G Wetland Delineation Report

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Naval Air Station Joint Reserve Base Willow Grove Wetland Delineation Report

A Technical Report in Support of the Environmental Impact Statement for the Disposal and Reuse of Naval Air Station Joint Reserve Base Willow Grove Horsham, Pennsylvania

Final

June 2013

Prepared for:

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Table of Contents

List of Tables

List of Figures

List of Abbreviations and Acronyms

BRAC Closure Law	Defense Base Closure and Realignment Act
BRAC PMO	BRAC Program Management Office
BRAC	Base Realignment and Closure
CFR	Code of Federal Regulations
cm	centimeter
°F	degrees Fahrenheit
EIS	Environmental Impact Statement
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
JD	Jurisdictional determination
GPS	Global positioning system
HLRA	Horsham Land Redevelopment Authority[1]
NAS JRB	Naval Air Station Joint Reserve Base
Navy	U.S. Department of the Navy
NRCS	Natural Resources Conservation Service
OBL	Obligate Wetland
UPL	Obligate Upland
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey

[1] Prior to June 2012, this entity was known as the Horsham Township Authority.

Executive Summary

The U.S. Department of the Navy is preparing an Environmental Impact Statement (EIS) to evaluate the disposal and reuse of Naval Air Station Joint Reserve Base Willow Grove, in Horsham, Pennsylvania. The installation ceased operations and was officially closed in September 2011 under the Defense Base Closure and Realignment Act of 1990, as amended in 2005 (BRAC Closure Law). To support preparation of the EIS, a wetland delineation was conducted on approximately 860 acres of the former installation in April and May of 2013.

The wetland delineation identified and mapped 23 wetland features encompassing a total of 25.96 acres. Drainage features associated with the wetlands, including both man-made features such as culverts and ditches and naturally occurring features such as seeps and streams, were also mapped. A total of 6,738.99 feet of linear features were mapped.

1 Introduction

The U.S. Department of the Navy (Navy) has closed Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove in accordance with Public Law 101-510, the Defense Base Closure and Realignment Act of 1990, as amended in 2005 (BRAC Closure Law). NAS JRB Willow Grove is located in Horsham Township, Montgomery County, Pennsylvania, approximately 18 miles north of Philadelphia. The main gate is located on Easton Road approximately 2.5 miles north of the Pennsylvania Turnpike (see Figure 1-1).

The site of NAS JRB Willow Grove was originally a municipal airfield constructed in the mid-1930s. The Navy acquired the airfield in response to World War II, and NAS Willow Grove was commissioned in January 1943. After World War II ended in 1945, the installation was designated a Reserve Training Station. In 1994, the installation was re-designated a Joint Reserve Base to more accurately reflect its status. The mission of NAS JRB Willow Grove prior to closure was to provide, train, and maintain a ready reserve force for the country.

The BRAC Commission recommended closure of NAS JRB Willow Grove on September 8, 2005. The recommendation to close NAS JRB Willow Grove was approved by President Bush and accepted by Congress on November 9, 2005. By law, the installation had to be closed before September 15, 2011. The installation ceased operations and was officially closed in September 2011. The Navy intends to dispose of the installation property based on the recommendation of the BRAC Commission to close the installation. As part of the disposal process, the Horsham Township Authority (HLRA[2]) for NAS JRB Willow Grove was formed as the entity responsible for preparing the Redevelopment Plan with respect to the installation (RKG 2012). The Navy is preparing an Environmental Impact Statement (EIS) to evaluate the disposal and reuse of NAS JRB Willow Grove.

This wetland delineation report was prepared to support the Navy's EIS. Field reconnaissance surveys were conducted at NAS JRB Willow Grove in April and May 2013 to assess the occurrence of wetlands and waterbodies (e.g., streams, tributaries, and other major watercourses). Section 2 describes the methods used to evaluate wetlands and waterbodies at NAS JRB Willow Grove, and Section 3 describes the wetlands and waterbodies identified during the reconnaissance field

[2] In June 2012, the Horsham Township Authority was redesignated as the Horsham Land Redevelopment Authority (HLRA). To avoid confusion, this entity is referred to herein as the HLRA.

visit. The wetland delineation was performed for NEPA planning purposes and to identify potential impacts, which will be evaluated in the EIS; therefore, a jurisdictional determination (JD) of the wetland boundaries was not conducted. A JD will need to be conducted by a developer prior to any redevelopment of the installation property.

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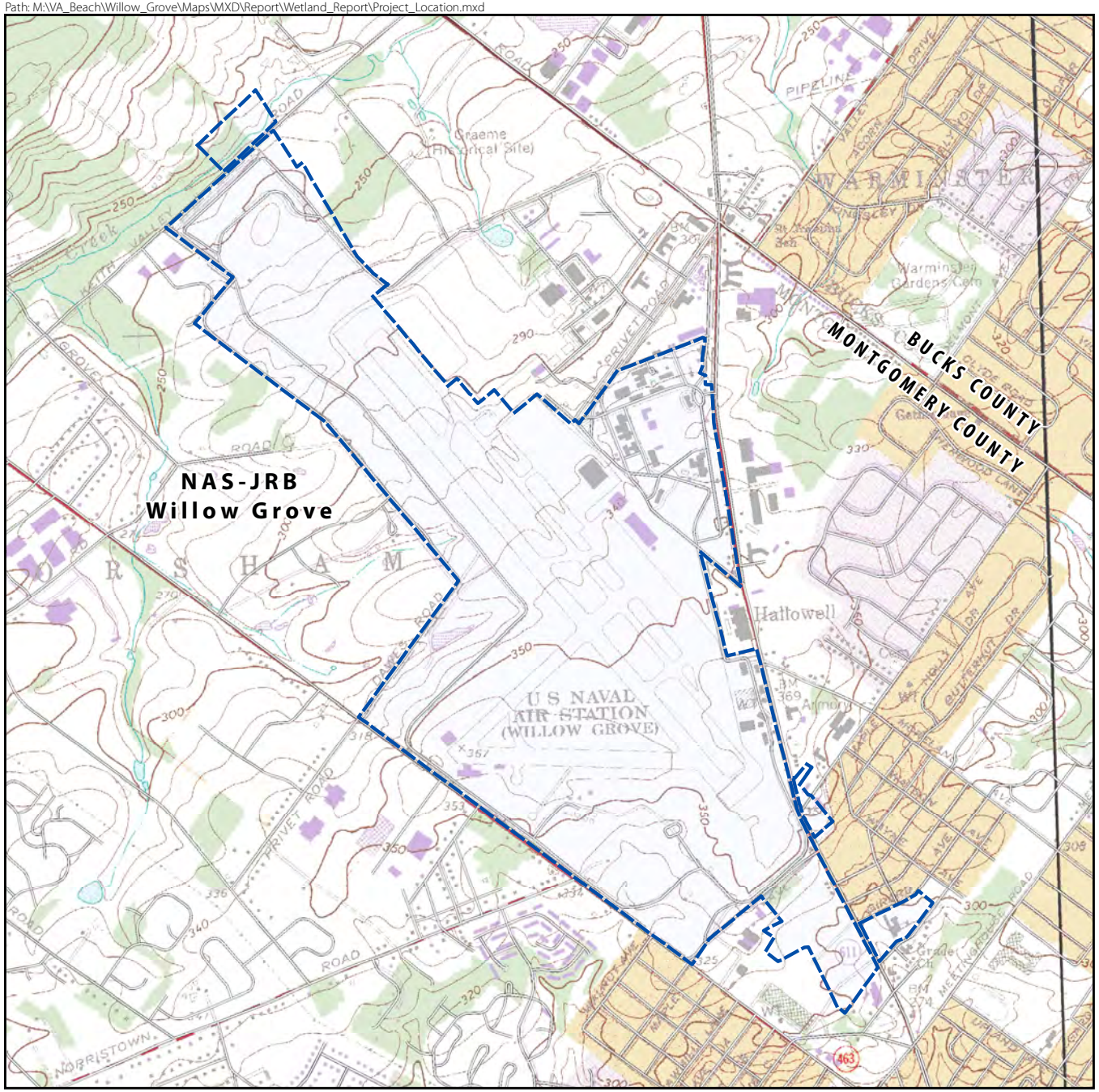

Figure 1-1

Project Location

NAS JRB Willow Grove

NAS JRB Willow Grove

Horsham, PA

Legend

- County Boundary
- NAS JRB Willow Grove

N

SCALE

0 0.25 0.5 Miles

SOURCE: ESRI 2010; USGS Ambler and Hatboro Quad 1996

2 Methodology

This section describes the definition of wetlands and accepted criteria used to identify wetlands at NAS JRB Willow Grove.

Wetlands are defined as:

> "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, bogs, marshes, and similar areas" (40 Code of Federal Regulations [CFR] 232.2).

The wetland delineation methods used in this study are described in the *1987 U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (USACE 2012). According to the wetland delineation manual, to be defined as a wetland an area must exhibit evidence of at least one positive wetland indicator from each of three parameters, including soils, hydrology, and vegetation (Environmental Laboratory 1987). These parameters are described below.

2.1 Characteristics of Hydric Soils

The National Technical Committee for Hydric Soils has developed criteria for identifying hydric soils and published a list of the nation's hydric soil types. A hydric soil is defined as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (USDA NRCS n.d.). The growing season is defined as the portion of the year when the soil temperature at 12 inches below the soil surface is 41 degrees Fahrenheit (^{o}F) or higher (USACE 2012). If the timing of the growing season based on vegetation growth and development and/or soil temperature is unknown and on-site data collection is not practical, then growing season dates may be approximated by the median dates (i.e., 5 years in 10, or a 50 percent probability) of 28 ^{o}F air temperatures in spring and fall, based on long-term records gathered at National Weather Service meteorological stations (USACE 2005). For Montgomery County, Pennsylvania, the growing season extends from April 18 through October 15, a period of 180 days (USDA NRCS 2002).

Anaerobic conditions are created when flooding, ponding, or saturation is of sufficient duration to result in the absence of oxygen from the soil. Such soils usually support hydrophytic vegetation. Due to their saturated condition during the growing season, hydric soils usually develop certain morphological features that can be observed in the field. A prolonged anaerobic environment typically results in the accumulation of organic matter and/or lowers the soil reduction-oxidation, or redox, potential and causes a chemical reduction of soil components, such as iron and manganese oxides. This reduction affects solubility, movement, and aggregations of these oxides, which are reflected in soil colors (USDA NRCS 2010).

2.2 Characteristics of Wetland Hydrology

Permanent or periodic inundation (where soil is saturated within the rooting zone, at least seasonally) is the hydrologic force behind wetland formation. The presence of water for 5 percent or more of the growing season typically creates an anaerobic condition in the soil, which affects the types of plants that can grow there and the types of soils that develop (Environmental Laboratory 1987).

Factors that influence the wetness of an area include precipitation, stratigraphy (i.e., layering), topography and micro-relief, and soil permeability. The water found in wetlands may come directly from precipitation and from overbank flooding, surface water runoff, groundwater discharge, or tidal flooding. The frequency and duration of inundation and soil saturation range from permanent flooding or saturation to intermittent flooding or saturation. Duration is usually the most important factor affecting soils and vegetation. Soil permeability, which is affected by soil texture and density, also influences the duration of inundation or soil saturation. For example, soils with high clay content generally have lower permeabilities, absorb water more slowly, and therefore remain saturated for a longer period of time than sandy or loamy soils (Environmental Laboratory 1987).

Of the three technical criteria for wetland identification, wetland hydrology is often the least exact and most challenging to characterize, primarily because of annual, seasonal, and daily fluctuations in water level. An area has wetland hydrology when saturated within the rooting zone (usually within 12 inches of the surface) for at least 5 percent of the growing season (Environmental Laboratory 1987).

The U.S. Army Corps of Engineers (USACE) defines the water table as "the upper surface of groundwater or the level below which the soil is saturated with water. It is at least 6 inches thick and persists in the soil for more than a few weeks" (Environmental Laboratory 1987). Field indicators used as evidence of wetland hydrology include one or more primary indicator such as surface water, high water table, or saturation. Two or more secondary indicators may also be used as evidence of wetland hydrology, such as ordinary high water marks, drift lines, drainage patterns, water marks, sediment deposition, vegetation morphology (e.g., adventitious roots), and presence or absence of algae or moss (Environmental Laboratory 1987). The *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* pro-

vides a complete list of primary and secondary wetland hydrology indicators for the region (USACE 2012).

2.3 Characteristics of Hydrophytic Vegetation

Hydrophytic vegetation is defined as macrophytic plant life growing in water or soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content (Environmental Laboratory 1987). Vascular plants are classified into the following five wetland indicator status groups based on qualitative ecological descriptions (Lichvar et al. 2012):

- **Obligate Wetland (OBL).** Almost always occur in wetlands.
- **Facultative Wetland (FACW).** Usually occur in wetlands, but may occur in non-wetlands.
- **Facultative (FAC).** Occur in wetlands and non-wetlands.
- **Facultative Upland (FACU).** Usually occur in non-wetlands, but may occur in wetlands.
- **Obligate Upland (UPL).** Almost never occur in wetlands.

A list of plants able to tolerate saturated soil conditions has been developed for the Eastern Mountains and Piedmont Region by the USACE as part of an interagency effort with the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service (USFWS), and U.S. Department of Agriculture - Natural Resources Conservation Service (USDA NRCS) (Lichvar 2012). The presence of hydrophytic vegetation is determined using the wetland indicator status of species encountered. Wetland boundaries are identified based on the presence of a wetland plant community rather than on any one particular indicator species. For example, a plant community with scattered individual upland species but dominated by hydrophytic species is considered to be a wetland plant community. Within each wetland, specific communities are determined on the basis of their dominant plant species, soils, and hydrology.

2.4 Classification

This section describes the different classes of wetlands and the criteria used to classify them. These criteria were used to classify wetlands at NAS JRB Willow Grove.

The wetlands delineated in the study area were classified using the USFWS wetland hierarchical classification system (Cowardin et al. 1979). This system classifies wetlands according to hydrologic, geomorphologic, chemical, and biological factors. Wetlands are first classified by the primary source of water to the wetland. These classes are usually identified by the physical form of the dominant vegetation community type or, less often, the substrate of the wetland. The Cowardin et al. (1979) primary systems are as follows:

- **Palustrine Systems** are shallow ponds and wet areas, including all non-tidal wetlands, dominated by trees, shrubs, persistent emergents, emergent mosses,

or lichens. This system also includes wetlands lacking such vegetation but with all of the following four characteristics: (1) total area is less than 20 acres; (2) active wave-formed or bedrock shoreline features are lacking; (3) water depth in the deepest part of the basin is less than 6.6 feet at low water; and (4) salinity, due to ocean-derived salts, is less than 0.5 part per thousand.

- **Lacustrine Systems** are lakes and deep ponds and include wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) trees, shrubs, persistent emergents, emergent mosses, or lichens with less than 30 percent aerial coverage; and (3) total area exceeds 20 acres. Similar wetland and deepwater habitats totaling less than 20 acres are also considered a Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 6.6 feet at low water. Lacustrine waters may be tidal or non-tidal, but ocean-derived salinity is always less than 0.5 parts per thousand.
- **Marine Systems** consist of open ocean overlying the continental shelf and its associated high-energy coastline. Marine habitats are exposed to the waves and currents of the open ocean, and the water regimes are determined primarily by the ebb and flow of oceanic tides. Salinities exceed 30 parts per thousand, with little or no dilution, except outside the mouths of estuaries. Shallow coastal indentations or bays without appreciable freshwater inflow and coasts with exposed rocky islands that provide the mainland with little or no shelter from wind and waves are also considered a Marine System because they generally support typical marine biota.
- **Estuarine Systems** consist of deepwater tidal habitats and their adjacent tidal wetlands, which are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may periodically increase above that of the open ocean by evaporation. Along some low-energy coastlines, there is appreciable dilution of seawater. Offshore areas with typical estuarine plants and animals are also included in this system.
- **Riverine Systems** include all wetlands and deepwater habitats contained within a channel, except: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean-derived salts in excess of 0.5 parts per thousand.

The above systems are then divided into more specific categories, or subsystems, although there are no subsystems in the Palustrine System. The classification system further subdivides wetlands into different classes based on general appearance of the life form in the plant community (e.g., trees, shrubs, aquatic vegetation; see Table 2-1). The class Forested Wetland is characterized by woody vegetation that is 19.7 feet or taller and greater than 3 inches in diameter at breast height. The class Scrub-Shrub Wetland is dominated by multi-stemmed woody vegetation less than 19.7 feet in height. This class includes shrubs, sapling trees, and trees that are small or stunted due to environmental conditions. The class

Emergent Wetland consists of erect, rooted, herbaceous vascular plants and excludes mosses and lichens.

Table 2-1 Palustrine System Classes and Subclasses

RB – ROCKY BOTTOM 1 – Bedrock 2 – Rubble **UB – UNCONSOLIDATED BOTTOM** 1 – Cobble-Gravel 2 – Sand 3 – Mud 4 – Organic **AB – AQUATIC BED** 1 – Algal 2 – Aquatic Moss 3 – Rooted Vascular 4 – Floating Vascular 5 – Unknown Submergent 6 – Unknown Surface **US – UNCONSOLIDATED SHORE** 1 – Cobble-Gravel 2 – Sand 3 – Mud 4 – Organic 5 – Vegetated	**ML – MOSS-LICHEN** 1 – Moss 2 – Lichen **EM – EMERGENT** 1 – Persistent 2 – Nonpersistent **SS – SCRUB-SHRUB** 1 – Broad-Leaved Deciduous 2 – Needle-Leaved Deciduous 3 – Broad-Leaved Evergreen 4 – Needle-Leaved Evergreen 5 – Dead 6 – Deciduous 7 – Evergreen **FO – FORESTED** 1 – Broad-Leaved Deciduous 2 –Needle-Leaved Deciduous 3 – Broad-Leaved Evergreen 4 – Needle-Leaved Evergreen 5 – Dead 6 – Deciduous 7 – Evergreen **OW – OPEN WATER/UNKNOWN BOTTOM**

Source: Cowardin et al. 1979.

The determination of wetland classes is based on the following criteria: if vegetation covers 30 percent or more of the substrate, then the class is distinguished on the basis of the life form of the plants that constitutes the uppermost layer of vegetation and that possesses an aerial coverage of 30 percent or greater. For example, an area with 50 percent areal coverage of trees over a shrub layer with 60 percent areal coverage would be classified as Forested Wetland; an area with 20 percent areal coverage of trees over the same (60 percent) shrub layer would be classified as Scrub-Shrub Wetland. When trees or shrubs alone cover less than 30 percent of an area but in combination cover 30 percent or more, the wetland would be assigned to the class Scrub-Shrub Wetland. When trees and shrubs together cover less than 30 percent of the area but the total cover of vegetation is 30 percent or greater, the wetland would be assigned to the appropriate class for the predominant life form below the shrub layer.

Finer differences in life form are recognized at the subclass level. For example, during this study, the only Forested Wetland subclass (and its classification code) encountered during surveys was "1 – Broad-Leaved Deciduous," the only Scrub-Shrub Wetland subclass encountered during field surveys was "1 – Broad-Leaved Deciduous," and the only Emergent Wetland subclass was "1 – Persistent."

2.5 Desktop Data Review

Prior to engaging in field work, background information was reviewed to familiarize field personnel with the study area and to assist in the initial identification of wetlands and waterbodies. This background information included data from the following publicly available sources:

- U.S. Geologic Survey (USGS) 7.5-Minute Series topographic maps (Ambler and Hatboro Quadrangles) (USGS 1996)
- Current aerial imagery
- USFWS National Wetland Inventory (USFWS 2011)
- USGS National Land Cover Data (Fry et al. 2011)
- USDA Soil Survey Geographic (SSURGO) Database (USDA NRCS 2009)
- USDA NRCS WETS table data (USDA NRCS 1995).

In addition to public databases queried during the desktop review, the installation's Integrated Natural Resources Management Plan (Atlantic Division, Naval Facilities Engineering Command 2000) was reviewed for descriptions of previously noted water resources.

2.6 Field Surveys

Field surveys were conducted on April 1 through April 6, April 30 through May 3, and May 12, 2013, to delineate and characterize water resources occurring within approximately 860 acres of the former NAS JRB Willow Grove property. The delineation did not include areas of the former installation that have been, or will be, transferred to other federal agencies, such as the Federal Aviation Administration and the U.S. Air Force (Horsham Air Guard Station).

Field data collected during the wetland delineation were recorded on "Wetland Determination Data Form: Eastern Mountains and Piedmont Region" datasheets (see Appendix A). A "Wetland Jurisdictional Field Data Sheet" was also completed for each delineated wetland (see Appendix A). In general, after preliminary identification of potential wetland areas based on vegetation and hydrology, the following activities were performed at each location to assist in verifying the presence of a wetland and delineating the wetland boundaries:

- The *Wetland Delineation Manual* (Environmental Laboratory 1987) and the Regional Supplement (USACE 2012) provide guidelines for determining the presence of wetland hydrology. In general, the criteria for wetland hydrology are met if the area is inundated or saturated at the soil surface during the growing season for a time sufficient to develop hydric soils and support hy-

drophytic vegetation. In some instances, it is necessary to use other field characteristics to identify wetland hydrology. These characteristics may include water staining, sediment deposits, drainage patterns, or drift lines. Hydrologic characteristics, as well as the depth of surface water or depth to soil saturation, were recorded for each wetland area.

- To determine the presence of hydrophytic vegetation, the dominant species in each major vegetative stratum (i.e., tree, shrub/sapling, herbaceous, and woody vine) and their relative percent cover were identified and recorded. Each dominant plant species was then associated with its wetland indicator status (i.e., OBL, FACW, FAC, FACU, or UPL) as defined by Lichvar (2012). If the percent cover is dominated by species that are classified as FAC, FACW, or OBL then hydrophytic vegetation is deemed to be present.
- Soils were examined by using a tile spade shovel, or "sharpshooter," to a depth of at least 36 centimeters (cm) (14 inches), if possible. Wherever disturbance of the soils caused by past excavation or fill activity was evident, a soil characterization was performed in adjacent, undisturbed areas within the potential wetland, if present. Soils were characterized at a depth immediately below the A-horizon or at 30 cm (12 inches), whichever was shallower. Soil colors were identified using a Munsell Soil Color Chart (Munsell Color 2009), and characteristics such as the presence of mottles and soil texture were recorded. Hydric characteristics such as organic soil layers, gleying, mottling, and oxidized rhizospheres were noted where they occurred.
- Each wetland was classified according to the USFWS hierarchical classification system developed by Cowardin et al. (1979).

In addition to delineating wetland boundaries, information on seeps, streams, and ponds/lakes was also collected. Man-made and natural features such as ditches, swales, drainage patterns, and culverts were also mapped as necessary to describe the hydrologic regime related to the wetlands at NAS JRB Willow Grove. Only man-made features connected to a wetland or stream with a significant enough function worth noting were mapped.

Based on the methods described above, the boundary of each water resource was determined and flagged with wetland delineation tape. Flag locations were surveyed using a Trimble GeoXT global positioning system (GPS) unit. Electronic files were then generated from the GPS survey for integration into figures for NAS JRB Willow Grove. Photographs were taken at each delineated feature (see Appendix B).

3 Results

3.1 Wetlands

Twenty-three wetland features encompassing a total of 25.96 acres were identified during the survey (see Figures 3-1, Frames 1 through 6). The 23 wetlands listed in Table 3-1 are identified on Figure 3-1 by 32 polygons; some features with a distinct upland area between them were treated as a single wetland if they had similar conditions and shared a distinct hydrologic connection. It is likely that many of these features were once larger wetlands that have been bisected by human activities. A summary of each wetland is provided in Table 3-1.

Table 3-1 Summary of Wetlands Delineated at NAS JRB Willow Grove

Wetland	Class	Size (acres)
W01	PEM1	0.08
W02 (East)	PFO1	1.13
W02 (West)	PEM1/PSS1/PFO1	0.49
W03	PEM1/PSS1/PFO1	0.30
W04 (East)	PSS1/PFO1	0.42
W04 (West)	PSS1/PFO1	0.41
W05	PFO1	0.24
W06	PSS1/PFO1	2.94
W07	PSS1/PFO1	0.66
W08 (East)	PSS1/PFO1/PEM1	6.86
W08 (West)	PEM1	0.18
W09	PSS1/PEM1	0.71
W10	PFO1	0.06
W11 (East)	PFO1/PEM1	0.11
W11 (West)	PFO1/PEM1	0.58
W12	PEM1	0.07
W13	PSS1	0.76
W14 (East)	PSS1/PEM1/OW	3.28
W14 (West)	PFO1	0.40
W15	PEM1	1.06
W16	PSS1	0.09
W17 (East)	PSS1	0.20
W17 (West)	PSS1	0.10
W18 (North)	PSS1/PFO1/PEM1	0.28

Table 3-1 Summary of Wetlands Delineated at NAS JRB Willow Grove

Wetland	Class	Size (acres)
W18 (South)	PSS1/PFO1/PEM1	0.16
W19 (East)	PFO1	0.34
W19 (West)	PFO1	0.16
W20	PSS1	0.36
W21	PEM1	0.04
W22	PSS1/PFO1	3.30
W23 (North)	PSS1/PFO1/OW	0.15
W23 (South)	PEM1	0.06
Total		**25.96**

Each of the wetland features shown on Figure 3-1 and listed in Table 3-1 are described below. More detailed information for each wetland can be found on the Wetland Jurisdictional Field Data Sheets and Wetland Determination Data Forms provided in Appendix A. Representative photos of each wetland are provided in Appendix B.

- **Wetland W01:** This 0.08 acres PEM1 wetland is located in the northeast corner of the property (see Figure 3-1, Frame 1). The wetland continues off the property to the north and receives hydrologic inputs from a retention pond located off the NAS JRB Willow Grove property. The wetland appears to have a discrete ephemeral connection to W02 and Park Creek (S02) via a swale (D01) that runs southeast, off the installation property. Dominant herbaceous species in the wetland include common fox sedge (*Carex vulpinoidea*), lesser poverty rush (*Juncus tenuis*), lamp rush (*Juncus effusus*), and common velvet grass (*Holcus lanatus*).
- **Wetland W02:** This 1.62 acres PFO1 wetland was delineated as two separate sections north of Keith Valley Road (see Figure 3-1, Frame 1). The western section encompasses 0.49 acres, and the eastern section encompasses 1.13 acres. The eastern section of the wetland continues to the east, off NAS JRB Willow Grove property. The wetland is located within the floodplain terrace of Park Creek (S02) and is bisected by a stream (S01) that flows south to Park Creek (S02). Each wetland section has a discrete ephemeral connection to S01. A swale (D02) is also present at the eastern end of the wetland that connects directly to Park Creek (S02). At the time of the survey, approximately 25 percent of the wetland was inundated or saturated at the surface. Dominant trees include silver maple (*Acer saccharinum*), American elm (*Ulmus americana*), and red maple (*Acer rubrum*). American elm, northern spicebush (*Lindera benzoin*), and rambler rose (*Rosa multiflora*) occur in the sapling/shrub stratum, and melic manna grass (*Glyceria melicaria*), thymeleaf speedwell (*Veronica serpyllifolia*), fig buttercup (*Ficaria verna*), and lamp rush occur in the herbaceous stratum.

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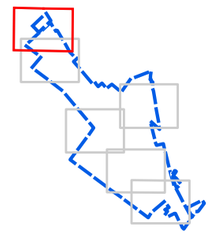
Figure 3-1
Field Delineated Features
Frame 1 of 6
NAS JRB Willow Grove
Horsham, PA

Legend

- Drain/Culvert
- Drain
- Off-Base Drain
- Hydrology
- Hydrology
- Off-Base Hydrology
- Stream
- Off-Base Stream
- Soil Point
- Wetland
- NAS JRB Willow Grove



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SOURCE: ESRI 2010; National Aerial Imagery Program 2010.

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Figure 3-1
Field Delineated Features
Frame 2 of 6
NAS JRB Willow Grove
Horsham, PA

Legend

- Drain/Culvert
- Drain
- Off-Base Drain
- Hydrology
- Hydrology
- Off-Base Hydrology
- Stream
- Off-Base Stream
- Soil Point
- Wetland
- NAS JRB Willow Grove

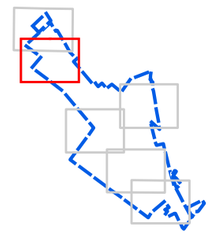

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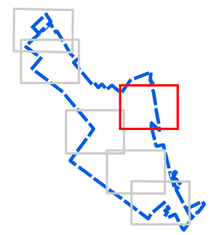
Figure 3-1
Field Delineated Features
Frame 3 of 6
NAS JRB Willow Grove
Horsham, PA

Legend

- Drain/Culvert
- Drain
- Off-Base Drain
- Hydrology
- Hydrology
- Off-Base Hydrology
- Stream
- Off-Base Stream
- Soil Point
- Wetland
- NAS JRB Willow Grove



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SOURCE: ESRI 2010; National Aerial Imagery Program 2010.

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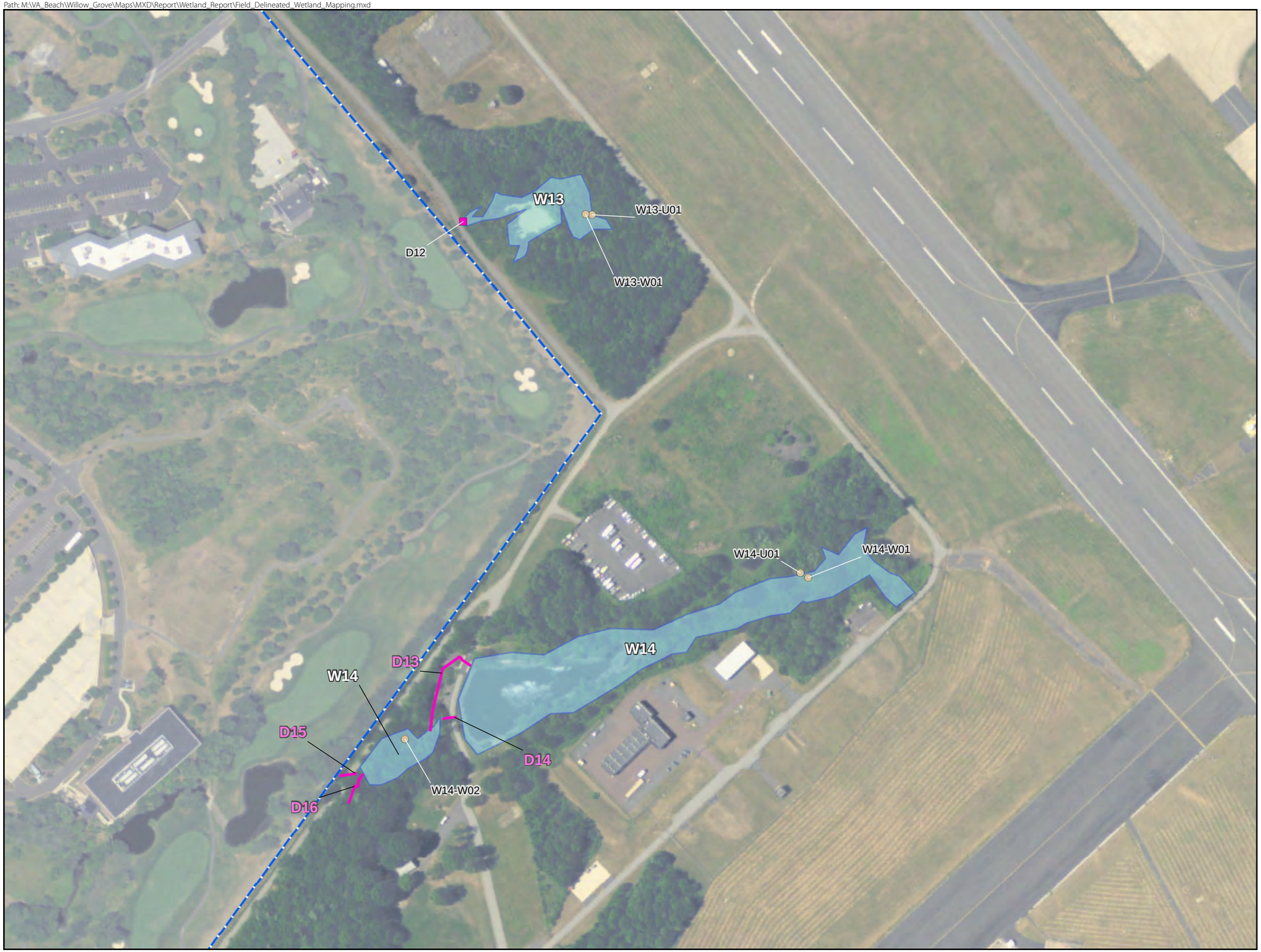
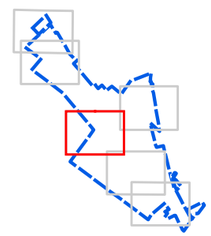


Figure 3-1
Field Delineated Features
Frame 4 of 6
NAS JRB Willow Grove
Horsham, PA

Legend

- Drain/Culvert
- Drain
- Off-Base Drain
- Hydrology
- Hydrology
- Off-Base Hydrology
- Stream
- Off-Base Stream
- Soil Point
- Wetland
- NAS JRB Willow Grove



N

SCALE

0 200 400 Feet

SOURCE: ESRI 2010; National Aerial Imagery Program 2010.

Path: M:\VA_Beach\Willow_Grove\Maps\MXD\Report\Wetland_Report\Field_Delineated_Wetland_Mapping.mxd

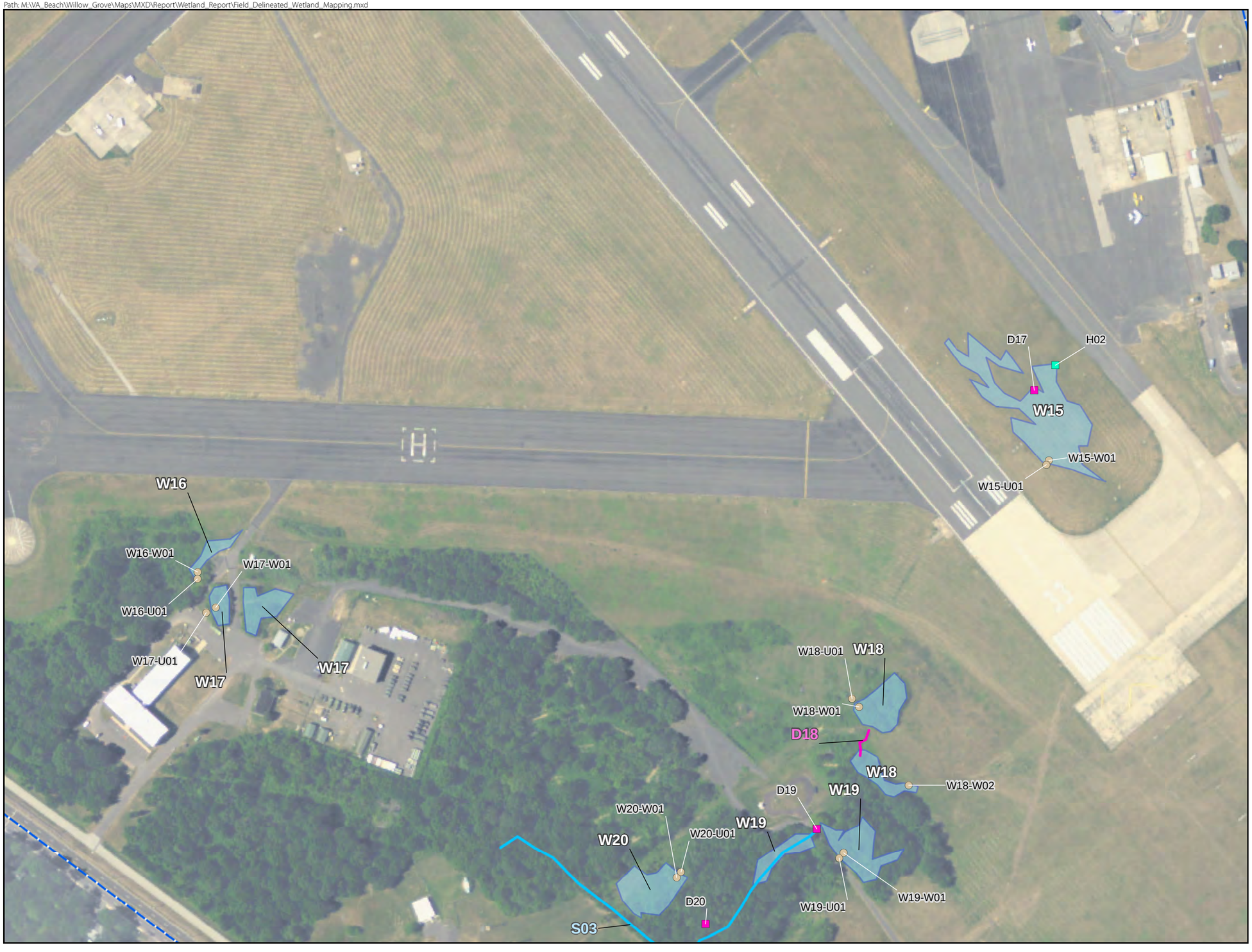
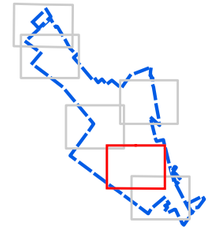


Figure 3-1
Field Delineated Features
Frame 5 of 6
NAS JRB Willow Grove
Horsham, PA

Legend

- Drain/Culvert
- Drain
- Off-Base Drain
- Hydrology
- Hydrology
- Off-Base Hydrology
- Stream
- Off-Base Stream
- Soil Point
- Wetland
- NAS JRB Willow Grove



N

SCALE

0 200 400 Feet

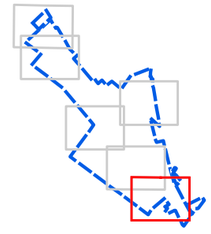
SOURCE: ESRI 2010; National Aerial Imagery Program 2010.

Path: M:\VA_Beach\Willow_Grove\Maps\MXD\Report\Wetland_Report\Field_Delineated_Wetland_Mapping.mxd

Figure 3-1
Field Delineated Features
Frame 6 of 6
NAS JRB Willow Grove
Horsham, PA

Legend

- Drain/Culvert
- Drain
- Off-Base Drain
- Hydrology
- Hydrology
- Off-Base Hydrology
- Stream
- Off-Base Stream
- Soil Point
- Wetland
- NAS JRB Willow Grove



N

SCALE

0 200 400 Feet

SOURCE: ESRI 2010; National Aerial Imagery Program 2010.

- **Wetland W03:** This 0.30 acres wetland borders the north side of Keith Valley Road; it continues off of the installation property to the east (see Figure 3-1, Frame 1). The wetland connects to Park Creek (S02) through a drainage (D03) originating on the south side of Keith Valley Road. It is a PEM1 wetland close to the road, and transitions to a PSS1 wetland and PFO1 wetland moving north from the road. Green ash (*Fraxinus pennsylvanica*) is the dominant tree species and also occurs in the sapling stratum. Red osier (*Cornus alba*) also occurs in the sapling stratum. Herbaceous species include skunk-cabbage (*Symplocarpus foetidus*), lamp rush, fig buttercup, uptight sedge (*Carex stricta*), and sensitive fern (*Onoclea sensibilis*).
- **Wetland W04:** This 0.83 acres PSS1/PFO1 wetland is located along the perimeter fence on the south side of Keith Valley Road (see Figure 3-1, Frame 1). The wetland is bisected by a road and was delineated as two separate polygons; the western portion encompasses 0.41 acres and the eastern portion encompasses 0.42 acres. The two areas are connected by a culvert and drain into a narrow roadside ditch along Keith Valley Road (D06). A small hillside seep (H01) was also noted during the survey draining into D06. Culverts (D04 and D05) continue under Keith Valley Road and drain into Park Creek (S02). At the time of the survey, approximately 20 percent of the wetland was inundated. The wetland contains an abundance of trees up to 40 feet tall and saplings up to 20 feet tall. Silver maple, slippery elm (*Ulmus rubra*), and red maple dominate the tree stratum. Silver maple and slippery elm are also common in the sapling stratum, along with red osier and black willow (*Salix nigra*). The herbaceous stratum is dominated by common reed (*Phragmites australis*), sensitive fern, and field horsetail (*Equisetum arvense*).
- **Wetland W05:** This 0.24 acres PFO1 depression may be man-made, as it is bounded by berms and appears to have been used for debris disposal (see Figure 3-1, Frame 1). Soils are hydric and show evidence of disturbance. A majority of the wetland was inundated with several inches of water at the time of the survey. The tree stratum is dominated by silver maple, green ash, and eastern red-cedar (*Juniperus virginiana*). Northern spicebush (*Lindera benzoin*), southern arrow-wood (*Viburnum dentatum*), and silver maple are common in the sapling/shrub stratum.
- **Wetland W06:** This 2.94 acres PSS1/PFO1 wetland is situated in a depression created by bermed roads on all sides (see Figure 3-1, Frame 1). The roads separate this wetland from W07, W08, and W09. A culvert/drain (D07) joins W08 to W06. Water appears to flow north from W08 into W06; however, no outlet from W06 was identified. Much of W06 was inundated at the time of the survey. Forested areas of the wetland are dominated by red maple, green ash, northern red oak (*Quercus rubra*), and slippery elm in the tree stratum. Southern arrow-wood, red osier, red maple, slippery elm, and flowering dogwood (*Cornus florida*) are common in the sapling/shrub stratum. In the scrub-shrub portions of the wetland, crack willow (*Salix fragilis*) and red maple are common saplings/shrubs; fringed yellow-loosestrife (*Lysimachia ciliata*) and rufous bulrush (*Scirpus pendulus*) are common herbs.

- **Wetland 07:** This 0.66 acres PSS1/PFO1 wetland is situated in a depression created by bermed roads to the south and east (see Figure 3-1, Frame 1), which separate this wetland from W06, W08, and W09. This wetland was not inundated at the time of the survey; however, the soil was saturated to the surface and primary (i.e., oxidized rhizospheres) and secondary (e.g., drainage patterns) wetland hydrology indicators were observed. Forested portions of this wetland are dominated by red maple and eastern red-cedar in the tree stratum, and red maple, southern arrow-wood, and rambler rose in the sapling/shrub stratum. In the scrub-shrub portions of the wetland, red osier, green ash, crack willow, and red maple are common in the sapling/shrub stratum, and lamp rush, uptight sedge, thyme-leaf speedwell, Canadian goldenrod (*Solidago canadensis*), fowl manna grass (*Glyceria striata*), and arrow-leaf tearthumb (*Persicaria sagittata*) are common in the herb stratum.
- **Wetland W08:** This 7.04 acres wetland has PFO1, PSS1, and PEM1 components (see Figure 3-1, Frames 1 and 2). As with other wetlands in this area (i.e., W06, W07, and W09), it is a depression bounded by bermed roads. A 0.18 acres portion of the wetland was delineated to the west of the main wetland area. This portion is a PEM1 wetland connected to the main wetland by a culvert (D10) (see Figure 3-1, Frame 2). D08 and D09 appear to be hydrologic inputs into W08. W08 drains into W06 through a culvert (D07); however, these wetlands appear to be isolated, as no outlet from W06 was observed. This wetland appears to have been cleared in the past, possibly for clear zone maintenance. Forested areas are dominated by red maple, silver maple, and green ash in the tree stratum; red osier, flowering dogwood, American plum (*Prunus americana*), red maple, green ash, southern arrow-wood, rambler rose, and twinsisters (*Lonicera tatarica*) in the sapling/shrub stratum; and, soft fox sedge (*Carex conjuncta*), Japanese honeysuckle (*Lonicera japonica*), and rufous bulrush in the herb stratum. Scrub-shrub areas contain saplings of red osier, black willow, green ash, ash-leaf maple (*Acer negundo*), pin oak, and red maple. Common reed and rufous bulrush occur in the herb stratum. PEM areas of the wetland are almost entirely vegetated with common reed.
- **Wetland W09:** This 0.71 acres PEM1/PSS1 wetland is situated in a depression created by bermed roads to the north and east (see Figure 3-1, Frame 1), which separate this wetland from W06, W07, and W08. The wetland appears isolated, as no outlets were observed during the survey. As with W08, W09 appears to have been cleared in the past, and contains emergent vegetation in the center with a scrub-shrub fringe. The center portion of the wetland was inundated at the time of the survey. The emergent portion of the wetland is dominated by rufous bulrush, uptight sedge, broad-leaf cat-tail (*Typha latifolia*), harvestlice (*Agrimonia parviflora*), blunt spike-rush (*Eleocharis obtusa*), and arrow-leaf tearthumb. Scattered saplings of green ash, slippery elm, and pin oak (*Quercus palustris*) are also present. The scrub-shrub fringe is dominated by pin oak, red osier, red maple, and slippery elm.
- **Wetland W10:** This is 0.06 acres isolated PFO1 depressional wetland is adjacent to a road (see Figure 3-1, Frame 2). At the time of the survey, it was inundated with 2 to 3 inches of water. It is dominated by red maple and sil-

ver maple, with red maple saplings also present. No herb stratum is present in the wetland.

- **Wetland W11:** This 0.69 acres PFO1/PEM1 wetland occurs within a stormwater outfall on the eastern side of NAS JRB Willow Grove (see Figure 3-1, Frame 3). It was delineated as two separate areas connected through a culvert (D11) under A Avenue. The western portion encompasses 0.58 acres and the eastern portion encompasses 0.11 acres. It drains northeast, off the installation. The PEM portion of the wetland is dominated by broad-leaf cattail, and the PFO portion is dominated by weeping willow (*Salix babylonica*).
- **Wetland W12:** This 0.07 acres isolated PEM1 wetland occurs within a retention pond (see Figure 3-1, Frame 3). It is dominated by broad-leaf cattail, but also contains lamp rush and needle spike-rush (*Eleocharis acicularis*).
- **Wetland W13:** This 0.76 acres wetland is primarily a PSS1 wetland with areas of open water, but it contains some pockets of larger trees within its interior and along its fringe (see Figure 3-1, Frame 4). An old boardwalk and evidence of altered hydrology were observed during the survey. A previously mapped NHD stream was not located, likely as a result of the previous disturbance. However, a culvert (D12) was identified at the western end of the wetland that drains the wetland area under a road and off the installation. Larger trees include red maple, shag-bark hickory (*Carya ovata*), and crack willow. The scrub-shrub areas are dominated by red osier, red maple, and pin oak.
- **Wetland W14:** This 3.68 acres wetland contains PSS1/PEM1 and PFO1 wetlands and open water. It was delineated as two separate areas (see Figure 3-1, Frame 4). The eastern area encompasses 3.28 acres and consists of a mixed PSS1/PEM1 wetland to the east that flows into an open water pond to the west. The pond is dammed by a road on its western side. A culvert and spill gate (D13 and D14) drain water to the west into a 0.40 acres PFO1 wetland. The system drains southwest off the installation through a culvert (D15). An overflowing monitoring well (D16) was noted during the survey; water from this well was flowing north into the wetland. Beaver (*Castor canadensis*) activity was noted throughout this wetland system. The PSS/PEM portion of the wetland is dominated by red osier, crack willow, sensitive fern, and uptight sedge. The forested portions are dominated by red maple, green ash, and tuliptree (*Liriodendron tulipifera*) in the tree stratum.
- **Wetland W15:** This 1.06 acres isolated PEM1 wetland is located in a depression between the runway and taxiway (see Figure 3-1, Frame 5). The size of the wetland is likely limited by a stormwater drain (D17), which drains the area during high water periods. At the time of the survey, soils within the wetland were saturated to the surface and inundated areas occurred in the interior. A seep (H02) was noted as a hydrologic input to the wetland. Dominant species include dark-green bulrush (*Scirpus atrovirens*), lamp rush, sallow sedge (*Carex lurida*), and slender spike-rush (*Eleocharis tenuis*).
- **Wetland W16:** This 0.09 acres isolated PSS1 wetland abuts a paved road and the airfield perimeter fence (see Figure 3-1, Frame 5). Portions of the wetland are disturbed with rock and debris. Dominant species include red

osier and crack willow in the shrub stratum, and rufous bulrush, lamp rush, and Canadian goldenrod in the herb stratum.

- **Wetland W17:** This 0.30 acres isolated PSS1 wetland was delineated as two separate areas, as it is divided by a road (see Figure 3-1, Frame 5). The western portion encompasses 0.10 acres, and the eastern portion encompasses 0.20 acres. Both portions were inundated at the time of the survey. The sapling/shrub layer is dominated by pussy willow (*Salix discolor*), crack willow, and red osier; the herb layer is dominated by common reed.
- **Wetland W18:** This 0.44 acres mixed PSS1/PFO1/PEM1 wetland is located in the wooded margins of the airfield (see Figure 3-1, Frame 5). It was delineated as two areas connected by an upland swale (D18). The northern portion encompasses 0.28 acres, and the southern portion encompasses 0.16 acres. While the two portions are connected to each other, the wetland appears to be isolated. Forested areas contain crack willow and red maple in the tree stratum and red osier, crack willow, and red maple in the sapling/shrub stratum. PSS and PEM areas contain saplings of crack willow and red osier, with lamp rush, uptight sedge, and field horsetail in the herb layer.
- **Wetland W19:** This 0.5 acres PFO1 wetland is drained by a stream (S04) (see Figure 3-1, Frames 5 and 6). It was delineated as two areas connected by a culvert (D19), which conveys a stream (S04) under a paved path; an additional culvert (D20) also feeds into this stream. During the survey, an overflowing well or manhole cover (H03) was noted providing additional hydrologic input to S04. S04 drains from the installation via a culvert (D22). The eastern portion of the wetland encompasses 0.34 acres, and the western portion of the wetland encompasses 0.16 acres. Dominant trees include red maple and green ash; red osier and red maple are common saplings.
- **Wetland W20:** This 0.36 acres PSS1 wetland is adjacent to a stream (S03) (see Figure 3-1, Frames 5 and 6). The wetland is separated from the stream by approximately 5 feet at the closest point, but likely has a subsurface connection. S03 drains into S04, which drains from the installation via a culvert (D22). The sapling/shrub stratum is primarily composed of red osier, but also contains red maple; rufous bulrush is dominant in the herb stratum.
- **Wetland W21:** This 0.04 acres PEM1 wetland is associated with a drainage ditch (see Figure 3-1, Frame 6). It is connected to other waterbodies on NAS JRB Willow Grove via a storm sewer. Broad-leaf cat-tail is the dominant vegetation; lesser poverty rush, needle spike-rush, and broom-sedge (*Andropogon virginicus*) also occur.
- **Wetland W22:** This 3.30 acres PSS1/PFO1 wetland complex contains two open-water ponds (see Figure 3-1, Frame 6). The wetland complex drains via S05, which drains from the installation via a culvert (D22). A man-made ditch (D21) flows southwest into S05. In addition, two seeps (H04 and H05) provide hydrologic inputs into S05. The PSS portions of the wetland are dominated by red maple and red osier in the sapling/shrub stratum, and sensitive fern and broad-leaf cat-tail in the herb stratum. PFO portions of the wetland are dominated by red maple in the tree stratum. The sapling/shrub stratum consists of red maple saplings and red osier, Virginia rose (*Rosa virgini-*

ana), and Allegheny blackberry (*Rubus allegheniensis*). The two open-water ponds are connected by D23.

- **Wetland W23:** This 0.21 acres PEM1 wetland is situated within a wide swale with berms on either side (see Figure 3-1, Frame 6). It appears to have been man-made for stormwater runoff. The wetland is delineated as two areas; the northern area encompasses 0.15 acres, and the southern area encompasses 0.06 acres. The two areas are hydrologically linked by a drainage ditch (D25). Two culverts (D24 and D27) appear to be hydrologic inputs to the system, while a third culvert (D26) appears to be an outlet from the system. The northern portion of the wetland appears to be permanently inundated, while the southern portion appears to be intermittently inundated. Dominant plants in both portions include common fox sedge and lamp rush.

3.2 Waterbodies

In addition to the wetlands described in Section 3.1, information on other hydrologic features at NAS JRB Willow Grove was collected. Three ponds were noted during the survey. All three of the ponds occur within the extent of wetlands (W14 and W22); therefore, specific pond boundaries were not delineated. Other features noted during the survey included drains, other hydrologic (hydrology) features, and streams. In general, drains refer to man-made structures such as ditches and culverts. Hydrology features generally include naturally occurring seeps. Streams are generally naturally occurring and can be intermittent or perennial. The features mapped at NAS JRB Willow Grove, including their associated wetland(s) or other feature(s), are summarized in Table 3-2. Descriptions of the features are included with their associated wetland in Section 3.1.

Table 3-2 Summary of Linear Features at NAS JRB Willow Grove

Number	Feature Type	Associated Feature	Length (feet)*
Drains			
D01	Swale	W01	-
D02	Swale	W02	22.32
D03	Culvert	W03	162.74
D04	Culvert	W04	-
D05	Culvert	W04	-
D06	Ditch	W04	124.13
D07	Culvert	W06, W08	83.65
D08	Drainage	W08	408.56
D09	Culvert	W08	-
D10	Culvert	W08	75.07
D11	Culvert	W11	67.41
D12	Culvert	W13	-
D13	Culvert	W14	247.89
D14	Culvert	W14	30.05
D15	Culvert	W14	39.26
D16	Other (Monitoring Well)	W14	85.36
D17	Drain	W15	-
D18	Swale	W18	76.07

Table 3-2 Summary of Linear Features at NAS JRB Willow Grove

Number	Feature Type	Associated Feature	Length (feet)*
D19	Culvert	W19	-
D20	Culvert	S04	-
D21	Ditch	W22	218.91
D22	Culvert	S04, S05	-
D23	Drainage	W22	74.59
D24	Culvert	W23	-
D25	Swale	W23	232.99
D26	Culvert	W23	-
D27	Culvert	W23	-
Hydrology			
H01	Seep	W04, D06	10.37
H02	Seep	W15	-
H03	Other (Manhole Cover/Well)	S04	264.91
H05	Seep	W22, S05	93.06
Streams			
S01	Intermittent	W02	573.57
S02	Perennial	W01, W02, W03, W04	1,022.14
S03	Ditch/Canal	W20	607.11
S04	Stream	W19	1,437.73
S05	Perennial	W22	781.11
Total			**6,738.99**

* Features such as culverts not associated with a linear drainage were mapped as a point and therefore do not have an associated length.

4 References

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A Wetland Data Forms

WETLAND ID: WW- W01

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☐ **yes**
☒ **no**
☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

The wetland drains to swale DR-002-012 which is east of the survey corridor by several feet. The swale appears to continue SE outside of the survey corridor toward the open boundaries for wetland W02 and stream S02 (Park Creek)

Associated Stream:

☐ **yes**
☒ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Comments:
DR-002-012 may continue SE off the survey corridor and run directly to S02 providing ephemeral discrete drainage from wetland to stream. Not determined. This wetland does however drain to W02 which is directly abutting S02.

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**
☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**
☐ **Ecological connection**
☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**
☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**
☐ **confined**
☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/12/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W01-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR or MLRA): 148 / S Lat: 2691531.6 Long: 332476.7 Datum: NAD 83

Soil Map Unit Name: Readington silt loam, 3-8% slopes. NWI classification: PEM

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

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

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

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

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

Remarks:
This plot is located at the eastern edge of the wetland and survey corridor near a drainage swale that runs southeast toward W02 and S02 (Park Creek). The plot is situated in a scrub-shrub opening on a slight slope near the NW end of the Park Creek forested riparian corridor. The plot is roughly 1' lower in elevation than paired plot U01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): <1 adjacent
Water Table Present?	Yes ✔	No _____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-8

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
This plot was saturated from the surface to the water table. Adjacent areas had pooled water in localized depressions at the time of delineation.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W01-W01**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Carex vulpinoidea	40	Y	OBL
2. Juncus tenuis	15	N	FAC
3. Juncus effusus	15	N	FACW
4. Holcus lanatus	10	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	15	x 2 =	30
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		145 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

SOIL

Sampling Point: **W01-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/4	90	5YR 3/4	3	C	M	SL	
			5YR 5/8	7	C	M		
8-13	7.5YR 5/6	70	10YR 6/2	30	D	M	C	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
The plot is located in 148/S and qualifies for problematic indicator red parent material in the first layer. No other indicators were met at this location.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/12/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W01-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): convex Slope (%): 1-3

Subregion (LRR or MLRA): 148 / S Lat: 2691519.5 Long: 332484.8 Datum: NAD 83

Soil Map Unit Name: Readington Silt Loam, 3-8% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a slight slope in an upland scrub-shrub area higher up the slope than the abutting wetland. The plot is approximately 1' higher in elevation than the paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
No indicators were met at this location. The soil profile was moist throughout.

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

Sampling Point: **W01-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Elaegnus umbellata	40	Y	UPL
2. Juniperus virginiana	15	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	55% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Festuca arundinacea	50	Y	FACU
2. Phalaris caroliniana	10	N	FACW
3. Holcus lanatus	10	N	FAC
4. Andropogon virginicus	2	N	FACU
5. Taraxacum officinale	2	N	FACU
6. Securigera varia	2	N	UPL
7.			
8.			
9.			
10.			
11.			
12.			
	76% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	10	x 3 =	30
FACU species	69	x 4 =	276
UPL species	42	x 5 =	210
Column Totals:	131 (A)		536 (B)

Prevalence Index = B/A = 4.1

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

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

SOIL

Sampling Point: **W01-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/3	100					SL	
8-13	7.5YR 4/3	85	7.5YR 5/6	15	C	M	L	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
This plot would qualify for problematic indicator red parent material however the plot failed both hydrology and vegetation.

WETLAND ID: WW-W02

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☒ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PFO. The wetland abutts S01. The wetland is adjacent to S01, situated roughly 30' from the left bank of the stream. Ephemeral, discrete flow from the wetland enters S01 and this stream terminates at S09 after flowing through the wetland. Ephemeral, confined flow from the wetland to S09 occurs via the S01 channel.

Associated Stream:

- ☒ **yes**
- ☐ **no**

If yes, list ID: SS-S09, S01

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): 30'

Wetland Association to Stream

Is the wetland:

- ☒ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☒ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface**
- ☒ **ephemeral surface**
- ☐ **perennial surface**
- ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☒ **discrete**
- ☐ **overland sheet flow**
- ☒ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W02-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): 148 / S Lat: 2691264.9 Long: 331924.3 Datum: NAD 83

Soil Map Unit Name: Penn-Lansdale Complex, 3-8% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
This plot is located at the edge of a linear wetland swale within the floodplain terrace of S02, Park Run. The plot is located within the forested riparian corridor of the stream off the left bank.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ✔ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 0.25
Water Table Present?	Yes ✔	No _____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-4"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
This plot is located within a swale with standing water. Approximately 0.25" inches of water was observed in wildlife prints. A faint H2S odor was also observed when excavating the soil pit.

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

Sampling Point: **W02-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	45	Y	FACW
2. Ulmus americana	30	Y	FACW
3. Acer rubrum	10	N	FAC
4.			
5.			
6.			
7.			
8.			
	85%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Ulmus americana	20	Y	FACW
2. Lindera benzoin	15	Y	FAC
3. Rosa multiflora	15	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Glyceria melicaria	25	Y	OBL
2. Veronica serpyllifolia	15	Y	FAC
3. Ficaria verna	10	N	FAC
4. Juncus effusus	2	N	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	52%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.71% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	97	x 2 =	194
FAC species	50	x 3 =	150
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	187 (A)		429 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Approximately 50% bare ground / open water is present at the plot.

SOIL

Sampling Point: **W02-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/2	100						Mucky Mineral
1-8	7.5YR 4/2	85	7.5YR 4/6	10	C	M	SCL	
			2.5YR 2.5/4	5	C	M/PL		
8-14	5YR 5/4	80	7/5YR 3/4	20	C	M	CL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✔ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
The soils at this plot qualify for the depleted matrix indicator in the second layer. H2S was also detected when the soil pit was excavated.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W02-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Toe Slope Local relief (concave, convex, none): Convex Slope (%): 2-4

Subregion (LRR or MLRA): 148 / S Lat: 2691235.1 Long: 331924.8 Datum: NAD 83

Soil Map Unit Name: Penn-Lansdale Complex, 3-8% Slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a toe slope within the forested riparian corridor of S02, Park Run. The plot is roughly 2' higher in elevation than paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
The plot is located on a well drained slope above the wetland.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W02-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americana	25	Y	FACW
2. Prunus serotina	20	Y	FACU
3. Juniperus virginiana	5	N	FACU
4.			
5.			
6.			
7.			
8.			
	50%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Lindera benzoin	45	Y	FAC
2. Rosa multiflora	10	N	FACU
3. Cornus florida	10	N	FACU
4. Lonicera tatarica	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	70%	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Claytonia virginica	25	Y	FAC
2. Ficaria verna	20	Y	FAC
3. Fragaria vesca	10	N	FACU
4. Carex blanda	5	N	FAC
5. Allium vineale	2	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	62%	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	95	x 3 =	285
FACU species	62	x 4 =	248
UPL species	0	x 5 =	0
Column Totals:	182 (A)		583 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Plot is located in a relatively open area of the forested riparian corridor of Park Creek with less coverage in the tree stratum than in other areas. Note plot passes dominance test but fails prevalence.

SOIL

Sampling Point: **W02-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	7.5YR 4/3	100					CL	
10-14	7.5YR 4/6	100					C	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW-W03

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☒ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PEM/PSS/PFO. Drainage D03 runs through the wetland and terminates at S02, Park Creek.

Associated Stream:

- ☒ **yes**
- ☐ **no**

If yes, list ID: SS-S02 Park Creek

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): 40

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☒ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☒ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface**
- ☒ **ephemeral surface**
- ☐ **perennial surface**
- ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete**
- ☐ **overland sheet flow**
- ☒ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W03-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): 148 / S Lat: 2691542.6 Long: 331852.7 Datum: NAD 83

Soil Map Unit Name: Bowmansville - Knauers Silt Loams NWI classification: PEM / PSS / PFO

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

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

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

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

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

Remarks:
This plot is located in a swale associated with D03 culvert and drainage line north of Keith Valley Road and at the eastern edge of the survey corridor. The swale and wetland extends only a short distance but is situated in PEM areas abutting Keith Valley Road, PSS areas, as well as PFO areas where the wetland ends near the right bank of Park Creek.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
Stronger hydrology indicators (surface water / saturation / water table) are present toward the interior of the wetland closer to the DR-002-007 drainage line.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W03-W01**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Fraxinus pennsylvanica	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	35	Y	FACW
2. Fraxinus pennsylvanica	25	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Symplocarpus foetidus	35	Y	OBL
2. Juncus effusus	15	Y	FACW
3. Ficaria verna	15	Y	FAC
4. Carex stricta	5	N	OBL
5. Onoclea sensibilis	5	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	90	x 2 =	180
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		265 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

SOIL

Sampling Point: **W03-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 3/2	99	7.5YR 4/6	1	C	M	CL	
2-9	7.5YR 3/2	95	7.5YR 4/6	5	C	M	CL	
9-15	7.5YR 6/2	60	7.5YR 5/8	20	C	M	C	
			7.5YR 3/6	10	C	M		
			2.5Y 7/1	10	D	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
The plot qualifies for redox dark surface in layer 2 and depleted martix in layer 3.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W03-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Roadside Berm Local relief (concave, convex, none): convex Slope (%): 2-3

Subregion (LRR or MLRA): 148 / S Lat: 2691548.1 Long: 331840.4 Datum: NAD 83

Soil Map Unit Name: Bowmansville - Knauers Silt Loams NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located near Keith Valley road in a grassy area next to the forested riparian corridor off S02. The plot is on a slight berm associated with the roadway and is situated roughly 1' higher in elevation than paired wetland plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
The plot is in a well drained position on a slight slope.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W03-U01**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Quercus rubra	20	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Festuca pratensis	45	Y	FACU
2. Ficaria verna	15	Y	FAC
3. Lamium purpureum	10	N	UPL
4. Taraxacum officinale	10	N	FACU
5. Plantago major	5	N	FACU
6. Carex blanda	5	N	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	90%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	80	x 4 =	320
UPL species	10	x 5 =	50
Column Totals:	110 (A)		430 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

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

SOIL

Sampling Point: **W03-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 3/3	99	7.5YR 4/6	1	C	M	CL	
3-12	7.5YR 3/3	95	2.5YR 3/6	5	C	M	C	
12-14	10YR 7/2	75	7.5YR 6/8	25	C	M	C	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
The depleted matrix present in layer three begins too deep in the soil profile to qualify for the depleted matrix indicator.

WETLAND ID: WW- W04

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☒ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PSS/PFO. A network of culverts drain this wetland into ditch D06. Culverts continue from D06 NW under Keith Valley road and to S02, Park Creek. Culverts and associated drainage lines D05 through D03 lead from ditch D06 to stream S02, providing perennial, confined flow from the wetland to the stream.

Associated Stream:

- ☒ **yes**
- ☐ **no**

If yes, list ID: SS- S02, Park Creek

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): 300

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☒ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☒ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☒ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete** ☐ **overland sheet flow**
- ☒ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W04-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR or MLRA): 148 / S Lat: 2691272.2 Long: 331477.7 Datum: NAD 83

Soil Map Unit Name: Doylestown Silt Loam, 0-3% slopes. NWI classification: PSS/PFO

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

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

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

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

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

Remarks:
This plot is located in a narrow, linear ditch between the base perimeter road and perimeter fence. The wetland ditch includes a mixture of shrub/ sapling and tree vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ✔ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-2, 8-10

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Standing water is present in other areas of the wetland.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W04-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	35	Y	FACW
2. Ulmus rubra	20	Y	FAC
3. Acer rubrum	5	N	FAC
4.			
5.			
6.			
7.			
8.			
	60%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus Alba	25	Y	FACW
2. Acer saccharinum	15	Y	FACW
3. Ulmus rubra	15	Y	FAC
4. Salix nigra	2	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	57%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Phragmites australis	40	Y	FACW
2. Onoclea sensibilis	15	Y	FACW
3. Equisetum arvense	10	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	40	Y	FAC
2. Toxicodendron radicans	5	N	FAC
3.			
4.			
5.			
6.			
	45%	= Total Cover	

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 8 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	130	x 2 =	260
FAC species	95	x 3 =	285
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	227 (A)		547 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Equisetum a. is present on mowed margins of the ditch. This plot is representative of PSS/PFO wetland overall with many trees between 20-40' and saplings below. The wetland is roughly a 50-50 mixture of PSS and PFO cover types.

SOIL

Sampling Point: **W04-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 4/3	97	7.5YR 4/6	3	C	M	SCL	
5-10	7.5YR4/2	95	7.5YR 6/8	5	C	M	SCL	
10-15	7.5YR 5/2	85	5YR 4/6	10	C	M	C	
			7.5YR 6/8	5	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
The plot qualifies for depleted matrix beginning at layer 2 of the soil profile.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W04-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Berm Local relief (concave, convex, none): convex Slope (%): 7-10

Subregion (LRR or MLRA): 148 / S Lat: 2691287.6 Long: 331460.6 Datum: NAD 83

Soil Map Unit Name: Doylestown Silt Loam, 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a berm associated with a wetland ditch roughly 4' higher than paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ✔

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

Remarks:
The plot is in well drained position above ditch, no indicators.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W04-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	15	Y	FAC
2. Ulmus rubra	15	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer rubrum	15	Y	FAC
2. Ulmus rubra	15	Y	FAC
3. Rhus typhina	5	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	80	Y	FAC
2.			
3.			
4.			
5.			
6.			
	80%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	140	x 3 =	420
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	145 (A)		445 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Lonicera j. has completely covered the herbaceous stratum at this location.

SOIL

Sampling Point: **W04-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/3	100					CL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW-W05

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- [X] **yes**
- [ ] **no**
- [ ] **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

A surface outlet for this wetland was not observed. There is likely a subsurface connection to roadside drainage ditch D06 which is located downslope from the wetland and has culverts running to S02 (Park Creek). Also downslope from this wetland is side seep H01 which leads directly to D06.

Associated Stream:

- [ ] **yes**
- [ ] **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Comments:

Wetland Association to Stream

Is the wetland:

- [ ] **directly abutting**
- [ ] **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- [ ] **Discrete wetland hydrologic connection**
- [ ] **Ecological connection**
- [ ] **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- [ ] **intermittent surface**
- [ ] **ephemeral surface**
- [ ] **perennial surface**
- [ ] **no surface flow**

Surface flow characteristic from wetland to associated stream:

- [ ] **discrete**
- [ ] **overland sheet flow**
- [ ] **confined**
- [ ] **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/12/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W05-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

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

Subregion (LRR or MLRA): 148 / S Lat: 2691833.4 Long: 331696.1 Datum: NAD 83

Soil Map Unit Name: Lawrenceville silt loam, 3-8 percent slopes NWI classification: PFO

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

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

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

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

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

Remarks:
This plot is located at the western edge of the wetland depression adjacent to a man-made berm. The plot is roughly 2' lower in elevation than the paired plot U01. The plot is in a forested area in a depression on a hillslope.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✔ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 1
Water Table Present?	Yes ✔	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
A majority of the wetland was inundated with several inches of water at the time of delineation.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W05-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	40	Y	FACW
2. Fraxinus pennsylvanica	15	Y	FACW
3. Juniperus virginiana	10	N	FACU
4.			
5.			
6.			
7.			
8.			
	65%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Lindera benzoin	20	Y	FAC
2. Viburnum dentatum	10	Y	FAC
3. Acer saccharinum	5	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35%	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Carex conjuncta	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10%	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	15	Y	FAC
2.			
3.			
4.			
5.			
6.			
	15%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	30	x 3 =	90
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	110 (A)		270 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

The prevalence test is a better representation of this wetland community than the dominance test. Not included in this plot is Pinus virginiana (UPL). Several pinus v. and Juniperus v. are located within the wetland boundary. These are stressed and dying but do push the overall vegetation community closer to upland than what is reflected in the dominance test at this plot.

SOIL

Sampling Point: **W05-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	90	7.5YR 3/4	10	C	M	L	
5-8	10YR 4/3	60	7.5YR 4/6	40	C	M	CL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

Soils are disturbed as the wetland exists between man-made berms. Refusal due to inorganic debris and gravel was encountered at 8".

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/12/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W05-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Berm Local relief (concave, convex, none): convex Slope (%): 2-4

Subregion (LRR or MLRA): 148 / S Lat: 2691822.0 Long: 3311706.1 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 3-8% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a man-made berm roughly 2' higher in elevation than paired plot W01 and the wetland depression. The plot is located in an upland forested area near the eastern boundary of the survey corridor.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
This plot is located on a berm/slope in a well drained position.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W05-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya tomentosa	20	Y	UPL
2. Pinus virginiana	20	Y	UPL
3. Juniperus virginiana	15	Y	FACU
4.			
5.			
6.			
7.			
8.			
	55%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Elaeagnus umbellata	30	Y	UPL
2. Cornus florida	15	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	45%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Alliaria petiolata	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
	10%	= 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: 6 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	35	x 4 =	140
UPL species	70	x 5 =	350
Column Totals:	115 (A)		520 (B)

Prevalence Index = B/A = 4.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
The herbaceous stratum is mostly bare ground.

SOIL

Sampling Point: **W05-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	100					SL	
6-12	7.5YR 4/6	100					CL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Rock refusal at 12".

WETLAND ID: WW-W06

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☐ **no**
- ☒ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PSS/PFO. Storm drain D07 connects W08 to this wetland under a travel road and associated berm. This wetland appears isolated however culverts/storm drains may exist that were not observed (overgrown). Natural topography would drain this wetland northerly toward Park Creek. The wetland is separated from W09, W08 and W07 by elevated roads.

Associated Stream:

- ☐ **yes**
- ☒ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete** ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/30/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W06-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2691699.9 Long: 331320.5 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
This plot is located in a PFO section of the large wetland depression and is situated between elevated roads to the NE and S in a poorly drained, forested area. No paired upland plot.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 0.25 (adjacent)
Water Table Present?	Yes ✔	No _____	Depth (inches): 5
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-5

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
The plot is adjacent to a swale with roughly 0.25" of standing water.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W06-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	40	Y	FAC
2. Quercus rubra	35	Y	FACU
3. Ulmus rubra	10	N	FAC
4. Fraxinus pennsylvanica	5	N	FACW
5.			
6.			
7.			
8.			
	90%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Viburnum dentatum	25	Y	FAC
2. Cornus alba	20	Y	FACW
3. Acer rubrum	15	Y	FAC
4. Ulmus rubra	5	N	FAC
5. Cornus florida	5	N	FACU
6.			
7.			
8.			
9.			
10.			
	70%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Onoclea sensibilis	10	Y	FACW
2. Glyceria striata	10	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.71% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	35	x 2 =	70
FAC species	95	x 3 =	285
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	180 (A)		525 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
This plot is representative for the forested areas of the wetland. Note the presence of Quercus rubra as well as Juniperus virginiana (not present in this plot) throughout the PFO area making vegetation only marginally hydrophytic overall.

SOIL

Sampling Point: **W06-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	97	7.5YR 4/6	3	C	M	SC	
3-11	10YR 4/2	85	7.5YR 5/6	15	C	M	CL	
11-15	10YR 4/2	80	7.5YR 4/6	20	C	M	C	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ✔ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Redox increasing with depth.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/01/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W06-W02

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2691228.1 Long: 331123.7 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: PSS

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

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

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

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

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

Remarks:
This plot is located at the western edge of the wetland in a PSS section that is bordered by a maintenance road on an elevated berm. The plot is roughly 4' lower in elevation than paired plot U01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 4-7

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
There is 2-3" of standing water in a swale several feet from the plot. Much of the PSS area of the wetland is currently inundated but these characteristics are not captured within this plot. This plot is on the margin of the wetland and inundated areas are located more toward the center of the wetland in this area.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W06-W02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Salix fragilis	65	Y	FAC
2. Acer rubrum	5	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	70% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Lysimachia ciliata	35	Y	FACW
2. Scirpus pendulus	10	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	35	x 2 =	70
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		290 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Roughly 50% of the herbaceous stratum is bare ground.

SOIL

Sampling Point: **W06-W02**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 4/3	98	10YR 6/6	2	C	M	CL	
2-7	7.5YR 4/3	85	5YR 3/4	5	C	M	CL	
			7.5YR 4/6	5	C	M		
			5YR 5/8	5	C	M/PL		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Clay Hardpan

Depth (inches): 7"

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

Remarks:
The plot is located within 148/S and qualifies for problematic soil indicator red parent material.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/01/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W06-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Berm Local relief (concave, convex, none): convex Slope (%): 20

Subregion (LRR or MLRA): 148 / S Lat: 2691216.9 Long: 331117.5 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% Slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a man-made berm associated with a maintenance road approximately 4' higher in elevation than paired plot W02.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
No indicators. The plot is located on a well drained slope (berm with elevated road) with depressions to the NE and SW.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W06-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Salix fragilis	15	Y	FAC
2. Elaeagnus umbellata	10	Y	UPL
3. Rosa multiflora	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Solidago canadensis	60	Y	FACU
2. Securigera varia	10	N	UPL
3. Allium vineale	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	70	x 4 =	280
UPL species	20	x 5 =	100
Column Totals:	105 (A)		425 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Roughly 25% bare ground is present in the herb stratum. The plot is located in a scrub-shrub area associated with a maintenance road.

SOIL

Sampling Point: **W06-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	7.5YR 4/3	100					SL	
4-9	7.5YR 4/3	99	5YR 6/8	1	C	M	SL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Rock refusal was encountered at 9".

WETLAND ID: WW-W07

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☐ **no**
- ☒ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

The wetland appears isolated however culverts / storm drains may exist that were unobserved due to the area being overgrown. Natural topography in the area would drain this wetland northerly toward Park Creek.

Associated Stream:

- ☐ **yes**
- ☒ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete** ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/01/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W07-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): 148 / S Lat: 2691250.8 Long: 330986.4 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% Slopes NWI classification: PSS

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

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

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

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

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

Remarks:
This plot is located at the edge of a large depression near an elevated maintenance road that is the upland boundary of the wetland in this area.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Wetland in this location appears to be saturated/inundated intermittently and this is representative of the wetland overall. Pit-Mound micro-topography is present at this location.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W07-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	20	Y	FACW
2. Fraxinus americana	15	Y	FACU
3. Salix fragilis	10	Y	FAC
4. Acer rubrum	5	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	50% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Juncus effusus	30	Y	FACW
2. Carex stricta	15	Y	OBL
3. Veronica serpyllifolia	15	Y	FAC
4. Solidago canadensis	10	N	FACU
5. Glyceria striata	5	N	OBL
6. Persicaria sagittata	2	N	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	77% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	22	x 1 =	22
FACW species	50	x 2 =	100
FAC species	30	x 3 =	90
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	127 (A)		312 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

SOIL

Sampling Point: **W07-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5 YR 4/3	90	5YR 5/8	10	C	M/PL	SC	
5-7	7.5YR 4/3	85	5 YR 4/6	10	C	M/PL	C	
			7.5 YR 5/6	5	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Clay Hardpan

Depth (inches): 7"

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

Remarks:
This plot is located within 148/S and meets the requirements for problematic red parent material. No other indicators were met at this plot.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W07-W02

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2691052.6 Long: 330720.2 Datum: NAD 83

Soil Map Unit Name: Chalfont Silt Loam, 0-3% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
This plot is located in the SW portion of the wetland north of a berm associated with a travel road that generally serves as the wetland boundary in the area. No paired upland plot.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
The upper 4" were nearly saturated at the time of investigation. Located in a poorly drained area subject to ponding after precipitation events. Generally weak but qualifying hydrology is characteristic of the PFO areas of the wetland in general.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W07-W02**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Acer rubrum	75	Y	FAC
2. Juniperus virginiana	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	85%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer rubrum	35	Y	FAC
2. Viburnum dentatum	15	Y	FAC
3. Rosa multiflora	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	55%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
	10%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	135	x 3 =	405
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	150 (A)		465 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

This plot is situated in a localized, small depression with no herbaceous coverage. This plot and the marginally hydrophytic community present is representative for the PFO areas of the wetland with one exception- Cornus alba is present and dominant in many other locations within the PFO boundary.

SOIL

Sampling Point: **W07-W02**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 3/3	95	7.5YR 5/4	5	C	M	CL	
3-7	5YR 3/3	90	5YR 5/8	10	C	M	SCL	
7-11	2.5YR 3/3	80	5YR 4/6	10	C	M	C	
			7.5YR 6/8	5	C	M		
			2.5Y 7/2	5	D	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
The plot is located in 148/S and qualifies for problematic red parent material. Rock refusal at approximately 12".

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W07-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 15%

Subregion (LRR or MLRA): 148 / S Lat: 2691252.7 Long: 331011.8 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a berm associated with a maintenance road about 4.5' higher in elevation than paired plot W01. The plot is located in a scrub-shrub area at the edge of the wetland.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
The plot is located on a well drained slope above the wetland.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W07-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Lonicera tatarica	35	Y	FACU
2. Rosa multiflora	20	Y	FACU
3. Prunus americana	10	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	65% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Solidago canadensis	20	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	45	Y	FAC
2. Toxicodendron radicans	5	N	FAC
3.			
4.			
5.			
6.			
	50% = Total Cover		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals:	135 (A)		490 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Herbaceous coverage is low due to slope and the presence Lonicera j. covering the ground.

SOIL

Sampling Point: **W07-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	7.5 YR 4/3	100	-	-	-	-	SL	
6-12	10YR 5/6	100	-	-	-	-	C	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Rock refusal at 12".

WETLAND ID: WW-W08

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☐ **yes**
☒ **no**
☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PEM/PSS/PFO. The wetland is connected to W06 via culvert and storm drain D07. The wetland is separated from W09, W06 and W07 by elevated roads.

Associated Stream:

☐ **yes**
☒ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**
☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**
☐ **Ecological connection**
☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**
☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**
☐ **confined**
☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/01/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W08-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2691634.9 Long: 330651.3 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: PSS

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

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

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

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

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

Remarks:
This plot is located in a PSS section of the wetland near an elevated maintenance road that serves as the upland boundary in the western area of the wetland.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ✔ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 0.25 (adjacent)
Water Table Present?	Yes ✔	No _____	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-3

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Approximately 0.25" of standing water was observed immediately adjacent to the plot and a faint H2S odor was detected when the soil pit was excavated.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W08-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	25	Y	FACW
2. Salix nigra	20	Y	OBL
3. Fraxinus pennsylvanica	20	Y	FACW
4. Acer negundo	10	N	FACW
5. Quercus palustris	5	N	FACW
6. Acer rubrum	5	N	FAC
7.			
8.			
9.			
10.			
	85% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phragmites australis	50	Y	FACW
2. Scirpus pendulus	30	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	110	x 2 =	220
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		285 (B)

Prevalence Index = B/A = 1.7

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Severe Phragmites a. infestations are present in the NW and SE areas of the wetland.

Approximately 20% bare ground.

SOIL

Sampling Point: **W08-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/3	95	7.5YR 5/8	5	C	M	SC	
8-14	7.5YR 4/3	80	7.5YR 4/6	10	C	M	C	
			2.5Y 6/6	10	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✔ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
A faint H2S odor was observed when excavating the soil pit. The plot would also qualify for indicator problematic red parent material.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/01/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W08-W02

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2691728.5 Long: 330866.6 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
This plot is located in a PFO area of the wetland roughly 30 feet east of a PSS area. The plot is near a swale that runs through the forested area. There is no paired upland plot associated with this plot.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 2 (adjacent)
Water Table Present?	Yes ✔	No _____	Depth (inches): ~7
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-7

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
There is pit-mound micro-topography at this location and the plot is immediately adjacent to a swale with approximately 2" of standing water.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W08-W02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	30	Y	FAC
2. Acer saccharinum	30	Y	FACW
3. Fraxinus pennsylvanica	30	Y	FACW
4.			
5.			
6.			
7.			
8.			
	90%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	15	Y	FACW
2. Cornus florida	10	Y	FACU
3. Prunus americana	10	Y	FACU
4. Acer rubrum	10	Y	FAC
5. Fraxinus pennsylvanica	10	Y	FACW
6. Viburnum dentatum	10	Y	FAC
7. Rosa multiflora	5	N	FACU
8. Lonicera tatarica	5	N	FACU
9.			
10.			
	75%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Carex conjuncta	25	Y	FACW
2. Glyceria melicaria	25	Y	OBL
3. Juncus effusus	10	N	FACW
4. Scirpus pendulus	5	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	5	Y	FAC
2. Toxicodendron radicans	5	Y	FAC
3.			
4.			
5.			
6.			
	10%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 13 (A)

Total Number of Dominant Species Across All Strata: 13 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	120	x 2 =	240
FAC species	60	x 3 =	180
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	240 (A)		570 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Approximately 40% bare ground / leaf litter present in herb stratum.

SOIL

Sampling Point: **W08-W02**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 4/3	99	7.5YR 4/6	1	C	M	SC	
4-6	7.5YR 4/3	90	7.5YR 4/6	10	C	M	SC	
6-11	7.5YR 4/3	80	7.5YR 5/8	15	C	M	C	
			2.5YR 4/8	5	C	M		
11-14	7.5YR 5/2	75	5YR 4/6	15	C	M	C	
			7.5YR 5/8	10	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

This plot is located within 148/S and meets the requirements for problematic indicator red parent material. The plot did not qualify for other indicators. The depleted matrix observed in layer 4 begins too deep in the soil profile to qualify for the depleted matrix indicator.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/01/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W08-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Berm Local relief (concave, convex, none): convex Slope (%): 5-7

Subregion (LRR or MLRA): 148 / S Lat: 2691628.4 Long: 330623.9 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is located on a berm associated with a maintenance road roughly 4' higher in elevation than the paired plot, W01, which is located in the adjacent wetland depression.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
This plot is in a well drained position on a man-made berm located between wetland depressions.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W08-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Lonicera tatarica	35	Y	FACU
2. Rhus typhina	5	N	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Solidago canadensis	50	Y	FACU
2. Securigera varia	15	N	UPL
3. Phragmites australis	15	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	20	Y	FAC
2.			
3.			
4.			
5.			
6.			
	20%	= Total Cover	

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	20	x 3 =	60
FACU species	85	x 4 =	340
UPL species	20	x 5 =	100
Column Totals:	140 (A)		530 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Phragmites a. has spread from within the wetland boundary to the upland berm.

SOIL

Sampling Point: **W08-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	7.5YR 4/3	95	7.5YR 5/6	5	C	M	CL	
7-9	7.5YR 4/3	90	7.5YR 5/6	10	C	M	L	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

Rock refusal at 9". This plot is located within 148/S and would qualify for problematic red parent material however there is a lack of hydrology and hydrophytic vegetation at the location. Also, this plot is located on a very apparent upland berm between two wetlands.

WETLAND ID: WW-W09

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☐ **yes**
☐ **no**
☒ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PEM/PSS. The wetland appears to be isolated however storm drains / culverts may exist that were not observed (overgrown). Natural topography would drain this wetland northerly toward Park Creek. The wetland is separated from W06, W08 and W07 by elevated roads.

Associated Stream:

☐ **yes**
☒ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**
☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**
☐ **Ecological connection**
☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**
☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**
☐ **confined**
☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/30/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W09-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): 148 / S Lat: 2691347.9 Long: 330621.8 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% slopes NWI classification: PSS

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

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

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

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

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

Remarks:
Plot is located at the southern edge of a large PSS wetland with some emergent openings in a concave, large depression.

A restrictive layer is present below the surface soil.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✔	Depth (inches): ____
Water Table Present?	Yes ✔	No ____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ✔	No ____	Depth (inches): 3-6

Wetland Hydrology Present? Yes ✔ No ____

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

Remarks:

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

Sampling Point: **W09-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Quercus palustris	30	Y	FACW
2. Cornus alba	15	Y	FACW
3. Acer rubrum	15	Y	FAC
4. Ulmus rubra	5	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	65% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Juncus effusus	40	Y	FACW
2. Solidago canadensis	5	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	85	x 2 =	170
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	110 (A)		250 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

Plot is representative of the wetland overall, with many saplings 20-25' nearing the edge of PFO.

Note, no saplings above 30' throughout wetland. Designated PSS

~51% BG

SOIL

Sampling Point: **W09-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/3	70	2.5Y 7/6	25	C	M	Loam	
			7.5YR 5/8	5	C	M		
6-7	2.5YR 3/2	100					Clay	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Hardpan

Depth (inches): 7

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

Remarks:

Plot is located within 148/S and qualifies for problematic indicator Red Parent Material.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/30/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W09-W02

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

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

Subregion (LRR or MLRA): 148 / S Lat: 2691398.1 Long: 330728.3 Datum: NAD 83

Soil Map Unit Name: Lawrenceville Silt Loam, 0-3% Slopes NWI classification: PEM

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

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

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

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

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

Remarks:
The plot is located on the margin of an inundated PEM area and the PSS area that surrounds it. Plot is in a large depression with hard pan restructure.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ✔ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

0.25" standing water at plot

Remarks:
The plot is located in an inundated area. H2S observed.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W09-W02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Fraxinus pennsylvanica	25	Y	FACW
2. Ulmus rubra	5	N	FAC
3. Quercus palustris	5	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Scirpus pendulus	20	Y	OBL
2. Carex stricta	15	Y	OBL
3. Typha latifolia	15	Y	OBL
4. Agrimonia parviflora	15	Y	FACW
5. Eleocharis obtusa	5	N	OBL
6. Persicaria sagittata	5	N	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	75% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	45	x 2 =	90
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110 (A)		165 (B)

Prevalence Index = B/A = 1.5

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
The plot is located on the margin of PEM and PSS areas of the wetland and includes PSS vegetation that is within the sample plot.

SOIL

Sampling Point: **W09-W02**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					SM	
2-5	7.5YR 4/3	93	5YR 4/6	5	C	M	SC	
			7.5YR 4/6	2	C	PL		
5-7	10YR 4/2	85	5YR 3/4	15	C	M	Clay	Restrictive layer at 7"

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✔ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Clay Hardpan

Depth (inches): 7

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

Remarks:
H2S odor was observed when excavating soil pit. A depleted matrix is present in layer 3 but does not meet the depth / thickness requirements for indicator F3.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/30/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W09-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): none Slope (%): 0-1

Subregion (LRR or MLRA): 148 / S Lat: 2691333.1 Long: 330602.0 Datum: NAD 83

Soil Map Unit Name: Lawrenceville silt loam, 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is situated roughly 1' higher in elevation than paired plot W01 in an upland area of a large depression. Plot is within a scrub-shrub vegetated area.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
No indicators were observed and only a moderate amount of moisture was present in the soil profile.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W09-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Lonicera tatarica	50	Y	FACU
2. Prunus americana	10	N	FACU
3. Cornus alba	10	N	FACW
4. Elaeagnus umbellata	5	N	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	75%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Solidago canadensis	60	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	120	x 4 =	480
UPL species	5	x 5 =	25
Column Totals:	135 (A)		525 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
note shift in emergent dominants-Juncus lost solidago increases bare ground about 40%.
Also much Lonicera t.

SOIL

Sampling Point: **W09-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	85	7.5YR 5/8	10	C	M	CL	
			5YR 4/6	5	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Hardpan

Depth (inches): 7"

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

Remarks:

Plot would qualify for problematic indicator Red Parent Material however plot fails both hydrology and vegetation.

WETLAND ID: WW- W10

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☑ **yes**

☐ **no**

☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Isolated PFO depression next to old road.

Associated Stream:

☐ **yes**

☑ **no**

If yes, list ID: SS-_____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**

☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**

☐ **Ecological connection**

☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**

☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**

☐ **confined**

☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/06/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W10-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

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

Subregion (LRR or MLRA): 148/LRRS Lat: 2691451.9 Long: 329428.5 Datum: NAD83

Soil Map Unit Name: Lawrenceville silt loam 0-3% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
Plot in isolated concave depression adjacent to road. No herb stratum present within wetland - dominated by red and silver maple.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No ____	Depth (inches): 1
Water Table Present?	Yes ✔	No ____	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes ✔	No ____	Depth (inches): 0-2

Wetland Hydrology Present? Yes ✔ No ____

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

Remarks:
Clear moss line at base of trees within wetland and not present outside of it.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W10-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	65	Yes	FAC
2. Acer saccharinum	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	75%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30)			
1. Acer rubrum	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	15%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		260 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Pin oak present, but not within plot.

SOIL

Sampling Point: **W10-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					L	Contains PDOM
2-6	10YR 4/2	95	10YR 4/4	5	C	M	SL	
6-12	10YR 4/3	85	7.5YR 3/4	15	C	M	CL	
12-16	10YR 4/4	95	10YR 4/6	5	C	M	C	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Soils marginal; however pass. Appears to be wet with standing water throughout most of the year. Approximately 4-6 inches of standing water at deepest point at center of wetland.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/06/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W10-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

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

Subregion (LRR or MLRA): 148/LRRS Lat: 2691465.6 Long: 329419.7 Datum: NAD83

Soil Map Unit Name: Lawrenceville silt loam 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is located on edge of concave depression. Approximately 0.5 foot higher than paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): 0-3

Wetland Hydrology Present? Yes _____ No ✔

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

Remarks:
Nearing saturation between 10-12 inches.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W10-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	65	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	65% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Ligustrum vulgare	50	Yes	FACU
2. Acer rubrum	10	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Allium vineale	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	75	x 3 =	225
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	130 (A)		445 (B)

Prevalence Index = B/A = 3.4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground/leaf litter = 95%

SOIL

Sampling Point: **W10-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					SL	
12-16	10YR 5-6	100					CL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW- W11

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☑ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

flows off base, situated in stormwater outfall #14.

Associated Stream:

- ☑ **yes**
- ☐ **no**

Drains NE off base to NHD mapped stream via ditch.

If yes, list ID: SS- _____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): ~650 feet

-two separate wetland boundaries culvert D07 connects both wetland boundaries under the road

-PEM/PFO W02 does not have a paired plot located in small PFO area within four mature Weeping Willows.

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☑ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☑ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface**
- ☐ **ephemeral surface**
- ☑ **perennial surface**
- ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☑ **discrete**
- ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:** _____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W11-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainage Way Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): 148/LRRS Lat: 2697379.5 Long: 328242.6 Datum: NAD83

Soil Map Unit Name: UDORTHCNTS, Shale and sandstone, 0-8% slope NWI classification: PEM

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

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

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

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

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

Remarks:
Plot located 1.5 feet lower in elevation than paired plot U01-situated in swale

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No ____

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

Remarks:
Saturated above clay layer.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W11-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Typha latifolia	70	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Approximately 30% bare ground.

SOIL

Sampling Point: **W11-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					SL	PDOM Present
2-10	2.5Y 4/2	93	10YR 3/4	7	C	M/PL	SC	
10-16	2.5Y 4/2	70	7.5YR 4/4	15	C	M	CL	
			7.5YR 4/6	15	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): 0.00

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W11-W02

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainage Way Local relief (concave, convex, none): Concave Slope (%): about 1

Subregion (LRR or MLRA): 148/LRRS Lat: 2697024.7 Long: 328019.2 Datum: NAD83

Soil Map Unit Name: UDORTHCNTS, Shale and sandstone, 0-8% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
No paired plot. W02 located roughly center of wetland in small, sparse PFO area with 4 mature Salix babylonica.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): <1
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-6

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Saturation and very little surface water above clay layer.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W11-W02**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Salix babylonica	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Typha latifolia	50	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		90 (B)

Prevalence Index = B/A = 1.3

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Approximately 50% bare ground and leaf litter.

SOIL

Sampling Point: **W11-W02**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					SL	some PDOM
3-8	10YR 4/2	90	7.5YR 3/4	10	C	M/PL	SL	
8-16	10YR 4/2	65	10YR 4/4	15	C	M	CL	
			7.5YR 4/4	20				

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): 0.00

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W11-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Convex Slope (%): 1 - 5

Subregion (LRR or MLRA): 148/LRRS Lat: 2697377.1 Long: 328250.7 Datum: NAD83

Soil Map Unit Name: UDORTHDENTS, shale and sandstone NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is located roughly 1.5 feet higher in elevation than paired plot W01 along a drainageway bank associated with the wetland swale.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
on slope

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W11-U01**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Picea abies	40	Yes	UPL
2. Quercus velutina	10	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	50%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Picea abies	5	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Festuca pratensis	60	Yes	FACU
2. Taraxacum officinale	10	No	FACU
3. Berteroa incana	10	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	70	x 4 =	280
UPL species	65	x 5 =	325
Column Totals:	135 (A)		605 (B)

Prevalence Index = B/A = 4.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

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

SOIL

Sampling Point: **W11-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 3/3	100					L	
14 - 16	10YR 3/3	85	7.5YR 3/4	15	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW- W12

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☑ **yes**

☐ **no**

☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Associated Stream:

☐ **yes**

☑ **no**

If yes, list ID: SS-_____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): Isolated storm-water retention pond.

Vegetated primarily with Typha l.

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**

☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**

☐ **Ecological connection**

☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**

☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**

☐ **confined**

☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W12-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

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

Subregion (LRR or MLRA): 148/LRRS Lat: 2697430.2 Long: 326546.9 Datum: NAD83

Soil Map Unit Name: Urban land, 0-8% slopes NWI classification: PEM

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

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

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

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

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

Remarks:
Plot located on edge of stormwater retention pond-approximately 3 feet lower than paired plot U01

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No _____ Depth (inches): 1 adj to plot

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 0-6

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Saturated above clay layer.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W12-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Typha latifolia	40	Yes	OBL
2. Juncus effusus	20	Yes	FACW
3. Eleocharis acicularis	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		100 (B)

Prevalence Index = B/A = 1.3

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Typha increases toward center of stormwater pond.

SOIL

Sampling Point: **W12-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y	85	7.5YR 3/4	15	C	M/PL	SC	
6-11	10YR 3/3	65	7.5YR 4/4	35	C	M	CL	Refused due to rock fill

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Refusal due to fill at 11 inches.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W12-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Man-made Berm Local relief (concave, convex, none): Convex Slope (%): 5 - 10

Subregion (LRR or MLRA): 148/LRRS Lat: 2697427.2 Long: 326561.1 Datum: NAD83

Soil Map Unit Name: Urban land, 0 - 8% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is located on a berm associated with a vegetated southwest retention pond. Plot is roughly 3 feet higher in elevation than its paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
On dry slope.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W12-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer saccharum	10	Yes	FACU
2. Rubus armeniacus	10	YES	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Allium vineale	25	Yes	FACU
2. Veronica filiformis	10	Yes	UPL
3. Berteroa incana	5	No	UPL
4. Taraxacum officinale	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	25	x 5 =	125
Column Totals:	65 (A)		285 (B)

Prevalence Index = B/A = 4.4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Several sugar maples present along margins of SW pond. Approx. 50% bare ground/leaf litter in herb stratum.

SOIL

Sampling Point: **W12-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/3	100					L	No redox. Dry.

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW- W13

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☑ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Wetland is mapped along unnamed NHD stream. However, a defined bed and bank was not observed within survey area. Wetland does drain off base via culvert and drainage line D12 to the same NHD stream where bed and bank is present further down flow.

Associated Stream:

- ☑ **yes**
- ☐ **no**

If yes, list ID: SS- Unnamed NHD with OF base

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): ~ 100 feet

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☑ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☑ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface**
- ☐ **ephemeral surface**
- ☑ **perennial surface**
- ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☑ **discrete**
- ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:** perennial to stream via

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/06/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W13-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Shallow swale Local relief (concave, convex, none): None Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2694116.7 Long: 3267016.7 Datum: NAD83

Soil Map Unit Name: Buckingham silt loam 0-3% slopes NWI classification: PSS

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

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

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

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

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

Remarks:
Plot located in eastern area of wetland away from open water (in west). Approximately 1 foot lower in elevation than paired U01 plot.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 1
Water Table Present?	Yes ✔	No _____	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-1

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Saturated from surface to water table. Plot adjacent to drainage with flowing water.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W13-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30)			
1. Cornus alba	50	Yes	FACW
2. Acer rubrum	15	Yes	FAC
3. Quercus palustris	5	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	70%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 15)			
1. Lonicera morrowii	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	20%	= Total Cover	

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	15	x 3 =	45
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	90 (A)		235 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
25% of herb stratum is a hydrophytic moss on small hummocks. Approximately 75% is bare ground/leaf litter.

SOIL

Sampling Point: **W13-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	7.5YR 3/4	100					L	
3 - 8	7.5YR 4/2	90	7.5YR 3/4	10	C	M	SL	
8-10	7.5YR 3/4	90	7.5YR 4/6	10	C	M	SC	
								refusal at 10" due to large rocks

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

Rocks and gravel present and throughout profile. Refusal at 10 inches due to large rocks

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/06/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W13-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Edge of slight swale Local relief (concave, convex, none): Convex Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2694136.7 Long: 326702.9 Datum: NAD83

Soil Map Unit Name: Buckingham silt loam NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is located in a forested area adjacent to PSS wetland roughly 1 foot higher in elevation than paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-3

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

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

Remarks:
Saturated at the surface only, moisture decreasing with depth.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W13-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	10	Yes	FAC
2. Populos grandidentata	10	Yes	FACU
3. Salix fragilis	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	30%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Juniperus virginiana	35	Yes	FACU
2. Rosa multiflora	20	Yes	FACU
3. Acer rubrum	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	65%	= Total Cover	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	105 (A)		380 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Near edge of PSS area where margins of wetland are forested.

SOIL

Sampling Point: **W13-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	7.5YR	100					SCL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW- W14

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☑ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

The wetland system drains SW off base through culvert and drainage D15. The drainage continues SW to the gulf course and likely runs to a NHD mapped stream off base.

Associated Stream:

- ☑ **yes**
- ☐ **no**

If yes, list ID: SS- Unnamed NHD.

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): ~ 1000 feet

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☑ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☑ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☑ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☑ **discrete** ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 4/5/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W14-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): 148/LRS Lat: 2694685.7 Long: 325773.3 Datum: NAD83

Soil Map Unit Name: CROTON SILT LOAM 0-3% SLOPES NWI classification: PSS/PEM

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

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

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

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

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

Remarks:
Plot approx 2 feet lower in elevation than plot U01. In large swale in NE portion of large wetland complex that is PEM/PSS up flow of a lake/pond.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): <1
Water Table Present?	Yes ✔	No _____	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Saturated from surface to water table.

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

Sampling Point: **W14-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 30)			
1. Cornus alba	15	Yes	FACW
2. Salix fragilis	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Onoclea sensibilis	80	Yes	FACW
2. Carex stricta	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85% = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	95	x 2 =	190
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		195 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
C. alba coverage is much thicker in other areas within flags 1-46 NE of the lake/pond.

SOIL

Sampling Point: **W14-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/2	92	7.5YR 3/4	8	C	M	SC	
7-9	10YR 4/2	60	7.5YR 4/4	40	C	M	L	
9-15	7.5YR 4/6	100					SL	
15-16	10YR 4/2	75	7.5YR 4/6	25	C	M	SCL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 4/6/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W14-W02

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression (Beaver Pond) Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2693655.8 Long: 325360.8 Datum: NAD83

Soil Map Unit Name: Penn-Lansdale complex 8-15% slopes NWI classification: PFO

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

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

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

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

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

Remarks:
Plot located in SW portion of wetland in forested, flooded area. No paired U02 plot. Ponded water in this area is due to beaver activity.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ✔ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 1
Water Table Present?	Yes ✔	No _____	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Saturated surface to water table.

Surface water present adjacent to plot at 1"

Aquatic Fauna-tadpole

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W14-W02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	70	Yes	FAC
2. Fraxinus pensylvanica	10	No	FACW
3. Liriodendron tulipifera	5	No	FACU
4.			
5.			
6.			
7.			
8.			
	85%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30)			
1. Rosa multiflora	15	Yes	FACU
2. Acer rubrum	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	25%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Carex stricta	1	No	OBL
2. Leersia oryzoides	1	No	OBL
3. Juncus effusus	1	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	3%	= Total Cover	
Woody Vine Stratum (Plot size: 15)			
1. Lonicera japonica	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	5%	= 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	2	x 1 =	2
FACW species	11	x 2 =	22
FAC species	85	x 3 =	255
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	118 (A)		359 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

SOIL

Sampling Point: **W14-W02**

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	85	7.5YR 3/4	15	C	M/PL	SL	
4-11	10YR 4/2	95	7.5YR 3/4	5	C	M	CL	
11-16	10YR 4/2	85	10YR 4/4	15	C	M	CL	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✔ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/05/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W14-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Natural berm Local relief (concave, convex, none): Convex Slope (%): 2-5

Subregion (LRR or MLRA): 148/LRRS Lat: 2694665.9 Long: 325785.6 Datum: NAD83

Soil Map Unit Name: Croton silt loam 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is located on a natural berm associated with a large wetland swale. Plot is located roughly 2 feet higher in elevation than wetland plot.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-2 and 14-16

Wetland Hydrology Present? Yes _____ No ✔

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

Remarks:
Top 0-2 near saturation. Moisture decreases with depth until water table at 16 inches.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W14-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	25	Yes	FAC
2. Salix fragilis	35	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	60%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	25	Yes	FACW
2. Acer rubrum	15	Yes	FAC
3. Rosa multiflora	10	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Allium vineale	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	5%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 71.43% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	80	x 3 =	240
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	130 (A)		390 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Approximately 75% bare ground/leaf litter in herb stratum.

SOIL

Sampling Point: **W14-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	93	7.5YR 3/4	7	C	M	SC	
2-16	10YR 4/3	100					SC	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
does not meet thickness requirements for F3.

WETLAND ID: WW-W15

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☒ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PEM. The wetland is located in a depression between airstrips. The wetland is fed by seep H02. Ephemeral discrete drainage from the wetland leads to storm drain D17.

Associated Stream:

- ☐ **yes**
- ☒ **no**

If yes, list ID: SS-_____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete** ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W15-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2697566.8 Long: 323857.5 Datum: NAD 83

Soil Map Unit Name: Udorthents, Shale and Sandstone, 0-8% slopes NWI classification: PEM

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

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

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

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

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

Remarks:
This plot is located at the edge of a PEM wetland depression roughly 1' lower in elevation than paired plot U01. The plot is located within the base airfield.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
Inundated areas were observed in the interior of the wetland away from this plot.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W15-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Scirpus atrovirens	40	Y	OBL
2. Juncus effusus	20	Y	FACW
3. Carex lurida	15	N	OBL
4. Eleocharis tenuis	10	N	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		115 (B)

Prevalence Index = B/A = 1.4

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

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

SOIL

Sampling Point: **W15-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					SM	
2-5	10YR 5/2	80	7.5YR 5/8	15	C	M	CL	
			2.5YR 3/6	5	C	M/PL		
5-12	10YR 5/2	70	7.5YR 5/8	20	C	M	CL	
			2.5YR 4/8	10	C	M		
12-14	10YR 5/2	70	7.5YR 6/6	15	C	M	C	
			2.5Y 7/6	15	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
A depleted layer qualifying for the depleted matrix indicator begins immediately below the organic layer.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W15-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): convex Slope (%): 2-4

Subregion (LRR or MLRA): 148 / S Lat: 2697560.2 Long: 323847.1 Datum: NAD 83

Soil Map Unit Name: Udorthents, Shale and Sandstone, 0-8% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
This plot is situated roughly 1" higher in elevation than paired plot W01 on a slight slope above a PEM wetland depression.

The plot is located in a mowed herbaceous area of the airfield.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
The plot is located on a well-drained slope above the wetland and did not qualify for any hydrology indicators.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W15-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Festuca arundinacea	80	Y	FACU
2. Taraxacum officinale	5	N	FACU
3. Apocynum cannabinum	1	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	86%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 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	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	86	x 4 =	344
UPL species	0	x 5 =	0
Column Totals:	86 (A)		344 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)
The plot is located in a mowed herbaceous area of the airfield.

SOIL

Sampling Point: **W15-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					L	
3-13	10YR 4/3	97	7.5YR 6/6	3	C	M	L	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
Rock refusal was encountered at 13".

WETLAND ID: WW- W16

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☑ **yes**

☐ **no**

☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

This wetland is situated in an isolated depression near two ponds (W17) and has weaker hydrology. Surface connections to W17.

Associated Stream:

☐ **yes**

☑ **no**

If yes, list ID: SS-_____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**

☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**

☐ **Ecological connection**

☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**

☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**

☐ **confined**

☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/05/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W16-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2 - 5

Subregion (LRR or MLRA): 148/LRS Lat: 2695377.4 Long: 323570.5 Datum: NAD83

Soil Map Unit Name: Lansdale Loam 0 - 3% Slopes NWI classification: PSS

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

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

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

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

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

Remarks:
Plot located at roughly the same elevation as paired plot U01 in an isolated depression dominated by C. alba and some wetland rushes.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
Nearing saturation from 0 - 3 inches.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W16-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 30)			
1. Cornus alba	30	Yes	FACW
2. Salix fragilis	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Scirpus pendulus	15	Yes	OBL
2. Juncus effusus	10	Yes	FACW
3. Solidago canadensis	10	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35% = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1. Lonicera japonica	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	40	x 2 =	80
FAC species	20	x 3 =	60
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	85 (A)		195 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground approximately 50%.

SOIL

Sampling Point: **W16-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 4/3	100					SL	
3 - 7	10YR 4/2	85	10YR 4/6	13	C	M	L	
			5YR 3/4	2	C	PL		
7 - 13	2.5Y 4/2	90	7.5YR 3/3	5	C	M	L	
			10YR 4/6	5	C	M		

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Hardpan

Depth (inches): 13

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

Remarks:
Refusal at 13 inches due to hardpan

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/05/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W16-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): edge of depression Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): 148/LRS Lat: 2695376.9 Long: 323552.9 Datum: NAD83

Soil Map Unit Name: Lansdale Loam 0-3% Slopes NWI classification: UPL

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

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

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

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

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

Remarks:
Approximately same elevation at paired lot W01. Plot located at edge of harwood forest.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:
No indicators, little moisture content in soil.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W16-U01**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1. Acer rubrum	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Rosa multiflora	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	15%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Solidago canadensis	25	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1. Lonicera japonica	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10%	= Total Cover	

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	80 (A)		280 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Approximately 70% bare ground.

SOIL

Sampling Point: **W16-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					SL	
3-7	10YR 3/3	98	7.5YR 5/6	2	C	M	L	
7-16	7.5YR 4/4	90	10YR 6/8	10	C	M	L	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND ID: WW- W17

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- [x] **yes**
- [ ] **no**
- [ ] **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

No outlet in this area. Wetland includes two areas of PSS vegetated ponded water, separated by a road.

Associated Stream:

- [ ] **yes**
- [ ] **no**

If yes, list ID: SS-_____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

- [ ] **directly abutting**
- [ ] **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- [ ] **Discrete wetland hydrologic connection**
- [ ] **Ecological connection**
- [ ] **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- [ ] **intermittent surface**
- [ ] **ephemeral surface**
- [ ] **perennial surface**
- [ ] **no surface flow**

Surface flow characteristic from wetland to associated stream:

- [ ] **discrete**
- [ ] **overland sheet flow**
- [ ] **confined**
- [ ] **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/05/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W17-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

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

Subregion (LRR or MLRA): 148/LRRS Lat: 2695423.7 Long: 323479.2 Datum: NAD83

Soil Map Unit Name: Lansdale Loam 0-3% slopes NWI classification: PSS

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

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

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

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

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

Remarks:
Plot placed in edge of wetland most ponded portion of wetland, approximately 1' lower in elevation than paired U01 plot.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No ____	Depth (inches): 1
Water Table Present?	Yes ✔	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✔	No ____	Depth (inches): 0-4

Wetland Hydrology Present? Yes ✔ No ____

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

Remarks:
near ponded water that is 6-12" deep

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W17-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 30)			
1. Salix discolor	40	y	FACW
2. Salix fragilis	30	y	FAC
3. Cornus alba	5	n	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	75% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phragmites austulis	70	y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70% = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	115	x 2 =	230
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		320 (B)

Prevalence Index = B/A = 2.2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Primarily Salix species along margins of pond with Phragmites a. in the interior in standing water.

SOIL

Sampling Point: **W17-W01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					L	contains PDOM
3-7	10YR 4/2	90	7.5YR 3/4	10	C	M/PL	SL	
7-12	5YR 4/3	80	7.5YR 4/6	20	C	M	L	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
profile was saturated and allowed to dry overnight-no refusal

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/05/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W17-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Burm Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): 148/LRRS Lat: 2695408.5 Long: 323419.9 Datum: NAD83

Soil Map Unit Name: Landsdale Loam 0-3% slopes NWI classification: UPL

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

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

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

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

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

Remarks:
Plot is approximately 1 foot higher than paired U01. Plot between pond and parking lot on burm in western portion of wetland.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W17-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Rosa multiflora	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Carex pensylvanica	20	Yes	UPL
2. Andropogon virginicus	10	No	FACU
3. Panicum virgatum	10	No	FAC
4. Solidago canadensis	5	No	FACU
5. Allium vineale	5	No	FACU
6. Taraxacum officinale	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	55%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 0 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	30	x 4 =	120
UPL species	20	x 5 =	100
Column Totals:	60 (A)		250 (B)

Prevalence Index = B/A = 4.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Mowed, dean unknown grass ~30% cover.

SOIL

Sampling Point: **W17-U01**

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					L	
3-5	10YR 2/1	100					SL	
5-11	10YR 4/3	95	10YR 4/6	5	C	M	L	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:
gravel/asphalt present throughout profile-refusal due to fill at 11 inches.

WETLAND ID: WW-W18

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☒ **yes**

☐ **no**

☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

PEM/PSS/PFO. The wetland boundary is near the boundary of W19 and the stream which drains it but a surface connection was not observed. Possible storm event OSF or subsurface connection to W19 and associated stream however the wetland is essentially isolated.

Associated Stream:

☐ **yes**

☒ **no**

If yes, list ID: SS-_____

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**

☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**

☐ **Ecological connection**

☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**

☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**

☐ **confined**

☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W18-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR or MLRA): 148 / S Lat: 2697077.6 Long: 323223.5 Datum: NAD 83

Soil Map Unit Name: Udorthents, Shale and Sandstone, 0-8% slopes NWI classification: PSS / PFO

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

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

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

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

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

Remarks:
This plot is located at the edge of a circular depression in a PSS/PFO vegetated area of the wetland within the boundary delineated by flags 1 to 13. The plot is roughly is roughly 1' lower in elevation than paired plot U01.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
This plot is located at the edge of a wetland depression. Standing water was present in the interior of this boundary at the time of delineation.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W18-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix fragilis	40	Y	FAC
2. Acer rubrum	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	50%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	40	Y	FACW
2. Salix fragilis	25	Y	FAC
3. Acer rubrum	5	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	70%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Juncus effusus	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		340 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
The herbaceous stratum is mostly bare and covered with leaf litter.

SOIL

Sampling Point: **W18-W01**

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 4/2	90	7.5YR 5/6	5	C	M	L	
			7.5YR 3/4	5	C	M		
4-12	7.5YR 5/6	85	7.5YR 6/2	10	D	M	SL	
			5 YR 5/8	5	C	M		
								Roughly 1-2" of duff above mineral layers

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ✔ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:
The plot qualifies for the depleted matrix indicator in the first layer. Rock refusal was encountered at 12"

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W18-W02

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): 148 / S Lat: 2697205.8 Long: 323023.6 Datum: NAD 83

Soil Map Unit Name: Udorthents, Shale and Sandstone, 0-8% slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
This plot is located at the edge of a sparsely vegetated and currently dry vernal pool that is hydrologically connected to PSS/PFO areas of the wetland delineated by flags 14-29. No paired upland plot.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✔ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The plot is located on the edge of a currently dry vernal pool. An algal mat is present. Soils were determined moist but were not nearing saturation.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W18-W02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Salix fragilis	25	Y	FAC
2. Cornus alba	10	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Juncus effusus	30	Y	FACW
2. Carex stricta	10	Y	OBL
3. Equisetum arvense	2	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	42% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	40	x 2 =	80
FAC species	27	x 3 =	81
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	77 (A)		171 (B)

Prevalence Index = B/A = 2.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

The interior of this vernal pool is sparsely vegetated and a majority of the vegetation within this plot occurs along the perimeter of the pool. Scirpus pendulus is also present in this area of the wetland but outside of the plot. Unknown moss present is also present.

This plot was determined PEM but note PSS margins.

SOIL

Sampling Point: **W18-W02**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	94	7.5YR 4/6	5	C	M	CL	
			2.5Y 6/4	1	C	M		
4-8	10YR 5/2	80	7.5YR 5/8	10	C	M	C	
			2.5YR 3/6	10	C	M		
8-10	10YR 6/2	70	7.5YR 5/6	20	C	M	CL	
			2.5Y 6/1	10	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Clay Hardpan

Depth (inches): 11"

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

This plot qualifies for the depleted matrix indicator beginning in layer 1. Redox increases with depth throughout the soil profile.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W18-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): convex Slope (%): 1-3

Subregion (LRR or MLRA): 148 / S Lat: 2697059.6 Long: 323246.7 Datum: NAD 83

Soil Map Unit Name: Udorthents, Shale and Sandstone, 0-8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
This plot is located on a slight slope roughly 1' higher in elevation than paired plot W01. The plot is located in an upland scrub-shrub opening near the edge of the airstrip.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The plot is situated in a well drained position on a slight slope above a wetland depression. No indicators.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W18-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Elaeagnus umbellata	40	Y	UPL
2. Cornus florida	10	N	FACU
3. Cornus alba	5	N	FACW
4. Rosa multiflora	5	N	FACU
5. Juniperus virginiana	2	N	FACU
6.			
7.			
8.			
9.			
10.			
	62% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Andropogon virginicus	65	Y	FACU
2. Solidago canadensis	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	102	x 4 =	408
UPL species	40	x 5 =	200
Column Totals:	147 (A)		618 (B)

Prevalence Index = B/A = 4.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W18-U01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/4	100					SL	
4-14	7.5YR 5/6	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:
Dry, no indicators met.

WETLAND ID: WW- W19

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☑ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Abutting S04.
Areas E of culvert DR-001-006 drain to S04 through intermittent small swales W of drain point.
Wetland is riparian OSF to stream.

Associated Stream:

- ☑ **yes**
- ☐ **no**

If yes, list ID: SS- S04

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Wetland Association to Stream

Is the wetland:

- ☑ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Discrete and OSF.

Surface flow type from wetland to associated stream:

- ☑ **intermittent surface**
- ☐ **ephemeral surface**
- ☐ **perennial surface**
- ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☑ **discrete**
- ☑ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/04/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W19-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2697038.6 Long: 322848.7 Datum: NAD83

Soil Map Unit Name: NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____
Hydric Soil Present?	Yes ✔	No ____	
Wetland Hydrology Present?	Yes ✔	No ____	

Remarks:
Plot is located in concave depression in wetland abutting and near the origin of S04. Roughly 1.5 feet lower in elevation than paired plot U01.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No ____	Depth (inches): 1
Water Table Present?	Yes ✔	No ____	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes ✔	No ____	Depth (inches): 0-6

Wetland Hydrology Present? Yes ✔ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturated from surface to water table

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W19-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	30	Yes	FAC
2. Fraxinus pennsylvanica	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	50%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	40	Yes	FACW
2. Acer rubrum	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		240 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Salix fracilis is also a dominant species within the wetland (tree sapling), but is absent in plot. Leaf litter and bare ground, no herbs in plot

SOIL

Sampling Point: **W19-W01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					SL	
2-6	10YR 3/2	85	10YR 4/6	15	C	M	SL	
6-16	10YR 4/2	80	10YR 3/2	20	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/04/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W19-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Berm Local relief (concave, convex, none): Convex Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2697027.3 Long: 322834.8 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0-8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
Plot located about 1.5 feet higher in elevation than paired wetland plot. Located in man-made burm associated with roadway. Tree and shrub stratum observed in photos is rooted in wetland boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Nearing saturation at 9 inches.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W19-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Panicum virgatum	30	Yes	FAC
2. Setaria pumila	15	Yes	FAC
3. Solidago canadensis	15	Yes	FACU
4. Andropogon virginicus	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	45	x 3 =	135
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	70 (A)		235 (B)

Prevalence Index = B/A = 3.4

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W19-U01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					L	
4-9	10YR 4/2	80	7.5YR 5/8	20	C	M/PL	CL	Refusal at 9 inches due to rock/fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

WETLAND ID: WW- W20

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☑ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Wetland is adjacent to ditch S03. Surface flow from wetland to stream is blocked by the ditch berm. Subsurface connection present.

Associated Stream:

- ☑ **yes**
- ☐ **no**

If yes, list ID: SS- S03

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): 5 - 10 feet

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☑ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☑ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☐ **perennial surface** ☑ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete** ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:**_____

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/04/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W20-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): 148/LRRS Lat: 2696609.3 Long: 322785.3 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0-8% slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
Plot is located in what appears to be an old orchard. Plot roughly 1.5 feet lower in elevation than paired plot U06. Pit-mound micro-topography is present within wetland, shallow depression.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ✔ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 1
Water Table Present?	Yes ✔	No _____	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-9 surf to WT

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W20-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Cornus alba	75	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	75% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Scirpus pendulus	15	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	75	x 2 =	150
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		165 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Unknown hydrophytic moss present.
Acer rubrum saplings present within wetland, but not plot. 60% bare ground.
Vast majority of wetland is dominated by Cornus alba saplings.

SOIL

Sampling Point: **W20-W01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/3	95	10YR 4/6	5	C	M	SL	
2-10	10YR 4/3	75	7.5YR 5/6	25	C	M/PL	L	Refusal at 10 inches due to rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✔ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

Chroma too high to qualify for F3, but nearly qualifies, appeared between 4/2 and 4/3. Sulfuric odor apparent at time of pit excavation.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/04/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W20-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): 148/LRRS Lat: 2696620.6 Long: 322799.4 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0-8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
Plot is located in an area of upland shrub/saplings in a relatively flat area abutting a PSS wetland depression (slight). Plot roughly 1.5 feet higher in elevation than paired plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Nearing saturation at 10 inches.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W20-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana	15	Yes	FACU
2. Pyrus communis	15	Yes	UPL
3. Acer rubrum	5	No	FAC
4.			
5.			
6.			
7.			
8.			
	35%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Rosa multiflora	10	Yes	FACU
2. Cornus alba	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	25	x 4 =	100
UPL species	15	x 5 =	75
Column Totals:	55 (A)		210 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W20-U01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 4/3	100					L	
4-6	10YR 5/3	75	7.5YR 4/6	25	C	M	CL	
6-10	10YR 4/1	90	7.5YR 3/4	10	C	M	C	Clay refusal at 10 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): 0.00

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:
Nearby area has been cleared and disturbed-soils in plot possibly disturbed.

WETLAND ID: WW- W21

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

☐ **yes**
☑ **no**
☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Connects to storm sewer drain.

Associated Stream:

☐ **yes**
☑ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

PEM wetland located in roadside drainage ditch

Wetland Association to Stream

Is the wetland:

☐ **directly abutting**
☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

☐ **Discrete wetland hydrologic connection**
☐ **Ecological connection**
☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

☐ **intermittent surface** ☐ **ephemeral surface**
☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

☐ **discrete** ☐ **overland sheet flow**
☐ **confined**
☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W21-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainage way Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): 148/LRRS Lat: 2698497.4 Long: 322656.4 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
Plot located approximately 2.5 feet below paired plot U01 - plot located at edge of drainage way/man-made ditch. In PEM wetland adjacent to perimeter road.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): <1
Water Table Present?	Yes ✔	No _____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0-10

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W21-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Typha latifolia	40	Yes	OBL
2. Juncus tenuis	20	Yes	FAC
3. Eleocharis acicularis	20	Yes	OBL
4. Andropogon virginicus	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	85 (A)		140 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W21-W01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	98	7.5YR 3/4	2	C	PL	SL	CONTAINS PDOM
2-9	10YR 4/2	85	7.5YR 5/6	10	C	M/PL	CL	
			10YR 4/6	5	C	M/PL		
9-12	7.5YR 3/3	95	10YR 4/6	5			SC	More clay content than 2nd layer, rock/fill refusal at 12 in.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/02/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W21-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): Convex Slope (%): 10

Subregion (LRR or MLRA): 148/LRRS Lat: 2698497.4 Long: 322656.4 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0 - 8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
Approx. 2.5 ft higher in elevation than paired W01 plot - on man-made ditch associated with wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W21-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Setaria pumila	30	Yes	FAC
2. Andropogon virginicus	25	Yes	FACU
3. Achillea millefolium	20	Yes	FACU
4. Taraxacum officinale	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	80 (A)		290 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: **W21-U01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2						SL	
4 - 7	10YR 4/2	70	7.5YR 3/4	15	C	M	SL	
			10YR 4/4	15	C	M		
7 - 12	2.5Y 5/6	97	10YR 4/6	3	C	M	CL	Rock/fill refusal at 12in.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:
Does not meet thickness requirements for F3.

WETLAND ID: WW- W22

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☑ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

Abutting S05. Seeps H04 and H05 ponds HY-001-003 and 004 (not shown on report figure) and drainage swales D21 and D23.

Associated Stream:

- ☑ **yes**
- ☐ **no**

If yes, list ID: SS- S05

(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet): _____

Wetland Association to Stream

Is the wetland:

- ☑ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface**
- ☐ **ephemeral surface**
- ☐ **perennial surface**
- ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete**
- ☐ **overland sheet flow**
- ☐ **confined**
- ☑ **other, explain:** All surface flow types are present at different areas of the wetland. The SE area likely has an ephemeral connection to the rest of the wetland and stream S05.

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W22-W01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2697092.7 Long: 321624.0 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0-8% slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
Approx. 0.25 feet lower than U01 in Southern area of wetland. Pit mount micro-topography present in area. Plot located in a slight forested depression away from other portions of the wetland that are riparian (SS-001-001).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): <1
Water Table Present?	Yes ✔	No _____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 8-12

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W22-W01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer rubrum	25	Yes	FAC
2. Cornus alba	25	Yes	FACW
3. Rosa virginiana	2	No	FAC
4. Rubus allegheniensis	2	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	54% = Total Cover		
Herb Stratum (Plot size: 5)			
1. Eutrochium purpureum	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15% = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0% = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	62	x 3 =	186
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	89 (A)		244 (B)

Prevalence Index = B/A = 2.7

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Moss present-lower herbaceous layer. Dead unidentifiable grass present. Approximately 40% bare ground/leaf litter. A. rubrum is the dominant tree in this area of the wetland but other PFO portions of the wetland have greater percentage of occurrence.

SOIL

Sampling Point: **W22-W01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	100					SL	
3-6	10YR 4/2	90	7.5YR 3/4	10	C	M/PL	SL	
6-11	2.5Y 6/2	70	10YR 4/6	30	C	M	SCL	
11-16	2.5Y 6/1	65	10YR 5/6	35	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W22-W02

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): 148/LRRS Lat: 2696978.8 Long: 322169.2 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0-8% slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes ✔** **No _____**
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
Plot is located at the northern most boundary of W22 near the origin of S05 and seep H04. Plot is located roughly 2 feet lower in elevation than paired plot U02 in Acer and Cornus PSS with sensitive fern herb stratum.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 4-12

Wetland Hydrology Present? **Yes ✔** **No _____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturation beginning at 4 inches, extends to water table.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W22-W02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer rubrum	15	Yes	FAC
2. Cornus alba	15	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Onoclea sensibilis	60	Yes	FACW
2. Typha latifolia	15	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	75	x 2 =	150
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110 (A)		225 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W22-W02**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					SL	
3-12	10YR 2/2	92	10YR 3/3	5	C	M	L	
			7.5YR 5/6	3	C	M		
12/16	2.5Y 3/2	80	10YR 4/6	20	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W22-U01

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Flat forest Local relief (concave, convex, none): None Slope (%): 0 - 2

Subregion (LRR or MLRA): 148/LRRS Lat: 2697110.8 Long: 321628.8 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0 - 8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
This plot is located approximately 2.5' higher in elevation than paired plot W01. The plot is located in the southern portion of the wetland in an upland forested area near the wetland and field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
no oxidized rhizospheres present soils did not reach saturation. No surface water or water stained leaves.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W22-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus strobus	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Prunus pensylvanica	15	Yes	FACU
2. Fraxinus americana	15	Yes	FACU
3. Acer rubrum	15	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	45%	= Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	85 (A)		325 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground and leaf litter in herb stratum only.

SOIL

Sampling Point: **W22-U01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 4/2						SL	
3 - 7	10YR 4/2	95	10YR 4/4	5	C	M	SL	
7 - 11	2.5Y 6/2	90	10YR 5/6	10	C	M	SCL	
11 - 16	2.5Y 6/1	60	7.5YR 5/6	40	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✔ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

Upland plot - located in a relatively flat, transitional area near the wetland and does have hydric soils.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 04/03/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W22-U02

Investigator(s): Z. Fink, J. Carlo Section, Township, Range:

Landform (hillslope, terrace, etc.): Hill slope Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): 148/LRRS Lat: 2696989.1 Long: 322186.1 Datum: NAD83

Soil Map Unit Name: Udorthents shale and sandstone 0 - 8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
Plot is located roughly 2 feet higher in elevation than paired plot W02 on a slight slope above the wetland in a maintained lawn beneath a mature A. rubrum.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W22-U02**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Poa pratensis	30	Yes	FACU
2. Poa annua	30	Yes	FACU
3. Teraxacum officinale	5	No	FACU
4. Plantago major	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	110 (A)		400 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W22-U02**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 11	10YR 3/2	100					SL	Rock/root refusal

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

WETLAND ID: WW-W23

Wetland Jurisdictional Field Data Sheet

Is wetland hydrologically isolated?

- ☐ **yes**
- ☒ **no**
- ☐ **could not be determined because wetland extends beyond the ROW**

If no, explain hydrologic connection:

The wetland is fed by culverts D27 and D24. The wetland is drained via drainage D25 which runs roughly south to culvert D26. All drainage from this wetland exits the survey corridor via culvert D26.

Associated Stream:

- ☐ **yes**
- ☐ **no**

If yes, list ID: SS-_____
(Use separate datasheet for each associated stream)

Approximate distance of wetland to stream (straight aerial feet):_____

Comments:

Wetland Association to Stream

Is the wetland:

- ☐ **directly abutting**
- ☐ **adjacent (not directly but hydrologically connected)**

Wetland adjacency determination (if not directly abutting):

- ☐ **Discrete wetland hydrologic connection**
- ☐ **Ecological connection**
- ☐ **Separated by berm/barrier**

Explain:

Surface flow type from wetland to associated stream:

- ☐ **intermittent surface** ☐ **ephemeral surface**
- ☐ **perennial surface** ☐ **no surface flow**

Surface flow characteristic from wetland to associated stream:

- ☐ **discrete** ☐ **overland sheet flow**
- ☐ **confined**
- ☐ **other, explain:_____**

Definitions

Abutting: Wetlands that provide a continuous surface connection to relatively permanent waters that flow directly or indirectly into TNWs are abutting. The wetland boundary must interface with the OHWM of the tributary. If the wetland boundary does not abut the OHWM of the tributary, the wetland is adjacent. Abutting wetlands are not separated from tributaries by uplands, berms, dikes, or similar features. It is important to note, a continuous surface connection does not require surface water to be continuously present between the wetland and tributary.

Adjacent: bordering, contiguous, or neighboring. Adjacent wetlands may have a continuous surface connection to TNWs, but may also be separated from these waters by man-made dikes or barriers, natural river berms, beach dunes, or similar features. By definition, a continuous surface water connection is not required to establish adjacency.

Hydrologically Isolated: no surface water connections to other aquatic features exist.

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Discrete: not defined bed and banks, slight depression where water runs.

Confined: defined bed and banks.

Overland Sheet Flow: no defined channel, comprised of runoff.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/12/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W23-W01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR or MLRA): 148 / S Lat: 2699361.9 Long: 321229.0 Datum: NAD 83

Soil Map Unit Name: Udorthents Shale and Sandstone, 0-8% slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
This plot is located at the edge of a wide stormwater retention ditch with wooded margins. The plot is near the outlet for the system (culvert D26) and is located roughly 5' lower in elevation than the paired plot U01.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 10-12

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Surface water was not present in this general area of the wetland but was observed at other locations during the delineation.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W23-W01**

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Carex vulpinoidea	70	Y	OBL
2. Juncus effusus	15	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		100 (B)

Prevalence Index = B/A = 1.2

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
This plot as well as the southern area of the wetland in general is populated mostly by Carex v.

SOIL

Sampling Point: **W23-W01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 4/3	95	7.5YR 3/4	5	C	M	SL	
4-12	7.5YR 4/3	90	7.5YR 3/4	10	C	M	SL	
12-14	7.5YR 4/2	90	7.5YR 3/4	10	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ✔ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:
This plot is located in 148/S and qualifies for problematic indicator red parent material in the second layer. A depleted matrix observed in the third begins too deep in the soil profile to qualify for the depleted matrix indicator.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Willow Grove EIS City/County: Montgomery Sampling Date: 05/12/2013

Applicant/Owner: U.S. Navy State: PA Sampling Point: W23-U01

Investigator(s): Z. Fink / R. Wardwell Section, Township, Range: Horsham Township

Landform (hillslope, terrace, etc.): Berm Local relief (concave, convex, none): convex Slope (%): 15-20

Subregion (LRR or MLRA): 148 / S Lat: 2699374.2 Long: 321217.8 Datum: NAD 83

Soil Map Unit Name: Udorthents, Shale and Sandstone, 0-8% slopes NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
This plot is located on a man-made berm associated with a wetland stormwater retention ditch. The plot is located in a wooded area roughly 5' higher in elevation than the paired wetland plot W01.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators were met however soils were moist throughout the profile and nearly saturated at 13".

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: **W23-U01**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula lenta	50	Y	FACU
2. Ulmus rubra	20	Y	FAC
3. Acer negundo	10	N	FACW
4.			
5.			
6.			
7.			
8.			
	80%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Acer negundo	15	Y	FACW
2. Betula lenta	15	Y	FACU
3. Rosa multiflora	15	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	45%	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Solidago canadensis	50	Y	FACU
2. Carex blanda	15	Y	FAC
3. Fragaria vesca	10	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75%	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 42.86% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	35	x 3 =	105
FACU species	140	x 4 =	560
UPL species	0	x 5 =	0
Column Totals:	200 (A)		715 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: **W23-U01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-13	7.5YR 4/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:
Uniform single layer.

STREAM ID: SS S01

STREAM DATA

☐ ROW ☑ Project Facility STATE: PA
☐ Access Road ☐ Staging/Storage Area PROJECT Willow Grove EIS

County: Montgomery

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 05/02/13

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Observers: R. Wardell, Z. Fink

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☐ Perennial ☑ Intermittent ☐ Ephemeral

Stream Flow Direction: SE

Width (ft) (water's edge to water's edge): 2

Width (ft) (bank to bank): 12
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☑ Sand
- ☑ Silt
- ☑ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☑ N/A
- ☐ 0 – 6"
- ☐ 7 – 12"
- ☐ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☐ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other

STREAM BANK HEIGHT AND SLOPE

Left Bank*	Right Bank*
Height (ft): 3	Height (ft): 5
Slope: ☐ 0-30º (4:1)	Slope: ☐ 0-30º (4:1)
☐ 31-45º (3:1)	☐ 31-45º (3:1)
☑ 46-60º (2:1)	☑ 46-60º (2:1)
☐ 61-90º (1:1)	☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 1
*Direction when facing downstream

Evidence of Erosion: ☑ yes ☐ no

☑ Sloughing ☑ Undercutting ☐ Impact from Cattle

☐ Other:

Top of Bank Characteristics

Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
*Direction when facing downstream

ASSOCIATED HABITAT

Riparian Vegetation
☑ yes
☐ no
If yes, list:
Faxinus pennsylvanica, Acer rubrum., Quercus rubra, Rosa multiflora., Lindera benzoin.

Width of riparian corridor (ft): 100

Stream Fringe (5' or less including both banks)

☐ yes, width (ft):
☑ no
If yes, list :

Aquatic Vegetation
☐ yes
☑ no
If yes, list:

ASSOCIATED SPECIES

Aquatic Organisms
☐ yes
☑ no
If yes, list:

Riparian/Terrestrial Organisms
☑ yes
☐ no
If yes, list:
Deer, Canada goose

Stream has potential for fish presence
☐ yes
☑ no

T&E Species
☐ yes, list ID:
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☐ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☑ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):

Discontinuous OHWM: ☐ yes ☑ no

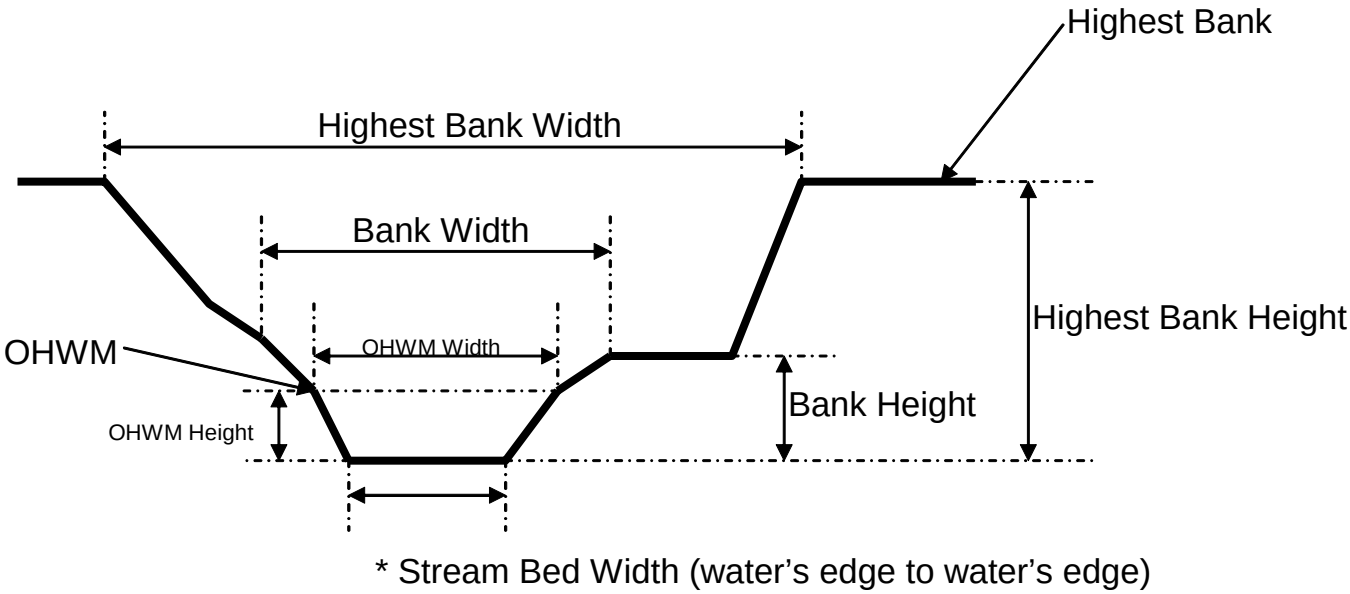
Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☐ run ☑ pools ☐ riffles

Is the stream/tributary:
☑ natural
☐ manmade – Explain:
☐ man-altered – Explain:

NOTES:

At the time of survey, perceptible flow was absent however puddles of ponded water remained in the channel. These were up to 2" deep and had an oily sheen. The stream is branched to the west, these channels are ephemeral and originate within the survey corridor. The main channel extends NW of the survey corridor. The stream terminates on the survey corridor at S02, Park Creek. The stream abutts W02 and drains it into Park Creek. The riparian corridor is primarily forested.



*Stream bed width is variable

DEFINITIONS:

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Run: A reach of stream characterized by fast flowing low turbulence water.

Riffle: A reach of stream that is characterized by shallow, fast moving water broken by the presence of rocks and boulders.

Pool: A reach of stream that is characterized by deep low velocity water and a smooth surface.

STREAM ID: SS S02

STREAM DATA

☐ ROW ☑ Project Facility **STATE**: PA
☐ Access Road ☐ Staging/Storage Area **PROJECT** Willow Grove EIS

County: Montgomery

Stream Name: ☐ UNNAMED ☑ NAMED: Park Creek

Date: 05/02/13

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Observers: Z. Fink, R. Wardwell

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: NE

Width (ft) (water's edge to water's edge): 30

Width (ft) (bank to bank): 45
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☑ Sand
- ☑ Silt
- ☑ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☐ N/A
- ☐ 0 – 6"
- ☐ 7 – 12"
- ☑ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☑ Clear
- ☐ Discolored
- ☐ Oily Film
- ☐ Other

STREAM BANK HEIGHT AND SLOPE

Left Bank*	Right Bank*
Height (ft): 6	Height (ft): 8
Slope: ☐ 0-30º (4:1)	Slope: ☐ 0-30º (4:1)
☑ 31-45º (3:1)	☐ 31-45º (3:1)
☐ 46-60º (2:1)	☐ 46-60º (2:1)
☐ 61-90º (1:1)	☑ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 3
***Direction when facing downstream**

Evidence of Erosion: ☑ yes ☐ no

☑ Sloughing ☑ Undercutting ☐ Impact from Cattle

☐ Other:

Top of Bank Characteristics
Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
***Direction when facing downstream**

ASSOCIATED HABITAT

Riparian Vegetation
☑ yes
☐ no
If yes, list:
Acer sacharinium, Acer rubrum, Rosa multiflora, Acer negundo,Lindera benzoin, Quercus r, Fraxinus pennsylvanica, Ulmus

Width of riparian corridor (ft): 150-300

Stream Fringe (5' or less including both banks)

☐ yes, width (ft):
☑ no
If yes, list :

Aquatic Vegetation
☐ yes
☑ no
If yes, list:

ASSOCIATED SPECIES

Aquatic Organisms
☑ yes
☐ no
If yes, list:
Fish, macro invertebrates

Riparian/Terrestrial Organisms
☑ yes
☐ no
If yes, list:
Deer, geese

Stream has potential for fish presence
☑ yes
☐ no

T&E Species
☐ yes, list ID:
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☐ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☐ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☑ abrupt change in plant community
- ☐ other (list):

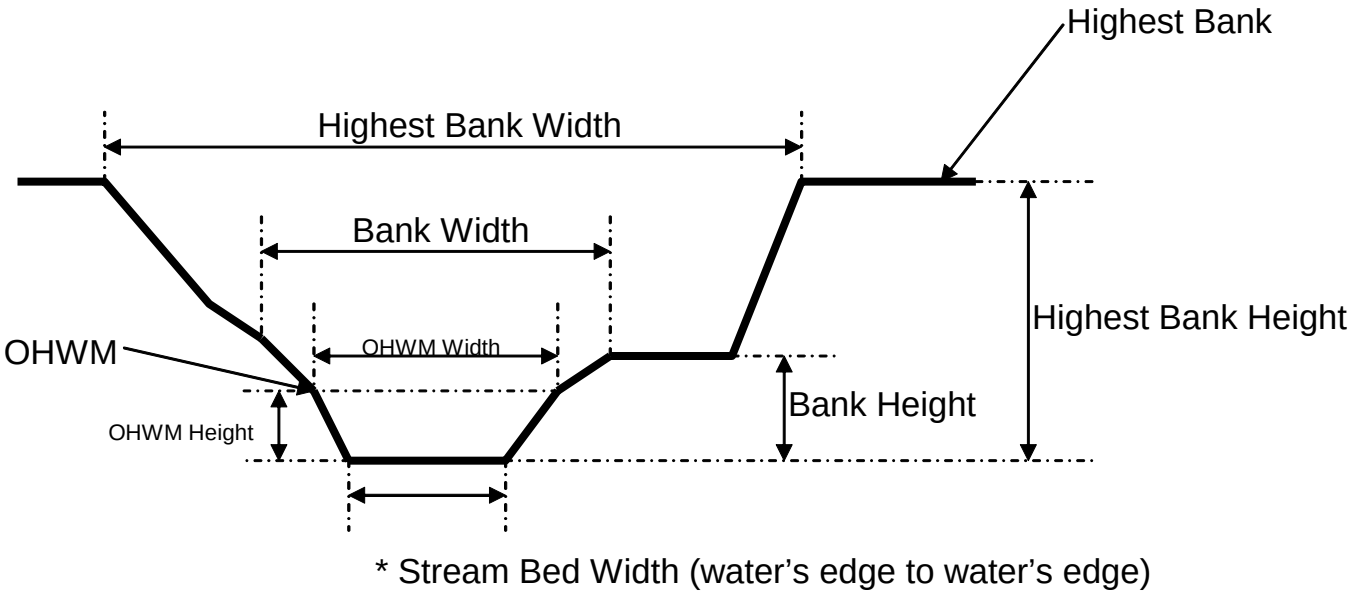
Discontinuous OHWM: ☐ yes ☑ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☑ pools ☑ riffles

Is the stream/tributary:
☐ natural
☐ manmade – Explain:
☑ man-altered – Explain: bridged and dammed W of survey corridor (PH-002-004)

NOTES:
In some areas bank width can reach 55' and 9' height, wet width 45'. Keith Valley Road construction has removed most of the riparian corridor along the right bank. A dam or spillway of some sort upstream off corridor is a barrier to fish passage. SW outfalls empty to stream including (D03, D04, D05). The stream was mapped from the right bank. The stream is the ultimate drainage for general area, including S01, W02, W03, and W04, as well as drainages D03, D04, and D05.



*Stream bed width is variable

DEFINITIONS:

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Run: A reach of stream characterized by fast flowing low turbulence water.

Riffle: A reach of stream that is characterized by shallow, fast moving water broken by the presence of rocks and boulders.

Pool: A reach of stream that is characterized by deep low velocity water and a smooth surface.

STREAM ID: SS S03

STREAM DATA

☐ ROW ☐ Project Facility **STATE** PA
☐ Access Road ☐ Staging/Storage Area **PROJECT** Willow Grove

County: Montgomery

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 4/4/2013

Stream Type: ☑ STREAM ☑ DITCH/CANAL channelized natural drainage

Observers: Z. Fink, J. Carlo

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☐ Perennial ☑ Intermittent ☐ Ephemeral

Stream Flow Direction: SE

Width (ft) (water's edge to water's edge): 3 feet

Width (ft) (bank to bank): 12 feet
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☐ Gravel
- ☑ Sand
- ☑ Silt
- ☐ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☐ N/A
- ☑ 0 – 6"
- ☐ 7 – 12"
- ☐ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☐ Clear
- ☑ Discolored
- ☐ Oily Film
- ☐ Other

STREAM BANK HEIGHT AND SLOPE

Left Bank*	Right Bank*
Height (ft): 3.5	Height (ft): 3.5
Slope: ☐ 0-30º (4:1)	Slope: ☐ 0-30º (4:1)
☑ 31-45º (3:1)	☑ 31-45º (3:1)
☐ 46-60º (2:1)	☐ 46-60º (2:1)
☐ 61-90º (1:1)	☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 1 foot
***Direction when facing downstream**

Evidence of Erosion: ☑ yes ☐ no

☐ Sloughing ☑ Undercutting ☐ Impact from Cattle

☐ Other:

Top of Bank Characteristics
Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
***Direction when facing downstream**

ASSOCIATED HABITAT

Riparian Vegetation
☐ yes
☑ no
If yes, list:

Width of riparian corridor (ft):

Stream Fringe (5' or less including both banks)
☐ yes, width (ft):
☑ no
If yes, list :

Aquatic Vegetation
☐ yes
☑ no
If yes, list:

ASSOCIATED SPECIES

Aquatic Organisms
☐ yes
☑ no
If yes, list:

Riparian/Terrestrial Organisms
☐ yes
☑ no
If yes, list:

Stream has potential for fish presence
☐ yes
☑ no

T&E Species
☐ yes, list ID:
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☐ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☐ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☑ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ abrupt change in plant community
- ☐ other (list):

Discontinuous OHWM: ☐ yes ☐ no

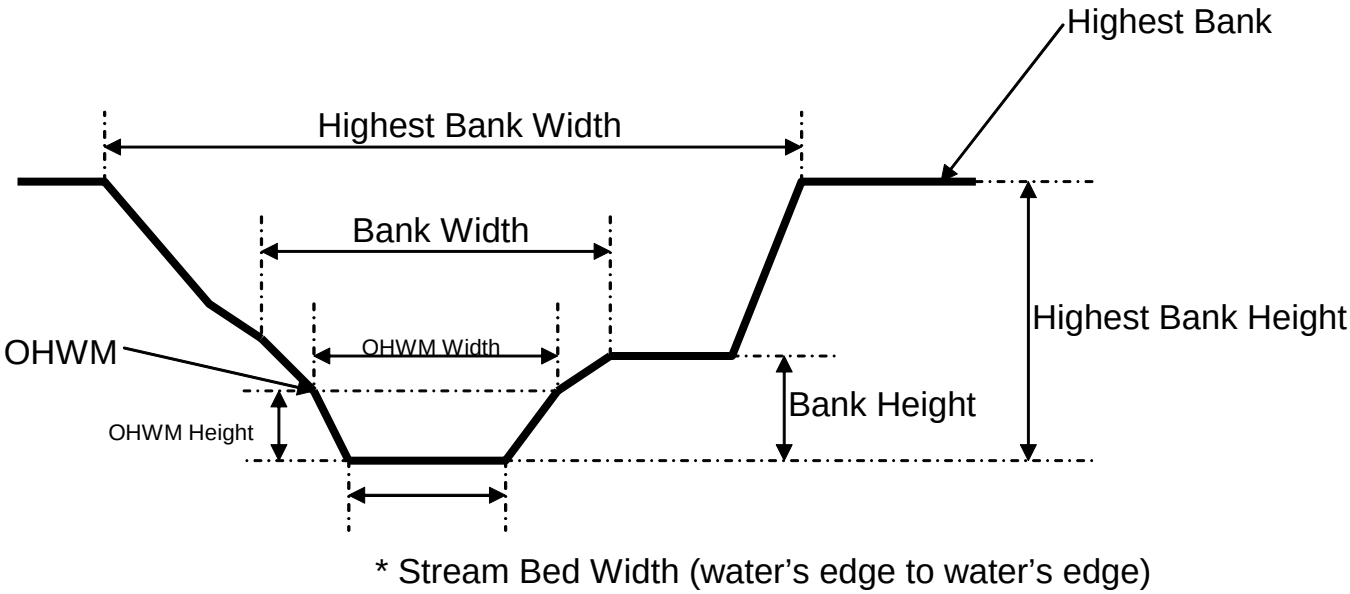
Geometry: ☐ Meandering ☑ Relatively Straight

Presence of: ☐ run ☐ pools ☐ riffles

Is the stream/tributary:
☐ natural
☐ manmade – Explain:
☑ man-altered – Explain: channelized natural drainage

NOTES:

Appears natural at flags 1 - 3. Flags 4 - S04 appears channelized - man made ditch.



*Stream bed width is variable

DEFINITIONS:

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Run: A reach of stream characterized by fast flowing low turbulence water.

Riffle: A reach of stream that is characterized by shallow, fast moving water broken by the presence of rocks and boulders.

Pool: A reach of stream that is characterized by deep low velocity water and a smooth surface.

STREAM ID: SS S04

STREAM DATA

☐ ROW ☐ Project Facility **STATE** PA
☐ Access Road ☐ Staging/Storage Area **PROJECT** Willow Grove

County: Montgomery

Stream Name: ☑ UNNAMED ☐ NAMED:

Date: 4/3/2013

Stream Type: ☑ STREAM ☐ DITCH/CANAL

Observers: Z. Fink, J. Carlo

CHARACTERISTICS

Water Present: ☑ yes ☐ no

Flow Type: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Flow Direction: SW

Width (ft) (water's edge to water's edge): 3 feet

Width (ft) (bank to bank): 11 feet
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ Bedrock
- ☑ Gravel
- ☑ Sand
- ☑ Silt
- ☑ Cobbles
- ☐ Clay
- ☐ Concrete
- ☐ Other

Probed Stream Depth
- ☐ N/A
- ☑ 0 – 6"
- ☐ 7 – 12"
- ☐ 13 – 24"
- ☐ 25 – 36"
- ☐ 37"+

Water Clarity
- ☐ Clear
- ☐ Discolored
- ☐ Oily Film
- ☑ Other clear with dense algal blooms

STREAM BANK HEIGHT AND SLOPE

Left Bank*	Right Bank*
Height (ft): 3.5	Height (ft): 4.0
Slope: ☑ 0-30º (4:1)	Slope: ☑ 0-30º (4:1)
☐ 31-45º (3:1)	☐ 31-45º (3:1)
☐ 46-60º (2:1)	☐ 46-60º (2:1)
☐ 61-90º (1:1)	☐ 61-90º (1:1)

Height (ft) (OHWM from stream bed): 1 foot
***Direction when facing downstream**

Evidence of Erosion: ☑ yes ☐ no

☑ Sloughing ☑ Undercutting ☐ Impact from Cattle

☐ Other:

Top of Bank Characteristics

Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
***Direction when facing downstream**

ASSOCIATED HABITAT

Riparian Vegetation
☑ yes
☐ no
If yes, list:
P. occidentalis, A. rubrum, C. alba, Rubus spp., Quercus spp.

Width of riparian corridor (ft): 25

Stream Fringe (5' or less including both banks)

☐ yes, width (ft): 0 - 15
☑ no
If yes, list :

Aquatic Vegetation
☑ yes
☐ no
If yes, list:
Algae is present in abundance throughout mapped reach.

ASSOCIATED SPECIES

Aquatic Organisms
☐ yes
☑ no
If yes, list:
Potential exists.

Riparian/Terrestrial Organisms
☐ yes
☑ no
If yes, list:

Stream has potential for fish presence
☑ yes
☐ no

T&E Species
☐ yes, list ID:
☑ no

OHWM Criteria – Ordinary High Water Mark

- ☐ clear, natural line impressed on bank
- ☐ changes in character of soil
- ☐ shelving
- ☐ vegetation matted down, bent or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☐ water staining
- ☐ presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ presence of wrack line
- ☐ sediment sorting
- ☑ scour
- ☐ abrupt change in plant community
- ☐ other (list):

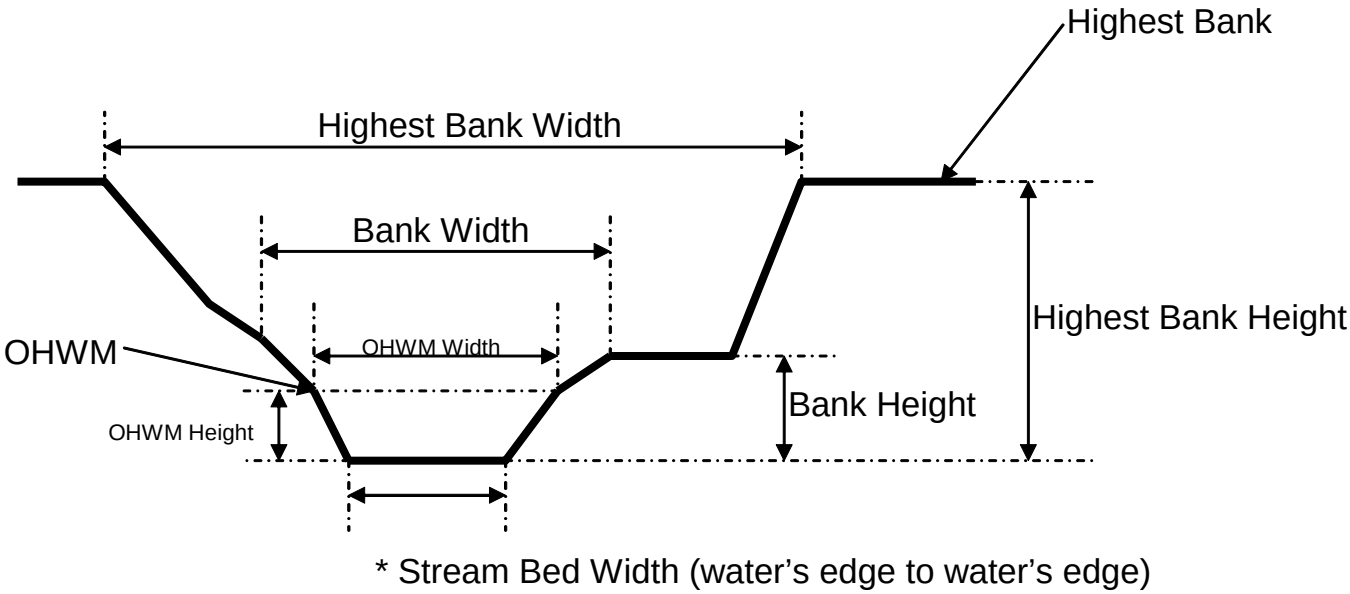
Discontinuous OHWM: ☐ yes ☐ no

Geometry: ☑ Meandering ☐ Relatively Straight

Presence of: ☑ run ☑ pools ☑ riffles

Is the stream/tributary:
☐ natural
☐ manmade – Explain:
☑ man-altered – Explain: culvert in locations

NOTES:
Barriers to fish passage are present. Small cascades present - downed trees, rocks, trash. Flows to confluence with S05. H03 flows into downstream end - exits at base via culvert D22. Stream is braided near data point. At D20 culvert upstream water source could not be traced as large culvert/storm sewer could not be followed to inlet.



*Stream bed width is variable

DEFINITIONS:

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Run: A reach of stream characterized by fast flowing low turbulence water.

Riffle: A reach of stream that is characterized by shallow, fast moving water broken by the presence of rocks and boulders.

Pool: A reach of stream that is characterized by deep low velocity water and a smooth surface.

STREAM ID: SS S05

STREAM DATA

☐ **ROW** ☐ **Project Facility** **STATE** PA
☐ **Access Road** ☐ **Staging/Storage Area** **PROJECT** Willow Grove

County: Montgomery

Stream Name: ☑ **UNNAMED** ☐ **NAMED:**

Date: 4/2/2013

Stream Type: ☑ **STREAM** ☐ **DITCH/CANAL**

Observers: Z. Fink, J. Carlo

CHARACTERISTICS

Water Present: ☑ **yes** ☐ **no**

Flow Type: ☑ **Perennial** ☐ **Intermittent** ☐ **Ephemeral**

Stream Flow Direction: SW, breaking due W

Width (ft) (water's edge to water's edge): 3 feet

Width (ft) (bank to bank): 4 feet
(above OHWM; use OHWM Criteria below)

CHARACTERISTICS

Substrate Type
- ☐ **Bedrock**
- ☐ **Gravel**
- ☑ **Sand**
- ☑ **Silt**
- ☑ **Cobbles**
- ☐ **Clay**
- ☐ **Concrete**
- ☐ **Other**

Probed Stream Depth
- ☐ **N/A**
- ☑ **0 – 6"**
- ☐ **7 – 12"**
- ☐ **13 – 24"**
- ☐ **25 – 36"**
- ☐ **37"+**

Water Clarity
- ☑ **Clear**
- ☐ **Discolored**
- ☐ **Oily Film**
- ☐ **Other**

STREAM BANK HEIGHT AND SLOPE

Left Bank*	Right Bank*
Height (ft): 1.5	**Height (ft):** 1.0
Slope: ☑ **0-30º (4:1)**	**Slope:** ☑ **0-30º (4:1)**
☐ **31-45º (3:1)**	☐ **31-45º (3:1)**
☐ **46-60º (2:1)**	☐ **46-60º (2:1)**
☐ **61-90º (1:1)**	☐ **61-90º (1:1)**

Height (ft) (OHWM from stream bed): <1 foot
***Direction when facing downstream**

Evidence of Erosion: ☑ **yes** ☐ **no**

☐ **Sloughing** ☑ **Undercutting** ☐ **Impact from Cattle**

☐ **Other:**

Top of Bank Characteristics
Width (ft) Highest Bank to Highest Bank:

Highest Left Bank Height*:
Highest Left Bank Slope*:
Highest Right Bank Height*:
Highest Right Bank Slope*:
***Direction when facing downstream**

ASSOCIATED HABITAT

Riparian Vegetation
☑ **yes**
☐ **no**
If yes, list:
Acer rubrum (tree layer), Cornus stolonifera (sapling/shrub layer)

Width of riparian corridor (ft): 25

Stream Fringe (5' or less including both banks)
☑ **yes, width (ft):** 0 - 15
☐ **no**
If yes, list :
see WW1-04

Aquatic Vegetation
☑ **yes**
☐ **no**
If yes, list:
Unknown

ASSOCIATED SPECIES

Aquatic Organisms
☐ **yes**
☑ **no**
If yes, list:
None observed, but possible is associated ponds

Riparian/Terrestrial Organisms
☑ **yes**
☐ **no**
If yes, list:
White-tailed deer, song sparrow

Stream has potential for fish presence
☐ **yes**
☑ **no**

T&E Species
☐ **yes, list ID:**
☑ **no**

OHWM Criteria – Ordinary High Water Mark

- ☐ **clear, natural line impressed on bank**
- ☐ **changes in character of soil**
- ☐ **shelving**
- ☐ **vegetation matted down, bent or absent**
- ☐ **leaf litter disturbed or washed away**
- ☐ **sediment deposition**
- ☐ **water staining**
- ☑ **presence of litter and debris**
- ☐ **destruction of terrestrial vegetation**
- ☐ **presence of wrack line**
- ☐ **sediment sorting**
- ☐ **scour**
- ☐ **abrupt change in plant community**
- ☐ **other (list):**

Discontinuous OHWM: ☐ **yes** ☑ **no**

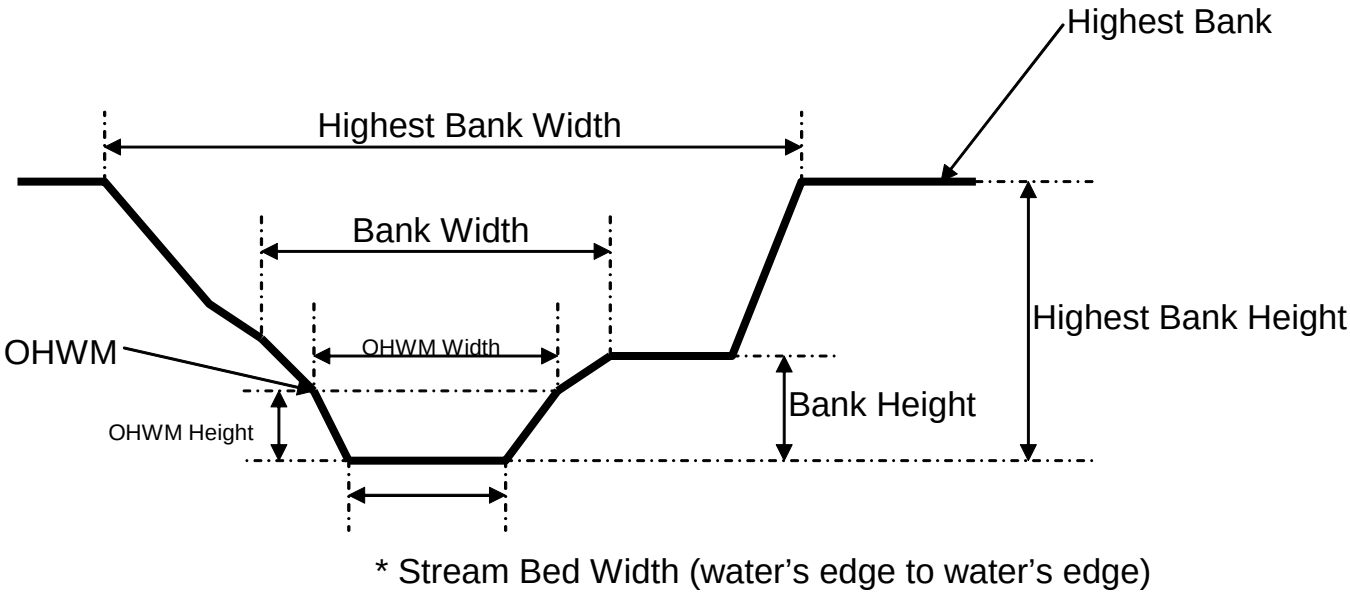
Geometry: ☑ **Meandering** ☐ **Relatively Straight**

Presence of: ☐ **run** ☑ **pools** ☑ **riffles**

Is the stream/tributary:
☐ **natural**
☐ **manmade – Explain:**
☑ **man-altered – Explain:** fed by drainage and old drain pipes present

NOTES:

Not mapped on NHD. Flows W off base via culvert D22. Large portion of W22 is a riparian wetland to this stream. Confluence with S04 near outlet off base. Drains W22, seeps H04 and H05, ponds HY-001-003 and 004 (HY-001-003 and 004 not shown on report figure).



*Stream bed width is variable

DEFINITIONS:

Perennial: has flowing water year-round during a typical year.

Intermittent: has flowing water during certain times of the year, when groundwater provides water for stream flow.

Ephemeral: has flowing water only during, and for a short duration after, precipitation events in a typical year.

Run: A reach of stream characterized by fast flowing low turbulence water.

Riffle: A reach of stream that is characterized by shallow, fast moving water broken by the presence of rocks and boulders.

Pool: A reach of stream that is characterized by deep low velocity water and a smooth surface.

B Photolog

Representative Photo of W01

Representative Photo of W02

Representative Photo of W03

Representative Photo of W04

Representative Photo of W05

Representative Photo of W06

Representative Photo of W07

Representative Photo of W08

Representative Photo of W09

Representative Photo of W10

Representative Photo of W11

Representative Photo of W12

Representative Photo of W13

Representative Photo of W14

Representative Photo of W15

Representative Photo of W16

Representative Photo of W17

Representative Photo of W18

Representative Photo of W19

Representative Photo of W20

Representative Photo of W21

Representative Photo of W22

Representative Photo of W23