~~ • Yes • No WETLAND SIZE: 6.437 acres
Wetland size estimation – If actual acreage is not known at time of investigation, check one:
• <0.1 acre • 0.1-0.5 acre • >0.5 to <1 acre • 1-2 acres • 2-4 acres ~~5+~~ acres • 10+ acres

WETLAND LOCATION: Lat 39.812605° N Long -77.037180° W
(approximate center of wetland) GPS Datum (check one): • NAD.27 ~~NAD 83~~ • WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 12/7/2016 Time In: 10:00 AM Time Out: 2:00 PM
Last precipitation: ~~< 24 hours~~ • 1-7 days • > 1 week • unknown Drought conditions? • Y • ~~N~~ • Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?
~~None~~ of it – the entire wetland is within the property boundaries (skip next 2 questions)
• some of it – _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?
• none of it • all of it • part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?
• all of it • part of it (at least _____ acres) • none of it

Are there any wetlands located off-site and close enough to be affected by this project? • Y • N ~~Unknown~~
If yes, *could* they be potential bog turtle habitat? • Y • N ~~Unknown~~

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. Fields, Woodlands, riparian floodplains

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ~~PEM~~ 100 • PSS _____ • PFO _____ • POW _____

~~Y~~ • N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

excavated ditch alongside western boundary of wetland

~~Y~~ • N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Mowing/maintenance of Ag Field adjacent to wetland

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Eisenhower Drive Extension Project
Project type: New Roadway Construction
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Canewaga Twp
PNDI # PNDI-602909 Potential conflict with USFWS species? • Y • ~~N~~

ACTION AREA²

Action area size: 205.33 ac Does the Phase 1 survey include all wetlands in the action area? ~~Y~~ • N³

WETLAND ID: WEF-5 PHOTOS TAKEN: ~~Yes~~ • No WETLAND SIZE: 0.060 acres
Wetland size estimation - If actual acreage is not known at time of investigation, check one:
~~X~~ < 0.1 acre • 0.1-0.5 acre • > 0.5 to < 1 acre • 1-2 acres • 2-4 acres • 5+ acres • 10+ acres

WETLAND LOCATION: Lat 39.817554°N Long -77.038887°W
(approximate center of wetland) GPS Datum (check one): • NAD 27 ~~X~~ NAD 83 • WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 12/07/2016 Time In: 9:00 AM Time Out: 9:50 AM
Last precipitation: • < 24 hours ~~X~~ 1-7 days • > 1 week • unknown Drought conditions? • Y • ~~N~~ • Unknown

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
~~X~~ none of it - the entire wetland is within the property boundaries (skip next 2 questions)
• some of it - _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
• none of it • all of it • part of it (_____ % or _____ acres of the off-site portion)

How much of the off-site portion of this wetland is visible (e.g., from the subject property or from a public road)?
• all of it • part of it (at least _____ acres) • none of it

Are there any wetlands located off-site and close enough to be affected by this project? • Y • N ~~X~~ Unknown
If yes, could they be potential bog turtle habitat? • Y • N ~~X~~ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag Fields, woodlands, riparian corridor, church

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ~~X~~ PEM 100 • PSS _____ • PFO _____ • POW _____

~~X~~ Y • N Are there any signs of disturbance to hydrology (ditching, filling, ponds, roads, etc.)? If yes, describe
Depression adjacent to Ag. Field and Plum Creek, Access Road for
~~X~~ Y • N Are there any signs of disturbance to vegetation (mowing, pasturing, burning, etc.)? If yes, describe
Mowing/Maintenance of Ag. Field adjacent to wetland

Project Name Etzshower Drive Extension Project Wetland WET-5 (con't)

Hydrology

- small depressional seep immediately adjacent to Plum Creek
- ☒ ~~Y~~ ☒ ~~N~~ Springs or seeps • visible or ~~likely~~? Watercress present? • ☒ ~~Yes~~ ☒ ~~No~~
- ☒ ~~Y~~ ☒ ~~N~~ Spring houses in or adjacent to wetland?
- ☒ ~~Y~~ ☒ ~~N~~ Saturated soils present? If yes, year-round? ☒ ~~Likely~~ • ☒ ~~Unlikely~~ • ☒ ~~Unknown~~
- ☒ ~~Y~~ ☒ ~~N~~ Water visible on surface? Check all that apply: • ☒ ~~small puddles/depressions~~ (" deep)
- ☒ ~~rivulets~~ (" deep) ☒ ~~larger pools/ponds~~ (2-6" deep)
- ☒ ~~Y~~ ☒ ~~N~~ Evidence of flooding? If yes, describe indicators low-lying depressional area immediately adjacent to Plum Creek

Soils Mapping Unit (optional): Dy = Dunning silty clay loam

Field observations confirm mapped type? • ☒ ~~YES~~ • ☒ ~~NO~~ • ☒ ~~Unknown~~

Soils - PEM Portion of Wetland			
Mucky ⁴ ? <input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	How much of it (PEM) is mucky? • <10% <input checked="" type="checkbox"/> 10-29% • 30-49% • 50-70% <input checked="" type="checkbox"/> >70% <u>15%</u>	Mucky soils range in depth from: <u>3</u> to <u>12</u> "	Most of the mucky part(s) of the wetland can be probed ⁵ : • 3-5" <input checked="" type="checkbox"/> 6-8" • 9-11" • ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	How much of it (PEM) is non-mucky? • <10% • 10-29% • 30-49% • 50-70% <input checked="" type="checkbox"/> >70% <u>85%</u>	<u>85%</u> hard - battened - mucky soil restricted to small seep area right adjacent to stream, consisted of 'mucky' mineral soils.	

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? • <input checked="" type="checkbox"/> YES • <input checked="" type="checkbox"/> NO	How much of it is mucky? • <10% • 10-29% • 30-49% • 50-70% • >70%	Mucky soils range in depth from: _____ to _____ "	Most of the mucky part(s) of the wetland can be probed ⁵ : • 3-5" • 6-8" • 9-11" • ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage). Little to no vegetative diversity and subsurface structure observed.

- ☒ ~~sedges~~ • ☒ ~~rushes~~ • ☒ ~~skunk cabbage~~ ☒ ~~cattail~~ • ☒ ~~sweet flag~~ • ☒ ~~jewelweed~~ • ☒ ~~sphagnum moss~~
- ☒ ~~sensitive fern~~ • ☒ ~~rice cutgrass~~ ☒ ~~tearthumb~~ ☒ ~~reed canary grass~~ • ☒ ~~Phragmites~~ • ☒ ~~purple loosestrife~~
- ☒ ~~alder~~ • ☒ ~~dogwood~~ • ☒ ~~red maple~~ • ☒ ~~willow~~ • ☒ ~~poison sumac~~ • ☒ ~~multiflora rose~~ • •

Additional dominant species: _____

Little to no nesting habitat, no tunnels observed

Herptiles

Were any bog turtles observed? • ☒ ~~YES~~⁷ • ☒ ~~NO~~ If yes, how many? _____

Other herptiles • ☒ ~~observed~~ • ☒ ~~previously observed~~: _____

Additional Comments/Observations: (use additional sheets if necessary)

Small wetland impacted by flooding from Plum Creek, small seep provides small area of mucky mineral soils, but highly unstable due to flooding from Plum Creek.

INVESTIGATOR'S OPINION

- ☒ ~~YES~~ ☒ ~~NO~~ • ☒ ~~UNSURE~~
- ☒ ~~YES~~ ☒ ~~NO~~ • ☒ ~~UNSURE~~
- ☒ ~~YES~~ ☒ ~~NO~~ • ☒ ~~UNSURE~~
- ☒ ~~YES~~ ☒ ~~NO~~ • ☒ ~~UNSURE~~

The hydrology criterion⁸ for bog turtle habitat is met. one small seep, but flooding from stream prevents.

The soils criterion⁸ for bog turtle habitat is met. marginal soils and veg.

The vegetation criterion⁸ for bog turtle habitat is met. ✓

This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Nern Craig Patterson Nern 12/07/2016
Investigator's Name (print) Investigator's Signature Date

Contact info: cnern@jmt.com, 717-741-6252

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Eisenhower Drive Extension Project
Project type: New Roadway ~~Extension~~ Construction
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Twp
PNDI # PNDI-602909 Potential conflict with USFWS species? • Y • ~~N~~

ACTION AREA²

Action area size: 295.33 ac Does the Phase 1 survey include all wetlands in the action area? • ~~Y~~ • ~~N~~³

WETLAND ID: WET-6 PHOTOS TAKEN: • ~~Yes~~ • No WETLAND SIZE: 8.229 acres
Wetland size estimation - If actual acreage is not known at time of investigation, check one:
• < 0.1 acre • 0.1-0.5 acre • > 0.5 to < 1 acre • 1-2 acres • 2-4 acres • ~~5+~~ acres • 10+ acres

WETLAND LOCATION: Lat 39.809643°N Long -77.036118°W
(approximate center of wetland) GPS Datum (check one): • NAD 27 • ~~NAD 83~~ • WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 12/21/2016 Time In: 8:30 AM Time Out: 1:00 PM
Last precipitation: • < 24 hours • ~~1-7 days~~ • > 1 week • unknown Drought conditions? • Y • ~~N~~ • Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?
• ~~none of it~~ - the entire wetland is within the property boundaries (skip next 2 questions)
• some of it - _____ acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?
• none of it • all of it • part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?
• all of it • part of it (at least _____ acres) • none of it

Are there any wetlands located off-site and close enough to be affected by this project? • Y • N • ~~Unknown~~
If yes, *could* they be potential bog turtle habitat? • Y • N • ~~Unknown~~

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. Fields, Woodlands, Residential properties

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: • PEM _____ • PSS _____ • ~~PFO~~ 100 • POW _____

• ~~Y~~ • ~~N~~ Are there any signs of disturbance to hydrology (ditching, filling, ponds, roads, etc.)? If yes, describe
Potential disturbance from residential developments to the south of wetland
• Y • ~~N~~ Are there any signs of disturbance to vegetation (mowing, pasturing, burning, etc.)? If yes, describe

- This wetland is contiguous with WET-4 to the north

Majority of wetland soils are hardbottomed, and some seasonal hydrology may perch above fine clay layer. Surface water observed in depressions within wetland largely hardbottomed, more vernal pool in nature.

Project Name Ernsbarger Drive Extension Project Wetland WET-6 (con't)

Hydrology

- One small spring within wetland
- ☒ Y ☒ N Springs or seeps ☒ visible or ☒ likely? Watercourse present? ☒ Yes ☒ No
- ☒ Y ☒ N Spring houses in or adjacent to wetland? ☒ highly limited, restricted to one spring/seep
- ☒ Y ☒ N Saturated soils present? If yes, year-round? ☒ Likely ☒ Unlikely ☒ Unknown
- ☒ Y ☒ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1-2' deep)
- ☒ Y ☒ N ☒ rivulets (" deep) ☒ larger pools/ponds (1-5' deep)
- ☒ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Dy = Dunning silty clay loam

Field observations confirm mapped type? ☒ YES ☒ NO ☒ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ? • YES • NO	How much of it (PEM) is mucky? • <10% • 10-29% • 30-49% • 50-70% • >70%	Mucky soils range in depth from: _____ to _____"	Most of the mucky part(s) of the wetland can be probed ⁵ : • 3-5" • 6-8" • 9-11" • ≥12"
Non-mucky ⁶ ? • YES • NO	How much of it (PEM) is non-mucky? • <10% • 10-29% • 30-49% • 50-70% • >70%	Mucky soil which drains north within hard-bottomed depressional area	restricted to one small spring

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? • YES • NO	How much of it is mucky? <input checked="" type="checkbox"/> <10% • 10-29% • 30-49% • 50-70% • >70% - 1%	Mucky soils range in depth from: 3 to 24"	Most of the mucky part(s) of the wetland can be probed ⁵ : • 3-5" • 6-8" • 9-11" • ≥12"

- 99% non-mucky

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- very sparse florists observed sp. yse
- ☒ sedges • ☒ rushes ☒ skunk cabbage • ☒ cattail • ☒ sweet flag ☒ jewelweed ☒ sphagnum moss
- ☒ sensitive fern • ☒ rice cutgrass • ☒ tearthumb • ☒ reed canary grass • ☒ Phragmites • ☒ purple loosestrife
- ☒ alder ☒ dogwood ☒ red maple • ☒ willow • ☒ poison sumac ☒ multiflora rose

Additional dominant species: Green ash, white oaks, box elder, parsonage, privet

Herptiles

Were any bog turtles observed? ☒ YES ☒ NO If yes, how many? _____

Other herptiles • observed • previously observed: none observed

Additional Comments/Observations: (use additional sheets if necessary)

Large forested wetland contiguous w/ PEM wetland (WET-4) to the north.

One small spring observed, but lack of persistent groundwater and mucky soils throughout majority of wetland.

INVESTIGATOR'S OPINION

- ☒ YES ☒ NO • UNSURE The hydrology criterion⁸ for bog turtle habitat is met. one small spring observed
- ☒ YES ☒ NO • UNSURE The soils criterion⁸ for bog turtle habitat is met. lack of mucky soils throughout vast majority of wetland.
- ☒ YES ☒ NO • UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
- ☒ YES ☒ NO • UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Hern
Investigator's Name (print)

Craig Patterson Reut
Investigator's Signature

12/21/2016
Date

Contact info: cnern@jmt.com, 717-741-6252

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Ernsbawer Drive Extension Project
Project type: New Roadway / Roadway Improvements
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Canewaga Township
PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: 593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-7 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.352 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☒ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.801750°N Long -77.046041°W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/8/2017 Time In: 1200 Time Out: 1230
Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Agricultural fields, woodlands

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

Ditching/stream alteration between Ag. fields

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Agricultural activity almost immediately adjacent to wetland

Corn fields along south, soybean field to north

Wetland - silted into stream channel, no perennial groundwater spring/seeps, fed by stream baseflow & Ag. runoff

Project Name Etzsharver Drive Extension Project Wetland WET-2 (con't)

Hydrology

- ☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No
- ☐ Y ☒ N Spring houses in or adjacent to wetland? within stream channel
- ☒ Y ☐ N Saturated soils present? If yes, year-round? ☒ Likely ☐ Unlikely ☐ Unknown
- ☒ Y ☐ N Water visible on surface? Check all that apply: ☐ small puddles/depressions (___" deep)
- ☐ rivulets (___" deep) ☒ larger pools/ponds (1-5" deep)
- ☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Penlaw silt loam - Pa

Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is mucky? <input checked="" type="checkbox"/> <10% <u>5%</u> <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: <u>3</u> to <u>5</u> "	Most of the mucky part(s) of the wetland can be probed ⁵ : <input checked="" type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> 70% <u>95%</u>		

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: ___ to ___ "	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- very sparse
- ☒ sedges ☒ rushes ☐ skunk cabbage ☒ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
- ☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ Phragmites ☐ purple loosestrife
- ☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐ _____

Additional dominant species: false nettle

Herptiles

Were any bog turtles observed? ☐ YES ☒ NO If yes, how many? _____

Other herptiles ☐ observed ☐ previously observed: none

Additional Comments/Observations: (use additional sheets if necessary)

PEM wetland within stream/depression channel between large Ag. fields. Features stream baseflow, but no spring/seeps in adjacent area.

INVESTIGATOR'S OPINION

- ☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
- ☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
- ☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
- ☐ YES ☐ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Nem
Investigator's Name (print)

Craig Patterson Nem
Investigator's Signature

11/8/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Erserhauer Drive Extension Project
Project type: New Roadway / Road Improvements
Applicant/Landowner Name: PennDOT 8-a
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~ 593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-8 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.144 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☒ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.816101° N Long -77.030420° W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/8/2012 Time In: 1500 Time Out: 1530
Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?
☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or ~ 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?
☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?
☒ all of it ☐ part of it (at least _____ acres) ☐ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown
If yes, could they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Pasture lands, Ag. fields, residential properties

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

road to west of wetland, which continues as stream to west

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Pasture surrounding wetland

Project Name Ersenhower Drive Extension Project Wetland WET-8 (con't)

Hydrology

☒ Y ☐ N Springs or seeps ☒ visible or ☐ likely? Watercress present? ☒ Yes ☐ No
☐ Y ☒ N Spring houses in or adjacent to wetland?
☒ Y ☐ N Saturated soils present? If yes, year-round? ☒ Likely ☐ Unlikely ☐ Unknown
☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1-2' deep)
☐ rivulets (" deep) ☒ larger pools/ponds (2-6' deep) - springhead upwelling
☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Dunning silty clay loam - Dy

Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input checked="" type="checkbox"/> 30-49% 35% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: 3 to 20"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input checked="" type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input checked="" type="checkbox"/> 50-70% <input type="checkbox"/> >70% 65%		

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

☒ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ Phragmites ☐ purple loosestrife
☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐ _____

Additional dominant species: Xanthium at fringes, watercress

Herptiles

Were any bog turtles observed? ☐ YES ☒ NO If yes, how many? _____

Other herptiles ☐ observed ☐ previously observed: none

Additional Comments/Observations: (use additional sheets if necessary)

Spring-fed emergent wetland east of Church Road, feeds into WUS-3, which continues to the west

INVESTIGATOR'S OPINION

☒ YES ☐ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Heim
Investigator's Name (print)

Craig Patterson Heim
Investigator's Signature

11/8/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹

(revised 06/01/2006)

Project/Property Name: Eisenhower Drive Extension Project
 Project type: New Roadway / Road Improvements
 Applicant/Landowner Name: Penn DOT 8-0
 County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
 PNDI # PNDF-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: 593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-9 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.025 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☐ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.815139° N Long -77.035275° W
 (approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/8/2017 Time In: 1545 Time Out: 1615
 Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. Fields, riparian stream corridor

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

Ag. Fields adjacent to wetland

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Ag. Fields adjacent to wetland

Eisenhower Peace Ext. Project

WET-

☒ Y ☐ N Springs or seeps ☒ Visible or ☐ likely? Watercress present? ☐ Yes ☒ No
☐ Y ☒ N Spring houses in or adjacent to wetland? *- only in seep channel*
☒ Y ☐ N Saturated soils present? If yes, year-round? ☒ Likely ☐ Unlikely ☐ Unknown
☒ Y ☐ N Water visible on surface? Check all that apply: ☐ small puddles/depressions (" deep)
from seep channel ☒ trickles (1-4" deep) ☐ larger pools/ponds (" deep)
☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Dunning silty clay loam - Dy

Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils – PEM Portion of Wetland			
<p><i>Mucky</i>⁴?</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>How much of it (PEM) is mucky?</p> <p><input type="checkbox"/> <10% <input checked="" type="checkbox"/> 10-29% <input type="checkbox"/> 30-49%</p> <p><input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <i>15%</i></p>	<p>Mucky soils range in depth from:</p> <p><i>3</i> to <i>8</i> "</p>	<p>Most of the mucky part(s) of the wetland can be probed⁵:</p> <p><input checked="" type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"</p>
<p><i>Non-mucky</i>⁶?</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>How much of it (PEM) is non-mucky?</p> <p><input type="checkbox"/> <10% <input checked="" type="checkbox"/> 10-29% <input type="checkbox"/> 30-49%</p> <p><input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <i>85%</i></p>	<p><i>- Limited mucky soil</i> <i>- wetland drains into</i></p>	

small hardbottomed trib to WGS

Soils – PSS and PFO Portions of Wetland			
<i>Mucky</i> ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky ? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____”	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5” <input type="checkbox"/> 6-8” <input type="checkbox"/> 9-11” <input type="checkbox"/> ≥12”

N/A

Check (X) if present ($\geq 5\%$ areal coverage), and also circle if dominant ($\geq 20\%$ coverage).

☐ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss ☒ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ *Phragmites* ☐ purple loosestrife ☐ alder ☒ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐

Additional dominant species:

silky dogwood

Were any bog turtles observed? ☐ YES⁷ ☒ NO If yes, how many? _____

Other herptiles ☐ observed ☐ previously observed: none

- Small wetland in depression adjacent to Ag. Field drains into fork to WUS-3

<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> UNSURE	The <u>hydrology</u> criterion ⁸ for bog turtle habitat is met.
<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> UNSURE	The <u>soils</u> criterion ⁸ for bog turtle habitat is met.
<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> UNSURE	The <u>vegetation</u> criterion ⁸ for bog turtle habitat is met.
<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> UNSURE	This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Mern
Investigator's Name (print)

Chris Pathe New
Investigator's Signature

11/18/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹

(revised 06/01/2006)

Project/Property Name: Ersenhower Drive Extension Project
 Project type: New Roadway / Road Improvements
 Applicant/Landowner Name: Penn DOT 8-0
 County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
 PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-1A PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.050 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☒ < 0.1 acre ☐ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.815393° N Long -77.034802° W
 (approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/9/2017 Time In: 0920 Time Out: 0950
 Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ Some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. fields, riparian woodlands

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

Ag. fields adjacent to wetland

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Ag. activities (clearing/planting) adjacent to wetland

- emergent wetland adjacent to riparian corridor,
 branches from adjacent canopy overhanging

Project Name Erserhauer Drive Ext. Project Wetland 1A (con't)

Hydrology

- ☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No
☐ Y ☒ N Spring houses in or adjacent to wetland? *— saturated soil restricted to upper 3 inches due to clay soil layer*
☒ Y ☐ N Saturated soils present? If yes, year-round? ☐ Likely ☒ Unlikely ☐ Unknown
☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1" deep)
☐ rivulets (" deep) ☐ larger pools/ponds (" deep)
☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Dunning silty clay loam - Dy
Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils – PEM Portion of Wetland			
<i>Mucky</i> ^{4?} <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	How much of it (PEM) is mucky ? <i>0%</i> <input checked="" type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% 100%	Mucky soils range in depth from: _____ to _____”	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5” <input type="checkbox"/> 6-8” <input type="checkbox"/> 9-11” <input type="checkbox"/> ≥12”
<i>Non-mucky</i> ^{6?} <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky ? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% <i>100%</i>		

Soils – PSS and PFO Portions of Wetland			
<i>Mucky</i> ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky ? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____”	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5” <input type="checkbox"/> 6-8” <input type="checkbox"/> 9-11” <input type="checkbox"/> ≥12”

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present ($\geq 5\%$ areal coverage), and also circle if dominant ($\geq 20\%$ coverage).

- ☐ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ *Phragmites* ☐ purple loosestrife
☐ alder ☒ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐

Additional dominant species: Rubus c. fringes

Herptiles

Were any bog turtles observed? ☐ YES⁷ ☒ NO If yes, how many? _____

Other herptiles ☐ observed ☐ previously observed: none

Additional Comments/Observations: (use additional sheets if necessary)

Marginal emergent wetland adjacent to riparian corridor and Ag. field. No perennial groundwater sources present.

INVESTIGATOR'S OPINION

- | | | | |
|------------------------------|--|---------------------------------|---|
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | <input type="checkbox"/> UNSURE | The <u>hydrology</u> criterion ⁸ for bog turtle habitat is met. |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | <input type="checkbox"/> UNSURE | The <u>soils</u> criterion ⁸ for bog turtle habitat is met. |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | <input type="checkbox"/> UNSURE | The <u>vegetation</u> criterion ⁸ for bog turtle habitat is met. |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | <input type="checkbox"/> UNSURE | This wetland is potential bog turtle habitat. |

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Mern
Investigator's Name (print)

Craig Patterson
Investigator's Signature

11/9/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹

(revised 06/01/2006)

Project/Property Name: Ersenhaver Drive Extension Project
 Project type: New roadway / Roadway Improvements
 Applicant/Landowner Name: Penn DOT 8-0
 County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
 PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-11 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.026 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☒ < 0.1 acre ☐ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.814317° N Long -77.005817° W
 (approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/13/12 Time In: 1130 Time Out: 1145
 Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?
☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?
☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?
☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown
 If yes, could they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Woodlands, fallow fields, recreational sports fields

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe
Adjacent disturbance/development of recreational fields to east
☐ Y ☒ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Project Name Etisenhower Drive Ext. ProjectWET-
Wetland 11 (con't)**Hydrology**

shallow seep feeds intermittent stream some further down in stream as well

☒ Y ☐ N Springs or seeps ☒ visible or ☐ likely? Watercress present? ☒ Yes ☐ No

☐ Y ☒ N Spring houses in or adjacent to wetland? in seep channel

☒ Y ☐ N Saturated soils present? If yes, year-round? ☒ Likely ☐ Unlikely ☐ Unknown

☒ Y ☐ N Water visible on surface? Check all that apply: ☐ small puddles/depressions (___" deep)

☐ rivulets (___" deep) ☐ larger pools/ponds (0-3" deep)

☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional):Dunning silty clay loam - DyField observations confirm mapped type? ☐ YES ☐ NO ☐ UnknownClay soils observed below 4-6 in.**Soils - PEM Portion of Wetland**

Mucky ⁴ ?	How much of it (PEM) is mucky?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>5%</u>	<u>3</u> to <u>5</u> "	<input checked="" type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ?	How much of it (PEM) is non-mucky?	<u>- minimal, shallow mucky soil w/in seep/stream channel</u> <u>- hardbottomed beneath with rocky substrate</u>	
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% <u>95%</u>		

Soils - PSS and PFO Portions of Wetland

Mucky ⁴ ?	How much of it is mucky?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	___ to ___"	<input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

tussock sedge

☒ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss

☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ Phragmites ☐ purple loosestrife

☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose

Additional dominant species: Mountain mint, NY Ironweed, Monkey Flower**Herptiles**Were any bog turtles observed? ☐ YES⁷ ☒ NO If yes, how many? _____Other herptiles ☐ observed ☐ previously observed: none**Additional Comments/Observations:** (use additional sheets if necessary)Small seep wetland at headwater of narrow stream that flows to forested uplands.**INVESTIGATOR'S OPINION**

☒ YES ☐ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.

☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.

☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.

☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Hern
Investigator's Name (print)Craig Patterson Hern
Investigator's Signature11/13/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Essex Drive Extension Project
Project type: New Roadway / Road Improvements
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-12 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.184 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☒ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.815059° N Long -77.006769° W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/13/12 Time In: 1330 Time Out: 1400
Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☒ Y ☐ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Woodlands, commercial properties, fallow fields

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☐ PEM _____ ☐ PSS _____ ☒ PFO 100 ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

Potential impacts from sewer line ROW

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Sewer line ROW clearing

Project Name Essenhawes Drive Ext ProjectWetland WET-12 (con't)**Hydrology**

- ☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No
- ☐ Y ☒ N Spring houses in or adjacent to wetland? ☒ saturated soils below surface from seasonally high water table
- ☒ Y ☐ N Saturated soils present? If yes, year-round? ☐ Likely ☒ Unlikely ☐ Unknown
- ☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1-3" deep)
- ☐ rivulets (___" deep) ☐ larger pools/ponds (___" deep)
- ☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Dunning silty clay loam - DyField observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown**Soils - PEM Portion of Wetland**

Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
N/A Non-mucky ⁶ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%		

Soils - PSS and PFO Portions of Wetland

Mucky ⁴ ? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	How much of it is mucky? <input checked="" type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
---	---	--	--

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- ☒ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
- ☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ Phragmites ☐ purple loosestrife
- ☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☒ multiflora rose

Additional dominant species: Japanese stiltgrass, green ash, black gum**Herptiles**Were any bog turtles observed? ☐ YES⁷ ☒ NO If yes, how many? _____Other herptiles ☐ observed ☐ previously observed: none**Additional Comments/Observations:** (use additional sheets if necessary)- Marginal wetland in woodlands, no perennial springs or seeps, no mucky soils**INVESTIGATOR'S OPINION**

- ☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
- ☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
- ☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
- ☐ YES ☐ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Mern
Investigator's Name (print)Craig Patterson Mern
Investigator's Signature11/13/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Ershenauer Drive Extension Project
Project type: New Roadway / Roadway Improvements
Applicant/Landowner Name: Penn DOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-13 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.524 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☐ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.817023°N Long -77.011222°W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/13/17 Time In: 1515 Time Out: 1615
Last precipitation: ☒ < 24 hours ☐ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. Fields, Commercial development, riparian woodlands

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ REM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

Site appears to be old pond that has silted in.

☐ Y ☒ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Project Name Ershenauer Drive Ext. ProjectWET-
Wetland 13 (con't)**Hydrology**

no perennial groundwater springs/seeps observed

☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No

☐ Y ☒ N Spring houses in or adjacent to wetland?

☒ Y ☐ N Saturated soils present? If yes, year-round? ☐ Likely ☒ Unlikely ☐ Unknown

☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (0-4" deep)

☐ rivulets (" deep) ☐ larger pools/ponds (" deep) old pond holding surface water

☐ Y ☒ N Evidence of flooding? If yes, describe indicators

Soils Mapping Unit (optional): Dunning silty clay loam - Dy

Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is mucky? <input checked="" type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>19%</u>	Mucky soils range in depth from: <u>3</u> to <u>4</u> "	Most of the mucky part(s) of the wetland can be probed ⁵ : <input checked="" type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% <u>99%</u>	<u>Almost entirely</u> hardbottomed	

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____ "	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

sparse

☒ sedges ☐ rushes ☐ skunk cabbage ☒ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss

☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ Phragmites ☐ purple loosestrife

☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐ _____

Additional dominant species: box elder on fringes**Herptiles**Were any bog turtles observed? ☐ YES⁷ ☒ NO If yes, how many? _____Other herptiles ☐ observed ☐ previously observed: none**Additional Comments/Observations:** (use additional sheets if necessary)

PEM wetland west of WUS-8, north of Clarks Building. Appears to be an old pond with surface connection to WUS-8 from channel flowing north.

INVESTIGATOR'S OPINION

☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.

☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.

☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.

☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Horn
Investigator's Name (print)

Craig Patterson Horn
Investigator's Signature

11/13/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Erserhower Drive Extension Project
Project type: New Roadway / Roadway Improvements
Applicant/Landowner Name: Penn DOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-14 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.012 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☒ < 0.1 acre ☐ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.810993°N Long -77.013862°W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/14/12 Time In: 0945 Time Out: 1015
Last precipitation: ☐ < 24 hours ☒ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☒ all of it ☐ part of it (at least _____ acres) ☐ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. fields, fallow fields, residential properties

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

Adjacent to roadway fill slope

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Adjacent to Ag. field, mowed/cleared for Ag. up to edge

Project Name Eisenhower Drive Ext. ProjectWET-
Wetland 14 (con't)**Hydrology**

- ☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No
☐ Y ☒ N Spring houses in or adjacent to wetland? saturated soils below surface from high water table
☒ Y ☐ N Saturated soils present? If yes, year-round? ☐ Likely ☒ Unlikely ☐ Unknown
☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1-2' deep)
☐ rivulets (___" deep) ☐ larger pools/ponds (___" deep)
☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Conestoga silt loam - CnAField observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown**Soils - PEM Portion of Wetland**

Mucky ⁴ ? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	How much of it (PEM) is mucky? <input checked="" type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>0%</u>	Mucky soils range in depth from: _____ to _____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% <u>100%</u>		

Soils - PSS and PFO Portions of Wetland

Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: _____ to _____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
--	--	--	--

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- ☐ sedges ☐ rushes ☐ skunk cabbage ☒ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☐ sensitive fern ☒ rice cutgrass ☐ tearthumb ☐ reed canary grass ☐ *Phragmites* ☐ purple loosestrife
☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐ _____

Additional dominant species: _____

HerptilesWere any bog turtles observed? ☐ YES ☒ NO If yes, how many? _____Other herptiles ☐ observed ☐ previously observed: none

Additional Comments/Observations: (use additional sheets if necessary)

Small wetland adjacent to Knodig Lane fill slope,
no perennial groundwater sources**INVESTIGATOR'S OPINION**

- ☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Hen
Investigator's Name (print)Craig Patterson Hen
Investigator's Signature11/14/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹

(revised 06/01/2006)

Project/Property Name: Ersenhower Drive Extension Project
Project type: New Roadway / Roadway Improvements
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PN05-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WES-15 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.104 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☒ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.818632° N Long -77.011498° W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/14/2017 Time In: 1130 Time Out: 1200
Last precipitation: ☐ < 24 hours ☒ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. fields, riparian woodlands

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

compaction from past/current agricultural activities

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

mowing adjacent to and across small path of wetland

Project Name Essenhower Drive Ext. ProjectWET-
Wetland 15 (con't)**Hydrology**

- ☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No
- ☐ Y ☒ N Spring houses in or adjacent to wetland?
- ☒ Y ☐ N Saturated soils present? If yes, year-round? ☐ Likely ☒ Unlikely ☐ Unknown
- ☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1-2" deep)
- ☐ rivulets (___" deep) ☐ larger pools/ponds (___" deep)
- ☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Dunning silty clay loam - Dy

Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ?	How much of it (PEM) is mucky ?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>0%</u>	___ to ___"	<input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ?	How much of it (PEM) is non-mucky ?	<u>Soils entirely hard bottomed</u>	
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% <u>100%</u>		

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ?	How much of it is mucky ?	Mucky soils range in depth from:	Most of the mucky part(s) of the wetland can be probed ⁵ :
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	___ to ___"	<input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- sparse ☒ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
- ☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ Phragmites ☐ purple loosestrife
- ☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐

Additional dominant species: false nettle, fringed by box elder, silver maple, green ash**Herptiles**Were any bog turtles observed? ☐ YES ☒ NO If yes, how many? _____Other herptiles ☐ observed ☐ previously observed: none**Additional Comments/Observations:** (use additional sheets if necessary)

PEM wetland adjacent to Ag. field and riparian woodlands east of WUS-8. No perennial groundwater hydrology observed.

INVESTIGATOR'S OPINION

- ☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
- ☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
- ☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
- ☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Nem
Investigator's Name (print)

Craig Patterson Nem
Investigator's Signature

11/14/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹

(revised 06/01/2006)

Project/Property Name: Etzenhauer Drive Extension Project
Project type: New Roadway / Roadway Improvements
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PNDI - 602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: 593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-16 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.051 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☒ < 0.1 acre ☐ 0.1-0.5 acre ☐ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.817505° N Long -77.010216° W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/14/2017 Time In: 1245 Time Out: 1315
Last precipitation: ☐ < 24 hours ☒ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. fields, riparian woodlands

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

compaction from past/current agricultural activities

☒ Y ☐ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

mowing adjacent to wetland

Project Name Essenhawer Drive Ext. ProjectWET-
Wetland 16 (con't)**Hydrology**

- ☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☒ No
☐ Y ☒ N Spring houses in or adjacent to wetland?
☒ Y ☐ N Saturated soils present? If yes, year-round? ☐ Likely ☒ Unlikely ☐ Unknown
☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (1-2" deep)
☐ rivulets (___" deep) ☐ larger pools/ponds (___" deep)
☐ Y ☒ N Evidence of flooding? If yes, describe indicators _____

Soils Mapping Unit (optional): Dunsmuir silty clay loam - Dy
Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	How much of it (PEM) is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>09%</u>	Mucky soils range in depth from: ___ to ___"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input checked="" type="checkbox"/> >70% <u>100%</u>	<u>entirely</u> hardbottomed.	

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: ___ to ___"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

- ☐ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ *Phragmites* ☐ purple loosestrife
☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐ _____

Additional dominant species: Silver maples along fringesno subsurface
structural features
observed**Herptiles**Were any bog turtles observed? ☐ YES ☒ NO If yes, how many? _____Other herptiles ☐ observed ☐ previously observed: none

Additional Comments/Observations: (use additional sheets if necessary)

PEM wetland adjacent to Ag. field and riparian woodlands east of WUS-8. No perennial groundwater hydrology observed.**INVESTIGATOR'S OPINION**

- ☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Hern
Investigator's Name (print)Craig Patterson Rein
Investigator's Signature11/14/2017
Date

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form¹
(revised 06/01/2006)

Project/Property Name: Eisenhower Drive Extension Project
Project type: New Roadway / Roadway Improvements
Applicant/Landowner Name: PennDOT 8-0
County: Adams Quad: McSherrystown Township/Municipality: Conewago Township
PNDI # PNDI-602909 Potential conflict with USFWS species? ☐ Y ☒ N

ACTION AREA²

Action area size: ~593 acres Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N³

WETLAND ID: WET-17 PHOTOS TAKEN: ☒ Yes ☐ No WETLAND SIZE: 0.865 acres

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☐ 0.1-0.5 acre ☒ > 0.5 to < 1 acre ☐ 1-2 acres ☐ 2-4 acres ☐ 5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 39.821773° N Long -77.005057° W
(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 11/14/2017 Time In: 1500 Time Out: 1600
Last precipitation: ☐ < 24 hours ☒ 1-7 days ☐ > 1 week ☐ unknown Drought conditions? ☐ Y ☒ N ☐ Unknown

How much of this wetland is located *off-site* (i.e., outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)
☒ some of it – _____ acres or 100 % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☒ all of it ☐ part of it (_____ % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (e.g., from the subject property or from a public road)?

☐ all of it ☐ part of it (at least _____ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐ Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐ Y ☐ N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Ag. fields, commercial properties, railroad

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 100 ☐ PSS _____ ☐ PFO _____ ☐ POW _____

☒ Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe

wetland formed on existing ditch

☐ Y ☒ N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe

Wetland consists of a drainage ditch that conveys stormwater north to Slagle Run

Project Name Erssenhawer Drive Ext. Project Wetland WET-12 (con't)

Hydrology

no perennial springs or seeps
☐ Y ☒ N Springs or seeps ☐ visible or ☐ likely? Watercress present? ☐ Yes ☐ No hydrology driven by surface water/
☐ Y ☒ N Spring houses in or adjacent to wetland?
☐ Y ☒ N Saturated soils present? If yes, year-round? ☐ Likely ☐ Unlikely ☐ Unknown stormwater collection in
☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (0.5" deep) depression channel
☐ rivulets (" deep) ☐ larger pools/ponds (" deep)
☒ Y ☐ N Evidence of flooding? If yes, describe indicators bent veg. from stormwater flows

Soils Mapping Unit (optional): Dunning silty clay loam (Dy)
Field observations confirm mapped type? ☒ YES ☐ NO ☐ Unknown

Soils - PEM Portion of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	How much of it (PEM) is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>0%</u>	Mucky soils range in depth from: ____ to ____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"
Non-mucky ⁶ ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	How much of it (PEM) is non-mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70% <u>100%</u>	<u>entirely no mucky soils</u>	<u>hard-bottomed,</u>

Soils - PSS and PFO Portions of Wetland			
Mucky ⁴ ? <input type="checkbox"/> YES <input type="checkbox"/> NO	How much of it is mucky? <input type="checkbox"/> <10% <input type="checkbox"/> 10-29% <input type="checkbox"/> 30-49% <input type="checkbox"/> 50-70% <input type="checkbox"/> >70%	Mucky soils range in depth from: ____ to ____"	Most of the mucky part(s) of the wetland can be probed ⁵ : <input type="checkbox"/> 3-5" <input type="checkbox"/> 6-8" <input type="checkbox"/> 9-11" <input type="checkbox"/> ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also circle if dominant (≥ 20% coverage).

☐ sedges ☐ rushes ☐ skunk cabbage ☐ cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☐ sensitive fern ☐ rice cutgrass ☐ tearthumb ☒ reed canary grass ☐ *Phragmites* ☐ purple loosestrife
☐ alder ☐ dogwood ☐ red maple ☐ willow ☐ poison sumac ☐ multiflora rose ☐ _____

Additional dominant species: Blue veranum, sparse black cherry in ditch

Herptiles

Were any bog turtles observed? ☐ YES ☒ NO If yes, how many? _____

Other herptiles ☐ observed ☐ previously observed: none

Additional Comments/Observations: (use additional sheets if necessary)

Wetland ditch that conveys stormwater, no persistent groundwater-fed hydrology or mucky soils

INVESTIGATOR'S OPINION

☐ YES ☒ NO ☐ UNSURE The hydrology criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE The soils criterion⁸ for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE The vegetation criterion⁸ for bog turtle habitat is met.
☐ YES ☒ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Craig Patterson Nem
Investigator's Name (print)

Craig Patterson Nem
Investigator's Signature

11/14/2017
Date



Appendix E Site Photographs



Site Photographs 2016 Fieldwork



Photo 1: Looking southeast along Centennial Road near the southernmost end of WUS-1 in the south-central portion of the study area. Photo taken November 17, 2016.



Photo 2: Looking north (downstream) from Centennial Road toward WUS-1 in the south-central portion of the study area. Photo taken November 17, 2016.



Photo 3: Looking northeast along WUS-1, located southwest of WET-1. Photo taken November 17, 2016.



Photo 4: Looking north along WUS-1 within the forested portion of WET-1. Photo taken December 27, 2016.



*Photo 5: Looking northwest (downstream) along Plum Creek (WUS-2) toward the Chapel Road bridge.
Photo taken December 7, 2016.*



*Photo 6: Looking southeast (upstream) along a section of Plum Creek (WUS-2) in the south-central portion
of the study area. Photo taken November 17, 2016.*



*Photo 7: Looking southeast (upstream) along Plum Creek (WUS-2) adjacent to northwestern end of WET-2.
Photo taken November 18, 2016.*



*Photo 8: Looking southeast (upstream) along WUS-3 in the central portion of the study area.
The southeastern end of WET-3 is visible in the foreground. Photo taken November 18, 2016.*



*Photo 9: Looking south (upstream) along WUS-3 in the central portion of the study area.
Photo taken December 7, 2016.*



*Photo 10: Looking west along a portion of WUS-4 located south of WET-6.
Photo taken December 27, 2016.*



*Photo 11: Looking east toward WUS-4, an intermittent tributary to Plum Creek located north of Tiffany Court.
Photo taken December 27, 2016.*



*Photo 12: Looking southeast toward WUS-4A, a small intermittent stream that drains into WUS-4 just east of its
confluence with Plum Creek. Photo taken December 27, 2016.*



*Photo 13: Looking north toward the DP-1-WET sample plot location within the PEM portion of WET-1.
Photo taken November 17, 2016.*



*Photo 14: Looking northeast toward the DP-1-UPL sample plot location along WUS-1, located southwest of WET-1.
Photo taken November 17, 2016.*



Photo 15: Looking southwest towards the southern portion of WET-1. Photo taken November 17, 2016.



Photo 16: Looking north toward DP-1A-WET sample plot within the forested portion of WET-1, located along the western side of WUS-1. Photo taken December 27, 2016.



Photo 17: Looking west toward DP-1A-UPL sample plot facing agricultural fields located west of the forested portion of WET-1. Photo taken December 27, 2016.



Photo 18: Looking northeast toward DP-2-WET sample plot within WET-2. Photo taken November 17, 2016.



Photo 19: Looking east toward edge of DP-2-WET sample plot within WET-2. Photo taken November 18, 2016.



Photo 20: Looking west toward DP-2-UPL sample plot located in fallow field east of Plum Creek and west of WET-2. Photo taken November 18, 2016.



*Photo 21: Looking southeast toward a culvert feeding a depressional mucky drainage channel within WET-2.
Photo taken November 17, 2016.*



*Photo 22: Looking north toward PEM portion of WET-2 located south of a residential area.
Photo taken November 17, 2016.*



*Photo 23: Looking northwest toward depressional area at the northern end of WET-2.
Photo taken December 27, 2016.*



Photo 24: Looking northwest toward the DP-3-WET sample plot location within WET-3, a small PEM wetland associated with WUS-3 in the north-central portion of the study area. Photo taken November 18, 2016.



*Photo 25: Looking southeast toward DP-3-UPL sample plot located upslope from WET-3.
Photo taken November 18, 2016.*



Photo 26: Looking south toward DP-4-WET sample plot located in the northern portion of WET-4, a large PEM wetland located east of Plum Creek. Photo taken December 7, 2016.



Photo 27: Looking north toward DP-4-UPL sample plot located west of WET-4. Photo taken December 7, 2016.



Photo 28: Looking north toward WET-4 from the southernmost portion of the wetland, located north of a forested area. Photo taken December 7, 2016.



*Photo 29: Looking north within an excavated, hard-bottomed drainage ditch located to the west of WET-4.
Photo taken December 7, 2016.*



Photo 30: Looking northwest toward DP-5-WET sample plot within WET-5, a small PEM wetland located to the west of Plum Creek in the central portion of the study area. Photo taken December 8, 2016.



*Photo 31: Looking southeast toward DP-5-UPL sample plot, located to the west of WET-5.
Photo taken December 7, 2016.*



*Photo 32: Looking southwest toward WET-5. Evidence of flooding from Plum Creek is visible in the foreground.
Photo taken December 8, 2016.*



Photo 33: Looking northwest toward the DP-6-WET sample plot on eastern side of WET-6, a large forested wetland located east of Plum Creek in the central portion of the study area. Photo taken December 21, 2016.



*Photo 34: Looking northeast toward the DP-6-UPL sample plot to the east of WET-6.
Photo taken December 21, 2016.*



Photo 35: Looking south toward the northern end of WET-6, where the forested wetland meets the southern end of WET-4. Photo taken December 21, 2016.



Photo 36: Looking north toward a small spring seep within WET-6 that flows north along a hard-bottomed drainage. Photo taken December 21, 2016.



Photo 37: Looking northwest toward DP-A-UPL sample plot located in the floodplain east of Plum Creek and south of Chapel Road in the north-central portion of the study area. Photo taken December 21, 2016.



Photo 38: Looking south toward DP-B-UPL sample plot located in the floodplain to the east of Plum Creek. Photo taken December 27, 2016.



Site Photographs 2017 Fieldwork



Photo 39: Looking east along WUS-5 located just south of Hanover Road (Route 116) in the southwest portion of the study area. Photo taken November 8, 2017.



Photo 40: Looking east along WUS-6 located just north of Hanover Road in the southwest portion of the study area. Photo taken November 8, 2017.



Photo 41: Looking northwest toward the eastern end of WUS-6, which emanates from a pipe on an adjacent residential property in the southwest portion of the study area. Photo taken November 8, 2017.



Photo 42: Looking east along WUS-7 in a wooded area to the west of Sunday Drive, in the southwest portion of the study area. Photo taken November 8, 2017.



Photo 43: Looking north toward the DP-7-WET sample plot from the southern end of WET-7 in the southwest portion of the study area. Photo taken November 8, 2017.



Photo 44: Looking west toward the DP-7-UPL sample plot at the northern end of WET-7 in the southwest portion of the study area. Photo taken November 8, 2017.



Photo 45: Looking west toward the groundwater spring system within WET-8, located to the east of Church Street in the central portion of the study area. Photo taken November 8, 2017.



Photo 46: Looking northeast toward the DP-8-WET sample plot within WET-8 in the central portion of the study area. Photo taken November 8, 2017.



Photo 47: Looking north toward the DP-8-UPL sample plot, located just north of WET-8 in the central portion of the study area. Photo taken November 8, 2017.



Photo 48: Looking southwest toward the DP-9-WET sample plot within WET-9, located in the central portion of the study area. Photo taken November 8, 2017.



*Photo 49: Looking northwest toward the DP-9-UPL sample plot in the central portion of the study area.
Photo taken November 8, 2017.*



*Photo 50: Looking north toward WUS-3A which connects WET-9 to WUS-3 in the central portion of the study area.
Photo taken November 8, 2017.*



Photo 51: Looking northwest toward the DP-10-WET sample plot within WET-10, located in the central portion of the study area. Photo taken November 8, 2017.



Photo 52: Looking northwest toward WET-10, located to the east of WET-9 in the central portion of the study area. Photo taken November 9, 2017.



*Photo 53: Looking east along WUS-8 to the north of Kindig Lane in the eastern portion of the study area.
Photo taken November 13, 2017.*



Photo 54: Looking north toward the DP-C-UPL sample plot in the WUS-8 floodplain in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 55: Looking southeast along WUS-8A, which flows northwest toward its confluence with WUS-8 in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 56: Looking west toward the confluence of WUS-8A and WUS-8 in the eastern portion of the study area. Photo taken November 13, 2017.



*Photo 57: Looking south toward the WUS-9 culvert beneath Kindig Lane in the eastern portion of the study area.
Photo taken November 13, 2017.*



*Photo 58: Looking southeast toward the confluence of WUS-8 (left) and WUS-9 (right).
Photo taken November 13, 2017.*



Photo 59: Looking west toward the DP-11-WET sample plot in the center of WET-11, in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 60: Looking southwest toward the DP-11-UPL sample plot in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 61: Looking east along WUS-10 towards the eastern side of WET-11. Photo taken November 13, 2017.



Photo 62: Looking southeast toward WET-12, located to the northeast of the Clarks building in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 63: Looking southeast toward the DP-12-UPL sample plot to the north of WET-12, located in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 64: Looking south along WUS-8 to the north of WET-12. Photo taken November 13, 2017.



Photo 65: Looking south toward the DP-13-WET sample plot from the north end of WET-13, located in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 66: Looking north toward the DP-13-UPL sample plot from the north end of WET-13, located in the eastern portion of the study area. Photo taken November 13, 2017.



Photo 67: Looking east toward the DP-14-WET sample plot from the western end of WET-14, at the corner of Kindig Lane and Oxford Avenue. Photo taken November 14, 2017.



*Photo 68: Looking northwest toward WET-15 in the eastern portion of the study area.
Photo taken November 14, 2017.*



Photo 69: Looking southwest toward the DP-15-UPL sample plot in a wooded area to the west of WET-15, located in the eastern portion of the study area. Photo taken November 14, 2017.



*Photo 70: Looking south along WUS-11 in the eastern portion of the study area.
Photo taken November 14, 2017.*



Photo 71: Looking south towards the DP-16-WET sample plot within WET-16 in the eastern portion of the study area. Photo taken November 14, 2017.



Photo 72: Looking north towards the DP-16-UPL sample plot to the southwest of WET-16, located in the eastern portion of the study area. Photo taken November 14, 2017.



*Photo 73: Looking north along WET-17 to the north of Radio Road, in the eastern portion of the study area.
Photo taken November 14, 2017.*



Site Photographs 2018 Fieldwork



Photo 74: Looking southeast towards the confluence of WUS-2A with Plum Creek (WUS-2) in the central portion of the study area. Photo taken October 31, 2018.



Photo 75: Looking east towards the NPDES outfall pipe that drains into WUS-2A. Photo taken October 31, 2018.



*Photo 76: Looking west (downstream) along WUS-8 towards beaver/debris dams diverting flow into WUS-8B.
Photo taken December 21, 2018.*



*Photo 77: Looking northeast towards WUS-8B, an intermittent oxbow channel along the northern side of WUS-8.
Photo taken December 21, 2018.*



Appendix F

Wetland Functional Assessment Data Forms and Key

Wetland Function-Value Evaluation Form

Total area of wetland 3.843 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, forested corridors, residential properties Distance to nearest roadway or other development 600 feet

Dominant wetland systems present PFO/PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 1













Latitude 39° 48' 27.7" Longitude 77° 02' 16.9"

Prepared by: CPN Date 01/10/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X		
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13	Retains stormwater runoff and WUS-1 flows, slowing inputs to Plum Creek
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X		1, 4, 10, 16	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 7, 8, 10, 13	Wetland can filter nutrients prior to reaching Plum Creek
 Production Export		X		
 Sediment/Shoreline Stabilization	X		1, 3, 4, 5, 6, 7, 9, 12, 14	Emergent and woody vegetation helps stabilize streambanks of WUS-1
 Wildlife Habitat	X		3, 4, 5, 6, 7, 11, 15, 21	Potential habitat for a variety of wildlife species (e.g., birds, small mammals)
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: PEM wetland area along WUS-1 channel flows north into large PFO wetland area

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 5.057 ac Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? No

Adjacent land use Agricultural fields, forested corridors, Distance to nearest roadway or other development 75 feet
residential properties, industrial (substation)

Dominant wetland systems present PFO/PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 2

Latitude 39° 48' 25.1" Longitude 77° 02' 01.3"













Prepared by: CPN Date 01/10/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation
completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	2, 7, 9, 13		Spring/seeps present within a portion of the wetland
 Floodflow Alteration	X	2, 3, 5, 6, 8, 9, 10, 13, 18		Retains stormwater runoff from developed land, slowing inputs to Plum Creek
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1, 2, 3, 4, 10, 11, 16	X	Traps sediments in stormwater runoff from ag. fields/developed land
 Nutrient Removal	X	3, 4, 7, 8, 9, 10, 11, 13, 14	X	Wetland can filter nutrients prior to reaching Plum Creek
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	5, 6, 7, 10, 11, 13, 15, 20, 21	X	Potential habitat for variety of wildlife (e.g., birds, small mammals, amphibians)
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		Marginal potential bog turtle habitat present, but species occurrence unknown
Other		X		

Notes: Wetland contains man-made/alterd drainage channel, as well as groundwater-fed areas draining to Plum Creek

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.047 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, forested corridors, fields, developed lands Distance to nearest roadway or other development 150 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 3

Latitude 39° 49' 05.6" Longitude 77° 02' 20.2"













Prepared by: CPN Date 01/10/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	7		Minor potential groundwater discharge adjacent to watercourse
 Floodflow Alteration	X	2, 5, 6, 9, 13, 18		Minor potential of dense vegetation to slow inputs into Plum Creek
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1, 3, 4, 10, 11, 16	X	Traps sediments in stormwater runoff from ag. fields/developed land
 Nutrient Removal	X	3, 4, 7, 8, 9, 10, 13	X	Wetland can filter nutrients prior to reaching Plum Creek
 Production Export		X		
 Sediment/Shoreline Stabilization	X	1, 3, 4, 6, 9, 12, 15	X	Dense vegetation slows stream velocities
 Wildlife Habitat	X	5, 7, 8, 13		Minor potential wildlife habitat
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: Small PEM wetland within vegetated portion of intermittent stream and low-lying fringe

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 6.437 ac Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? No

Adjacent land use Agricultural fields, woodlands forested corridors Distance to nearest roadway or other development 1,000 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 4

Latitude 39° 48' 45.4" Longitude 77° 02' 13.8"













Prepared by: CPN Date 01/10/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	<input type="checkbox"/> <input checked="" type="checkbox"/>	6		
 Floodflow Alteration	<input checked="" type="checkbox"/> <input type="checkbox"/>	2, 3, 5, 6, 8, 9, 10, 15, 18		Can retain floodwaters from Plum Creek, and slow stormwater runoff from entering stream
 Fish and Shellfish Habitat	<input type="checkbox"/> <input checked="" type="checkbox"/>			
 Sediment/Toxicant Retention	<input checked="" type="checkbox"/> <input type="checkbox"/>	1, 3, 4, 16	<input checked="" type="checkbox"/>	Traps sediments in stormwater runoff from ag. fields/developed land
 Nutrient Removal	<input checked="" type="checkbox"/> <input type="checkbox"/>	3, 4, 7, 8, 9, 10, 11, 13	<input checked="" type="checkbox"/>	Wetland can filter nutrients prior to reaching watercourses
 Production Export	<input type="checkbox"/> <input checked="" type="checkbox"/>			
 Sediment/Shoreline Stabilization	<input type="checkbox"/> <input checked="" type="checkbox"/>			
 Wildlife Habitat	<input checked="" type="checkbox"/> <input type="checkbox"/>	3, 4, 5, 7, 8, 13, 21	<input checked="" type="checkbox"/>	Potential habitat for a variety of wildlife species (e.g., birds, small mammals)
 Recreation	<input type="checkbox"/> <input checked="" type="checkbox"/>			
 Educational/Scientific Value	<input type="checkbox"/> <input checked="" type="checkbox"/>			
 Uniqueness/Heritage	<input type="checkbox"/> <input checked="" type="checkbox"/>			
 Visual Quality/Aesthetics	<input type="checkbox"/> <input checked="" type="checkbox"/>			
ES Endangered Species Habitat	<input type="checkbox"/> <input checked="" type="checkbox"/>			
Other	<input type="checkbox"/> <input checked="" type="checkbox"/>			

Notes: Large PEM wetland, has been impacted by excavated drainage ditch running along western side

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.060 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, woodlands forested corridors, developed lands Distance to nearest roadway or other development 325 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 5

Latitude 39° 49' 03.2" Longitude 77° 02' 20.0"

Prepared by: CPN Date 01/10/17













Wetland Impact:

Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	7, 13	X	Small groundwater spring/seep present adjacent to Plum Creek
 Floodflow Alteration	X	2, 3, 5, 8, 9, 10, 13, 18		Can retain floodwaters from Plum Creek, and slow stormwater runoff from entering stream
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1, 3, 4, 10, 16	X	Traps sediments in stormwater runoff from ag. fields/developed land
 Nutrient Removal	X	3, 4, 7, 8, 9, 10, 11, 13	X	Wetland can filter nutrients prior to reaching Plum Creek
 Production Export		X		
 Sediment/Shoreline Stabilization	X	2, 3, 4, 6, 13, 15		Emergent vegetation provides minor streambank stabilization
 Wildlife Habitat	X	4, 5, 7, 8, 13, 17, 21		Minor potential wildlife habitat (meadow voles observed)
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: Small PEM wetland adjacent to Plum Creek, flooding from stream impacts wetland

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 8.229 ac Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? No

Adjacent land use Agricultural fields, woodlands, forested corridors, residential properties Distance to nearest roadway or other development 250 feet

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? No Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 6

Latitude 39° 48' 34.7" Longitude 77° 02' 10.0"













Prepared by: CPN Date 01/10/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	13		Small groundwater spring/seep present at southern end of wetland
 Floodflow Alteration	X	2, 3, 5, 6, 7, 8, 9, 10		Can retain floodwaters from Plum Creek, and slow stormwater runoff from entering stream
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1, 3, 4, 5	X	Traps sediments in stormwater runoff from ag. fields/developed land
 Nutrient Removal	X	3, 4, 7, 8, 9, 10		Wetland can filter nutrients prior to reaching Plum Creek
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	3, 4, 5, 7, 8, 11, 13, 14, 15, 20, 21	X	Potential habitat for variety of wildlife (birds, small mammals, amphibians)
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: Large PFO wetland contiguous with WET-4 to the north; vernal pool features observed throughout wetland

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .35 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, forested corridors, residential properties Distance to nearest roadway or other development 600 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Lower

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 7

Latitude 39° 48' 06" Longitude 77° 02' 46"













Prepared by: GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	<input type="checkbox"/>	X		
 Floodflow Alteration	X	3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-7
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X	3, 4, 7, 8, 10, 13	X	Wetland can filter nutrients prior to continuing down WUS-7
 Production Export		X		
 Sediment/Shoreline Stabilization	X	1, 3, 4, 5, 7, 9, 12, 15		Emergent vegetation helps stabilize streambanks of WUS-7
 Wildlife Habitat	X	3, 4, 5, 6, 7, 21		Potential habitat for a variety of wildlife species (e.g., birds, small mammals)
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: PEM wetland situated west of Sunday Drive and fed by WUS-7 from the east.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .15 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, fenced pasture, residential properties Distance to nearest roadway or other development 30 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 8

Latitude 39° 48' 58.0" Longitude 77° 01' 49.0"













Prepared by: GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	13		Wetland is fed by a groundwater spring system.
 Floodflow Alteration	X	2, 3, 5, 6, 7, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields and pastures, slowing inputs to WUS-3
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X	3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-3
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	3, 4, 5, 6, 7, 15, 21		Potential habitat for a variety of wildlife species (e.g., birds, small mammals)
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		Marginal potential bog turtle habitat present, but species occurrence unknown
Other		X		

Notes: PEM, spring-fed wetland east of Church Street, surrounded by a fenced pasture.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .02 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, woodlands Distance to nearest roadway or other development 800 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 9













Latitude 39° 48' 54.0" Longitude 77° 02' 7.00"

Prepared by GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-3 and WUS-3A
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-3 and WUS-3A
 Production Export		X			
 Sediment/Shoreline Stabilization		X			
 Wildlife Habitat	X		3, 5, 6, 7		Marginal habitat for a variety of wildlife species
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			













Notes: PEM wetland located along the southern side of WUS-3.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .05 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No
 Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 650 feet
 Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper
 How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 10
 Latitude 39° 48' 55.0" Longitude 77° 02' 6.00"
 Prepared by GME Date 12/19/17
 Wetland Impact:
 Type Fill/unknown Area Unknown
 Evaluation based on:
 Office X Field X
 Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-3
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-3
 Production Export		X			
 Sediment/Shoreline Stabilization		X			
 Wildlife Habitat	X		3, 4, 5, 6, 7		Marginal habitat for a variety of wildlife species
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics					
ES Endangered Species Habitat		X			
Other		X			

Notes: Small PEM wetland located east of WET-9, along the southern side of WUS-3.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .03 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 500 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 11













Latitude 39° 48' 51.0" Longitude 77° 02' 21.0"

Prepared by GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X		13		Wetland hydrology is supplied by a small seep.
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-8 and WUS-10
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-8 and WUS-10
 Production Export		X			
 Sediment/Shoreline Stabilization		X			
 Wildlife Habitat	X		3, 5, 6, 7		Marginal habitat for a variety of wildlife species
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			













Notes: Small PEM wetland located east of WUS-8 and west of recreational fields.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .18 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No
 Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 300 feet
 Dominant wetland systems present PFO Contiguous undeveloped buffer zone present Yes
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper
 How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 12
 Latitude 39° 48' 51.0" Longitude 77° 02' 21.0"
 Prepared by GME Date 12/19/17
 Wetland Impact:
 Type Fill/unknown Area Unknown
 Evaluation based on:
 Office X Field X
 Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-8
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-8
 Production Export		X			
 Sediment/Shoreline Stabilization					
 Wildlife Habitat	X		3, 5, 6, 7, 15, 21		Potential habitat for a variety of wildlife species (e.g., birds, amphibians)
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			

Notes: **PEM** **PFO** wetland located east of WUS-8 at the north end of the Clarks building.

*** Refer to backup list of numbered considerations.**

Wetland Function-Value Evaluation Form

Total area of wetland .52 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 750 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 13













Latitude 39° 49' 01.0" Longitude 77° 00' 40.0"

Prepared by GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-8
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-8
 Production Export		X			
 Sediment/Shoreline Stabilization					
 Wildlife Habitat	X		3, 5, 6, 7, 15, 21		Potential habitat for a variety of wildlife species (e.g., birds, amphibians)
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			













Notes: PEM wetland located west of WUS-8 and north of the Clarks building.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .01 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No
 Adjacent land use Agricultural fields, wooded areas, residential Distance to nearest roadway or other development 10 feet
 Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper
 How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 14
 Latitude 39° 48' 49.0" Longitude 77° 00' 50.0"
 Prepared by GME Date 12/19/17
 Wetland Impact:
 Type Fill/unknown Area Unknown
 Evaluation based on:
 Office X Field X
 Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X			
 Floodflow Alteration	X			
 Fish and Shellfish Habitat	X			
 Sediment/Toxicant Retention	X	1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X	3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients from ag. runoff
 Production Export	X			
 Sediment/Shoreline Stabilization	X			
 Wildlife Habitat	X			
 Recreation	X			
 Educational/Scientific Value	X			
 Uniqueness/Heritage	X			
 Visual Quality/Aesthetics	X			
ES Endangered Species Habitat	X			
Other	X			













Notes: PEM located west of the Clarks building at the corner of Oxford Avenue and Kindig Lane.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .10 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No
 Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 800 feet
 Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper
 How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 15
 Latitude 39° 49' 07.0" Longitude 77° 00' 41.0"
 Prepared by GME Date 12/19/17
 Wetland Impact:
 Type Fill/unknown Area Unknown
 Evaluation based on:
 Office X Field X
 Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-8
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-8
 Production Export		X			
 Sediment/Shoreline Stabilization					
 Wildlife Habitat	X		3, 5, 6, 7, 15, 21		Potential habitat for a variety of wildlife species (e.g., birds, amphibians)
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			

Notes: PEM wetland located east of WUS-8 adjacent to large agricultural fields.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .05 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 850 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 16













Latitude 39° 49' 03.0" Longitude 77° 00' 37.0"

Prepared by GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to WUS-8
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching WUS-8
 Production Export		X			
 Sediment/Shoreline Stabilization		X			
 Wildlife Habitat	X		3, 5, 6, 7, 15, 21		Potential habitat for a variety of wildlife species (e.g., birds, amphibians)
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			

Notes: PEM wetland located east of WUS-8 adjacent to large agricultural fields.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland .87 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural fields, wooded areas Distance to nearest roadway or other development 200 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 17













Latitude 39° 49' 13.0" Longitude 77° 00' 16.0"

Prepared by GME Date 12/19/17

Wetland Impact:
Type Fill/unknown Area Unknown

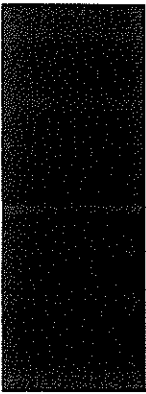
Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration	X		2, 3, 5, 6, 8, 9, 10, 13		Retains stormwater runoff from adjacent ag. fields, slowing inputs to stream
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1, 4, 10, 16	X	Wetland can trap sediments from stormwater runoff/adjacent ag. fields
 Nutrient Removal	X		3, 4, 5, 7, 8, 10, 13	X	Wetland can filter nutrients prior to reaching downstream watercourse
 Production Export		X			
 Sediment/Shoreline Stabilization					
 Wildlife Habitat	X		3, 5, 6, 7, 15, 21		Potential habitat for a variety of wildlife species (e.g., birds, small mammals)
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			

Notes: PEM wetland located north of Radio Road adjacent to large agricultural fields.

* Refer to backup list of numbered considerations.



Appendix A

Wetland evaluation supporting documentation; Reproducible forms.

Below is an example list of considerations that was used for a New Hampshire highway project. Considerations are flexible, based on best professional judgment and interdisciplinary team consensus. This example provides a comprehensive base, however, and may only need slight modifications for use in other projects.



GROUNDWATER RECHARGE/DISCHARGE— This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

CONSIDERATIONS/QUALIFIERS

1. Public or private wells occur downstream of the wetland.
2. Potential exists for public or private wells downstream of the wetland.
3. Wetland is underlain by stratified drift.
4. Gravel or sandy soils present in or adjacent to the wetland.
5. Fragipan does not occur in the wetland.
6. Fragipan, impervious soils, or bedrock does occur in the wetland.
7. Wetland is associated with a perennial or intermittent watercourse.
8. Signs of groundwater recharge are present or piezometer data demonstrates recharge.
9. Wetland is associated with a watercourse but lacks a defined outlet or contains a constricted outlet.
10. Wetland contains only an outlet, no inlet.
11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.
12. Quality of water associated with the wetland is high.
13. Signs of groundwater discharge are present (e.g., springs).
14. Water temperature suggests it is a discharge site.
15. Wetland shows signs of variable water levels.
16. Piezometer data demonstrates discharge.
17. Other



FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

CONSIDERATIONS/QUALIFIERS

1. Area of this wetland is large relative to its watershed.
2. Wetland occurs in the upper portions of its watershed.
3. Effective flood storage is small or non-existent upslope of or above the wetland.
4. Wetland watershed contains a high percent of impervious surfaces.
5. Wetland contains hydric soils which are able to absorb and detain water.
6. Wetland exists in a relatively flat area that has flood storage potential.
7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.
8. During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions.
9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.
10. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.
11. Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland.
12. The watershed has a history of economic loss due to flooding.
13. This wetland is associated with one or more watercourses.
14. This wetland watercourse is sinuous or diffuse.
15. This wetland outlet is constricted.
16. Channel flow velocity is affected by this wetland.
17. Land uses downstream are protected by this wetland.
18. This wetland contains a high density of vegetation.
19. Other

FISH AND SHELLFISH HABITAT (FRESHWATER) — This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.



CONSIDERATIONS/QUALIFIERS

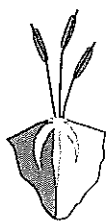
1. Forest land dominant in the watershed above this wetland.
 2. Abundance of cover objects present.
- STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE**
3. Size of this wetland is able to support large fish/shellfish populations.
 4. Wetland is part of a larger, contiguous watercourse.
 5. Wetland has sufficient size and depth in open water areas so as not to freeze solid and retain some open water during winter.
 6. Stream width (bank to bank) is more than 50 feet.
 7. Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations.
 8. Streamside vegetation provides shade for the watercourse.
 9. Spawning areas are present (submerged vegetation or gravel beds).
 10. Food is available to fish/shellfish populations within this wetland.
 11. Barrier(s) to anadromous fish (such as dams, including beaver dams, waterfalls, road crossing) are absent from the stream reach associated with this wetland.
 12. Evidence of fish is present.
 13. Wetland is stocked with fish.
 14. The watercourse is persistent.
 15. Man-made streams are absent.
 16. Water velocities are not too excessive for fish usage.
 17. Defined stream channel is present.
 18. Other

Although the above example refers to freshwater wetlands, it can also be adapted for marine ecosystems. The following is an example provided by the National Marine Fisheries Service (NMFS) of an adaptation for the fish and shellfish function.

FISH AND SHELLFISH HABITAT (MARINE) — This function considers the effectiveness of wetlands, embayments, tidal flats, vegetated shallows, and other environments in supporting marine resources such as fish, shellfish, marine mammals, and sea turtles.

CONSIDERATIONS/QUALIFIERS

1. Special aquatic sites (tidal marsh, mud flats, eelgrass beds) are present.
2. Suitable spawning habitat is present at the site or in the area.
3. Commercially or recreationally important species are present or suitable habitat exists.
4. The wetland/waterway supports prey for higher trophic level marine organisms.
5. The waterway provides migratory habitat for anadromous fish.
6. Essential fish habitat, as defined by the 1996 amendments to the Magnuson-Stevens Fishery & Conservation Act, is present (consultation with NMFS may be necessary).
7. Other



SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas.

CONSIDERATIONS/QUALIFIERS

1. Potential sources of excess sediment are in the watershed above the wetland.
2. Potential or known sources of toxicants are in the watershed above the wetland.
3. Opportunity for sediment trapping by slow moving water or deepwater habitat are present in this wetland.
4. Fine grained mineral or organic soils are present.
5. Long duration water retention time is present in this wetland.
6. Public or private water sources occur downstream.
7. The wetland edge is broad and intermittently aerobic.
8. The wetland is known to have existed for more than 50 years.
9. Drainage ditches have not been constructed in the wetland.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

10. Wetland is associated with an intermittent or perennial stream or a lake.
11. Channelized flows have visible velocity decreases in the wetland.
12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.
13. No indicators of erosive forces are present. No high water velocities are present.
14. Diffuse water flows are present in the wetland.
15. Wetland has a high degree of water and vegetation interspersion.
16. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation is present.
17. Other



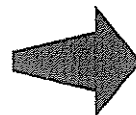
NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

CONSIDERATIONS/QUALIFIERS

1. Wetland is large relative to the size of its watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping exists in the wetland.

4. Potential sources of excess nutrients are present in the watershed above the wetland.
 5. Wetland saturated for most of the season. Ponded water is present in the wetland.
 6. Deep organic/sediment deposits are present.
 7. Slowly drained fine grained mineral or organic soils are present.
 8. Dense vegetation is present.
 9. Emergent vegetation and/or dense woody stems are dominant.
 10. Opportunity for nutrient attenuation exists.
 11. Vegetation diversity/abundance sufficient to utilize nutrients.
- STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.
12. Waterflow through this wetland is diffuse.
 13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation.
 14. Water moves slowly through this wetland.
 15. Other

PRODUCTION EXPORT (Nutrient) — This function evaluates the effectiveness of the wetland to produce food or usable products for humans or other living organisms.



CONSIDERATIONS/QUALIFIERS

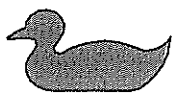
1. Wildlife food sources grow within this wetland.
2. Detritus development is present within this wetland.
3. Economically or commercially used products found in this wetland.
4. Evidence of wildlife use found within this wetland.
5. Higher trophic level consumers are utilizing this wetland.
6. Fish or shellfish develop or occur in this wetland.
7. High vegetation density is present.
8. Wetland exhibits high degree of plant community structure/species diversity.
9. High aquatic vegetative diversity/abundance is present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. "Flushing" of relatively large amounts of organic plant material occurs from this wetland.
12. Wetland contains flowering plants that are used by nectar-gathering insects.
13. Indications of export are present.
14. High production levels occurring, however, no visible signs of export (assumes export is attenuated).
15. Other

SEDIMENT/ShORELINE STABILIZATION — This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.



CONSIDERATIONS/QUALIFIERS

1. Indications of erosion or siltation are present.
2. Topographical gradient is present in wetland.
3. Potential sediment sources are present up-slope.
4. Potential sediment sources are present upstream.
5. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
6. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout.
7. Wide wetland (>10') borders watercourse, lake, or pond.
8. High flow velocities in the wetland.
9. The watershed is of sufficient size to produce channelized flow.
10. Open water fetch is present.
11. Boating activity is present.
12. Dense vegetation is bordering watercourse, lake, or pond.
13. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond.
14. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).
15. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.
16. Other



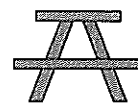
WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.¹

CONSIDERATIONS/QUALIFIERS

1. Wetland is not degraded by human activity.
2. Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.
3. Wetland is not fragmented by development.
4. Upland surrounding this wetland is undeveloped.
5. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width.
6. Wetland is contiguous with other wetland systems connected by a watercourse or lake.
7. Wildlife overland access to other wetlands is present.
8. Wildlife food sources are within this wetland or are nearby.
9. Wetland exhibits a high degree of interspersed vegetation classes and/or open water.
10. Two or more islands or inclusions of upland within the wetland are present.
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.
12. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland, are present.
13. Density of the wetland vegetation is high.
14. Wetland exhibits a high degree of plant species diversity.
15. Wetland exhibits a high degree of diversity in plant community structure (e.g., tree/shrub/vine/grasses/mosses)
16. Plant/animal indicator species are present. (List species for project)
17. Animal signs observed (tracks, scats, nesting areas, etc.)
18. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons.
19. Wetland contains or has potential to contain a high population of insects.
20. Wetland contains or has potential to contain large amphibian populations.
21. Wetland has a high avian utilization or its potential.
22. Indications of less disturbance-tolerant species are present.
23. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources, etc.).
24. Other

¹In March 1995, a rapid wildlife habitat assessment method was completed by a University of Massachusetts research team with funding and oversight provided by the New England Transportation Consortium. The method is called WEThings (wetland habitat indicators for non-game species). It produces a list of potential wetland-dependent mammal, reptile, and amphibian species that may be present in the wetland. The output is based on observable habitat characteristics documented on the field data form. This method may be used to generate the wildlife species list recommended as backup information to the wetland evaluation form and to augment the considerations. Use of this method should first be coordinated with the Corps project manager. A computer program is also available to expedite this process.

RECREATION (Consumptive and Non-Consumptive) — This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Wetland is part of a recreation area, park, forest, or refuge.
2. Fishing is available within or from the wetland.
3. Hunting is permitted in the wetland.
4. Hiking occurs or has potential to occur within the wetland.
5. Wetland is a valuable wildlife habitat.
6. The watercourse, pond, or lake associated with the wetland is unpolluted.
7. High visual/aesthetic quality of this potential recreation site.
8. Access to water is available at this potential recreation site for boating, canoeing, or fishing.
9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at the potential recreation site.
11. Accessibility and travel ease is present at this site.
12. The wetland is within a short drive or safe walk from highly populated public and private areas.
13. Other

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.



CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened, rare, or endangered species.
2. Little or no disturbance is occurring in this wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site is undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat.
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.
9. Potential educational site is within safe walking distance or a short drive to schools.
10. Potential educational site is within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site is available.
12. Direct access to pond or lake at potential educational site is available.
13. No known safety hazards exist within the potential educational site.
14. Public access to the potential educational site is controlled.
15. Handicap accessibility is available.
16. Site is currently used for educational or scientific purposes.
17. Other



UNIQUENESS/HERITAGE — This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

CONSIDERATIONS/QUALIFIERS

1. Upland surrounding wetland is primarily urban.
2. Upland surrounding wetland is developing rapidly.
3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep), including streams, occur in wetlands.
4. Three or more wetland classes are present.
5. Deep and/or shallow marsh or wooded swamp dominate.
6. High degree of interspersed vegetation and/or open water occur in this wetland.
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.
8. Potential educational site is within a short drive or a safe walk from schools.
9. Off-road parking at potential educational site is suitable for school buses.
10. No known safety hazards exist within this potential educational site.
11. Direct access to perennial stream or lake exists at potential educational site.
12. Two or more wetland classes are visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) are visible from primary viewing locations.
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.
15. Large area of wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.
17. Overall view of the wetland is available from the surrounding upland.
18. Quality of the water associated with the wetland is high.
19. Opportunities for wildlife observations are available.
20. Historical buildings are found within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland is within 50 yards of the nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland.
24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.
28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Other

VISUAL QUALITY/AESTHETICS — This value considers the visual and aesthetic quality or usefulness of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Multiple wetland classes are visible from primary viewing locations.
2. Emergent marsh and/or open water are visible from primary viewing locations.
3. A diversity of vegetative species is visible from primary viewing locations.
4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.
6. Visible surrounding land use form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance.
8. Wetland is considered to be a valuable wildlife habitat.
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line exists through wetland.
13. Other

ENDANGERED SPECIES HABITAT — This value considers the suitability of the wetland to support threatened or endangered species.

ES

CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened or endangered species.
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.