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# WETLANDS DELINEATION REPORT

## 25 NEW JERSEY ARMY NATIONAL GUARD INSTALLATIONS

***Prepared for***

**STATE OF NEW JERSEY**
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## APPENDICES

**A** Site Photographs
**B** List of Plant Species Observed on the Site
**C** Wetland Delineation Data Forms
**D** Resumes of Personnel Involved with this Project

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# 1.0 INTRODUCTION

AMEC Earth & Environmental, Incorporated (AMEC), on behalf of the State of New Jersey Department of Military and Veterans Affairs, conducted wetland delineations at twenty-five (25) New Jersey Army National Guard (NJARNG) installations throughout the state. The objective of this effort was to identify the outer boundaries of potentially-regulated wetlands, state open waters, and wetland transition areas (i.e. wetland buffers) at each installation.

## 1.1 Project Sites

The 25 NJARNG sites were as follows:

| Installation Name | Municipality | County |
|---|---|---|
| Bordentown Armory/FMS | Bordentown Township | Burlington |
| Bordentown CSMS A | Bordentown Township | Burlington |
| Bridgeton Armory | Upper Deerfield Township | Cumberland |
| Cape May Armory FMS | Middle Township | Cape May |
| Cherry Hill Armory FMS | Cherry Hill Township | Camden |
| Dover Armory FMS | Dover Township | Morris |
| Flemington Armory | Raritan Township | Hunterdon |
| Fort Dix, 3200 | Wrightstown Borough | Burlington |
| Fort Dix, UTES | Plumsted Township | Ocean |
| Franklin Armory | Franklin Borough | Sussex |
| Hackettstown Armory | Town of Hackettstown | Warren |
| Hammonton Armory | Town of Hammonton | Atlantic |
| Lawrenceville Complex | Lawrence Township | Mercer |
| Morristown Armory FMS | Morris Township | Morris |
| Newton Armory | Town of Newton | Sussex |
| Picatinny FMS | Rockaway Township | Morris |
| Pitman Armory | Washington Township | Gloucester |
| Princeton Warehouse | Princeton Township | Mercer |
| Sea Girt NGTC | Sea Girt Borough | Monmouth |
| Somerset Armory FMS | Franklin Township | Somerset |
| Toms River Armory FMS | Dover Township | Ocean |
| Tuckerton Armory | Tuckerton Borough | Ocean |
| Vineland Armory FMS | Vineland City | Cumberland |
| West Orange Armory FMS/CSMS | West Orange Township | Essex |
| West Trenton AASF/FMS | Ewing Township | Mercer |

The purpose of these wetland delineations was to update existing site survey plans for the installations. The field portion of the delineations was conducted from August 30, 2005 to October 26, 2006. The methods used to conduct these delineations are presented in Section 2.0, whereas the specific results for each installation are presented in their respective sections (i.e. Section 3.0 "Bordentown Armory/FMS"). Each installation section presents its own photo-documentation, a list of plant species observed during the delineation, and wetland delineation field data forms in their respective appendices. The resumes of personnel involved with the wetlands aspect of this project are presented in the main **Appendix D** for this report.

# 2.0 METHODS

The Clean Water Act (CWA) defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 230.3).

The primary governing regulation for freshwater wetlands in the State of New Jersey is the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) (the "Act") and to a lesser extent, the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq. The rules governing the implementation of the Freshwater Wetlands Protection Act and the Water Pollution Control Act are the New Jersey Freshwater Wetlands Protection Act Rules (the "Rules") at N.J.A.C. 7:7A. In addition, freshwater wetlands and State open waters under the jurisdiction of the NJ Pinelands Commission are also subject to the rules under N.J.A.C. 7:7A and the Pinelands Comprehensive Management Plan (CMP) at N.J.A.C. 7:50. These regulations provide more stringent regulation of activities in and around freshwater wetlands and their transition areas.

The State of New Jersey uses the 1989 Federal Interagency Committee for Wetland Delineation "Federal Manual for Identifying and Delineation Jurisdictional Wetlands" to field delineate wetlands within the State of New Jersey. The manual organizes environmental characteristics of a potential wetland into three categories: hydric soils, hydrophytic vegetation, and wetland hydrology. The manual contains criteria for each category. With this approach, an area that meets all three criteria is considered a wetland.

For vegetation, the criteria means that more than 50% of the composition of the dominant species from all strata must be categorized as hydrophytic or adapted to living in saturated areas. That is, the plant species must be classified as obligate, facultative wetland or facultative as defined in the *National List of Plant Species That Occur in Wetlands*, published by the United States Fish & Wildlife Service (USFWS), and where applicable, as revised by the NJ Pinelands Commission. Soils are considered hydric if they meet the criteria defined by the National Technical Committee for Hydric Soils in *Hydric Soils of the United States* (Soil Conservation Service, 1987). Wetland hydrology must be present to affect either permanent or periodic saturation of the soil.

The first criterion, hydrophytic vegetation, is considered to be present when a predominance of the plant species present in a community is either obligate, facultative wetland, or facultative. The United States Fish and Wildlife Service (USFWS) has compiled data on the habitat characteristics of plants of the United States based on frequency of observation in various regions. This list categorizes plant species by their frequency of occurrence as follows:

**Obligate Wetland Plants (OBL):** Those species that occur almost exclusively in wetlands (>99 percent of the time)

**Facultative Wetland Plants (FACW):** Those species that usually occur in wetlands (67 - 99 percent of the time)

**Facultative Plants (FAC):** Those species equally likely to occur in wetland or non-wetland (34 - 66 percent of the time)

**Facultative Upland Plants (FACU):** Those species that usually occur in non-wetlands (67 - 99 percent of the time)

**Upland Plants (UPL):** Those species that occur almost exclusively in uplands (>99 percent of the time).

Excluding New Jersey, some regulatory programs assign a positive (+) or negative (-) symbol in conjunction with one of the facultative indicator classes. This designation identifies a species' preference to either the wetter or drier end of its indicator class, with the positive sign indicating a preference to the wetter end of the class. Species for which insufficient information is available for classification are listed in the USFWS list with a designation of No Indicator (NI) for regional status. A designation of Not Listed (NL) was assigned by AMEC if a species was not present on the USFWS list. According to the "1989 Manual", plants not listed are presumed to be upland species. A designation of Not Applicable (NA) was assigned by AMEC for vegetation that could not be identified to species level. Furthermore, the NJ Pinelands Commission has revised several of the USFWS indicators to more accurately reflect the probabilities of certain plant species occurring on the sandy substrates that characterize this region. These modifiers are presented in the "*NJ Pinelands Commission Manual for Identifying and Delineating Pinelands Area Wetlands*" (Zampella, 1991).

To accurately describe the vegetation at each sampling point, data on each horizontal strata or layer was collected. Vegetative strata for which dominants were determined included:

**Tree** ($\geq$ 5.0 inches diameter at breast height (dbh) and 20 feet or taller)

**Sapling** (0.4 to < 5.0 inches dbh and 20 feet or taller)

**Shrub** (usually 3 to 20 feet tall, including multi-stemmed, bushy shrubs and small trees and saplings)

**Woody vine** (determined by morphological characteristics and botanical classification)

**Herb** (herbaceous plants, including graminoids, forbs, ferns, fern allies, herbaceous vines, and tree seedlings)

The dominant species was determined by making visual estimates of tree, sapling, shrub, woody vine, and herb strata and by assigning one of the following cover classes, with the midpoints of each cover class in parentheses:

- T < 1 percent (0)
- 1 = 1-5 percent (3.0)
- 2 = 6-15 percent (10.5)
- 3 = 16-25 percent (20.5)
- 4 = 26-50 percent (38.0)
- 5 = 51-75 percent (63.0)
- 6 = 76-95 percent (85.5)
- 7 = 96-100 percent (98.0)

The midpoints of each species were averaged at each sample point and ranked. The dominance threshold number was calculated and used to determine dominant species. Those species composing 50 percent of the total cover were considered to be the dominants, as were additional species representing 20 percent or more of the total cover class midpoint values for each stratum. A USFWS wetland indicator or NJ Pinelands Commission indicator was assigned to each recorded species. The affinity of the dominant species to wetlands was used in determining the wetland status of each sample point.

A two-step process was used to determine the presence of hydric soils at each site. A preliminary desk-top assessment was first conducted that involved reviewing USDA Soil Conservation Service (SCS) soil survey manuscripts, USDA Natural Resource Conservation Service (NRCS) soils GIS data, and the USDA state hydric soils lists. This desk-top assessment provided a coarse-scale examination of the potential locations for hydric soils on each site, as well as providing information on historical land use.

The second step of this process was the field examination of site soils. Soil borings (a maximum depth of 18 inches) were used to examine the nature of the soil below the "A" horizon. The hydric nature of soils can generally be determined by color changes resulting from the chemical reduction of soil components, which occurs because of extended periods of saturation or inundation. The Munsell Soil Color Charts were developed in order to assign values to these colors to simplify classification. The Munsell system uses three components in assigning color to a soil: hue, value, and chroma:

**Hue:** Related to one of the main spectral colors: red, yellow, green, blue, or purple, or various mixtures of these principal colors

**Value:** Refers to the degree of lightness

**Chroma:** Indicates the color strength or purity

In mineral soils, two or more colors may exist within the same soil. The dominant color is referred to as the matrix while the less dominant is referred to as the mottle. Mottling tends to occur under fluctuating conditions of saturation. Mineral soils are considered hydric if the matrix chroma is 2 or less when mottling is present, or when the matrix chroma is 1 or less if no mottling is present.

Other soil characteristics, such as high organic content, gleying, histic epipedons, sulfidic materials, aquic or peraquic moisture regime, root pore linings, and iron or manganese concretions, are also indicators of a hydric soil condition.

The last parameter, wetland hydrology, is present when inundation or saturation of the soil within 6 inches to 18 inches of the surface occurs for a minimum of 7 consecutive days during the growing season. In periods during which inundation or saturation is not present, field indicators are typically used to determine the presence of wetland hydrology. Wetland hydrology field indicators are grouped into two categories: primary indicators and secondary indicators. Primary indicators are typically considered to be robust indicators of wetland hydrology and include, but are not limited to, inundation and saturation (as noted above), water marks, drift lines, sediment deposits, and drainage patterns in the ground layer. Secondary indicators are relatively less robust and include, but are not limited to, the presence of a high frequency of

oxidized root channels (i.e., pore linings) near the soil surface, water-stained leaves, local soil survey hydrology data, and various environmental or ecological indicators.

A desktop survey was conducted to develop a preliminary understanding of the possible extent of the wetlands in advance of the field delineation. The desktop survey included a review of available information, including United States Geological Survey (USGS) 7.5-foot quadrangle topographic maps, USFWS National Wetlands Inventory (NWI) maps, NJDEP Freshwater Wetland Maps, USDA SCS soil surveys, USDA NRCS soils data, and aerial photographs of the Site.

In the field, wetland delineation involves determining the boundary line between the areas in which the three-wetland parameters are present and where they are not. Using perceived changes in elevation and vegetation as a guide, representative observation points were selected along the apparent border of any potential wetland areas. Soil borings were made to determine the presence of hydric soil and wetland hydrology at each of the observation points. Observations were made on both the suspect wetland and upland side.

## 2.1 Wetland Buffers

This section discusses the concept of wetland buffers in the State of New Jersey and their regulation by the NJDEP under the aforementioned Freshwater Wetland Act Rules at N.J.A.C. 7:7A. This section also discusses the April 2007 Rare Species Survey Report prepared by Parsons and Andrea M. Teti, Inc. (AMT) for a subset of the NJARNG installations, and the role that the rare species data play in determining the types of wetland buffers that would likely be applied by the NJDEP. This wetlands delineation effort thus incorporates the findings of the rare species survey with AMEC's field observations of the wetland and upland habitats to provide an estimate of the likely wetland buffer.

In addition, NJDEP wetland regulations require property owners to comply with wetland buffer requirements if the wetland occurs on an adjacent owner's property. Therefore, AMEC performed "windshield" wetland surveys of adjacent properties to determine if offsite wetlands produced wetland buffers on any facility surveyed.

### 2.1.1 NJDEP Wetland Resource Values

In the State of New Jersey, wetlands regulated under the Freshwater Wetlands Act Rules at N.J.A.C. 7:7A are categorized into one of three "resource value" types, which subsequently governs the widths of their respective buffers, or as codified in Subchapter 2 of N.J.A.C. 7:7A, their "transition area". The transition area is defined at N.J.A.C. 7:7A-1.4 as *"…an area of upland adjacent to a freshwater wetland which minimizes adverse impacts on the wetland or serves as an integral component of the wetlands ecosystem*". The three resource value types in Subchapter 2 are most easily understood by defining them in the following order: exceptional resource value, intermediate resource value, and ordinary resource value. These definitions are presented below, largely excerpted from the Rules.

An **exceptional resource value** wetland:

1. Discharges into FW1 or FW2 trout production waters of their tributaries;

2. Is a present habitat for threatened or endangered species; or
3. Is a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat.

From the above criteria, the NJDEP identifies "present habitat" and "documented habitat" based on the GIS data contained in the NJDEP Landscape Project, a supplement to their Natural Heritage Program database.

An **ordinary resource value** wetland:

1. Does not exhibit any of the above characteristics of an exceptional resource value wetland;
2. Is an isolated wetland as defined at N.J.A.C. 7:7A-1.4 which must also be:

    i. Smaller than 5,000 square feet; and

    ii. Has the uses listed below covering more than 50 percent of the area within 50 feet of the wetland boundary, provided that the use was legally existing prior to July 1, 1998, or was permitted by the Rules since that date:

        (1) Lawns;
        (2) Maintained landscaping;
        (3) Impervious surfaces;
        (4) Active railroad rights-of-way; and
        (5) Gravelled or stoned parking/storage areas and roads;

3. A drainage ditch (as defined at N.J.A.C. 7:7A-1.4);
4. A swale (as defined at N.J.A.C. 7:7A-1.4); or
5. A detention facility created by humans in an area that was upland at the time the facility was created.

An **intermediate resource value** wetland is any freshwater wetland that is not an exceptional resource value wetland or an ordinary resource value wetland.

The Rules implement standard transition area widths for each of the above three resource value wetland types as follows:

| RESOURCE VALUE | STANDARD TRANSITION AREA WIDTH |
|---|---|
| Ordinary | 0 feet |
| Intermediate | 50 feet |
| Exceptional | 150 feet |

Activities proposed to be conducted within these transition areas require prior approval from the NJDEP. These approvals include wetland permits and permits specific to transition areas only (i.e. transition area waivers).

### 2.1.2 Rare Species Survey

The results of the April 2007 Rare Species Survey Report were reviewed during the preparation of this Wetlands Delineation Report. This rare species survey was conducted by Parsons and Andrea M. Teti, Inc. for the following 15 NJARNG installations:

- Bordentown CSMS
- Cape May Armory
- Dover Armory
- Fort Dix HQ, FMS, and RTS-M
- Fort Dix UTES
- Franklin Armory
- Hammonton Armory
- Morristown Armory
- Picatinny FMS
- Princeton Warehouse
- Sea Girt NGTC
- Toms River Armory
- Tuckerton Armory
- Vineland Armory
- West Orange Armory

Of the above installations, all but the Fort Dix HQ, FMS, and RTS-M installation were sites investigated by AMEC for wetlands. However, the Fort Dix HQ, FMS, and RTS-M installation abuts the Ft. Dix 3200 site to the north and forms part of the northern boundary of the 3200 site. Briefly, the objective of the rare species survey was to document the presence or absence of rare species and suitable habitat at each of the 15 installations, using information obtained from various state and federal agencies such as the NJDEP, the USFWS, and the NJARNG. These inquiries were supplemented with Phase I and Phase II field assessments conducted at select installations to verify the presence of rare species and/or their habitats.

The results of the survey yielded numerous positive specimen sightings and captures, and documented the presence or absence of suitable habitat for various species. The site-specific results are presented in each respective section of this delineation report. These results were used in conjunction with additional field observations of the wetlands made during the delineation effort, in order to estimate the likely resource value classification that would be applied to the wetlands by the NJDEP, and thus, the likely width of the transition area.

### 2.1.3 Additional Land Use Regulation

This section presents a list and brief overview of additional land use regulations that may be applicable to the various NJARNG sites investigated for wetlands.

#### 2.1.3.1 NJDEP Stormwater Management - Category 1 (C1) Waters

Streams classified by the NJDEP as Category 1 (C1) waters, and their tributaries will possess a 300-foot wide buffer, codified as a "*special water resource protection area*" (N.J.A.C. 7:8 – Stormwater Management Rules). Additional stormwater management rules also apply for land areas within C1 watersheds. These rules are implemented directly by the NJDEP through its Land Use Regulation Program (LURP), and indirectly through the Residential Site Improvement

Standards (RSIS) and through implementation of the Municipal Phase II Stormwater Ordinance Program. Of the 25 NJARNG installations investigated in this study, the following may be subject to regulation under the NJ Stormwater Management Rules for their proximity to, or drainage into, C1 waters:

- Cape May Armory FMS
- Dover Armory FMS
- Flemington Armory
- Fort Dix, 3200
- Fort Dix, UTES
- Franklin Armory
- Hackettstown Armory
- Hammonton Armory
- Newton Armory
- Picatinny FMS
- Pitman Armory
- Sea Girt NGTC
- Toms River Armory FMS

#### 2.1.3.2 NJ Pinelands Protection Program – Comprehensive Management Plan (CMP)

Sites located in areas regulated by the NJ Pinelands Commission under the Pinelands Protection Program, will have around their wetlands a 300-foot wide buffer. Additionally, land use regulation within these areas is governed by the NJ Pinelands Commission's Comprehensive Management Plan (CMP) Rules at N.J.A.C. 7:50, with input from the NJDEP. Of the 25 NJARNG installations investigated in this study, the following may be subject to regulation by the NJ Pinelands Commission:

- Hammonton Armory
- Fort Dix, 3200
- Fort Dix, UTES

#### 2.1.3.3 Federally-Listed Species (USFWS and NMFS)

Land use on sites that contain a federally threatened or endangered species, or are within the immediate vicinity of a site containing a federally threatened or endangered species, may also be regulated by the USFWS and the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA). Of the 25 NJARNG installations investigated in this study, the following may be subject to additional regulated by federal entities based on the results of the April 2007 Rare Species Survey:

- Dover Armory FMS
- Franklin Armory
- Hammonton Armory
- Morristown Armory
- Tuckerton Armory.

#### 2.1.3.4 Coastal Zone Management (CZM)

In addition to regulation under the New Jersey Freshwater Wetlands Act, tidal wetlands and upland areas adjacent to the tidal wetlands are additionally regulated by the Waterfront Development Law of 1914, the Coastal Area Facility Review Act (CAFRA) of 1973, and possibly the Wetlands Act of 1970, under the Coastal Zone Management (CZM) Act of 1972, as amended, with rules at N.J.A.C. 7:7 and 7:7E. Depending upon the land use of the adjacent upland area, the spatial configuration of existing and any proposed development and a case-specific analysis of any proposed activities, the limits of upland regulation may extend to a distance of 500 feet from the wetlands boundary.

Of the 25 NJARNG installation investigated for this study, the following may be subject to additional land use regulation under the Coastal Management Zone (CMZ) rules at N.J.A.C. 7:7:

- Sea Girt NGTC
- Toms River Armory
- Tuckerton Armory
- Cape May Armory

# 3.0 BORDENTOWN ARMORY/FMS

This section of the report presents the results of the wetlands delineation for the Bordentown Armory/FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation.

## 3.1 Site Location

The Bordentown Armory/FMS installation is a 4.3-acre parcel designated as Block 128.01, Lot 18 in the Township of Bordentown, Burlington County, New Jersey (**Figure 1**). It is located on the southbound side of U.S. Highway 206 (Route 206), south of the intersection of U.S. Highway 130 (Route 130). The NJ State Plane Coordinates for the site are East 434623.377184 feet and North 473648.446842 feet. The site is located in the Inner Coastal Plain physiographic section of New Jersey, in the Blacks Creek watershed of Watershed Management Area 20 (Assicunk, Crosswicks, and Doctors).

The site is bound to the north and south by undeveloped land, to the east by Route 206, and to the west by a wastewater treatment plant. The surrounding land use is mixed rural, commercial, and residential. The main developed portion of the installation (i.e. building, parking lot, and other structures) is generally situated in the central and northern portions of the site, whereas the naturalized areas are generally to the west. A description of these areas is presented in Section 3.2.

## 3.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 3.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 20 and 50 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Blacks Creek, a tributary to the Crosswicks Creek/Delaware River complex. At its closest point, Blacks Creek is approximately 1,000 feet to the southeast of the site. A wastewater treatment plant, among other properties, is situated between the site and Blacks Creek. Net drainage on the site is to the south, towards the treatment plant.

### 3.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetlands to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped community is a palustrine, forested, broad-leaved deciduous wetland (PFO1) located approximately 400 feet to the southwest of the site. This PFO1 wetland is associated with the floodplain of Blacks Creek.

### 3.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site also indicates the wetland community depicted on the NWI, but also indicates the presence of an off-site, deciduous wooded wetland along a portion of the northern site boundary (**Figure 3B**).

### 3.2.4 USDA Soils

A review of the USDA soil GIS data for the site area indicates the site to be underlain by a single soil type, Urban land, sandy (UdrB) (**Figure 4**). This soil is not listed by the USDA as a hydric soil (USDA 1995).

## 3.3 Results of the Field Assessment

As of September 2005, the Bordentown Armory/FMS installation was composed of the following three distinct community types: deciduous woodland, mowed lawn, and developed land. Although no wetlands were identified within the site boundaries, a portion of the site contains freshwater wetlands transition area from an adjacent, off-site forested deciduous wetland, designated as Wetland Series A (**Figure 5**). Each of these community types, including the off-site wetland, is described below.

An off-site forested deciduous wetland is located to the north of the installation, somewhat adjacent to the installation boundary. This community is an early-stage forested community dominated by a mix of deciduous species such as red maple (*Acer rubrum*, FAC), silver maple (*Acer saccharinum*, FACW), river birch (*Betula nigra*, FACW), pin oak (*Quercus palustris*, FACW), black gum (*Nyssa sylvatica*, FAC), sweetgum (*Liquidambar styraciflua*, FAC), and green ash (*Fraxinus pensylvanica*, FACW) in the canopy and sapling layers. A distinct shrub and ground layer was not apparent at the time of the site visit, likely the result of over-browsing by deer. Nevertheless, the ground layer exhibits occasional populations of soft rush (*Juncus effusus*, FACW+) beneath canopy openings. Otherwise, the ground layer is sparsely vegetated with seedlings of the above tree species.

Soil borings from throughout this community are markedly similar, exhibiting an 8-inch surface horizon of brown (10YR 4/3) sandy loam with ~40% pore linings and ~20% soft, dark masses; above a pan of dark grayish-brown (2.5Y 4/2) clay loam with ~50% pore linings; underlain by an upper subsoil of dark grayish-brown (2.5Y 4/2) medium friable sandy loam with ~30% small, round, quartzose pebbles. This community was identified as a wetland, and an anticipated 50-foot wetlands buffer results in the presence of transition area in the northern portion of the installation.

Mowed lawn and developed land characterizes the majority of the installation property. These areas occupy the central and northern portions of the site. Some intermittent pockets of deciduous woodland are present in the western/south-western portion of the site. These areas are primarily remnant stands of trees that have not been disturbed by development or landscaping. This woodland community was dominated by silver maple (FACW), white ash (*Fraxinus americana*, FACU), and black cherry (*Prunus serotina*, FACU). The ground layer was a mix of species ranging from common lawn weeds to monotypic populations of prickly dewberry (*Rubus flagellaris*, NL).

A topographically low-lying area within this community, suspected of possessing wetland soils was investigated further but did not yield any field indicators of hydric soils. The lowest-lying area in this community exhibited a deep (19-inch), depositional soil of dark brown (7.5YR 3/4) medium to fine sandy loam, with no redoxymorphic features. No areas within the deciduous woodland community, mowed lawn, or developed land area were identified as wetland.

## 3.4 Conclusion

The results of the wetlands delineation conducted for the Bordentown Armory FMS installation revealed the presence of a freshwater wetlands transition area in the northern portion of the site. This transition area results from an off-site forested deciduous wetland depicted as Wetland Series A on **Figure 5**. It is anticipated that this wetland will be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer), as per Subchapter 2 of N.J.A.C. 7:7A.

This conclusion was reached because the off-site wetland does not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

This off-site wetland also does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetland that has 50 percent or more of the area within 50 feet of the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d)..

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Bordentown Armory FMS

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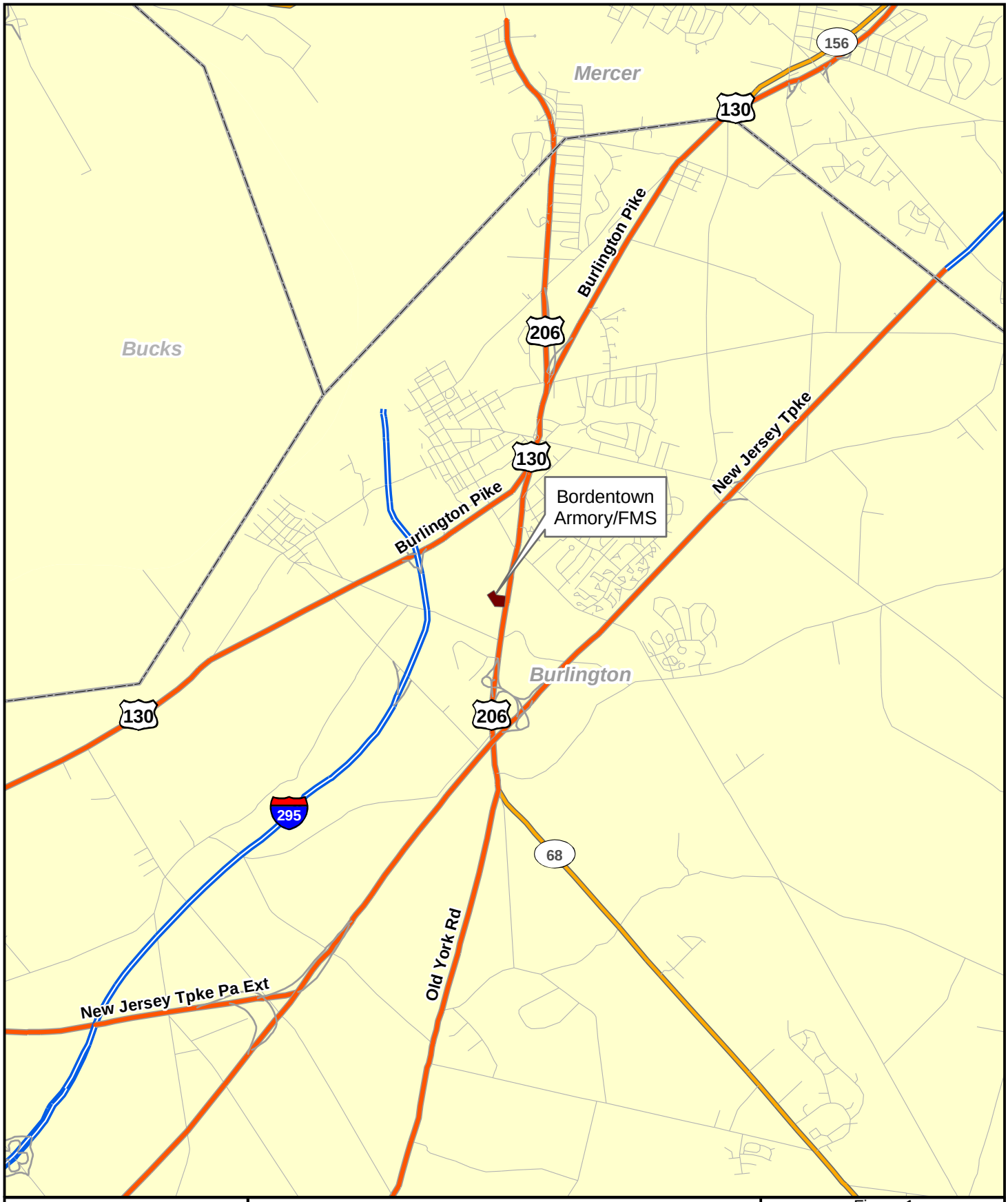




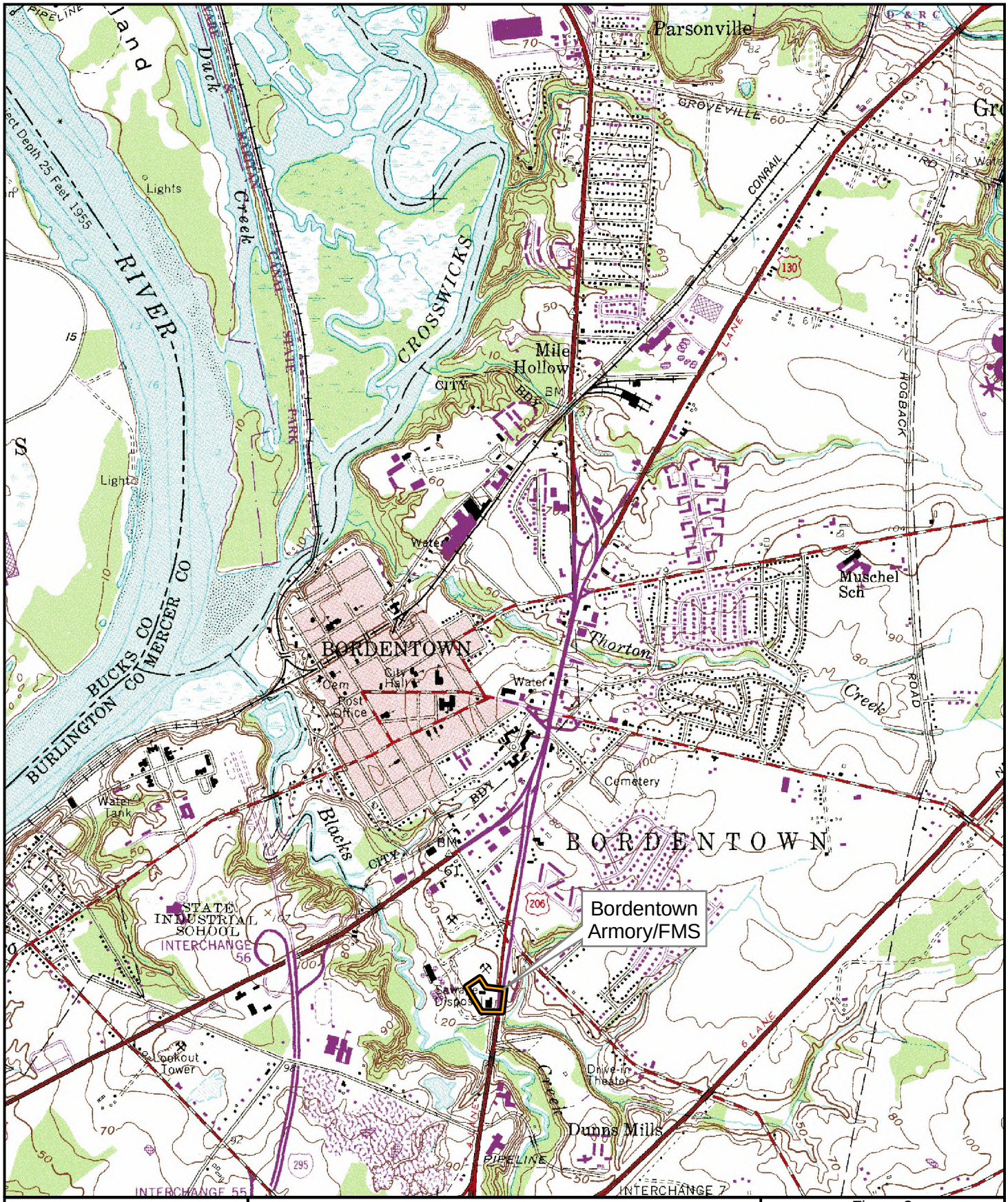

**Legend**

- Installation Area
- County Line
- Limited Access Freeway
- Highway
- Secondary Road
- Local Road
- Minor Road
- Ramp
- Other Road

1:50,000

Figure 1
Site Location Map
Bordentown Armory-FMS
Bordentown Twp.,
Burlington Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

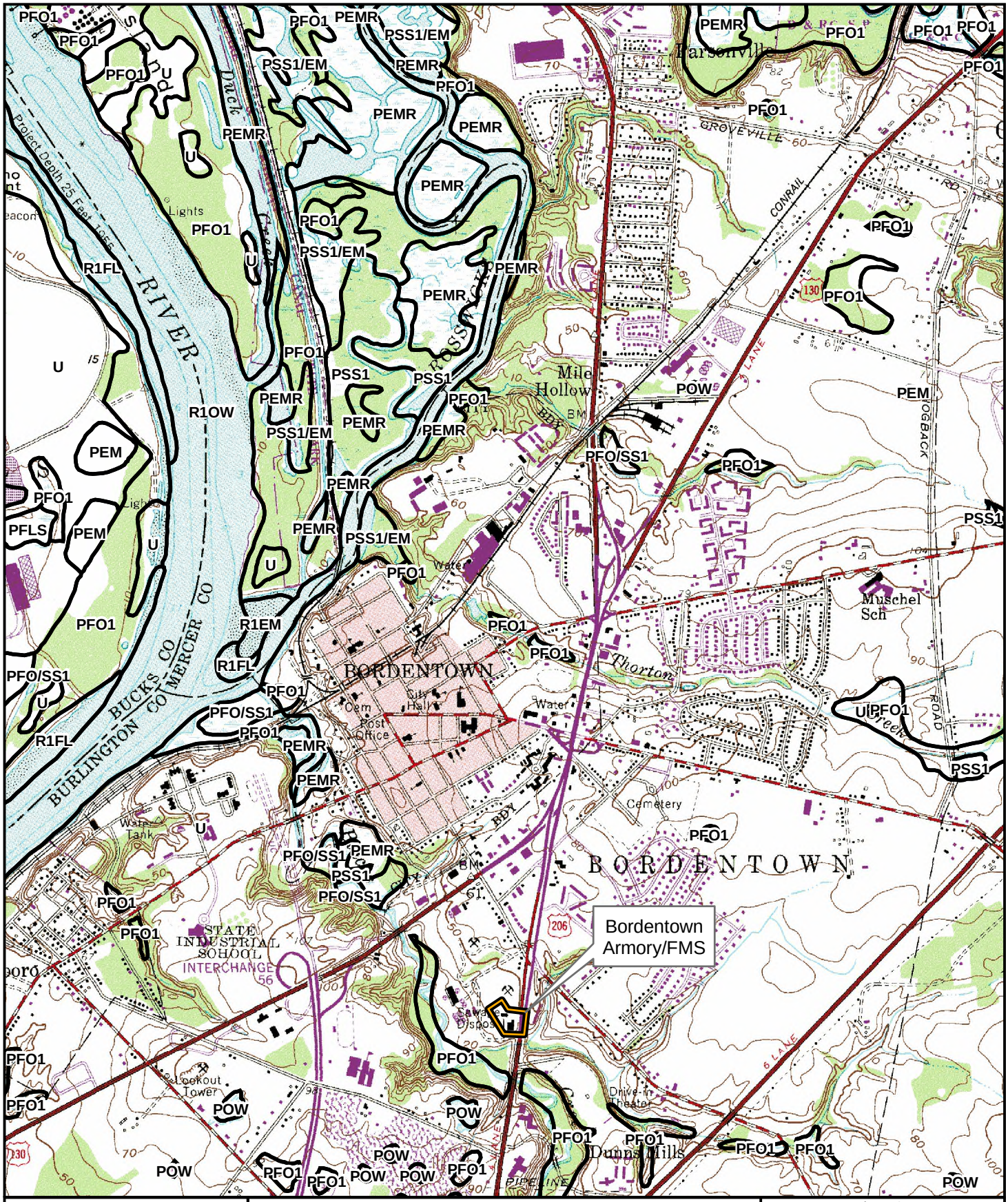
Installation Area

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:24,000

Figure 2
USGS Topographic Map
Bordentown Armory-FMS
Bordentown Twp.,
Burlington Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Bordentown Armory-FMS
Bordentown Twp.,
Burlington Co., NJ

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Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJDEP Wetlands

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Bordentown Armory-FMS
Bordentown Twp.,
Burlington Co., NJ

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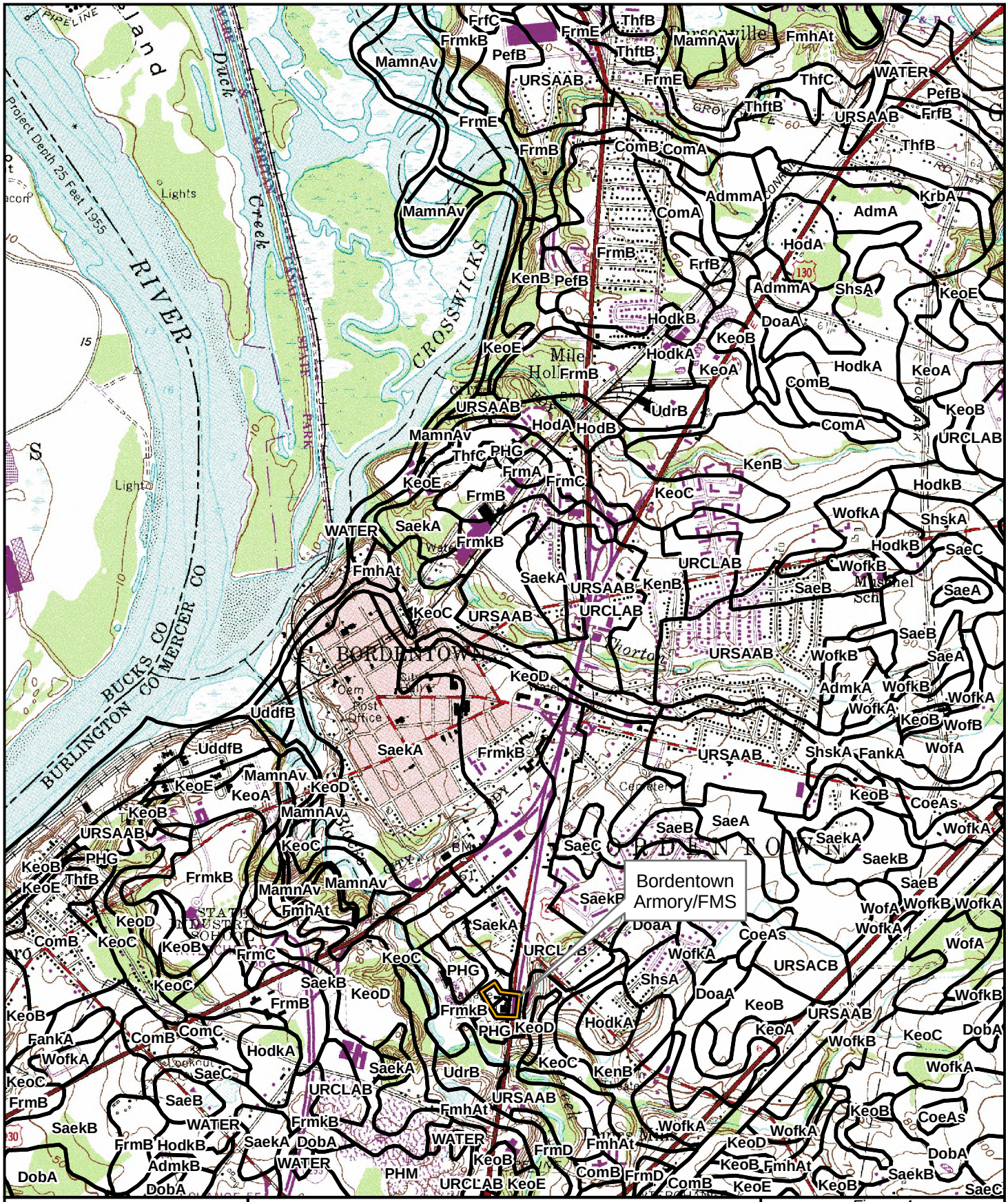


**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Bordentown Armory-FMS
Bordentown Twp.,
Burlington Co., NJ

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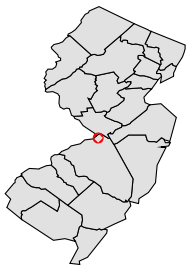
Plymouth Meeting, PA 19462



**Legend**

Soil Boring

Wetland Flag

Wetland Boundary

50' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:1,200

Figure 5
Wetlands Location Map
Bordentown Armory-FMS
Bordentown Twp.,
Burlington Co., NJ

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Plymouth Meeting, PA 19462

# 4.0 BORDENTOWN CSMS A

This section of the report presents the results of the wetlands delineation for the Bordentown CSMS A installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 4.1 Site Location

The Bordentown CSMS A installation is an approximately 13.28-acre parcel designated as Block 128.02, Lot 1.01 in the Township of Bordentown, Burlington County, New Jersey (**Figure 1**). It is located on the northbound side of U.S. Highway 130 (Route 130), south of the intersection of U.S. Highway 206 (Route 206). The NJ State Plane Coordinates for the site are East 434623.377184 feet and North 473648.446842 feet. The site is located in the Inner Coastal Plain physiographic section of New Jersey, in the Blacks Creek watershed of Watershed Management Area 20 (Assicunk, Crosswicks, and Doctors).

The site is bound to the north and west by Route 130, to the east by Interstate 295, and to the south by Dunns Mill Road and undeveloped land. The surrounding land use is mixed rural, commercial, and residential. The main developed portion of the installation (i.e. buildings, parking lot, and other structures) is generally situated in the central and northern portions of the site, whereas the naturalized areas are generally to the west and south/southeast. A description of these areas is presented in Section 4.2.

## 4.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 4.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 80 and 90 feet above (MSL) (**Figure 2**). The nearest mapped open water feature is Blacks Creek, a tributary to the Crosswicks Creek/Delaware River system. At its closest point, Blacks Creek is approximately 1,600 feet to the northeast of the site; however, net drainage on the site is to the west, towards the Delaware River.

### 4.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped community is a palustrine, open water wetland (POW) located approximately 500 feet to the southwest of the site. This POW wetland is mapped as an isolated feature.

### 4.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site indicates no wetland communities to occur on or adjacent to the site. The nearest mapped community is a deciduous wooded wetland located approximately 500 feet to the east/north-east of the site, roughly coincident with the community depicted on the NWI (**Figure 3B**).

### 4.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following three soil types (**Figure 4**):

- Holmdel fine sandy loam, clayey substratum, 0-2% slopes (HodkA) – This soil occupies the majority of the site area, with the exception of two small fingers that extend from the northwest and western site boundaries (see below).
- Collington fine sandy loam, 5-10% slopes (ComC) – This soil occurs as a small finger that extends into the site from the northwest site boundary.
- Sassafras fine sandy loam, 5-10% slopes (SaeC) – This soil occurs as a small finger that extends into the site from the western site boundary.

None of these soil types is listed by the USDA as a hydric soil (USDA 1995).

### 4.2.5 Rare Species Survey

The April 2007 Rare Species Survey Report indicated the potential presence of a herptile species of concern at the site. However, the results of a Phase 1 survey of the site indicated no herptile species of special concern to be present or suitable habitat for a herptile species of special to be present.

## 4.3 Results of the Field Assessment

As of September 2005, the Bordentown CSMS installation was composed of the following six distinct community types: open water, emergent marsh, forested riparian corridor, deciduous woodland, mowed lawn, and developed land. The open water and emergent marsh communities were collectively designated as Wetland Series A, B, and C (**Figure 5**). Each of these six communities is described below.

The open water community is a drainage channel that generally bisects the southern portion of the installation. This channel originates as a linear undulation in the landscape in the eastern portion of the site, and then develops increasingly distinct bed and banks as it progresses westward. Surface water conveyed by this channel leaves the site at a pipe culvert for Route 130. Along the western (down-gradient) portion, the channel is approximately 6 feet in width, and entrenched with near vertical banks reaching heights of up to 6 to 8 feet. Shallow pockets of standing water were present during the delineation. The channel bottom was primarily gravel and sand.

A small portion of this drainage channel near the center of the site exhibits a segment of narrow, emergent marsh. This community is located immediately down-gradient of an existing road

crossing over this channel. This emergent community is vegetated with a mix of species such as lurid sedge (*Carex lurida*, OBL), soft rush (*Juncus effusus*, FACW+), purple loosestrife (*Lythrum salicaria*, FACW+), English plantain (*Plantago lanceolata*, NL), downy brome (*Bromus tectorum*, NL), crabgrass (*Digitaria sanguinalis* FACU-), fescue (*Festuca* sp.), and various species of goldenrod (*Solidago* spp.). A representative soil boring collected from this community exhibited a single, deep (12+ inches) depositional horizon of grayish-brown (2.5Y 5/2) silt loam with ~30% pore linings. This emergent marsh and the top-of-bank of the drainage channel were collectively identified as wetland and designated as Wetland Series A and Wetland Series B/C (**Figure 5**).

A narrow, forested riparian corridor is present along both sides of the drainage channel near its western end and eastern end, interrupted by a road crossing and the emergent marsh described above. This forested riparian community is dominated by red maple (*Acer rubrum*, FAC) in the canopy and sapling layer, multiflora rose (*Rosa multiflora*, FACU) and Tartarian honeysuckle (*Lonicera tatarica*, FACU) in the shrub layer; Allegheny blackberry (*Rubus allegheniensis*, FACU) and poison ivy (*Toxicodendron radicans*, FAC) in the vine layer; and Japanese honeysuckle (*Lonicera japonica*, FAC) in the ground layer. This corridor was not identified as wetland.

A late-stage, deciduous woodland community is located in the south-eastern portion of the site. This community is vegetated with a mix of hardwood species such as red oak (*Quercus rubra*, FACU-), black gum (*Nyssa sylvatica*, FAC), sweetgum (*Liquidambar styraciflua*, FAC), red maple (*Acer rubrum*, FAC), black cherry (*Prunus serotina*, FACU), and American beech (*Fagus grandifolia*, FACU). This community was not identified as wetland.

The mowed lawn and developed land communities that are generally located in the central and northern portions of the site exhibited vegetative communities typical of disturbed land such as staghorn sumac (*Rhus typhina*, NL), autumn olive (*Elaeagnus umbellata*, NL), common pokeweed (*Phytolacca americana*, FACU+), downy brome (NL), crabgrass (FACU-), fescue (NA), common reed (*Phragmites australis*, FACW), and bristly foxtail (*Setaria* sp., NA), as well as red maple (FAC), poison ivy (FAC), multiflora rose (FACU), Allegheny blackberry (FACU-), prickly dewberry (*Rubus flagellaris*, NL), and wild carrot (*Daucus carota*, NL). None of these areas were identified as wetland.

## 4.4 Conclusion

The results of the wetlands delineation conducted for the Bordentown CSMS A installation revealed the presence of a linear drainage feature that roughly bisects the site. This drainage feature, depicted as Wetland Series A and Wetlands Series B/C on **Figure 5**, is anticipated to meet the definition of a State open water at N.J.A.C. 7:7A-1.4, with no associated freshwater wetlands transition area (i.e. buffer). The absence of a wetland transition area along the drainage feature is further supported by the findings of the April 2007 Rare Species Survey Report which found no rare species or rare species habitats to be present on the site.

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Bordentown CSMS A

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**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Bordentown CSMS A
Bordentown Twp.,
Burlington Co., NJ

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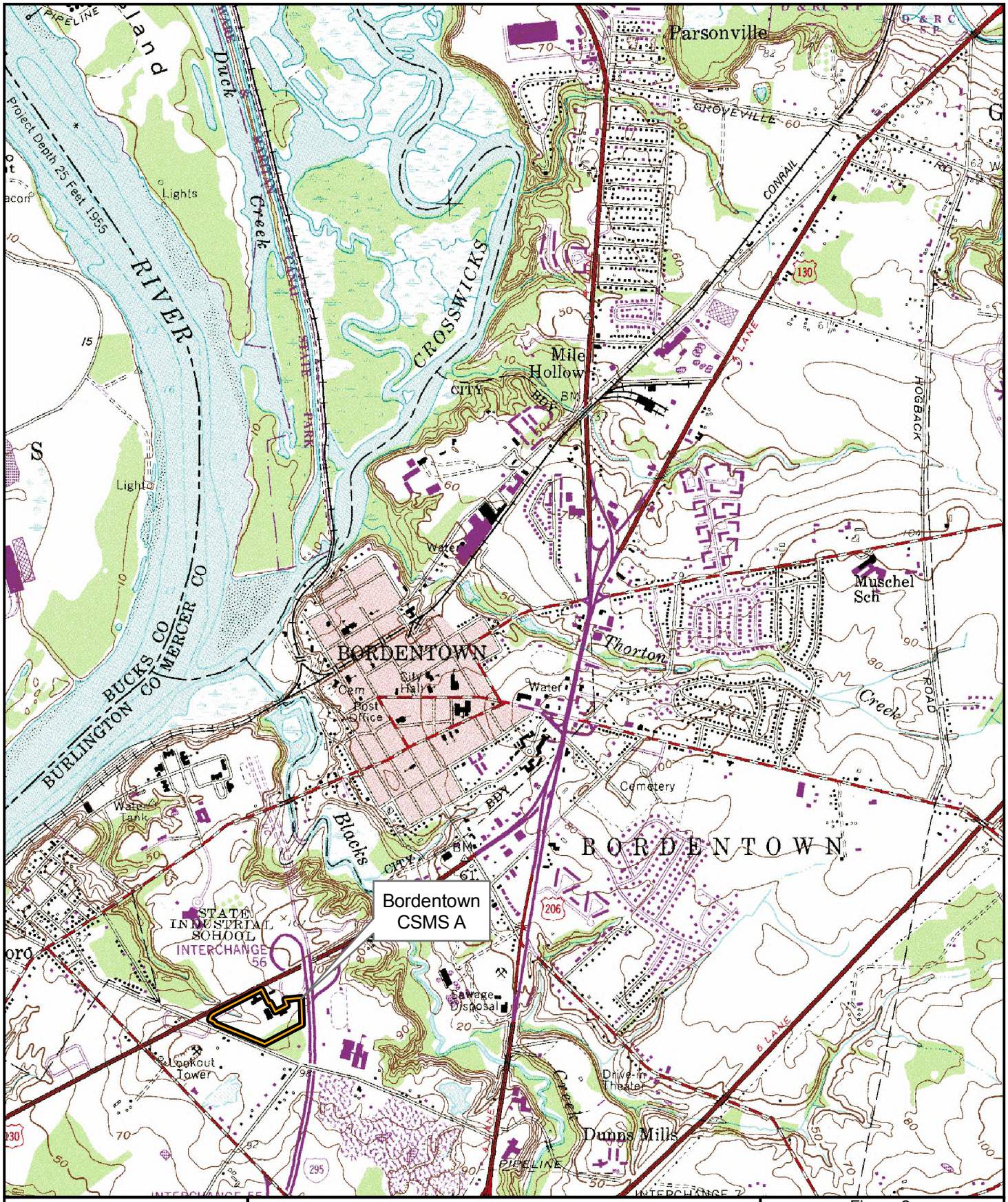
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:24,000

Figure 2
USGS Topographic Map
Bordentown CSMS A
Bordentown Twp.,
Burlington Co., NJ

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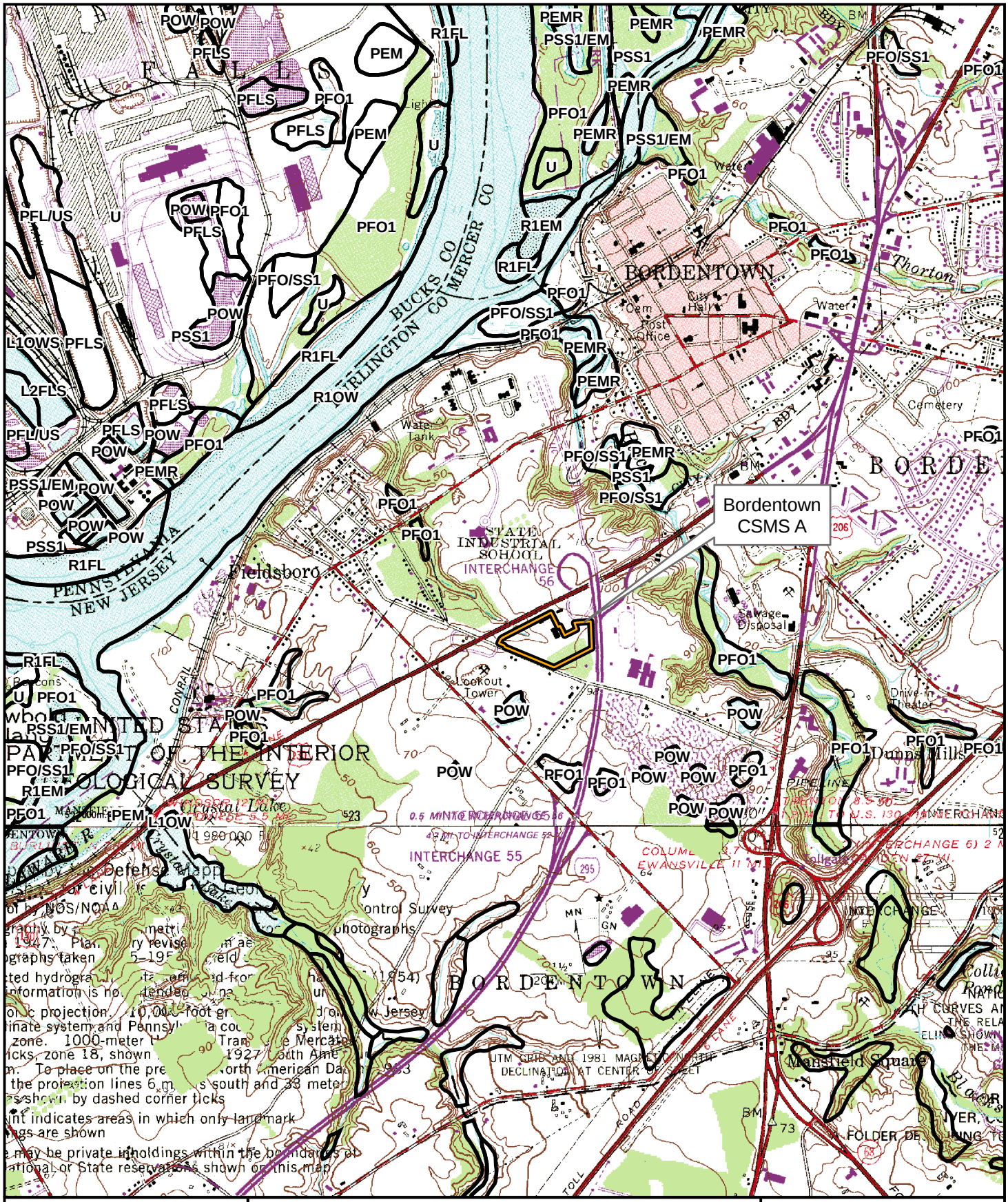


Figure 3a
USFWS NWI
Wetlands Inventory Map
Bordentown CSMS A
Bordentown Twp.,
Burlington Co., NJ

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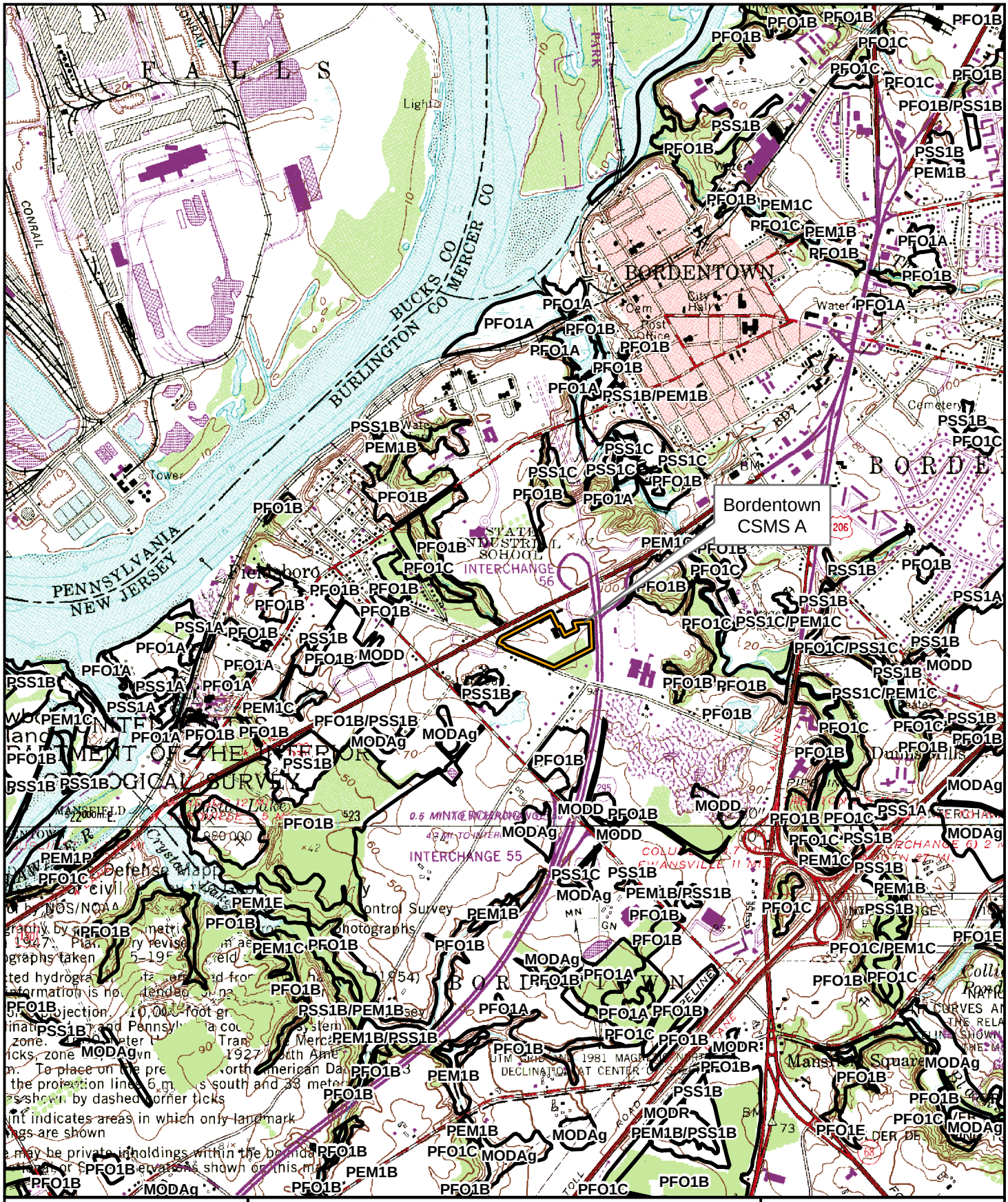




***Legend***

Installation Area

burwet

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Bordentown CSMS A
Bordentown Twp.,
Burlington Co., NJ

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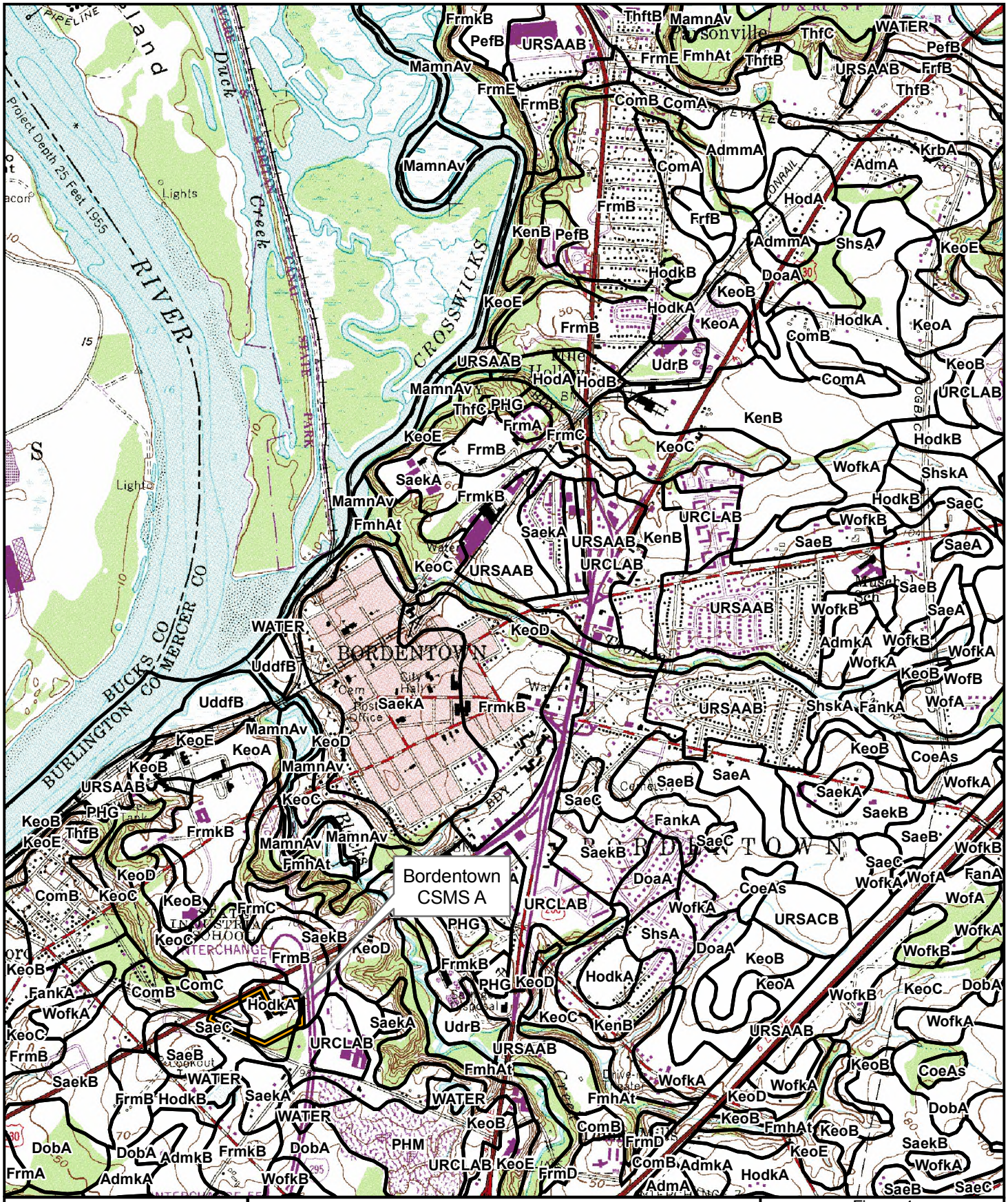




**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Bordentown CSMS A
Bordentown Twp.,
Burlington Co., NJ

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***Legend***

Soil Boring

Wetland Flag

Property Boundary

Wetland Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 434623.377184 Feet
Northing: 473648.446842 Feet

1:1,275

Figure 5
Wetlands Location Map
Bordentown CSMS A
Bordentown Twp.,
Burlington Co., NJ

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# 5.0 BRIDGETON ARMORY

This section of the report presents the results of the wetlands delineation for the Bridgeton Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 5.1 Site Location

The Bridgeton Armory installation is a 25.7-acre parcel designated as Block 1201, Lot 2 in Upper Deerfield Township, Cumberland County, New Jersey (**Figure 1**). It is located on the southbound side of State Route 77, north of the intersection of State Route 56 and north of the City of Bridgeton. The NJ State Plane Coordinates for the site are East 291665.682508 feet and North 237020.262705 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Cohansey River watershed of Watershed Management Area 17 (WMA 17; Maurice, Salem, and Cohansey).

The site is a triangle-shaped parcel bound to the north and south and west by Finley Road and to the east by Route 77. The surrounding land use is mixed rural and agricultural. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northeast corner of the property, whereas the naturalized areas are generally to the west and south. A description of these areas is presented in Section 5.2.

## 5.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 5.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 70 and 90 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Loper Run which is located approximately 100 feet to the west of the site. Net drainage on the site is to the west, towards Loper Run.

### 5.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetlands to be mapped on the property (**Figure 3A**). The nearest mapped community is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located immediately adjacent to the northeast property corner. This PFO1 wetland is associated with the floodplain of Loper Run.

### 5.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of the following two wetland communities on the site (**Figure 3B**):

- Herbaceous wetlands – Mapped to be coincident with a stream that bisects the site in an east to west direction. This wetland is not depicted on the NWI map.
- Deciduous wooded wetlands – Mapped to be coincident with the eastern end of a stream that bisects the site in an east to west direction. This wetland is not depicted on the NWI map.

### 5.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Downer sandy loam, 0 to 2 percent slopes (DoeA) – Mapped to occur as a finger extending into the site from the northern site boundary.
- Downer sandy loam, 2 to 5 percent slopes (DoeB) – Mapped to occur as two small fingers extending into the site from the southwest property boundary.
- Downer loamy sand, 5 to 10 percent slopes (DocC) – Mapped to occur as a long and narrow finger extending into the site from the northern property boundary.
- Fallsington sandy loam, 0 to 2 percent slopes (FamA) – Mapped to be roughly coincident with the stream channel that bisects the property.
- Pits, sand and gravel (PHG) – Mapped to occur as an oval-shaped area in the south/southeast portion of the site.
- Sassafras gravely sandy loam, 2 to 5 percent slopes (SadB) – Mapped to occur as along a portion of the southwest property boundary.
- Sassafras sandy loam, 2 to 5 percent slopes (SacB) – Mapped to occur in the northeast portion of the site.

The Fallsington series is classified as a Typic Ochraquult, and is therefore listed by the USDA as a hydric soil (USDA 1995).

## 5.3 Results of the Field Assessment

As of September 2005, the Bridgeton Armory installation was composed of the following eight distinct community types: open water, swale, forested deciduous wetland, deciduous woodland, scrub-shrub, oldfield, mowed lawn and developed land. The open water, swale, and forested deciduous wetland communities were designated as Wetland Series A, B, C, D, E, and F (**Figure 5**). Each of these eight community types is described below.

An open water network of permanent streams and intermittent streams, some exhibited braided portions, bisects and traverses the southern and western portions of the site. At its up-gradient

end in the south-western corner of the site, a single, discrete stream channel conveys surface water from a culvert for Finley Road. This channel extends east/south-east and leaves the site also within a single, discrete stream channel at the southern corner of the property. The middle portions of this open water community are less discrete however, often exhibiting braided channel morphology and broad, floodplain morphology with evidence of sedimentation and erosion. During the time of the site investigations, shallow (two to four inches) surface water was observed at the up-gradient and down-gradient ends of this network. The middle portion of the network, dry during the start of the investigation, was rapidly submerged under approximately 12 inches of flowing water in a rainstorm that occurred during the delineation activities. This community was identified as wetland and is designated; in part with the forested deciduous wetland, as Wetland Series A and B/E.

To account for possible wetland transition areas extending from off-site areas, off-site portions of the wetland system associated with Wetland Series A and B/E were also delineated. At the up-gradient end of Wetland Series A and B/E (across Finley Road), the off-site wetlands were designated as Wetland Series F. At the down-gradient end of Wetland Series A and B/E (along Route 77), the off-site wetlands were designated as Wetland Series C.

A short drainage swale extends from the parking lot to the edge of the deciduous woodland community. This straight and narrow drainage feature was identified as wetland and designated as Wetland Series D.

A mixed-stage forested deciduous wetland surrounds the open water network community. This community is dominated by red maple (*Acer rubrum*, FAC), green ash (*Fraxinus pensylvanica*, FACW), black gum (*Nyssa sylvatica*, FAC), pignut hickory (*Carya glabra*, FACU-), multiflora rose (*Rosa multiflora*, FACU), poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*, FAC), false nettle (*Boehmeria cylindrical*, FACW+), and jewelweed (*Impatiens capensis*, FACW). This community varied in width along the open water network, ranging from a narrow fringe along the top-of-bank to broad floodplain areas.

Representative soil borings collected from this community typically exhibited a 12 to 14 inch surface horizon of dark grayish-brown (10YR 4/2) loamy silt to silt loam with 0 to 5 percent pore linings, underlain by a dark grayish-brown (10YR 4/2) sandy loam to loam with 40 to 50 percent pore linings. Some areas also exhibited an upper subsoil that ranged from dark grayish-brown (10YR 4/2) to dark gray (10YR 4/1). These soils were considered to be hydric. This community was identified as wetland and designated, in part, as Wetland Series A and B/E.

The up-gradient, drier portions of this wooded community were identified as deciduous woodland. This community was dominated by red maple (FAC), pignut hickory (FACU-), black walnut (*Juglans nigra*, FACU), sassafras (*Sassafras albidum*, FACU-), white ash (*Fraxinus Americana*, FACU), red raspberry (*Rubus idaeus*, FAC-), and common pokeweed (*Phytolacca Americana*, FACU+). This community was not identified as wetland.

A fringe of scrub-shrub vegetation is present along the north-western edge of Wetland Series B/E, along the property boundary. This community was dominated by Allegheny blackberry (*Rubus allegheniensis*, FACU-), common ragweed (*Ambrosia artemisiifolia*, FACU), common mugwort (*Artemisia vulgaris*, NL), common pokeweed (FACU+). This community was not identified as wetland.

An old-field community is present near the central/north-central portion of the site, immediately west of the parking lot. This community was dominated by *Eupatorium* sp. (NA), various species of goldenrod (*Solidago* spp., NA), little bluestem (*Schizachyrium scoparium*, FACU-), prickly dewberry (*Rubus flagellaris*, NL), common ragweed (FACU), and common mugwort (NL). This community was not identified as wetland.

A mowed lawn and developed land community characterized the remaining portions of the property, generally the northeast portion. None of these areas were identified as wetland.

## 5.4 Conclusion

The results of the wetlands delineation conducted for the Bridgeton Armory installation revealed the presence of a number of wetland types, all associated with a drainage system that bisects the site. Portions of this drainage feature possess fringes of forested wetland communities along its edges, whereas others are anticipated to meet the definition of a State open water per N.J.A.C. 7:7A-1.4. Portions of the drainage feature with wetlands along its edges are anticipated to be classified by the NJDEP as intermediate-resource value wetlands, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer), as per Subchapter 2 of N.J.A.C. 7:7A.

The conclusion regarding the 50-foot freshwater wetlands transition area was reached because these wetland areas do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4. These wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Bridgeton Armory

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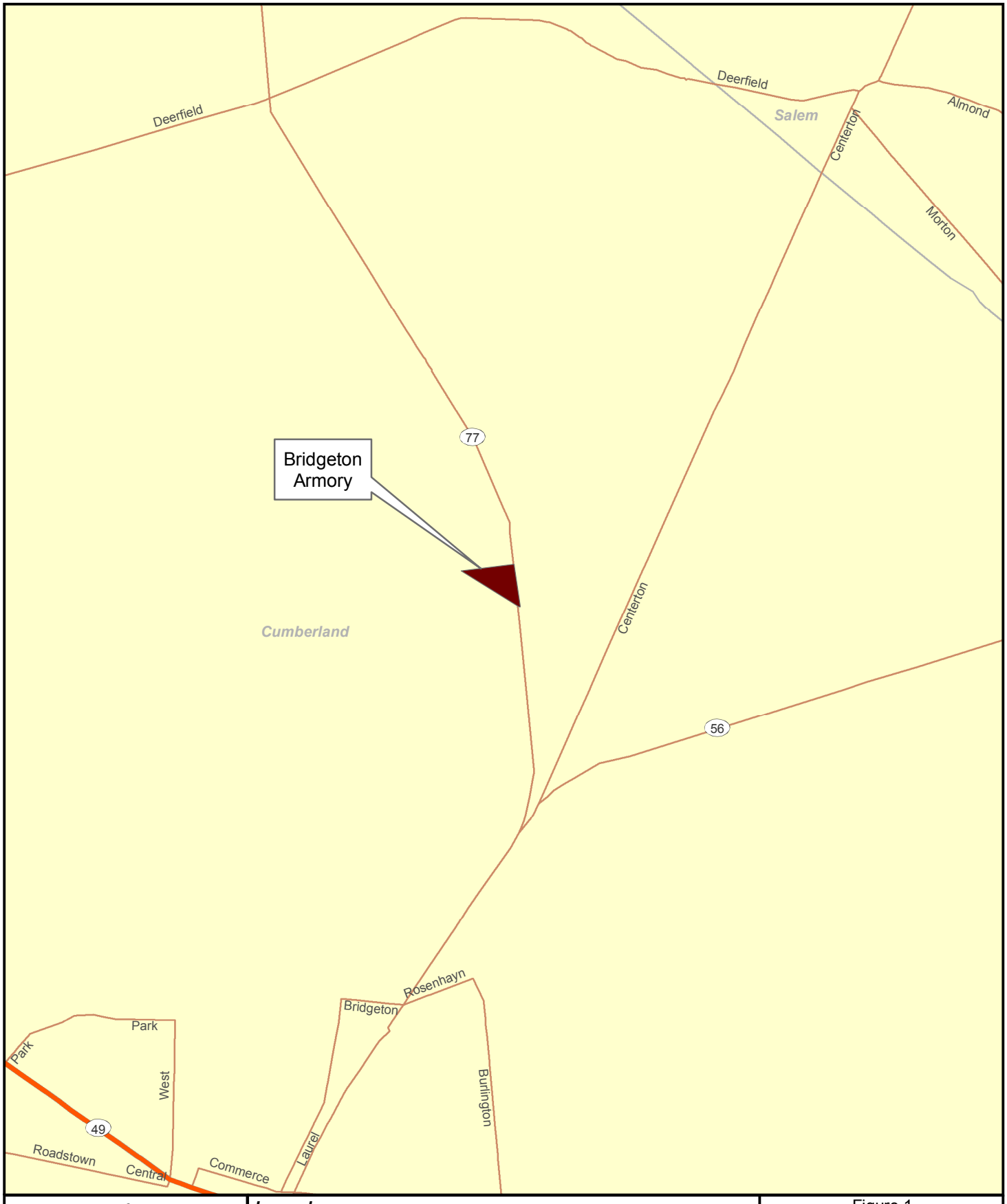




**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Bridgeton Armory
Upper Deerfield twp.,
Cumberland Co., NJ

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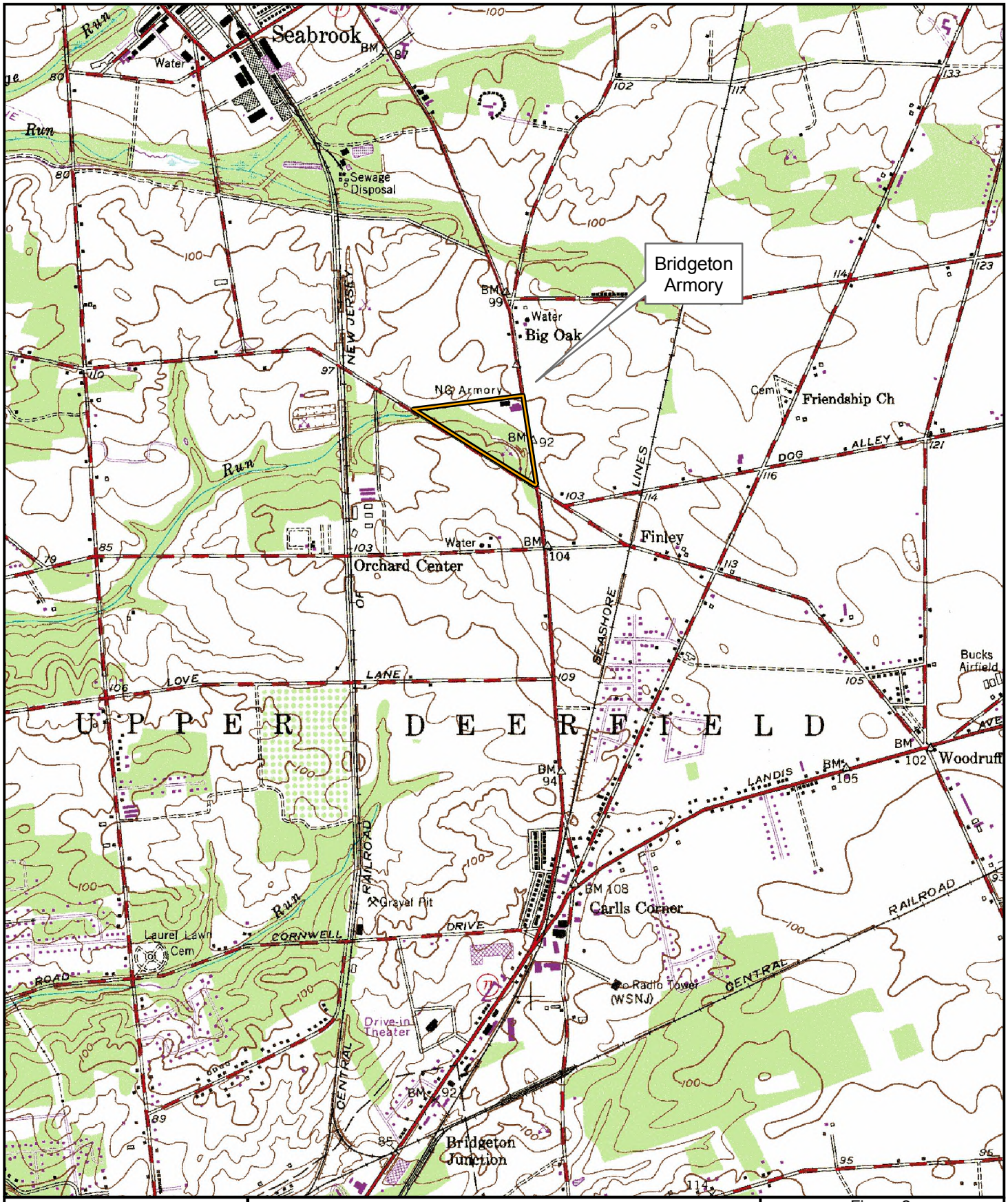
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 291665.682508 Feet
Northing: 237020.262705 Feet

1:24,000

Figure 2
USGS Topographic Map
Bridgeton Armory
Upper Deerfield twp.,
Cumberland Co., NJ

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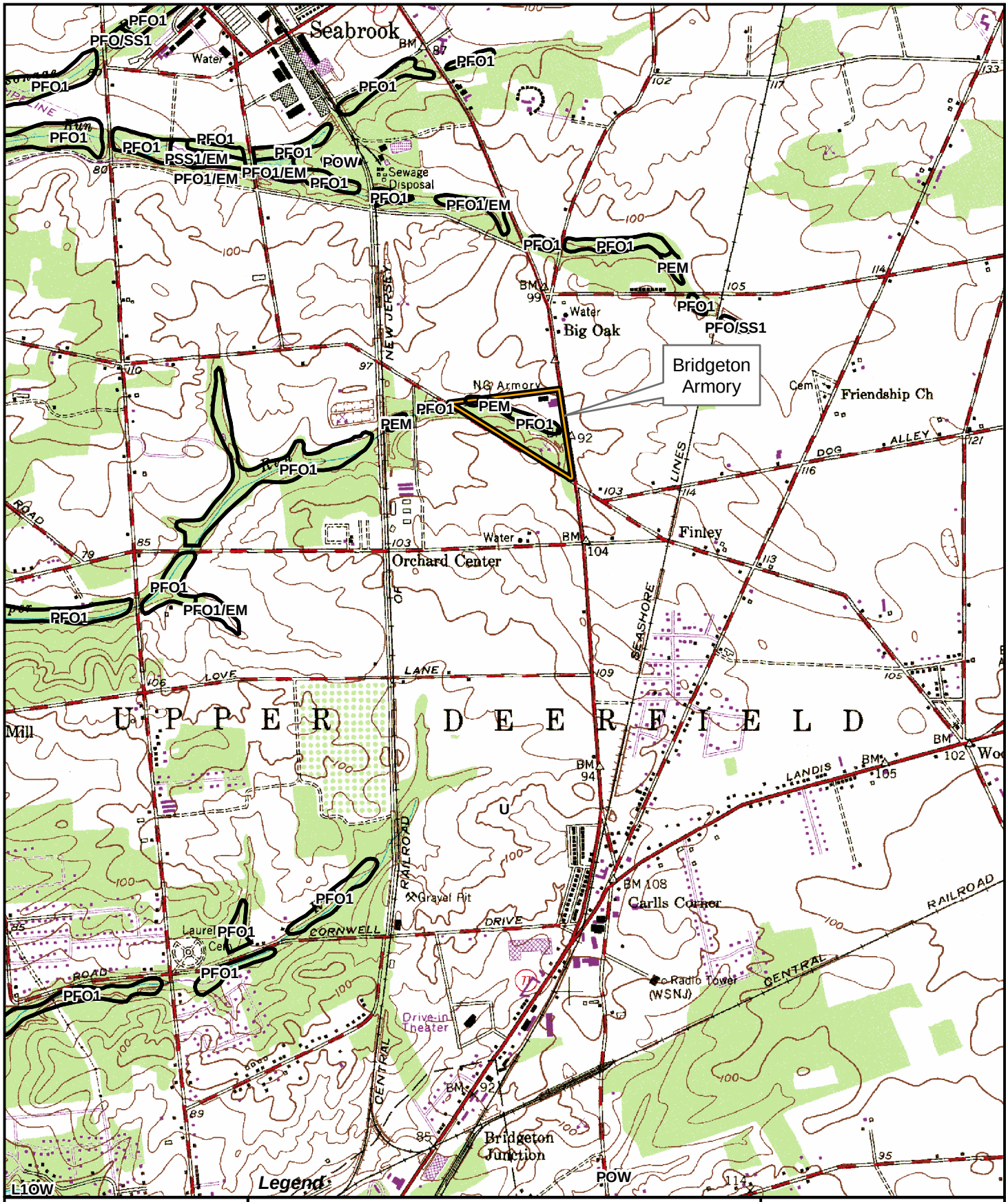
Plymouth Meeting, PA 19462




Legend

Installation Area

NWI Wetland

NJ State Plane Coordinates
Easting: 291665.682508 Feet
Northing: 237020.262705 Feet

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Bridgeton Armory
Upper Deerfield twp.,
Cumberland Co., NJ

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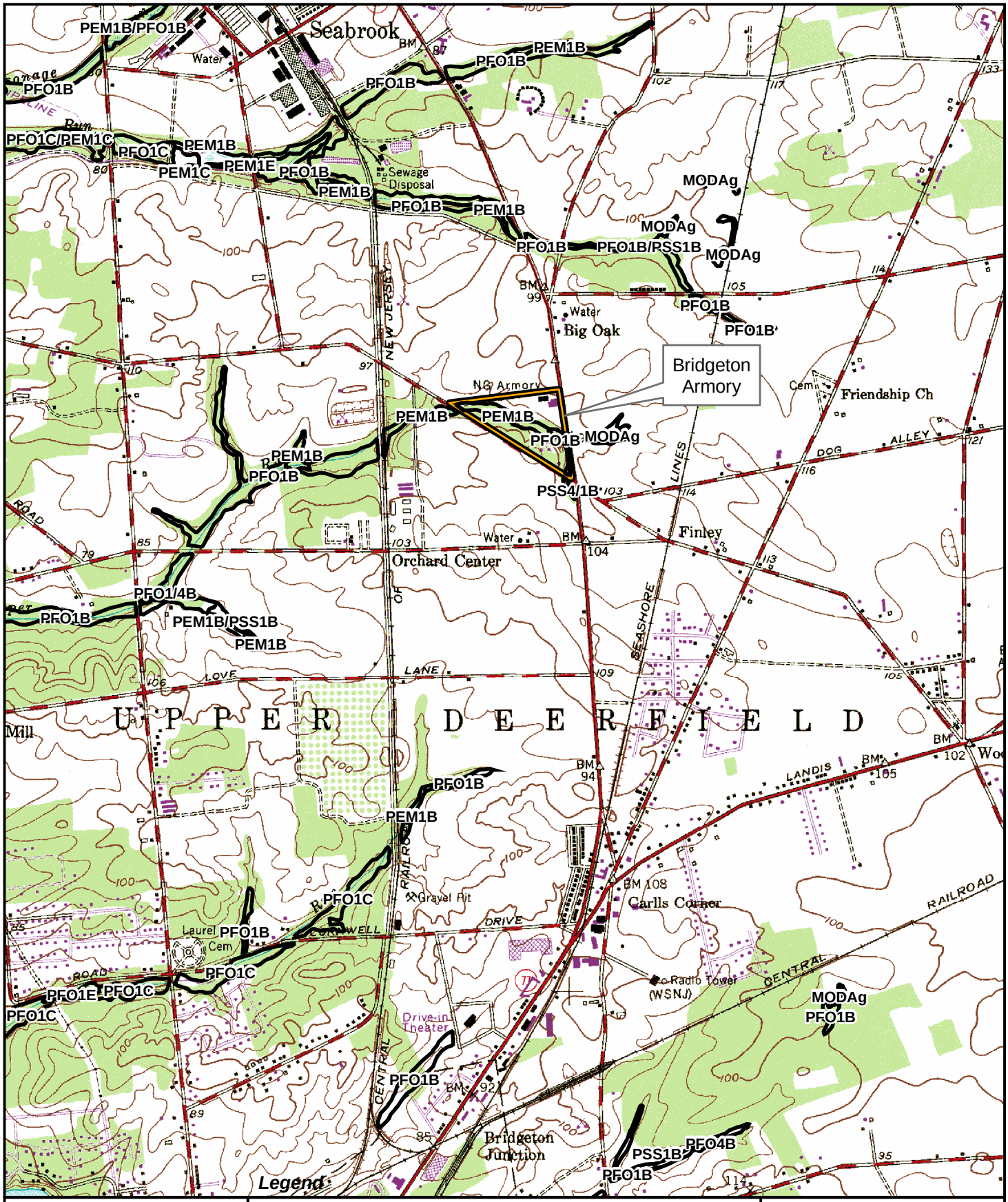


Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Bridgeton Armory
Upper Deerfield twp.,
Cumberland Co., NJ

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Plymouth Meeting, PA 19462






**Legend**

Installation Area

USDA Soils Map

NJ State Plane Coordinates:
Easting: 291665.682508 Feet
Northing: 237020.262705 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Bridgeton Armory
Upper Deerfield twp.,
Cumberland Co., NJ

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***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 291665.682508 Feet
Northing: 237020.262705 Feet

1:3,326

Figure 5
Wetlands Location Map
Bridgeton Armory
Upper Deerfield twp.,
Cumberland Co., NJ

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# 6.0 CAPE MAY ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Cape May Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 6.1 Site Location

The Cape May Armory FMS installation is a 20.31-acre parcel designated as Block 115.01, Lot 17.01 in Middle Township, Cape May County, New Jersey (**Figure 1**). It is located on the northbound side of the Garden State Parkway near its southern end (i.e. non-expressway segment), north of the intersection of Stone Harbor Boulevard. The NJ State Plane Coordinates for the site are East 405425.270429 feet and North 96376.742648 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Cape May Atlantic Coast watershed of Watershed Management Area 16 (WMA 16; Cape May).

The site bound to the north and east by developed municipal land, to the south by salt marsh and Holmes Creek, and to the west by the Garden State Parkway. Holmes Creek is a tributary to the Great Sound. The surrounding land use is mixed rural and government use. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northern side of the property, whereas the naturalized areas are generally to the south. A description of these areas is presented in Section 6.2.

## 6.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 6.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is approximately 10 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Holmes Creek which is situated along the southern site boundary. Holmes Creek is a tidally-influenced stream for an extensive tidal marsh system to the east. Net drainage on the site is to the south, towards Holmes Creek.

### 6.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates the presence of the following two wetland communities on the site (**Figure 3A**):

- E2EM1P – Estuarine, intertidal, emergent, persistent, irregularly flooded wetland, mapped to occur in the southern portion of the site.

- PSS4/1R – Palustrine, scrub-shrub, needle-leaved evergreen, scrub-shrub, broad-leaved deciduous, seasonal-tidal wetland, mapped to occur as a band along the up-gradient side (northward) of the E2EM1P community.

Both of the above communities are associated with the extensive marsh areas along Holmes Creek.

### 6.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of the following two wetland communities to be mapped on the site (**Figure 3B**):

- Not Applicable (non-freshwater wetland) – Mapped to occur as a linear band through the southern portion of the site, roughly coincident with the NWI's E2EM1P community.
- Mixed scrub/shrub wetlands (deciduous dominant) – Mapped to occur as a linear band in the center of the site, roughly coincident with the NWI's PSS4/1R community.

### 6.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Urban land, consociation (UR) – Mapped to occur in the northern half of the site.
- Pawcatuck-Transquaking complex, 0 to 1 percent slopes, very frequently flooded (PdwAv) – Mapped to occur in the southern half of the site.

Of the above soil types, the Pawcatuck and Transquaking soils are listed by the USDA as a hydric soil. The Pawcatuck series is classified as a Terric Sulfhemist and the Transquaking series is classified as a Typic Sulfhemist (USDA 1995).

### 6.2.5 Rare Species Survey

The April 2007 Rare Species Survey Report indicated the potential presence of three state-listed amphibian species, eight state-listed bird species, and two state-listed plant species on or within the vicinity of the site. Of these species, only the following two specimens were documented on the site based on the results of Phase I and/or Phase II field surveys:

- Fowler's toad (*Bufo woodhousei fowleri*) – State species of special concern
- Osprey (*Pandion haliaetus*) – State threatened (breeding population only).

In addition to the above, suitable habitat for the following five species was documented to be present:

- Peregrine falcon (*Falco peregrinus*) – State endangered
- Black-crowned night-heron (*Nycticorax nycticorax*) – State threatened (breeding population only)

- Yellow-crowned night-heron (*Nycticorax violaceus*) – State threatened
- Black skimmer (*Rynchops niger*) – State endangered (breeding population only)
- Tern, unspecified (*Sternus* sp.) – State endangered.

Separate from the results of the rare species survey, a single eastern box turtle (*Terrapene carolina carolina*), a state species of special concern, was observed in the forested wetland community on the site during the wetland delineation activities.

Based on the mixed results for this site, it is possible that the NJDEP will classify the site's wetlands as exceptional resource value until the results of Phase I and/or Phase II field surveys can be evaluated and approved.

## 6.3 Results of the Field Assessment

As of October 2005, the Cape May Armory FMS installation was composed of the following four distinct community types: forested deciduous wetland, scrub-shrub wetland, mowed lawn, and developed land. The forested deciduous wetland and scrub-shrub wetland were collectively designated as Wetland Series A (**Figure 5**). Each of these four community types is described below.

Forested deciduous wetland is the dominant wetland type on this site. This community occupies the southern portion of the site and is dominated by red maple (*Acer rubrum*, FAC), black gum (*Nyssa sylvatica*, FAC), sweetgum (*Liquidambar styraciflua*, FAC), highbush blueberry (*Vaccinium corymbosum*, FACW-), southern arrowwood (*Viburnum dentatum*, FAC), groundsel tree (*Baccharis halimifolia*, FACW), Japanese honeysuckle (*Lonicera japonica*, FAC), common greenbrier (*Smilax rotundifolia*, FAC), and poison ivy (*Toxicodendron radicans*, FAC).

Representative soil borings collected from this community typically exhibited a thin (three to four inch) surface horizon of dark brown (10YR 3/3) to very dark grayish-brown (10YR 3/2) loamy medium sand, underlain by an upper subsoil of brown (10YR 5/3) to grayish-brown (10YR 5/2) coarse to medium loamy sand. The lower part of the subsoil typically exhibited a brown (10YR 5/3) to yellowish-brown (10YR 5/4) medium sand. These soils were considered to exhibit field indicators of hydric soils and were thus determined to be hydric. This forested deciduous wetland community was identified as wetland and designated, in part, as Wetland Series A.

A relatively narrow fringe of scrub-shrub wetlands was present along the northern edge of the forested deciduous wetland community. This community ranged in width from less than five feet to over 50 feet. These areas were dominated by groundsel tree (FACW), *Eupatorium* sp. (NA), various species of goldenrod (*Solidago* spp., NA), common greenbrier (FAC), and common reed (*Phragmites australis*, FACW). These areas were included as part of Wetland Series A.

Mowed lawn and developed land communities occupied the remaining portions of the site, generally the northern half of the property. None of these areas were identified as wetland.

## 6.4 Conclusion

The results of the wetlands delineation conducted for the Cape May Armory FMS installation revealed the presence of a wetland system occupying the southern half of the site. This wetland, depicted as Wetland Series A on **Figure 5**, is anticipated to be classified by the NJDEP as an exceptional-value resource wetland, thus possessing a 150-foot freshwater wetlands transition area (i.e. buffer). This conclusion was reached because the findings of the April 2007 Rare Species Survey Report support the criteria for designating this wetland as a present habitat for threatened or endangered species, or as a documented habitat for threatened or endangered species, and which remains suitable for breeding, nesting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). The Rare Species Survey Report documented the presence of osprey (state-threatened, breeding population only) and the presence of suitable habitat for peregrine falcon (state-endangered), black-crowned night-heron (state threatened, breeding population only), yellow-crowned night-heron (state threatened), black skimmer (state endangered, breeding population only), and unspecified tern species (state endangered).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Cape May Armory FMS

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**Legend**

- Limited Access
- Highway
- Major Road
- Minor Road
- Local Road
- Ramps
- Other Road
- Installation Area

1:50,000

Figure 1
Site Location Map
Cape May Armory/FMS
Middle Twp.,
Cape May Co., NJ

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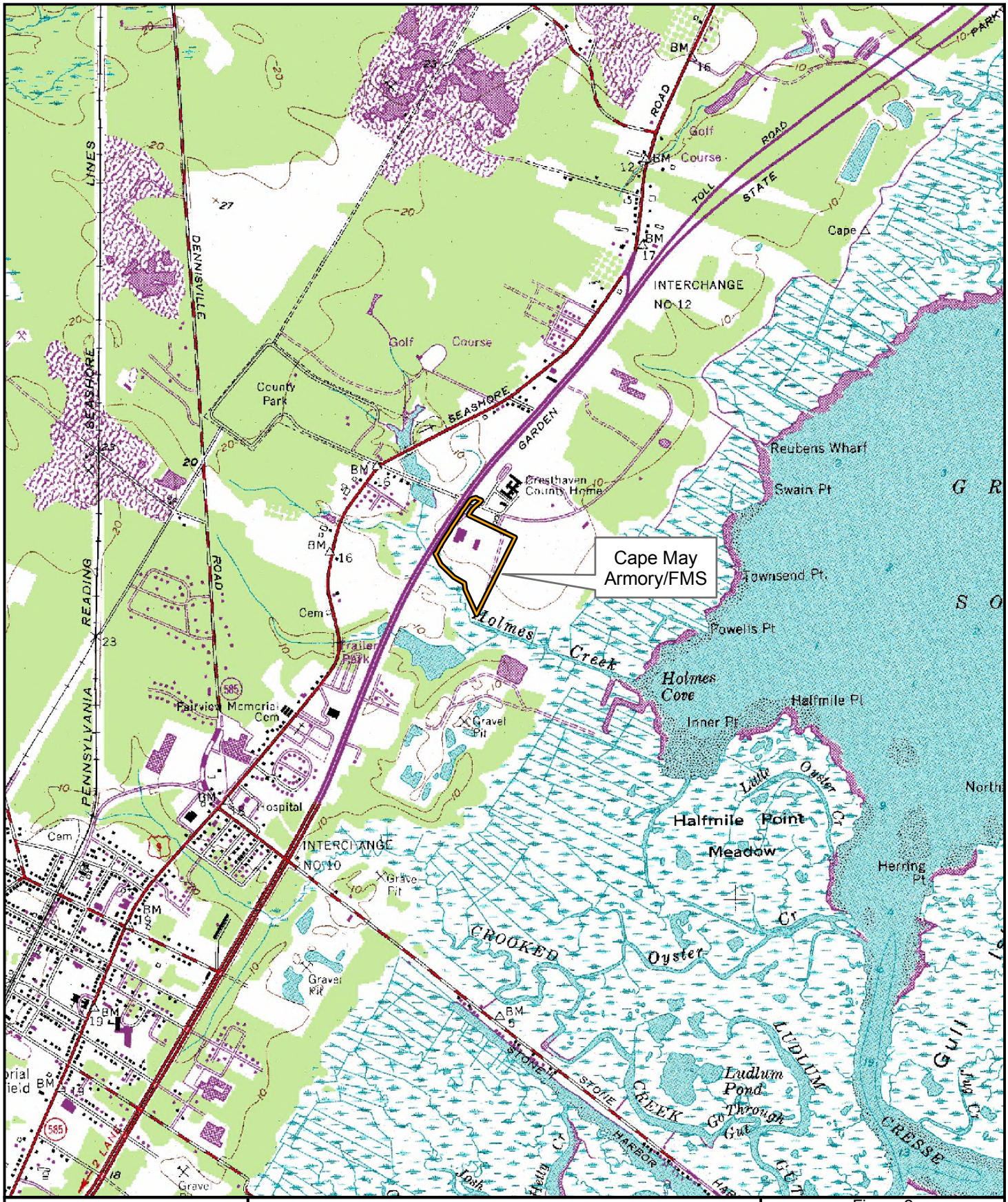




***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 405425.270429 Feet
Northing: 96376.742648 Feet

1:24,000

Figure 2
USGS Topographic Map
Cape May Armory/FMS
Middle Twp.,
Cape May Co., NJ

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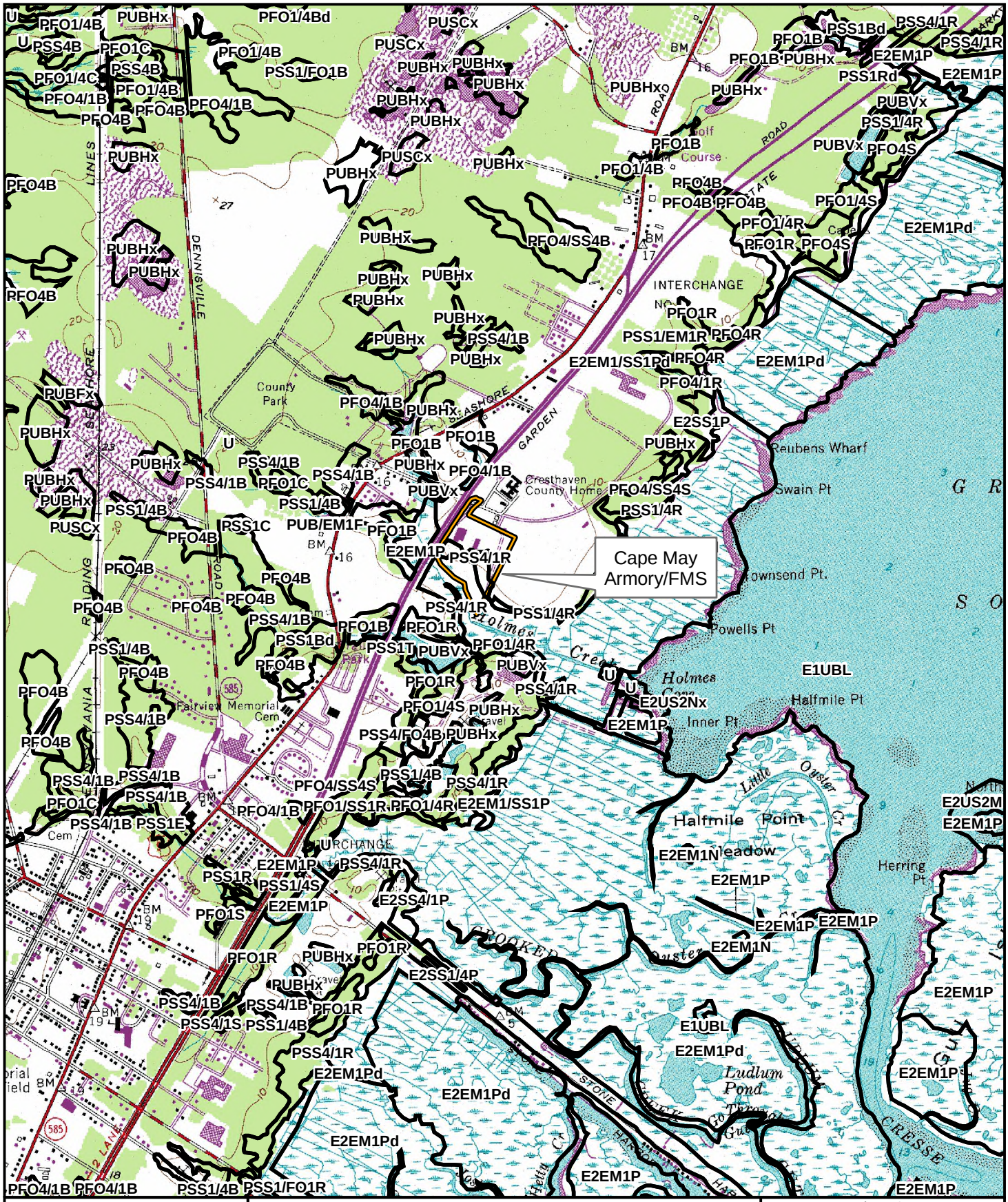




***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 405425.270429 Feet
Northing: 96376.742648 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Cape May Armory/FMS
Middle Twp.,
Cape May Co., NJ

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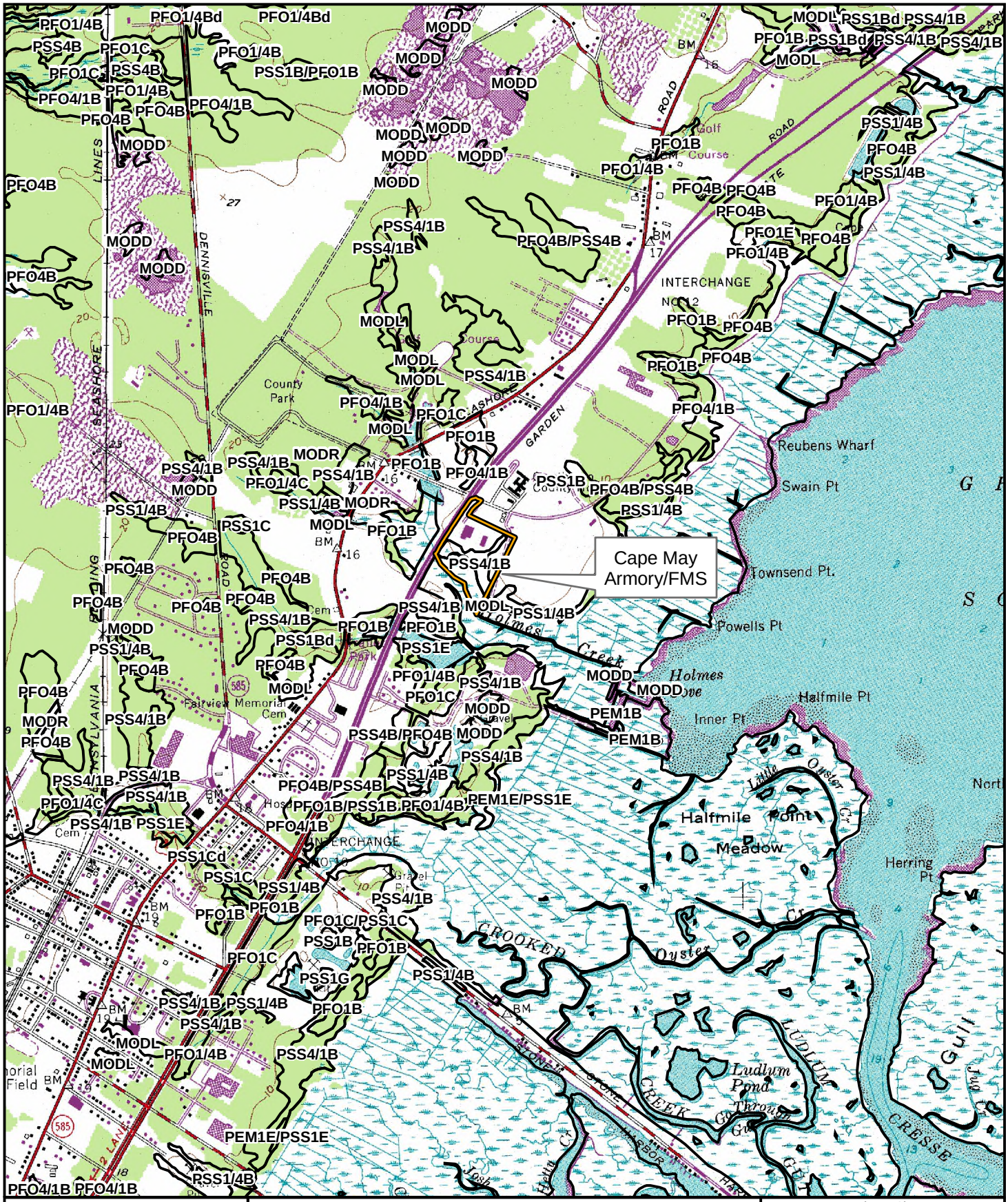
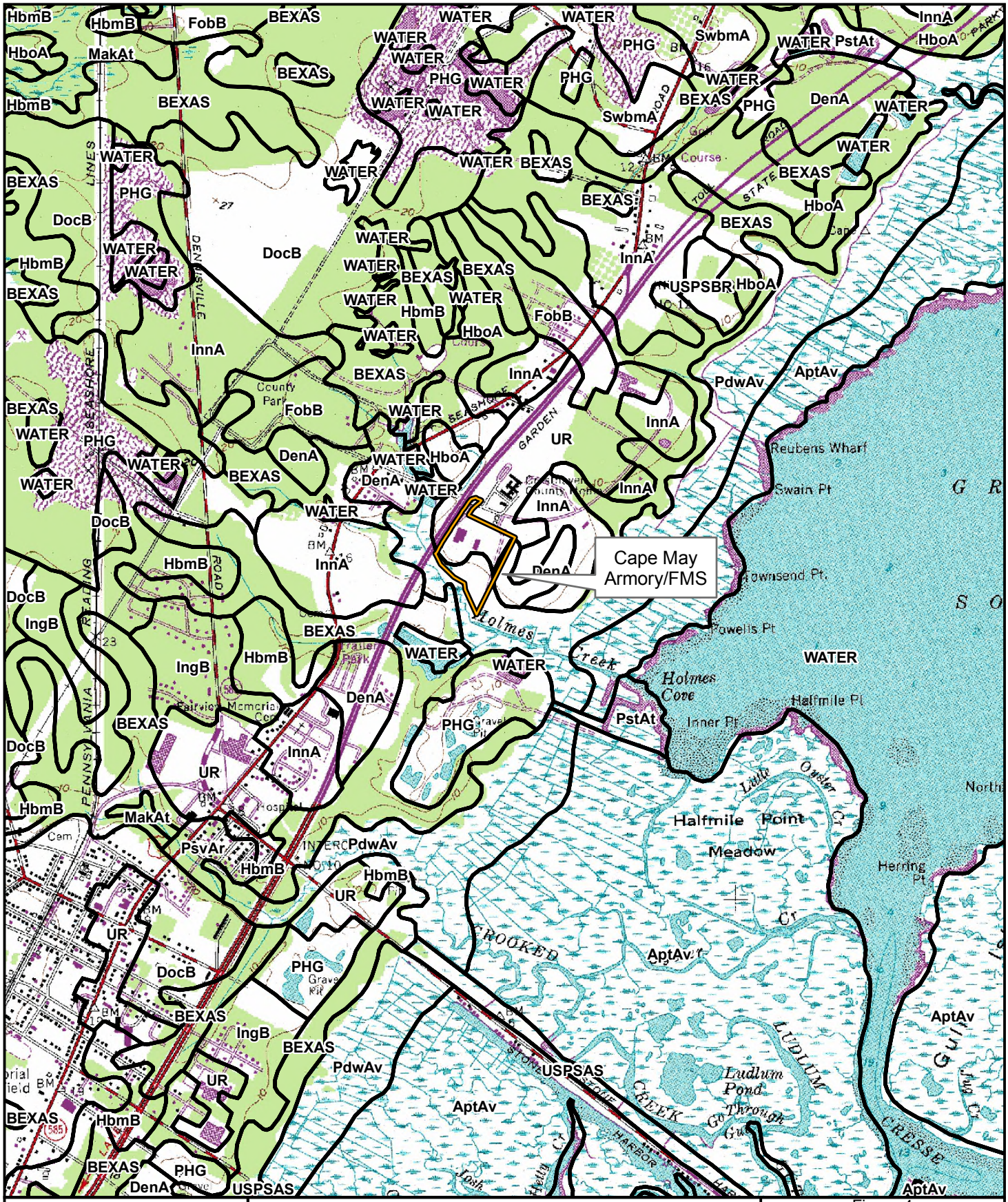

Cape May Armory/FMS
PFO1/4B
PFO1/4Bd
PSS4B
PFO1C
PSS1B/PFO1B
MODD
PFO4/1B
PFO4B
PSS4/1B
PFO4B/PSS4B
PFO1B
PFO1/4B
PFO1E
MODL
PSS1Bd
PSS4/1B
PSS1/4B
PFO4B
PFO1/4B
INTERCHANGE
PFO1B
PFO4B
PFO1B
PFO4B
PFO1/4B
PSS4/1B
PSS4/1B
MODL
MODL
PSS4/1B
PFO4/1B
PFO1C
MODL
PFO1B
MODR
PSS4/1B
PSS4/1B
PFO1/4C
PSS1/4B
MODR
PSS1B
PFO4B/PSS4B
PSS1/4B
MODD
PSS1/4B
PSS1C
MODL
PFO1B
PFO4B
PFO4B
PFO4B
PFO4B
PFO4B
PSS4/1B
MODL
PSS1/4B
PSS4/1B
PFO1B
PFO1B
MODD
PSS1/4B
PSS1Bd
PSS1E
PFO4B
PFO1/4B
PSS4/1B
PFO4B
MODL
PFO1C
MODD
PFO4B
MODR
PSS4/1B
PSS4B/PFO4B
MODD
PFO4B
PSS4/1B
PSS4/1B
PSS4/1B
PSS1/4B
PFO4B/PSS4B
PFO1/4C
PSS4/1B
PFO1B/PSS1B
PFO1/4B
PEM1E/PSS1E
PSS4/1B
PSS1E
PFO4/1B
PSS1Cd
PSS1C
PSS1/4B
PSS4/1B
PFO1B
PFO1B
PFO1C/PSS1C
PSS1B
PFO1B
PFO1C
PSS1G
PSS4/1B
PSS4/1B
PSS1/4B
PFO1B
PSS4/1B
MODL
PFO1/4B
MODL
PSS4/1B
PEM1E/PSS1E
PSS1/4B
PFO4/1B
PFO4/1B
MODD
MODD
MODD






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 405425.270429 Feet
Northing: 96376.742648 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Cape May Armory/FMS
Middle Twp.,
Cape May Co., NJ

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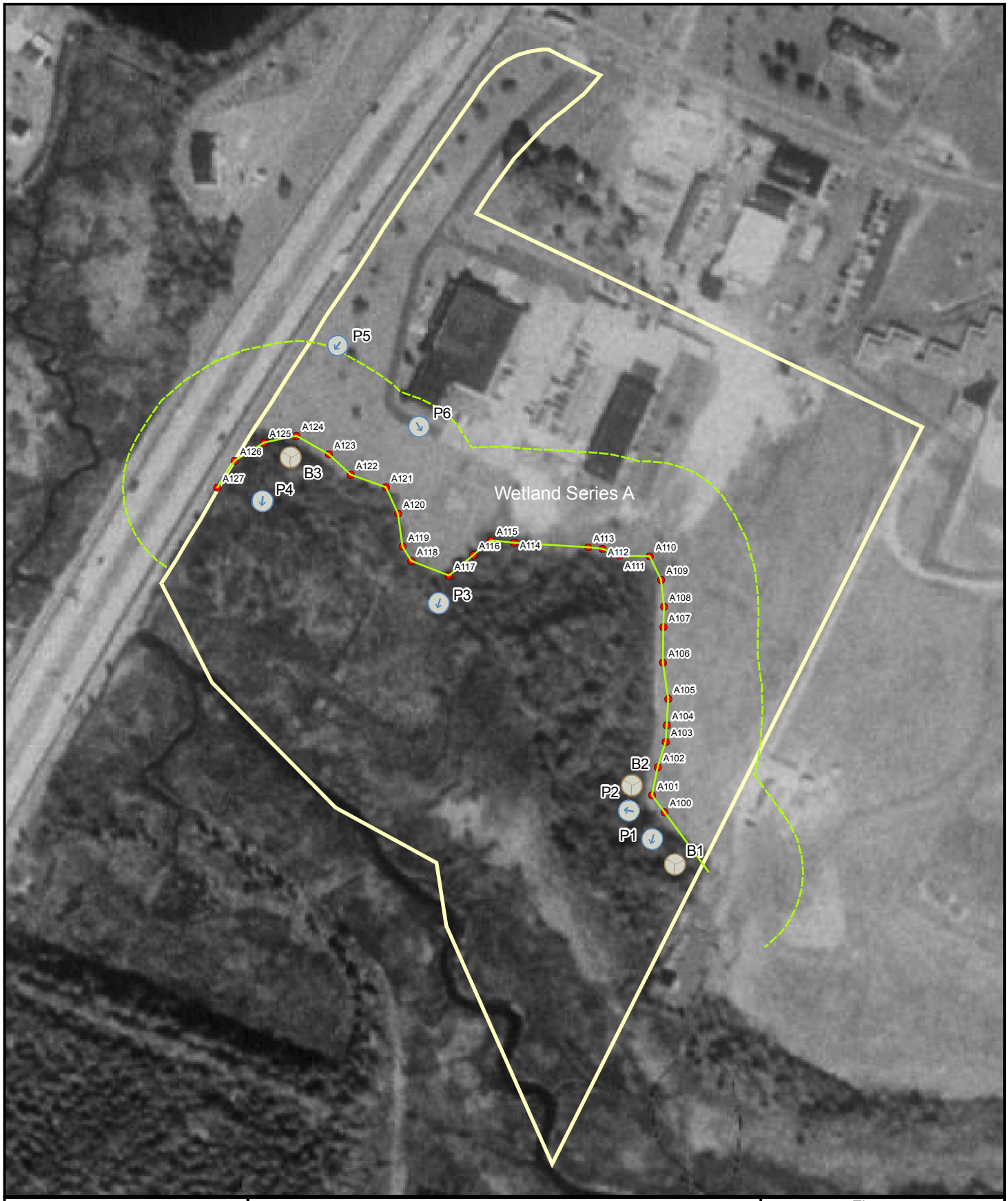




***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

150' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 405425.270429 Feet
Northing: 96376.742648 Feet

1:2,515

Figure 5
Wetlands Location Map
Cape May Armory/FMS
Middle Twp.,
Cape May Co., NJ

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# 7.0 CHERRY HILL ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Cherry Hill Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 7.1 Site Location

The Cherry Hill Armory FMS installation is a 12.71-acre parcel designated as Block 49.01, Lot 4 in Cherry Hill Township, Camden County, New Jersey (**Figure 1**). It is located on the southeast-bound side of Park Boulevard, also known as County Route 628. The NJ State Plane Coordinates for the site are East 341245.415016 feet and North 395219.319122 feet. The site is located in the Inner Coastal Plain physiographic section of New Jersey, in the Coopers Creek watershed of Watershed Management Area 19 (WMA 19; Rancocas).

The site is a long rectangle-shaped parcel bound to the north by Park Boulevard, to the east by Curtis Avenue, to the south by Cooper River Park, and to the west by a wastewater treatment plant. The surrounding land use is mixed residential and commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northern and eastern portions of the property, whereas the naturalized areas are generally to the south/southwest. A description of these areas is presented in Section 7.2.

## 7.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 7.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated approximately 20 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Cooper River which parallels the southern site boundary, but is separated from the site by the Cooper River Park. At its closest point, the Cooper River is approximately 20 feet from the site. Net drainage on the site is to the south, towards the Cooper River.

### 7.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates the presence of the following two communities on and adjacent to the property (**Figure 3A**):

- PFO1 – Palustrine, forested, broad-leaved, deciduous wetland, mapped to occur along the southern property boundary.

- R1OW – Riverine, tidal, open water/unknown bottom wetland, mapped to occur adjacent to the southern property boundary.

Both of the above communities are associated with the riparian areas and floodplain of the Cooper River.

### 7.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates that an artificial lakes community type is mapped to occur along the southern site boundary, roughly coincident with the NWI's R1OW wetland community. Additionally, an off-site deciduous wooded wetlands community and a streams/canals community is mapped to the east of the site, indicated on the NWI as a PFO1 wetland community (**Figure 3B**).

### 7.2.4 USDA Soils

A review of the USDA soils GIS data indicates that the site is underlain by the following two soil types (**Figure 4**):

- Holmdel clayey substratum – Urban land complex (USUDHB) – Mapped to occur throughout the majority of the site area, with the exception of the easternmost end (see below).
- Freehold and Downer – Urban land complex, sloping (FrpC) – Mapped to occur at the easternmost end of the site.

Neither of the above soils is listed by the USDA as a hydric soil (USDA 1995).

## 7.3 Results of the Field Assessment

As of October 2005, the Cherry Hill Armory FMS installation was composed of the following two distinct community types: mowed lawn and developed land. Off-site and roughly adjacent to the property, the following four communities were identified: open water, forested riparian corridor, scrub-shrub wetland, and forested deciduous wetland. These off-site wetland areas were designated as Wetland Series A, B, and C (**Figure 5**). Each of these community types, on-site and off-site, is described below.

The mowed lawn community was divided into two distinct sub-communities – mowed lawn with mature trees and mowed lawn without trees. The herbaceous ground layer of both sub-communities exhibited a similar assemblage of various lawn grasses such as bluegrass (*Poa* sp.), fescue (*Festuca* sp.), and rye (*Lolium* sp.), intermixed with common lawn weeds such as English plantain (*Plantago lanceolata*, NL) and violet (*Viola* spp., NA). However, the mowed lawn with mature trees sub-community occupied topographically lower elevations on the property and exhibited tree species that suggested relatively wetter conditions. These trees included red maple (*Acer rubrum*, FAC), sweetgum (*Liquidambar styraciflua*, FAC), and green ash (*Fraxinus pensylvanica*, FACW).

Representative soil borings collected from this suspect community typically exhibited a thin (three inch) surface horizon of dark grayish-brown (10YR 4/2) medium sandy loam, underlain by

an upper subsoil of dark olive-brown (2.5Y 3/3) coarse to medium sandy loam containing approximately 5 percent round quartzose pebbles. These soils were not considered to possess field indicators of hydric soils and were thus not considered to be hydric. Based on this assessment, none of the mowed lawn community was identified as wetland.

The off-site open water community was the Cooper River, located within the Cooper River Park along the southern site boundary. A forested riparian corridor and paved pedestrian trail extends along the edge of the river and southern site boundary. This riparian corridor was vegetated by a mix of plant species such as white mulberry (*Morus alba*, NL), red maple (FAC), pin oak (*Quercus palustris*, FACW), red oak (*Quercus rubra*, FACU-), multiflora rose (*Rosa multiflora*, FACU), Allegheny blackberry (*Rubus allegheniensis*, FACU-), poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*, FAC), Virginia creeper (*Parthenocissus quinquefolia*, FACU), grape (*Vitis* sp., NA), white snakeroot (*Ageratina altissima*, FACU-), small white aster (*Aster vimineum*, FAC), and various species of goldenrod (*Solidago* spp., NA).

A representative soil boring collected from this community typically exhibited a single, deep (16 inch) horizon of very dark grayish-brown (10YR 3/2) medium sandy loam with 30 to 40 percent pore linings. This riverine system and portions of the adjacent forested riparian corridor was identified as wetland and designated, in part, as Wetland Series A. The eastern extent of Wetland Series A includes an off-site forested deciduous wetland that is a broad, floodplain for Cooper River. This community is maintained as mowed lawn and appears to be part of the Cooper River Park.

Similarly, an off-site scrub-shrub wetland associated with a small, drainage ditch was identified as wetland and designated as Wetland Series B. This community was located past the western site boundary and was vegetated with a mix of species such as eastern red cedar (*Juniperus virginiana*, FACU), swamp beggar ticks (*Bidens frondosa*, FACW), Japanese stilt grass (*Microstegium viminea*, FAC), purple loosestrife (*Lythrum salicaria*, FACW+), curly dock (*Rumex crispus*, FACU), and lurid sedge (*Carex lurida*, OBL).

A representative soil boring collected from this community typically exhibited a surface horizon of very dark grayish-brown (10YR 3/2) coarse to medium sandy loam with approximately 20 percent pore linings, underlain by an upper subsoil of dark grayish-brown (10 YR 4/2) coarse to medium sandy loam, also with approximately 20 percent pore linings. These soils were considered to exhibit field indicators of hydric soils, subsequently, this community was identified as wetland.

## 7.4 Conclusion

The results of the wetlands delineation conducted for the Cherry Hill Armory FMS installation revealed the presence of a riverine wetland system along the southern site boundary. This wetland, depicted as Wetland Series A on **Figure 5** is associated with the Cooper River, and is anticipated to meet the definition of a State open water at N.J.A.C. 7:7A-1.4, thus possessing no freshwater wetland transition area (i.e. buffer). An off-site segment of this wetland does exhibit a forested floodplain community along its northern side. This off-site adjacent wetland is anticipated to be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot transition area as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the off-site wetland does not meet the criteria for either an exceptional

resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

The off-site wetland also does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetland that has 50 percent or more of the area within 50 feet of the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Cherry Hill Armory FMS

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***Legend***

- Limited Access
- Highways
- Secondary Roads
- Installation Area

1:50,000

Figure 1
Site Location Map
Cherry Hill Armory/FMS
Cherry Hill Twp.,
Camden Co., NJ

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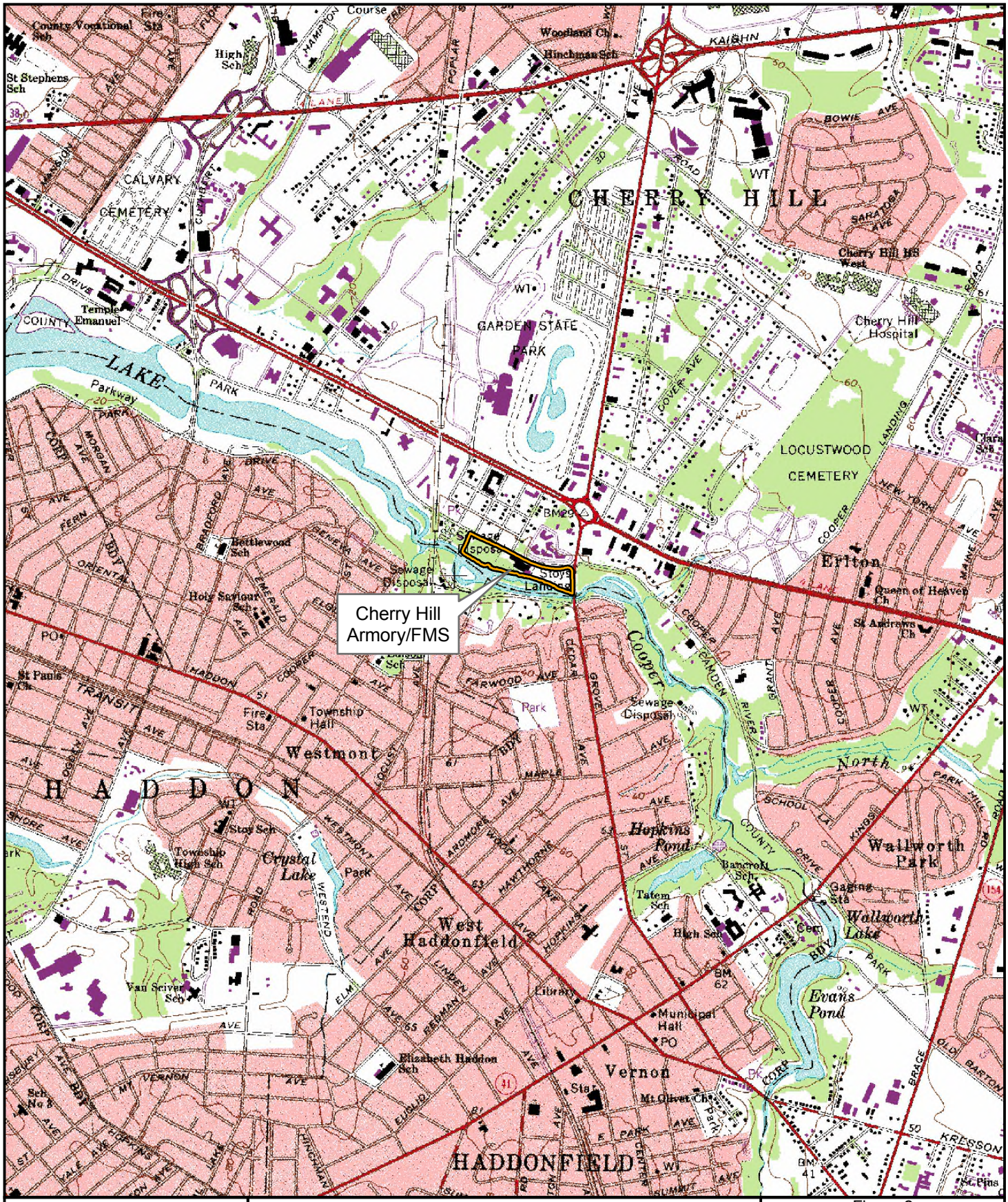




***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 341245.415016 Feet
Northing: 395219.319122 Feet

1:24,000

Figure 2
USGS Topographic Map
Cherry Hill Armory/FMS
Cherry Hill Twp.,
Camden Co., NJ

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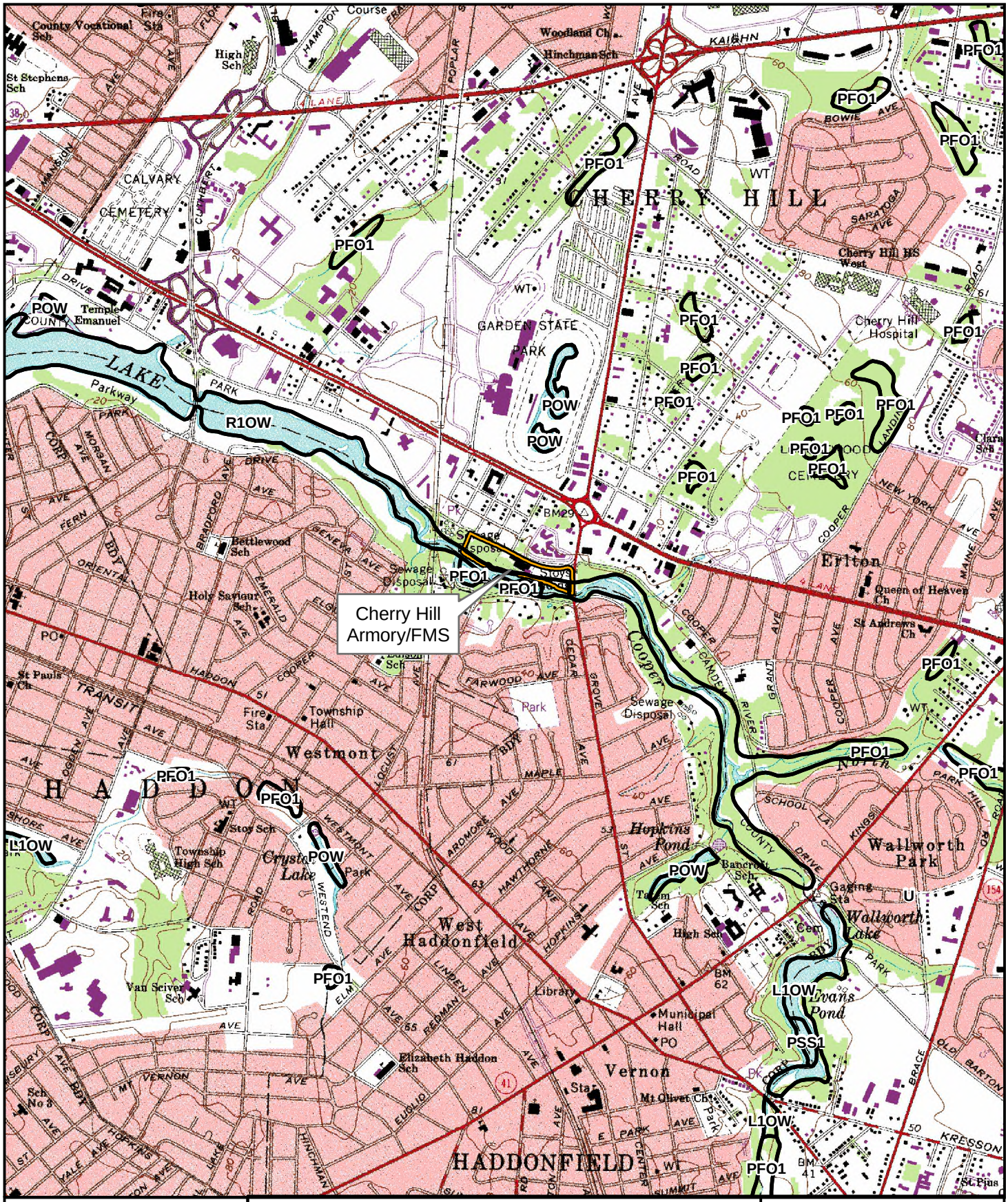




**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 341245.415016 Feet
Northing: 395219.319122 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Cherry Hill Armory/FMS
Cherry Hill Twp.,
Camden Co., NJ

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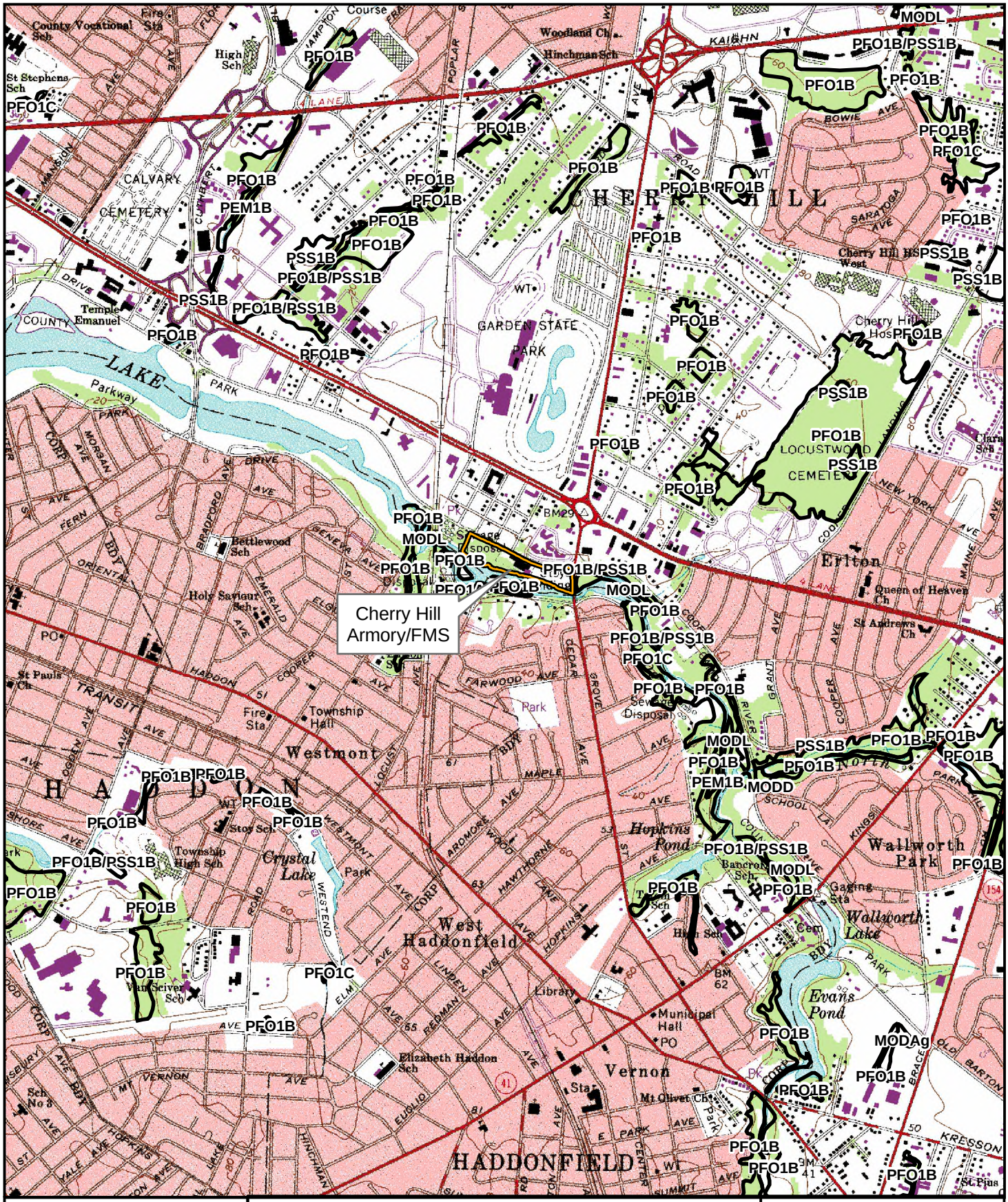
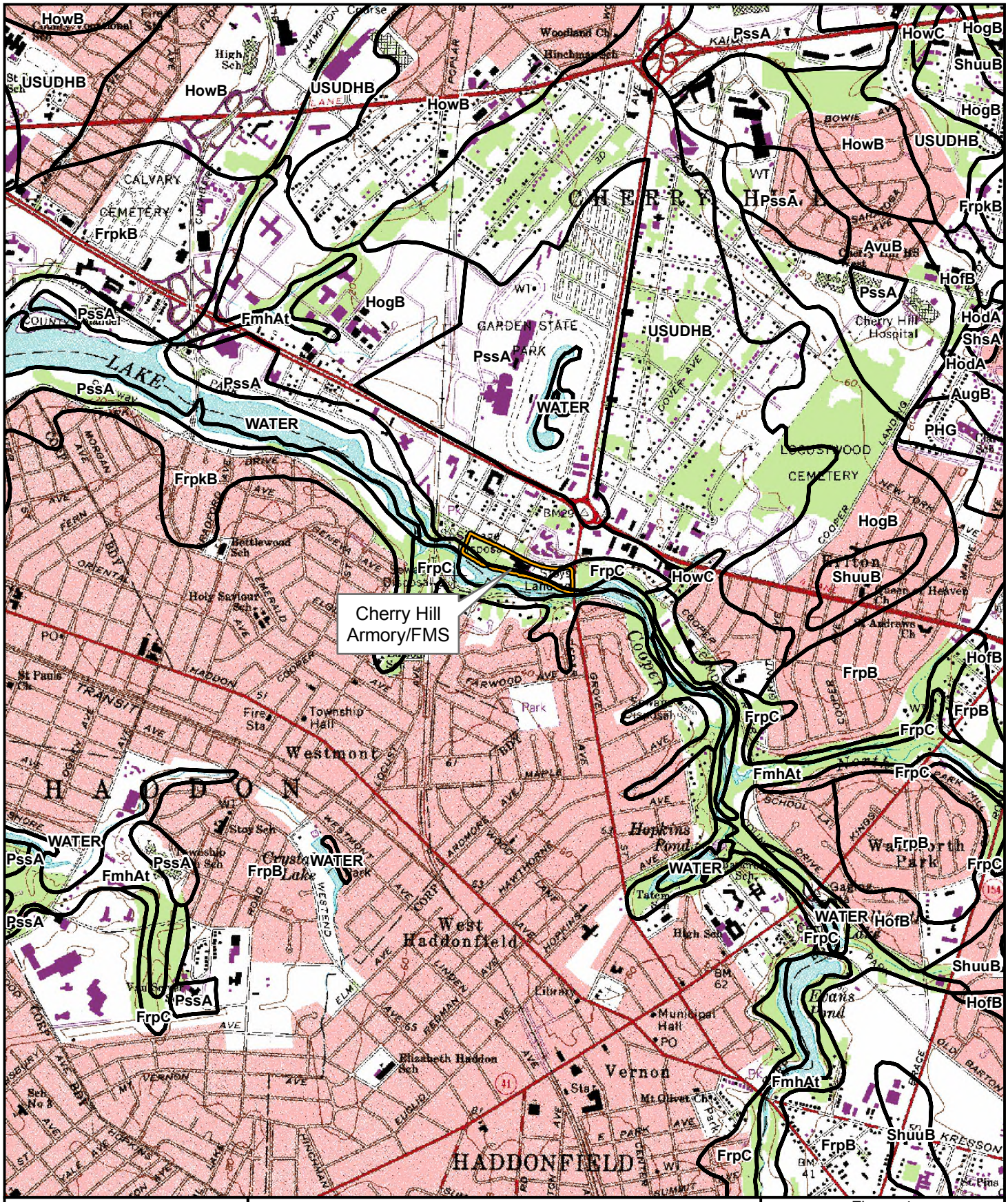

Cherry Hill Armory/FMS
PFO1B
PFO1C
PFO1B/PSS1B
PEM1B
PSS1B
MODL
MODD
MODAg
Cherry Hill
Haddonfield
Westmont
West Haddonfield
Erlton
Wallworth Park
Crystal Lake
Hopkins Pond
Evans Pond
Wallworth Lake
Garden State Park
Lake Parkway
Calvary Cemetery
Locustwood Cemetery
Cherry Hill West
Woodland Ch
Hinchman Sch
County Vocational Sch
St Stephens Sch
High Sch
Temple Emanuel
Bettlewood Sch
Holy Saviour Sch
St Pauls Ch
Township Hall
Fire Sta
Stoy Sch
Township High Sch
Van Sciver Sch
Elizabeth Haddon Sch
Bancroft Sch
Gaging Sta
Municipal Hall
Library
Mt Olivet Cem
Queen of Heaven Ch
St Andrews Ch
Clara Sch
Park
Course
Transit
Kaighn
Bowie Ave
Saratoga Ave
Maple Ave
Haddon Ave
Kresson
Hopkins
Westend
Elm
Linden
Redman
Vernon
Euclid
Hawthorne
Aromore Wood
Grant
Cooper
Cedar Grove
Fairwood
Evesham
Ferdinand
Emerald
Bradford
Morgan
Fern
Genevra
Orient
Corp
Ogden
Ocist
Maple
Hopkins
Lake
Center
Summit
Park
Drive
Road
Ave
Sch
Fire Sta
Township Hall
Municipal Hall
Library
Mt Olivet Cem






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 341245.415016 Feet
Northing: 395219.319122 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Cherry Hill Armory/FMS
Cherry Hill Twp.,
Camden Co., NJ

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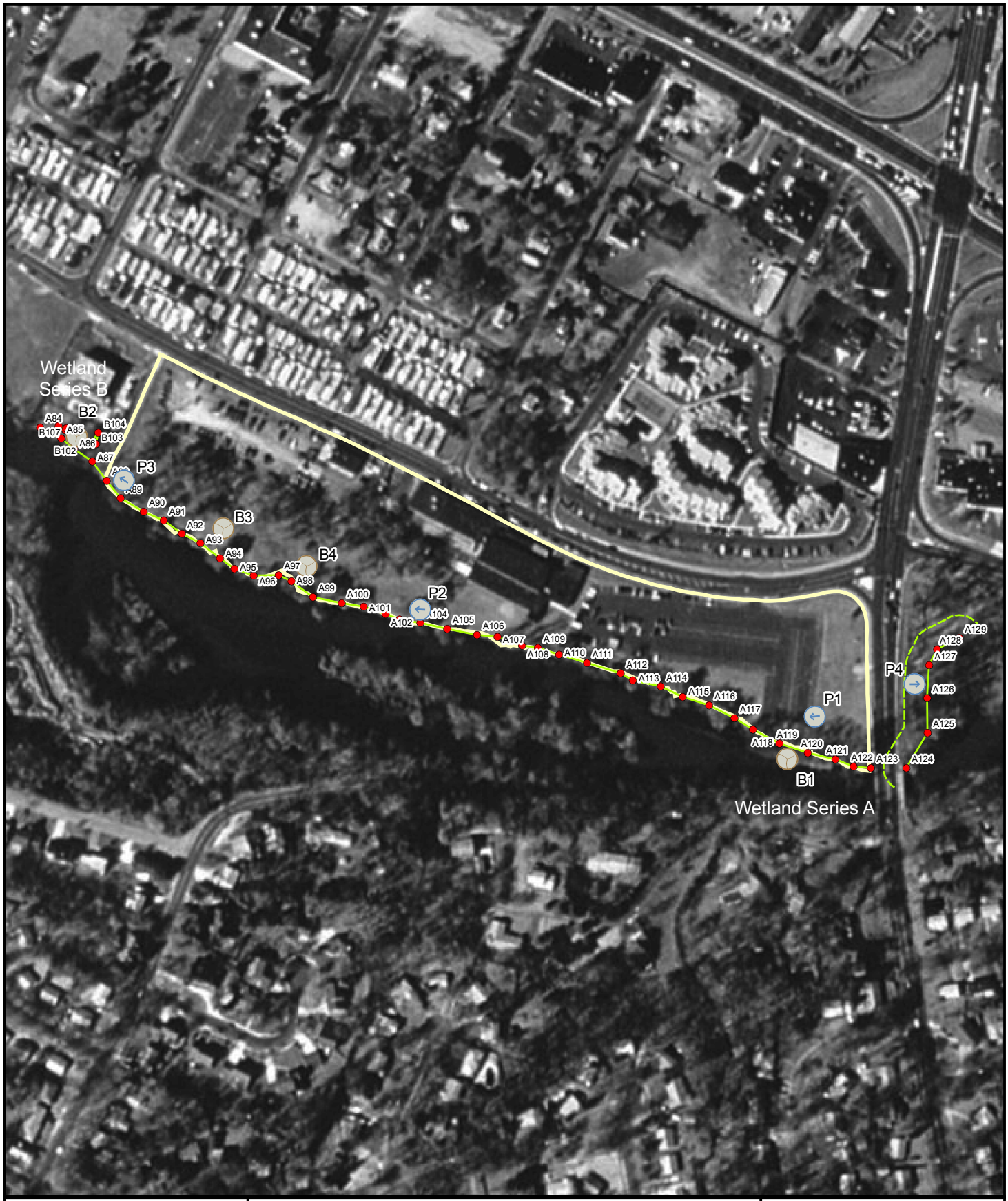




***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 341245.415016 Feet
Northing: 395219.319122 Feet

1:3,465

Figure 5
Wetlands Location Map
Cherry Hill Armory/FMS
Cherry Hill Twp.,
Camden Co., NJ

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# 8.0 DOVER ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Dover Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 8.1 Site Location

The Dover Armory FMS installation is an approximately 16.17-acre parcel designated as Block 10902, Lot 1 in Dover Township, Morris County, New Jersey (**Figure 1**). It is located on the northbound side of State Route 15, south of the intersection with Interstate 80. The NJ State Plane Coordinates for the site are East 474115.249219 feet and North 753404.644433 feet. The site is located in the Highlands physiographic section of New Jersey, in the Rockaway River watershed of Watershed Management Area 06 (WMA 6; Upper Passaic, Whippany, and Rockaway).

The site is a flag parcel bound to the north and east by undeveloped land, to the south by residential properties, and to the west by Route 15. The surrounding land use is commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the west/southwest portion of the property, whereas the naturalized areas are generally to the north and east. A description of these areas is presented in Section 8.2.

## 8.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 8.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated approximately 600 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is the confluence of Green Pond Brook and Rockaway River. At its closest point, Green Pond Brook is located approximately 175 feet west of the site, and the Rockaway River is located approximately 400 feet southwest of the site. Net drainage on the site is to the northwest, towards Green Pond Brook.

### 8.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates the presence of two separate palustrine, forested, broad-leaved, deciduous wetland (PFO1) community in the western and eastern portions of the site (**Figure 3A**). These communities are associated with the riparian and floodplain areas of Green Pond Brook.

### 8.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the following two communities to be mapped on the site (**Figure 3B**):

- Deciduous wooded wetlands – Mapped to occur in the eastern portion of the site, roughly coincident with the NWI's PFO1 community.
- Disturbed wetlands (Modified) – Mapped to occur in the north-eastern portion of the site, but largely adjacent to the site. This community is not indicated on the NWI map.

### 8.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Urban land (UR) – Mapped to occur in the western portion of the site, coincident with the developed areas.
- Hibernia stony loam, 3 to 15% slopes (HhmCa) – Mapped to occur in the eastern portion of the site.
- Preakness sandy loam, 0 to 4% slopes (PrkAt) – Mapped to occur in the east-central portion of the site.
- Preakness sandy loam, dark surface variant (PrsdAt) – Mapped to occur as a very narrow fringe along the northeast property boundary.
- Rockaway gravely sandy loam, 3 to 8% slopes (RocB) – Mapped to occur in the northwest corner of the site, and as a very small finger extending into the site from the north-central property boundary.
- Rockaway very stony sandy loam, 3 to 15% slopes (RobCb) – Mapped to occur along the eastern site boundary.
- Urban land – Preakness complex (USPREB) – Mapped to occur as a narrow band along a portion of the southeast property boundary.
- Urban land – Rockaway complex, gently sloping and sloping (USROCC) – Mapped to occur along the southwest and south-central site boundary.

The Preakness series is classified as a Typic Humaquept and is therefore listed by the USDA as a hydric soil (USDA 1995).

### 8.2.5 Rare Species Survey

The results of the rare species survey indicated the potential for four state-listed bird species, one federal- and state-listed mammal species, and one state-listed herptile species or their habitats to occur on or within the vicinity of the site. Of these species, the results of a Phase I survey indicated the only presence of suitable habitat for the Indiana bat (*Myotis sodalis*) to be on site. However, this suitable habitat is reported to be limited based on the small size of the

wooded communities, the species composition, age structure, and lack of dead standing trees with loose bark.

## 8.3 Results of the Field Assessment

As of October 2005, the Dover Armory FMS installation was composed of the following five distinct community types: forested deciduous wetland, drainage channels, deciduous woodland, mowed lawn, and developed land. The forested deciduous wetland and drainage channels were collectively designated as Wetland Series A and B (**Figure 5**). Each of these five community types is described below.

Forested deciduous wetland dominates the northeast and eastern portions of the site. The outer boundary for this community ranges from relatively straight lines coincident with the toe-of-slope at distinct topographic breaks, to sinuous lines from gradual and subtle changes in elevation and soil texture. This community ranged in age from early to late stage and was dominated by red maple (*Acer rubrum*, FAC), pin oak (*Quercus palustris*, FACW), ironwood (*Carpinus caroliniana*, FAC), coast pepperbush (*Clethra alnifolia*, FAC+), witch hazel (*Hamamelis virginiana*, FAC-), spicebush (*Lindera benzoin*, FACW-), American elm (*Ulmus americana*, FACW-), silky dogwood (*Cornus amomum*, FACW), Japanese honeysuckle (*Lonicera japonica*, FAC), grape (*Vitis* sp., NA), poison ivy (*Toxicodendron radicans*, FAC), small white aster (*Aster vimineus*, FAC), grass-leaved goldenrod (*Euthamia graminifolia*, FAC), Japanese stilt grass (*Microstegium viminea*), and tussock sedge (*Carex stricta*, OBL). Representative soil borings collected from this community typically exhibited a grayish-brown (10YR 5/2) surface horizon with approximately 10 percent pore linings, underlain by an upper subsoil of light-gray (7.5YR 7/1) loamy silt with approximately 10 percent pore linings. These soils were considered to exhibit field indicators of hydric soils.

A series of drainage channels exist within the forested deciduous wetland community that generally drain to the east. These channels range in width from around five feet to broad, wide linear features estimated to be over 25 feet, resembling linear depressions or undulations in the landscape. All of these features were dry at the time of the site visit. The bottoms of these channels ranged in texture and composition from angular fill material exhibiting no field indicators of hydric soils to deep, black (10YR 2/1) loam. All of the drainage features observed on the site were included within Wetland Series A and B.

A deciduous woodland community occupies the up-gradient, drier portions of the wooded areas on the site. These areas are located along the outer edges of the forested deciduous wetland community, ranging in width from narrow (5 feet) fringe areas to expansive tracts of woodland. This community was dominated by red maple (FAC), sugar maple (*Acer saccharum*, FACU), white oak (*Quercus alba*, FACU), red oak (*Quercus rubra*, FACU-), white ash (*Fraxinus americana*, FACU), black cherry (*Prunus serotina*, FACU), Allegheny blackberry (*Rubus allegheniensis*, FACU-), Virginia creeper (*Parthenocissus quinquefolia*, FACU), white snakeroot (*Ageratina altissima*, FACU-), and garlic mustard (*Alliaria officinalis*, FACU-). This community was not identified as wetland.

The mowed lawn and developed land areas were generally in the west and southwest portions of the site and were not identified as wetland.

## 8.4 Conclusion

The results of the wetlands delineation of the Dover Armory FMS installation reveal wetland areas to occupy the majority of the undeveloped portions of the site. These wetlands are depicted as Wetland Series A and B on **Figure 5**. It is anticipated that these wetlands will be classified by the NJDEP as intermediate-resource value wetlands, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer), as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the wetlands do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4.

The wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). The latter criteria are further supported by the findings of the April 2007 Rare Species Survey Report.

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Dover Armory FMS

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***Legend***

- Installation Area
- Limited Access Freeway
- Highway
- Secondary Roads
- Local Roads
- Minor Roads
- Ramps
- Other Roads

1:50,000

Figure 1
Site Location Map
Dover Armory/FMS
Dover Township,
Morris Co., NJ

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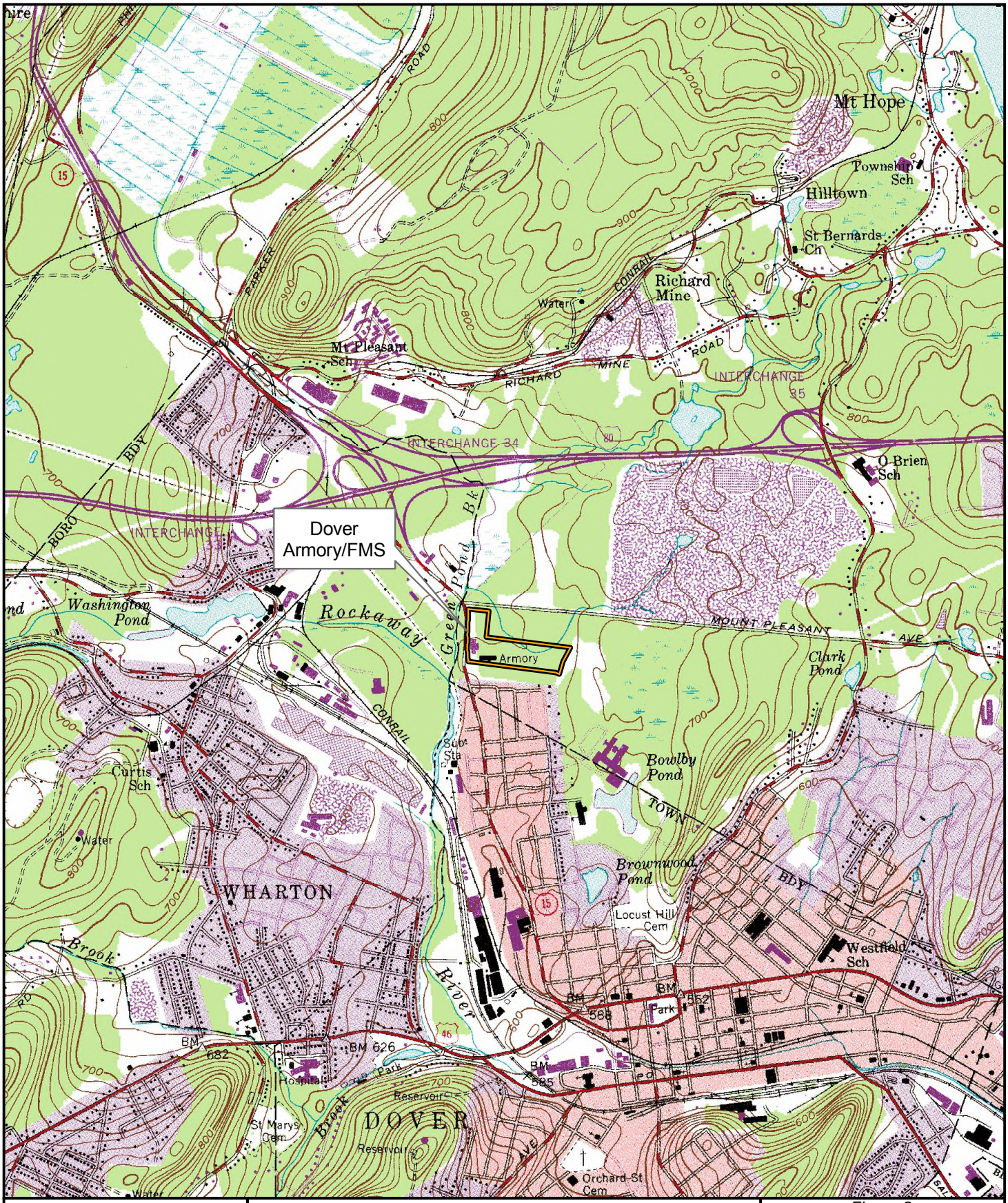
Plymouth Meeting, PA 19462






**Legend**

installation_area

NJ State Plane Coordinates:
Easting: 474115.249219 Feet
Northing: 753404.644433 Feet

1:24,000

Figure 2
USGS Topographic Map
Dover Armory/FMS
Dover Township,
Morris Co., NJ

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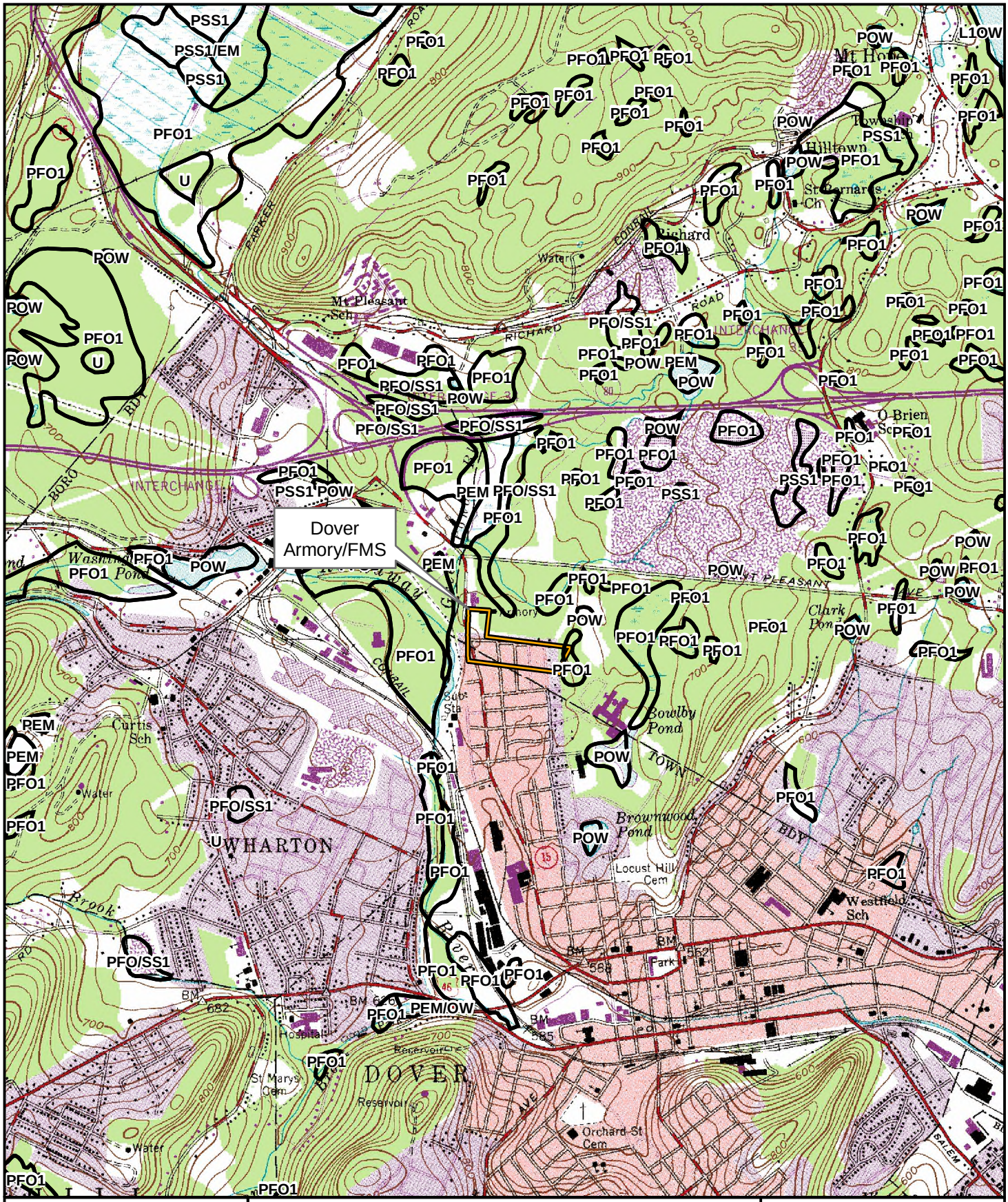




**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 474115.249219 Feet
Northing: 753404.644433 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Dover Armory/FMS
Dover Township,
Morris Co., NJ

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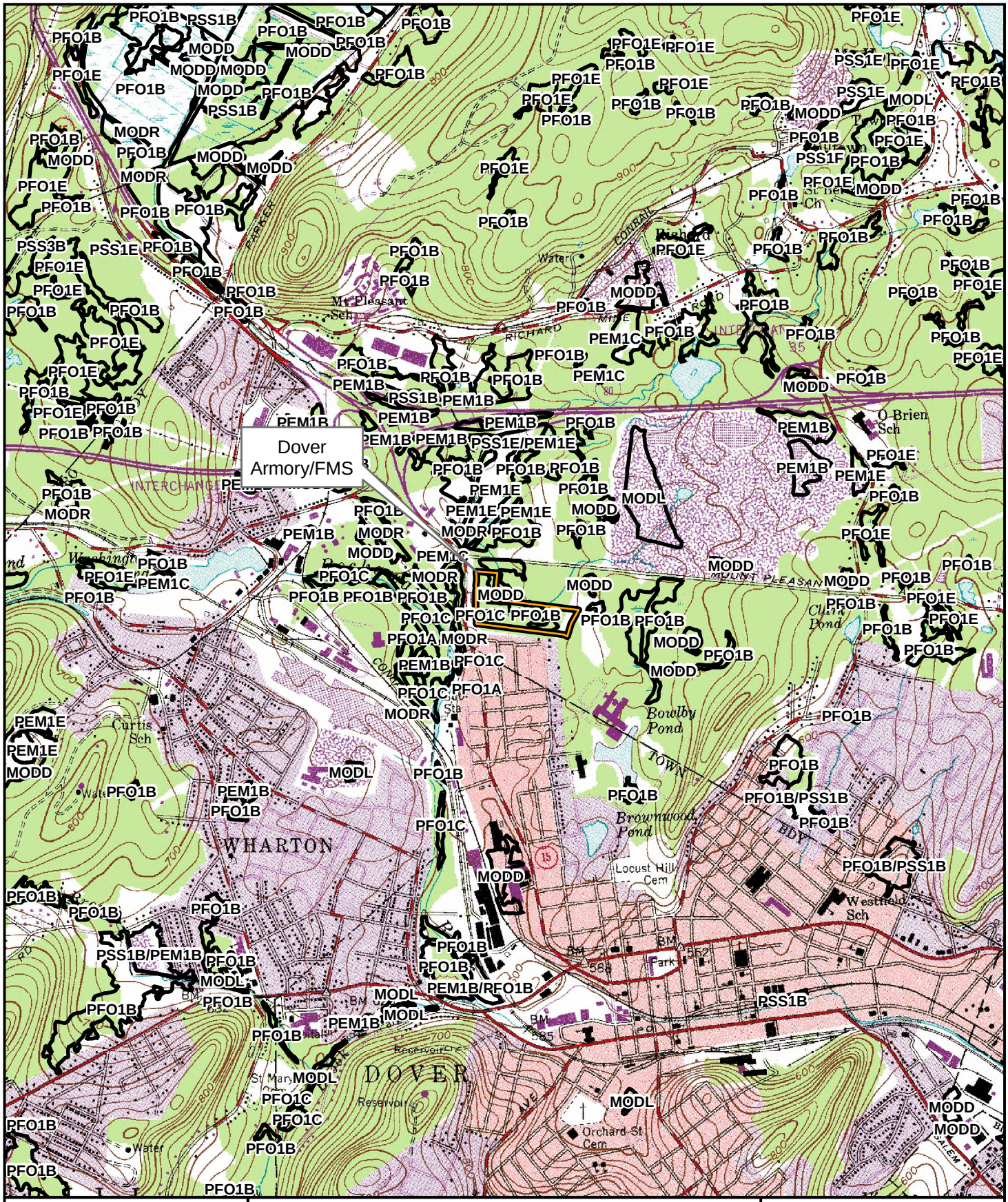




***Legend***

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 474115.249219 Feet
Northing: 753404.644433 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Dover Armory/FMS
Dover Township,
Morris Co., NJ

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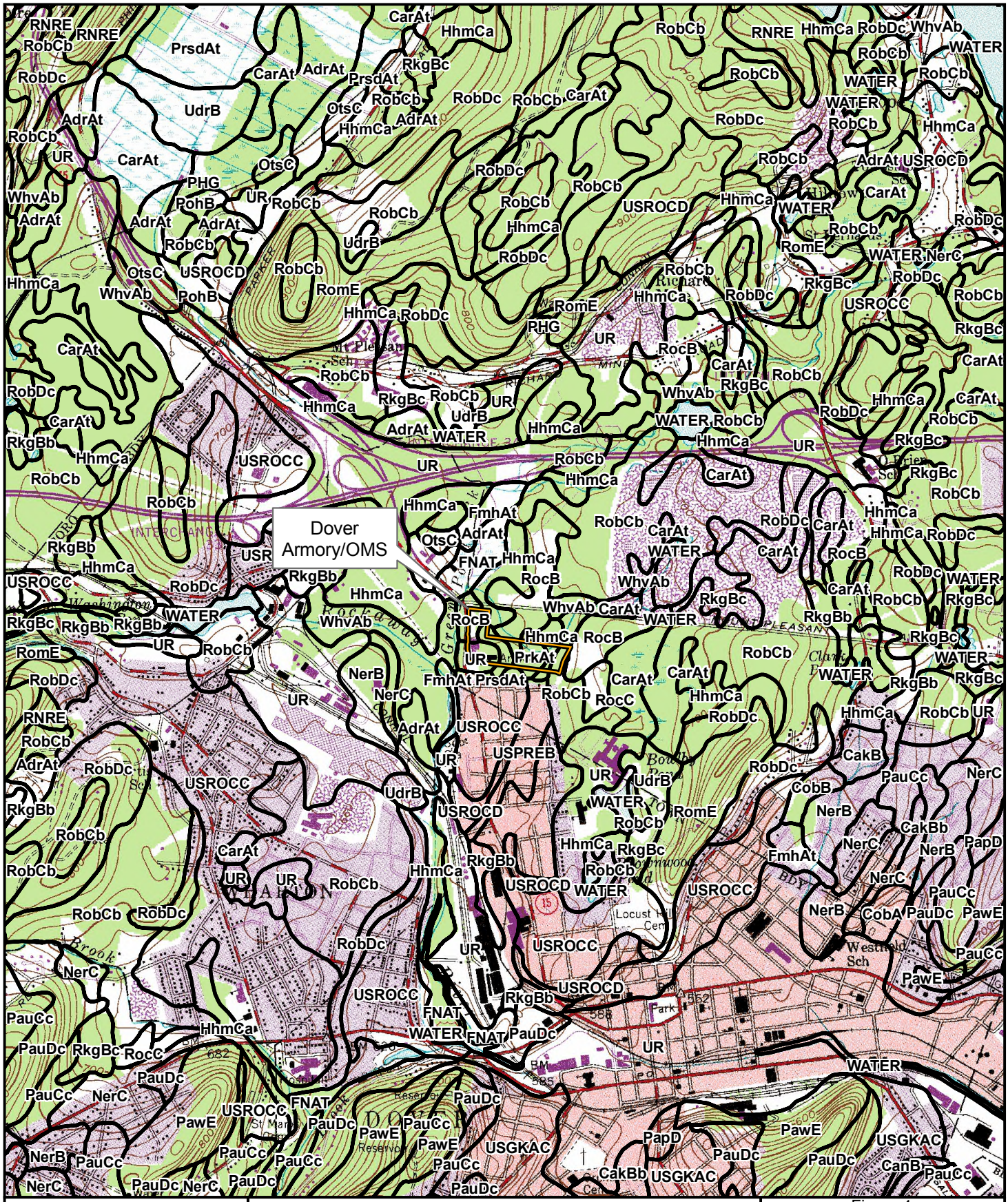




***Legend***

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 474115.249219 Feet
Northing: 753404.644433 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Dover Armory/OMS
Dover Township,
Morris Co., NJ

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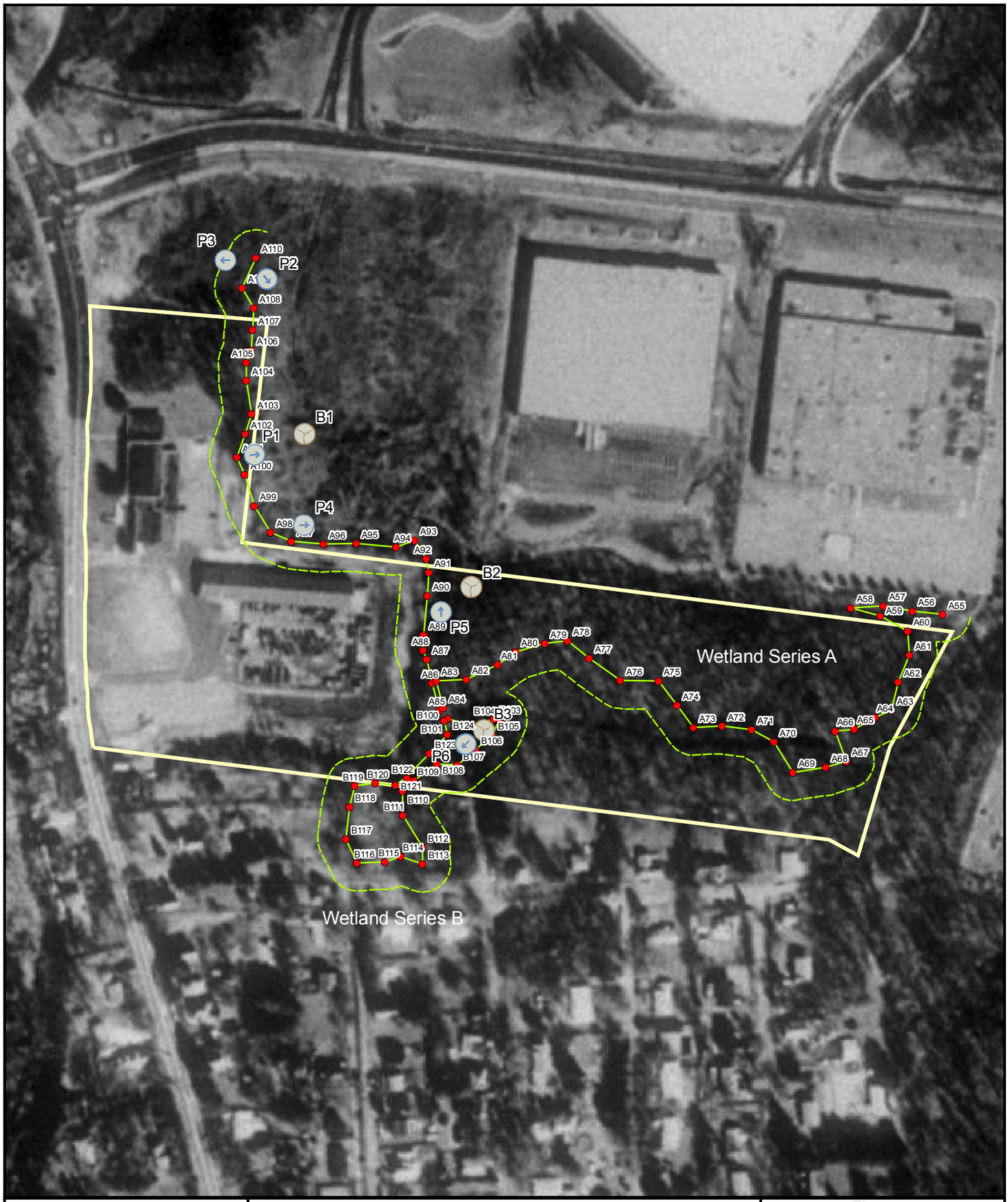




***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

50' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 474115.249219 Feet
Northing: 753404.644433 Feet

1:2,844

Figure 5
Wetlands Location Map
Dover Armory/FMS
Dover Township,
Morris Co., NJ

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# 9.0 FLEMINGTON ARMORY

This section of the report presents the results of the wetlands delineation for the Flemington Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 9.1 Site Location

The Flemington Armory installation is an approximately 9.55-acre parcel designated as Block 42, Lot 14 in Raritan Township, Hunterdon County, New Jersey (**Figure 1**). It is located on the eastbound side of State Route 12, west of the Borough of Flemington. The NJ State Plane Coordinates for the site are East 377893.280702 feet and North 609232.848615 feet. The site is located in the Piedmont physiographic section of New Jersey, in the South Branch Raritan River watershed of Watershed Management Area 06 (WMA 08; North and South Branch Raritan).

The site is a flag-shaped parcel bound to the north by Route 12, to the east and west by undeveloped land, and to the south by Plum Brook Road and undeveloped land. The surrounding land use is rural and residential. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the north/northwest portion of the property, whereas the naturalized areas are generally to the east and southeast. A description of these areas is presented in Section 9.2.

## 9.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 9.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 520 and 540 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Plum Brook, a tributary to Wickecheoke Creek. At its closest point, Plum Brook is located approximately 200 feet to the west of the site. Net drainage on the site is to the northwest, towards Plum Brook.

### 9.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the site (**Figure 3A**). The nearest mapped community is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located approximately 350 feet to the west of the site. This PFO1 community is associated with the riparian and floodplain areas of Plum Brook.

### 9.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates no wetland communities to be mapped on the site; however, an off-site deciduous wooded wetland community is mapped immediately outside of the western site boundary. This community is roughly coincident with the NWI's PFO1 community, although depicted to be much closer to the site (**Figure 3B**).

### 9.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Chalfont silt loam, 0 to 2 percent slopes (ChcA) – Mapped to occur in the central and northern portions of the site.
- Klinesville shaly loam, 4 to 12 percent slopes (KkoC) – Mapped to occur in the southern portion of the site.

Neither of these soil types is listed by the USDA as a hydric soil (USDA 1995).

## 9.3 Results of the Field Assessment

As of September 2005, the Flemington Armory installation was composed of the following five distinct community types: forested deciduous wetland, open water, deciduous woodland, mowed lawn, and developed land. The forested deciduous wetland and open water communities were collectively designated as Wetland Series A, B, C, D, E, and F (**Figure 5**). Each of these five community types is described below.

A mixed-stage, forested deciduous wetland community occupies the topographically low-lying portions of the much larger deciduous woodland community. This forested wetland includes most of the open water community and as such, often takes the form of a linear or sinuous-shaped area. This community is dominated by red maple (*Acer rubrum*, FAC), ironwood (*Carpinus caroliniana*, FAC), American elm (*Ulmus americana*, FACW-), southern arrowwood (*Viburnum dentatum*, FAC), silky dogwood (*Cornus amomum*, FACW), witch hazel (*Hamamelis virginiana*, FAC-), spicebush (*Lindera benzoin*, FACW-), multiflora rose (*Rosa multiflora*, FACU), Japanese honeysuckle (*Lonicera japonica*, FAC-), poison ivy (*Toxicodendron radicans*, FAC), red raspberry (*Rubus idaeus*, FAC-), and Japanese stiltgrass (*Microstegium vimineum*, FAC).

Representative soil borings collected from this community typically exhibited a surface horizon of grayish-brown (10YR 5/2) to dark grayish-brown (10YR 4/2) loamy silt with approximately 30 percent pore linings, underlain by an upper subsoil of grayish-brown (10YR 5/2) loamy silt to platy, silty clay loam with approximately 10 percent pore linings and 20 percent soft, dark masses. These soils were considered to exhibit field indicators of hydric soils.

Numerous man-made, linear drainage features are present within the forested deciduous wetland community, ranging from dry and very narrow (one to two feet) and straight drainage ditches to relatively wider (20 to 30 feet) areas that contained standing water at the time of the site visit. Two man-made drainage features along the property frontage were also identified as

wetland and delineated as Wetland Series E and F. These features were created to convey stormwater away from the site and are hydraulically connected to a portion of Wetland Series D.

An early to mid-stage deciduous woodland community occupies the higher elevations on the site. This community was dominated by sassafras (*Sassafras albidum*, FACU-), shagbark hickory (*Carya ovata*, FACU-), black walnut (*Juglans nigra*, FACU), Japanese barberry (*Berberis thunbergii*, multiflora rose (FACU), and red raspberry (FAC-). This community was not identified as a wetland.

The mowed lawn and developed land areas are generally located in the north and northwest portion of the property. None of these areas were identified as wetland.

## 9.4 Conclusion

The results of the wetlands delineation conducted for the Flemington Armory installation reveal wetlands to surround the developed portion of the site. These wetlands range from small and narrow drainage ditches to expansive forested wetland communities that continue off-site. They are depicted as Wetland Series A through F on **Figure 5**. Portions of this wetland system are anticipated to be classified by the NJDEP as either State open waters, as defined at N.J.A.C. 7:7A-1.4, or as ordinary-resource value wetlands as defined at N.J.A.C. 7:7A-2.4(d), thus possessing no associated freshwater wetlands transition area (i.e. buffer). The conclusion regarding the ordinary resource value wetland was reached because some of these areas meet the definition of a drainage ditch or swale at N.J.A.C. 7:7A-1.4.

However, other portions are anticipated to be classified by the NJDEP as intermediate-resource value wetlands, thus possessing a 50-foot transition area, as per Subchapter 2 of N.J.A.C. 7:7A. The conclusion regarding intermediate resource value wetlands was reached because these wetland portions do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4. These wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Flemington Armory

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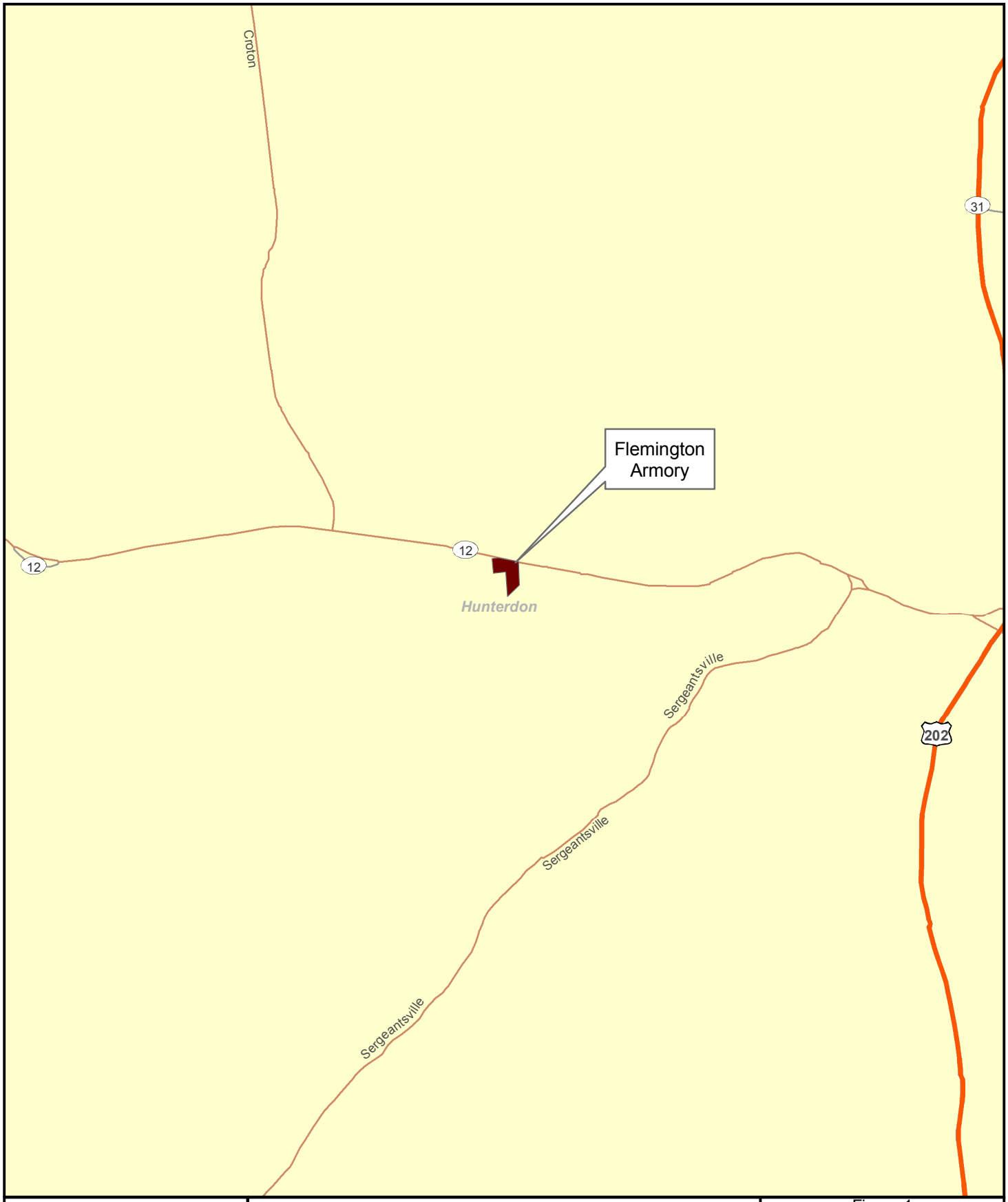




**Legend**

- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrian Way
- Installation Area

1:50,000

Figure 1
Site Location Map
Flemington Armory
Raritan Twp.,
Hunterdon Co., NJ

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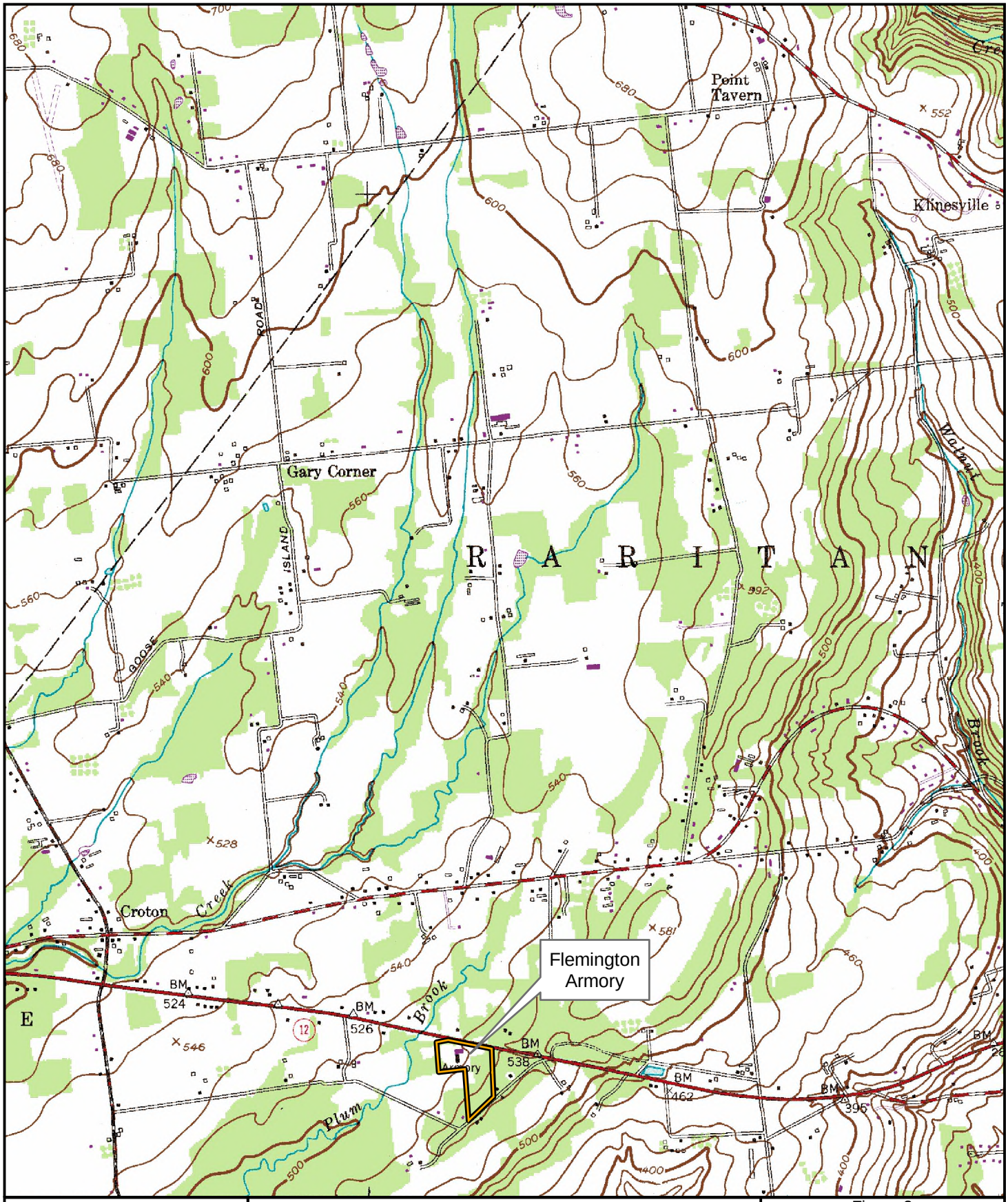




***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 377893.280702 Feet
Northing: 609232.848615 Feet

1:24,000

Figure 2
USGS Topographic Map
Flemington Armory
Raritan Twp.,
Hunterdon Co., NJ

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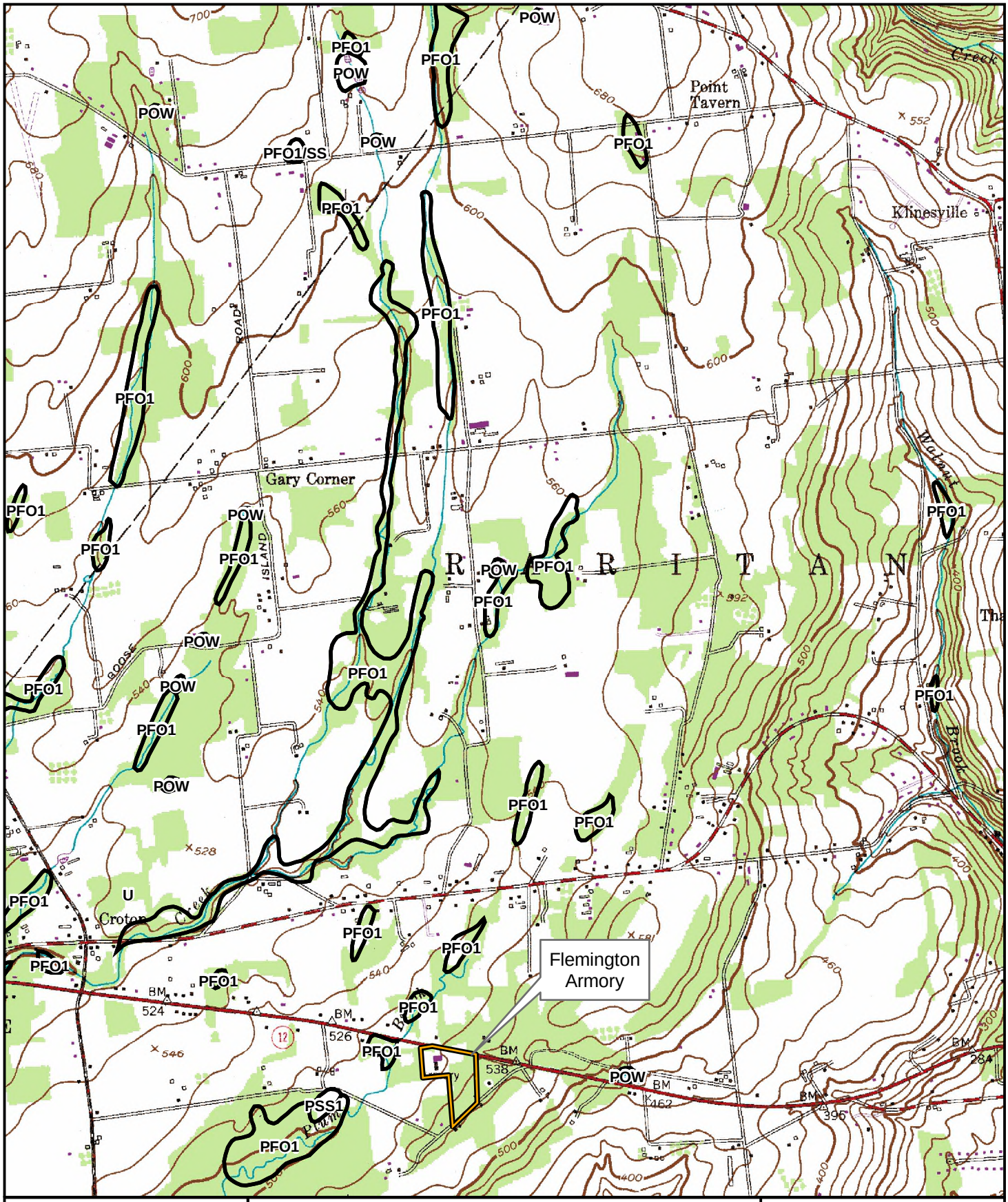
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 377893.280702 Feet
Northing: 609232.848615 Feet

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Flemington Armory
Raritan Twp.,
Hunterdon Co., NJ

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Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 377893.280702 Feet
Northing: 609232.848615 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Flemington Armory
Raritan Twp.,
Hunterdon Co., NJ

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Plymouth Meeting, PA 19462

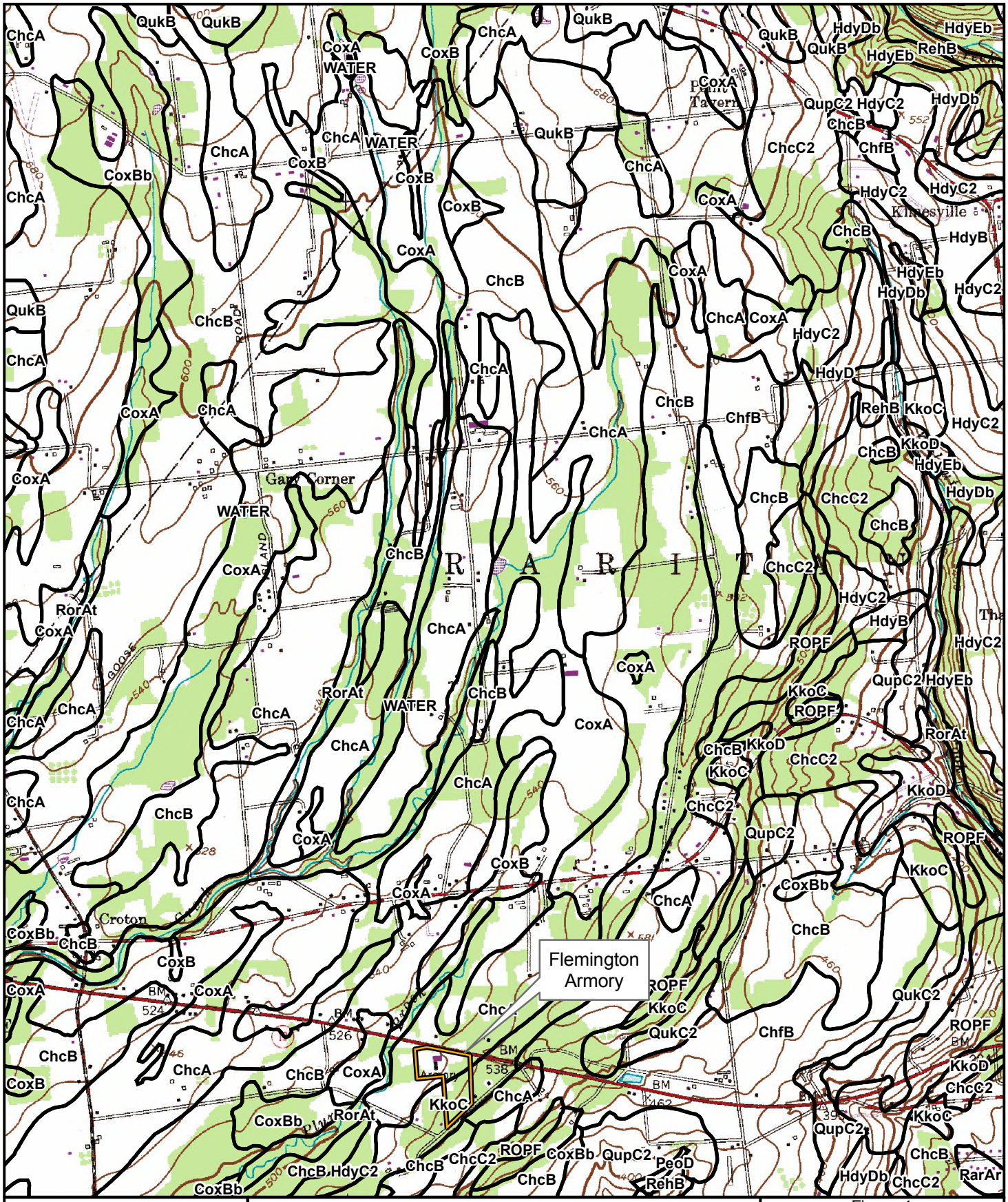


Figure 4
USDA Soils Map
Flemington Armory
Raritan Twp.,
Hunterdon Co., NJ

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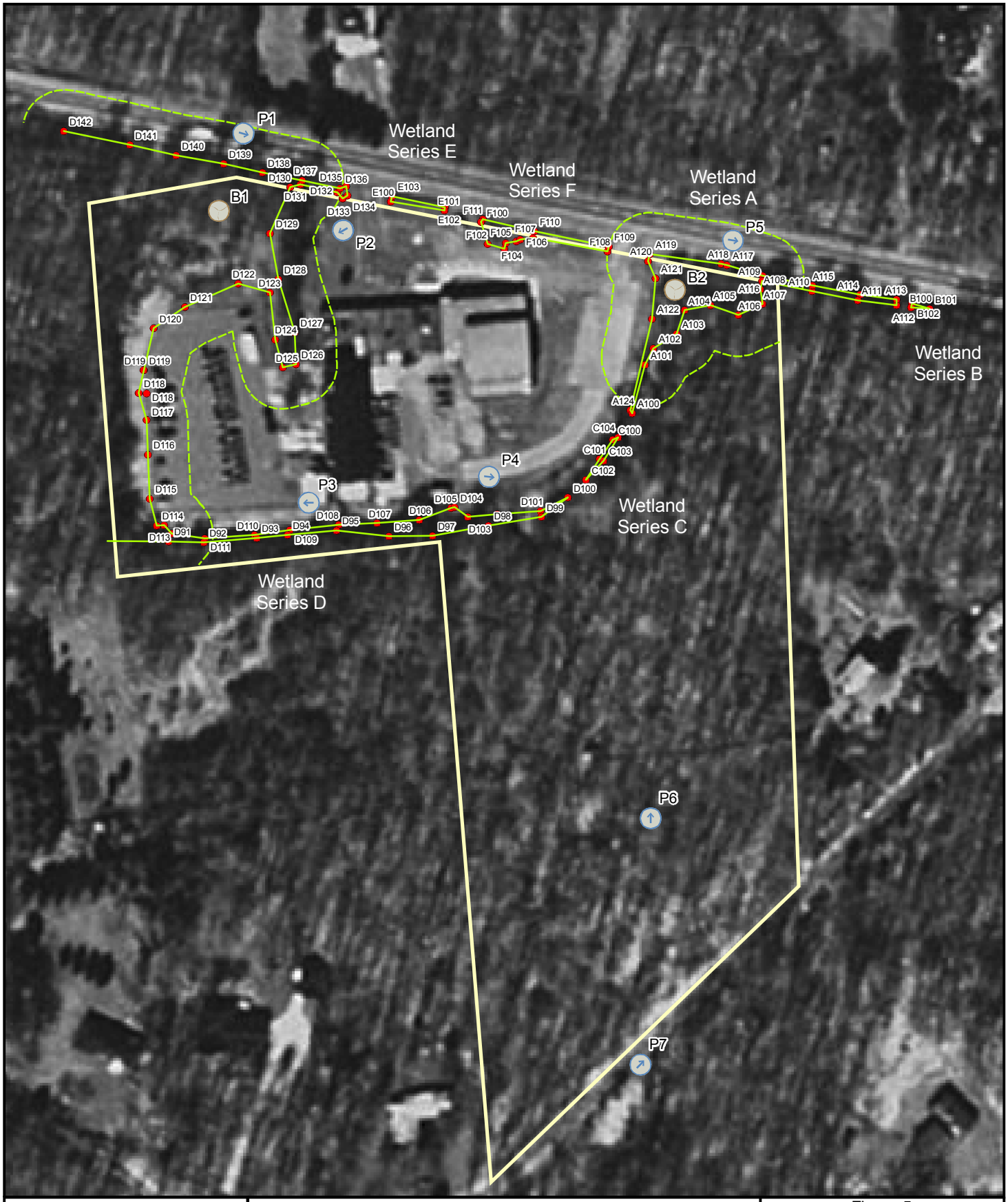
Plymouth Meeting, PA 19462






***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

50' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 377893.280702 Feet
Northing: 609232.848615 Feet

1:1,921

Figure 5
Wetlands Location Map
Flemington Armory
Raritan Twp.,
Hunterdon Co., NJ

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# 10.0 FORT DIX, 3200

This section of the report presents the results of the wetlands delineation for the Fort Dix, 3200 area. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 10.1 Site Location

The Fort Dix, 3200 site is a 30.69-acre parcel located in Wrightstown Borough, Burlington County, New Jersey (**Figure 1**). It is located on the northbound side of State Route 68, immediately north of the Route 68 entrance gate to Fort Dix. The NJ State Plane Coordinates for the approximate center of the site are East 453426 feet and North 434054 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the South Branch Rancocas Creek watershed of Watershed Management Area 19 (WMA 19, Rancocas).

The site is a roughly-inverted triangle shape and is bounded to the north by Administration Street and existing development (i.e. the Fort Dix HQ, FMS, and RTS-M installation), to the east and south by Florida Avenue, and to the west by State Route 68. Administration Street and Florida Avenue are roads within the Fort Dix Military Installation. The surrounding land use is developed land. A softball field composes the majority of the site; wooded areas are located in the northwestern and southern corners of the site.

## 10.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 10.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated at elevations ranging from approximately 150 to 170 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is an on-site unnamed tributary to a series of impoundments situated between the Fountain Green Golf Course (an installation course) and Pennsylvania Avenue. Drainage from these impoundments is piped underground, and likely lead to the tributary system that includes Larkins Run, Jacks Run, and Ong Run, among others. This on-site unnamed tributary is located in the southern portion of the site and bisects Florida Avenue, with flow to the east.

### 10.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the site (**Figure 3A**). The nearest mapped wetlands are as follows, both of which are situated upgradient of the site:

- PEM1B/PFO1B = palustrine, emergent, persistent, saturated / palustrine, forested, broad-leaved deciduous, saturated wetland

- PFO1B = palustrine, forested, broad-leaved deciduous, saturated wetland

At its nearest points, the PEM1B/PFO1B system is located approximately 700 feet to the northwest of the site, and the PFO1B wetland is located approximately 700 feet to the southwest of the site.

### 10.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetland GIS data for the site indicates no wetland communities to be mapped on or adjacent to the site. Similar to the NWI, the nearest mapped wetland is a palustrine, deciduous, broad-leaved deciduous, saturated community (PFO1B) located approximately 800 feet to the southwest and upgradient of the site, across State Route 68. The nearest mapped wetland downgradient of the site is a palustrine, scrub-shrub, broad-leaved deciduous, saturated community (PSS1B) located over 1 mile to the east/southeast of the site.

### 10.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded (FmhAt) – Mapped to occur as the floodplain region for the unnamed tributary that bisects the southern portion of the site.
- Freehold loamy sand, 0 to 5 percent slopes (FrfB) – Mapped to occur in the central portion of the site.
- Freehold loamy sand, 5 to 10 percent slopes (FrfC) – Mapped to occur in the northwestern corner of the site.
- Freehold fine sandy loam, 2 to 5 percent slopes (FrmB) – Mapped to occur in the central portion and southern tip of the site.
- Freehold fine sandy loam, 5 to 10 percent slopes (FrmC) – Mapped to occur in the southeastern corner of the site.
- Holmdel fine sandy loam, 0 to 2 percent slopes (HodA) – Mapped to occur in the southern central portion of the site.

Of the above, the FmhAt, FrfB, and HodA are listed as state hydric soils by the USDA.

## 10.3 Results of the Field Assessment

As of October 2006, the Fort Dix, 3200 installation and surrounding area were composed of the following six distinct community types: open water, forested deciduous wetland, forested woodland, scrub-shrub wetland, emergent marsh, and developed land. **Figure 5** depicts the outer boundaries of areas identified as wetland, both on and within 300 feet of the site. Each of

these six community types is described below. The USFWS wetland indicator classifications provided below are as modified by the NJ Pinelands Commission.

The open water communities on this site include three stormwater drainage ditches located throughout the site. These stormwater drainages range in size from very small, erosional areas, short in length and formed in mowed lawn (e.g. Wetland Series E) to stream channels with distinct bed and banks that extend to off-site areas (e.g. the off-site Wetland Series A and on-site Wetland Series B). With the exception of Wetland Series F and G, both of which are located off-site, all of the Wetland Series are associated with a stormwater conveyance system. There was no flowing water in any of the drainage channels at the time of the site visit, and only the upgradient portion of Wetland Series B exhibited standing water. This pocket of standing water was located at the concrete headwall of this conveyance.

Forested deciduous wetland is the dominant wetland community type on and around the site. This community is generally the floodplain area for the stormwater conveyances associated with Wetland Series A, B, and D. The forested wetland community for Wetland Series A and B, located in the southern portion of the site, is dominated by species such as sweetgum (*Liquidambar styraciflua*, FAC), multiflora rose (*Rosa multiflora*, FACU), grape (*Vitis* sp.), Japanese stiltgrass (*Microstegium vimineum*, FAC), lady thumb (*Polygonum persicaria*, FACW), and white snakeroot (*Ageratina altissima*, FACU-). In contrast, the forested wetland community for Wetland Series D, located in the northern portion of the site, is dominated by a differing assemblage of red maple (*Acer rubrum*, FAC), spicebush (*Lindera benzoin*, FACW-), grape, and Japanese honeysuckle (*Lonicera japonica*, FAC-). This assemblage suggests relatively richer soils than the assemblage observed in Wetland Series A and B.

Representative soil borings collected from the forested portion of Wetland Series A typically exhibited a surface horizon of 10YR 3/2 (very dark grayish-brown) medium to fine sandy loam with 2 percent pore linings, underlain by an upper subsoil of 2.5Y 3/2 (very dark grayish-brown) medium to fine sandy loam with 5 percent distinct 2.5Y 4/4 (olive brown) mottles. The lower subsoil was typically a 2.5Y 5/4 (light olive-brown) medium to fine sandy loam. A similar profile was found in representative soil borings collected from the forested portion of Wetland Series B. This area typically exhibited a surface horizon of 10YR 4/2 (dark grayish-brown) medium to fine sandy loam with 5 percent faint 10YR 4/4 (dark yellowish-brown) mottles, underlain by an upper subsoil of 2.5YR 4/4 (reddish-brown) medium loamy sand. The lower subsoil was typically a 2.5YR 4/4 (reddish-brown) medium loamy sand with 2 percent distinct 2.5Y 3/2 (very dark grayish-brown) mottles.

In addition to the differences observed in the species assemblage between the forested deciduous wetland communities in the southern and northern portions of the site, a similar difference was also observed in the soils. The soil textures were relatively coarse in the northern portion of the site, and exhibited different colorations. The surface texture was typically a thin 10YR 3/1 (dark gray) loam, underlain by an upper subsoil of 2.5Y 4/3 (olive brown) medium to fine loamy sand with 2 percent pore linings. The lower subsoil was typically a 2.5Y 3/1 (very dark gray) medium loamy sand.

Forested deciduous wetlands also characterize the community for Wetland Series F and G. These two wetland series are located off-site, across Florida Avenue and State Route 68. This community is part of a larger wetland system that extends southwest of the site, and includes an abandoned railroad bed.

The eastern portion of Wetland Series B is a late-stage scrub-shrub wetland community. This portion of the wetland is dominated by sweetgum saplings (FAC), multiflora rose (FACU), tussock sedge (*Carex stricta*, OBL), and grass-leaved goldenrod (*Euthamia graminifolia*, FAC). A soil boring collected from this community exhibited a surface horizon of 10YR 3/1 (very dark gray) silty clay loam with distinct 10YR 4/4 (dark yellowish-brown) mottles, underlain by a subsoil of 10YR 4/4 (dark yellowish-brown) clay loam with faint 10YR 4/1 (dark gray) mottles and 5 percent iron concretions.

Forested woodlands occupy the higher elevations around the forested deciduous wetland communities. Similar to the pattern observed between the northern and southern portions of the site, the surrounding upland plant communities also differed in species composition. The forested woodland community in the southern portion of the site (i.e. around Wetland Series A and B) include species such as sweetgum (FAC), black locust (*Robinia pseudo-acacia*, FACU-), eastern white pine (*Pinus strobus*, FACU), eastern red cedar (*Juniperus virginiana*, FACU), white snakeroot (FACU-), and Japanese stiltgrass (FAC). The forested woodland community in the northern portion of the site (i.e. around Wetland Series D) include species such as sugar maple (*Acer saccharum*, FACU-), flowering dogwood (*Cornus florida*, FACU-), black cherry (*Prunus serotina*, FACU), black oak (*Quercus velutina*, NI), multiflora rose (FACU), and grape.

An emergent wetland (Wetland Series C) is located in the northeastern portion of the site, between Administration Street and the northern site boundary. This linear wetland is associated with a stormwater drainage system. This community is dominated by common cattail (*Typha latifolia*, OBL), grass-leaved goldenrod (FAC), dock-leaved smartweed (*Polygonum lapathifolium*, FACW+), and black willow (*Salix nigra*, FACW+) saplings. The higher elevations are dominated by yellow foxtail (*Setaria glauca*, NL). Standing water was present in the drainage channel during the time of the site visit, and based on observations of the ground elevation, flow was determined to be to the east, towards Florida Avenue.

The developed land community composes the remainder of the site area. This community includes a softball field, mowed lawn, landscaped areas, and paved areas. No wetlands were identified within this community.

## 10.4 Conclusion

The results of the wetlands delineation of the Fort Dix 3200 site reveal the presence of four on-site (Wetlands Series B, C, D, and E) and two off-site (Wetland Series A and F/G) wetland areas (**Figure 5**). All of these wetlands are anticipated to possess 300-foot buffers per the NJ Pinelands Comprehensive Management Plan (CMP) Rules at N.J.A.C. 7:50. In contrast to the NJDEP Freshwater Wetland Act Rules, the CMP Rules do not make distinctions with regards to wetland buffers based on wetland size, type, hydrological characteristics, or surrounding land use, but uniformly apply a 300-foot buffer to all areas designated as wetlands. The determinations of the wetland boundaries and their respective buffers are subject to review by the NJ Pinelands Commission. As such, the above finding should not be considered final until approval from the Commission.

# FIGURES

## Fort Dix 3200

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**Legend**

| | |
|---|---|
| Installation Area | Minor Road |
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |

1:100,000

Figure 1
Site Location Map
Fort Dix 3200 Area
Wrightstown Borough,
Burlington Co., NJ

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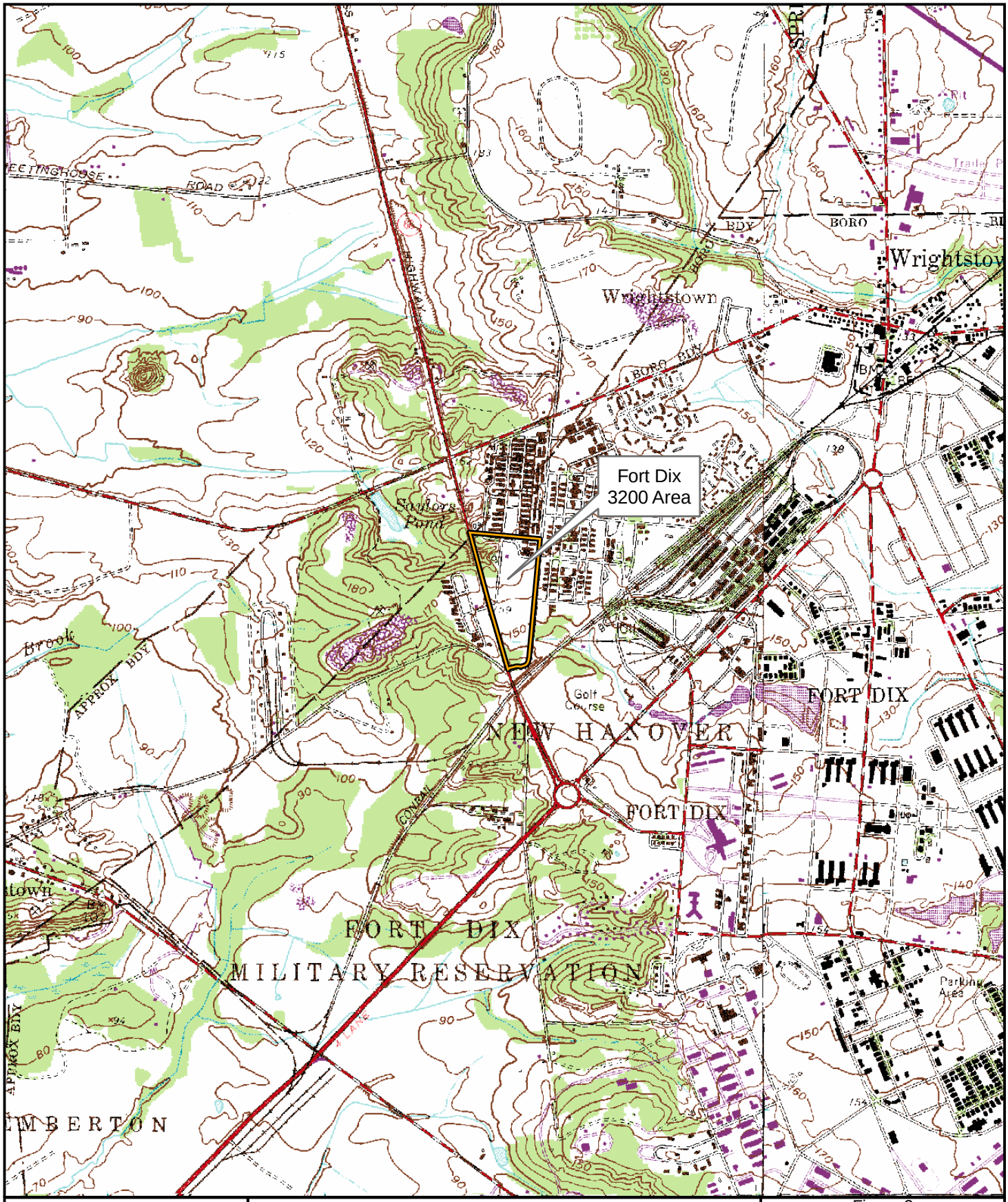




***Legend***

3200 Area

NJ State Plane Coordinates:
Easting: 453426.40 Feet
Northing: 434054.30 Feet

1:24,000

Figure 2
USGS Topographic Map
Fort Dix 3200 Area
Wrightstown Borough,
Burlington Co., NJ

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**Legend**

3200 Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 453426.40 Feet
Northing: 434054.30 Feet

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Fort Dix 3200 Area
Wrightstown Borough,
Burlington Co., NJ

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***Legend***

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 453426.40 Feet
Northing: 434054.30 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Fort Dix 3200 Area
Wrightstown Borough,
Burlington Co., NJ

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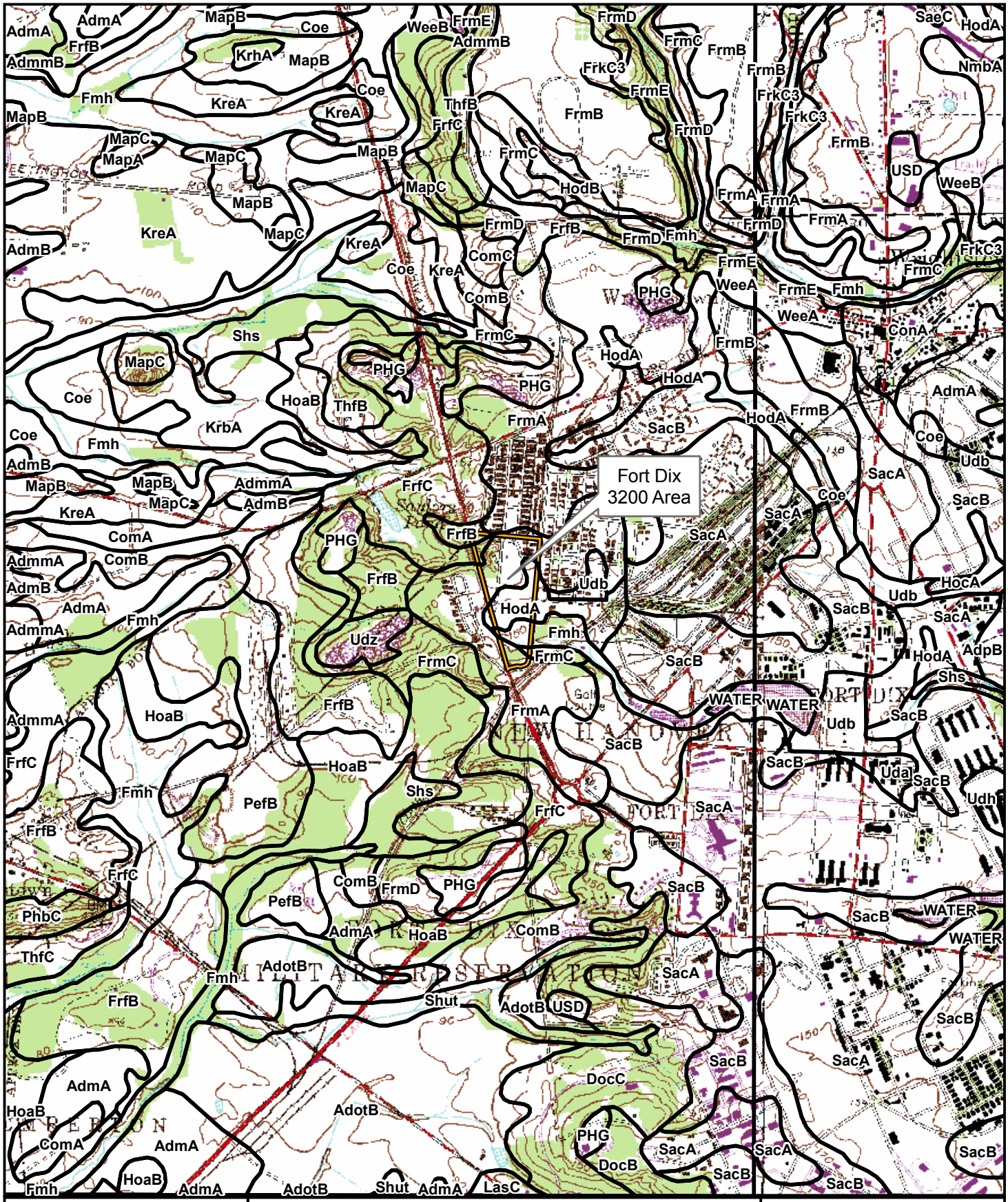




**Legend**

3200 Area

USDA Soils

NJ State Plane Coordinates:
Easting: 453426.40 Feet
Northing: 434054.30 Feet

* See report text for soil descriptions.

1:24,000

**Figure 4**
**USDA Soils Map**
**Fort Dix 3200 Area**
**Wrightstown Borough,**
**Burlington Co., NJ**

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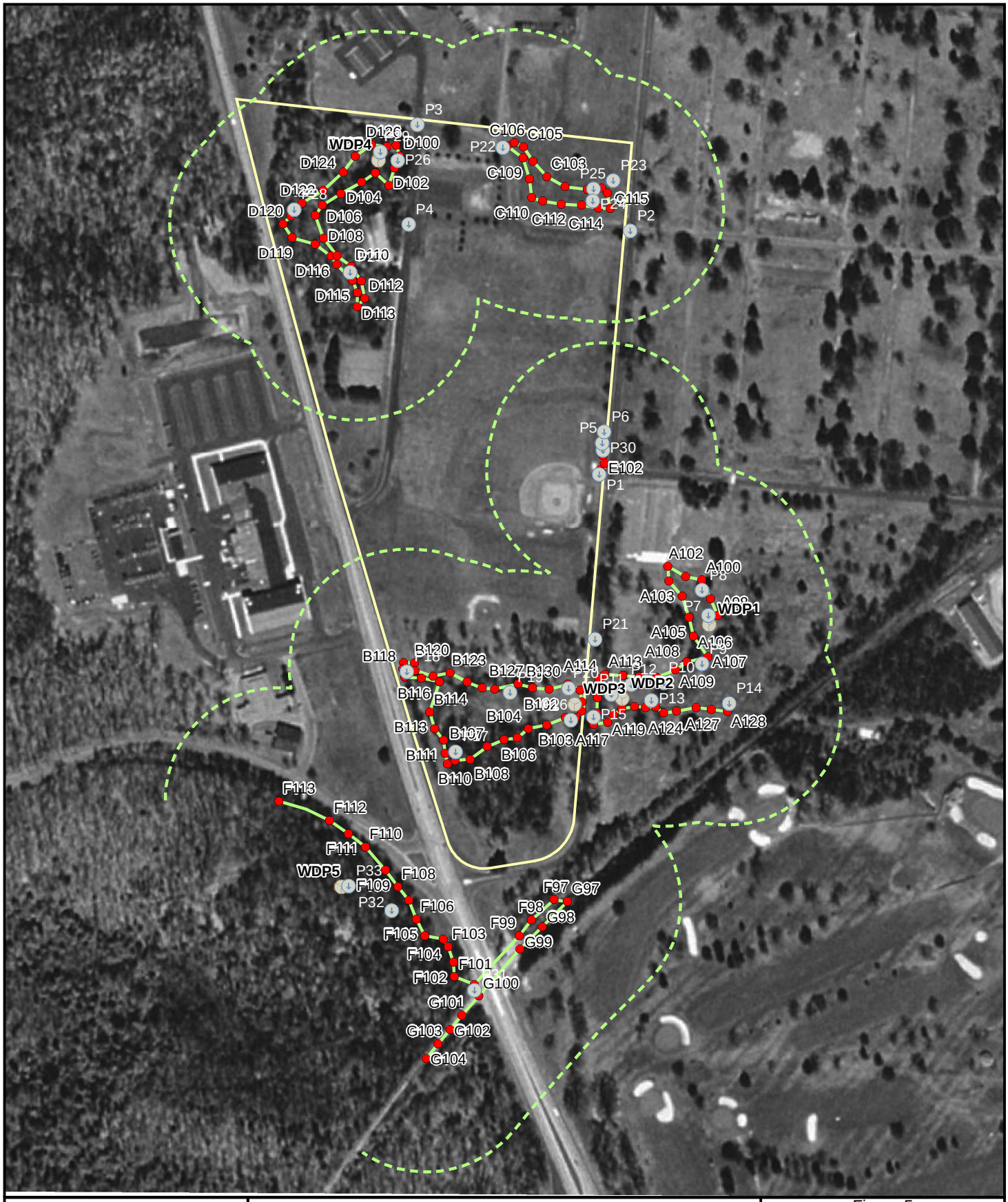




**Legend**

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 300' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 453426.40 Feet
Northing: 434054.30 Feet

1:4,200

Figure 5
Wetlands Location Map
Fort Dix 3200 Area
Wrightstown Borough,
Burlington Co., NJ

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# 11.0 FORT DIX, UTES

This section of the report presents the results of the wetlands delineation for the Fort Dix, UTES installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 11.1 Site Location

The Fort Dix, UTES installation is a 10,898.33-acre parcel designated as Block 92, Lot 1 in Plumsted Township, Ocean County, New Jersey (**Figure 1**). It is located on the southbound side of County Route 539, south of the intersection with County Route 537. The NJ State Plane Coordinates for the site are East 502966.058616 feet and North 441364.440066 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Crosswicks Creek watershed of Watershed Management Area 20 (WMA 20; Assicunk, Crosswicks, and Doctors).

The site is an irregular-shaped parcel bound on all sides by undeveloped land. The surrounding land use is rural. The developed portion of the installation (i.e. building, parking lot, and other structures) is primarily in the northern half of the property, whereas the relatively more naturalized areas are generally to the south. A description of these areas is presented in Section 11.2.

## 11.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 11.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated on a mound, at elevations ranging from 130 to 180 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is an unnamed tributary to Jumping Brook. At its closest point, the unnamed tributary is located approximately 400 feet to the north of the site. Since the site is situated on a mound, net drainage on the site is downslope to the north, south, east, and west.

### 11.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on the property (**Figure 3**). The nearest wetland is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located adjacent to the northwest corner of the property. This PFO1 wetland is associated with the riparian and floodplain areas for the unnamed tributary of Jumping Brook.

### 11.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetland GIS data for the site indicates no wetland communities to be mapped on or adjacent to the site. In contrast to the NWI, the nearest mapped wetland is a deciduous wooded wetland and coniferous scrub-shrub wetland located approximately 450 feet to the north/north-east of the site.

### 11.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Evesboro sand, 10 to 15 percent slopes (EveD) – Mapped to occur as a circular area in the north/northwest portion of the site.
- Lakewood sand, 5 to 10 percent slopes (LasC) – Mapped to occur in the central portion of the site.
- Lakewood sand, 0 to 5 percent slopes (LasB) – Mapped to occur in the southern portion of the site.

None of these soil types is listed by the USDA as a hydric soil (USDA 1995).

### 11.2.5 Rare Species Survey

The results of the rare species survey indicated the potential for six state-listed herptile species and five state-listed bird species or their habitats to occur on or within the vicinity of the site. Of these species, the results of Phase I and Phase II surveys indicated the presence of the following species on or within the vicinity of the site:

- Fowler's toad (*Bufo woodhousei fowlerii*) – state species of special concern
- Northern pine snake (*Pituophis melanoleucus melanoleucus*) – state threatened
- Eastern box turtle (*Terrapene carolina carolina*) – state species of special concern.

In addition, suitable habitat for the timber rattlesnake (*Crotalus horridus horridus*), a state endangered species, was documented to be present on the site. The documentation of northern pine snake on the site is not anticipated to result in the on-site wetlands to be classified by the NJDEP as exceptional-resource value wetlands since this species utilizes upland habitats almost exclusively. Additionally, this species was found off-site.

## 11.3 Results of the Field Assessment

As of October 2005, the Fort Dix, UTES installation was composed of the following five distinct community types: mixed forested wetland, emergent wetland, mixed forested woodland, mixed scrub-shrub upland, and developed land. The mixed forested wetland and emergent wetland was designated as Wetland Series A and B, respectively (**Figure 5**). Each of these five community types is described below. The USFWS wetland indicator classifications provided below are as modified by the NJ Pinelands Commission.

A small, mixed forested wetland community was identified near the southern site boundary. This community occupies a topographic depression surrounded by sand roads within a highly disturbed portion of the site. It is dominated by red maple (*Acer rubrum*, FAC), pitch pine (*Pinus rigida*, FAC), black gum (*Nyssa sylvatica*, FACW), highbush blueberry (*Vaccinium corymbosum*, FACW+), black huckleberry (*Gaylussacia baccata*, FAC-), and dwarf huckleberry (*Gaylussacia dumosa*, FACW+). Representative soil borings collected from this community typically exhibited a surface horizon of organic-coated individual grains of sand, underlain by a light brownish-gray (10YR 6/2) medium sand.

An even smaller roadside depression to the west/northwest of Wetland Series A was identified as wetland and designated as Wetland Series B. This community is sparsely vegetated with New York ironweed (*Veronia noveboracensis*, FACW+), twig rush (*Cladium mariscoides*, OBL), woolgrass (*Scirpus cyperinus*, FACW+), purple loosestrife (*Lythrum salicaria*, FACW+), and common cattail (*Typha latifolia*, OBL).

Mixed forested woodland is the dominant plant community within and outside of the site boundaries. This large and expansive community is dominated by pitch pine (FAC), scrub oak (*Quercus ilicifolia*, NL), mountain laurel (*Kalmia latifolia*, FACU), and black huckleberry (FAC-). Pockets of mixed scrub-shrub upland are also located in various portions of this community, particularly to the south/southeast of the site. These pockets appear to be the result of past land disturbance and with the exception of various ground lichens, exhibit the same species assemblage as the mixed forested woodland, except younger. None of these areas were identified as wetland.

The developed land community occupies the northern portion of the site; no portions of this community were identified as wetland.

## 11.4 Conclusion

The results of the wetlands delineation of the Fort Dix, UTES installation reveal the presence of two small, isolated wetland areas in the southern portion of the site. These wetlands are depicted as Wetland Series A and B on **Figure 5**. The Ft. Dix UTES installation is located in the NJ Pinelands Area, and as such, all wetlands will possess a 300-foot buffer as per the NJ Pinelands Comprehensive Management Plan (CMP) rules at N.J.A.C. 7:50. In contrast to the NJDEP Freshwater Wetland Act Rules, the CMP Rules do not make distinctions with regards to wetland buffers based on wetland size, type, hydrological characteristics, or surrounding land use, but uniformly apply a 300-foot buffer to all areas designated as wetlands. The determination of the wetland boundaries and their respective buffers are subject to review by the NJ Pinelands Commission. As such, the above finding should not be considered final until approval from the Commission.

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# FIGURES

## Fort Dix, UTES

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**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:100,000

Figure 1
Site Location Map
Fort Dix UTES
Plumsted Twp.,
Ocean Co., NJ

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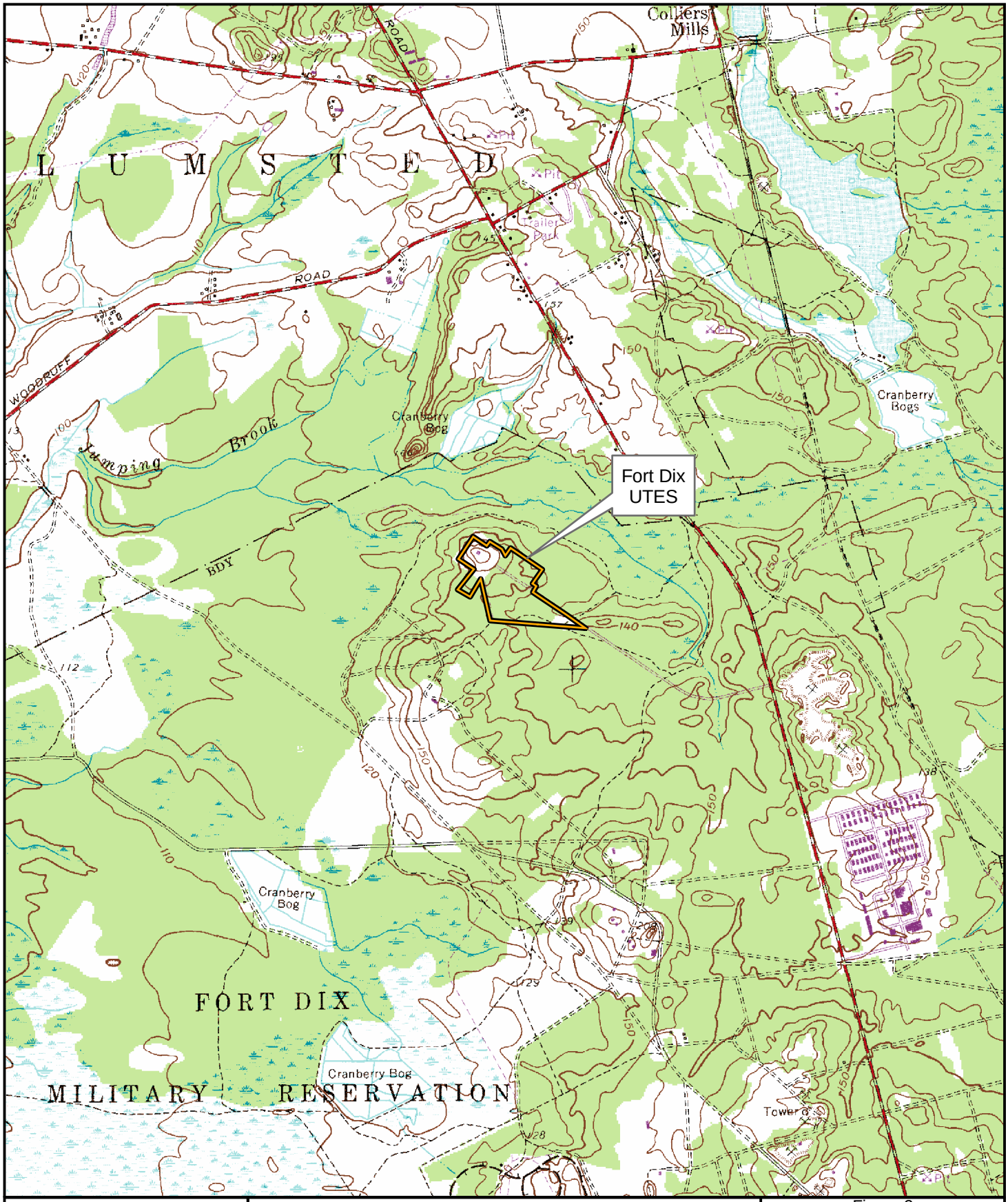




***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 502966.058616 Feet
Northing: 441364.440066 Feet

1:24,000

Figure 2
USGS Topographic Map
Fort Dix UTES
Plumsted Twp.,
Ocean Co., NJ

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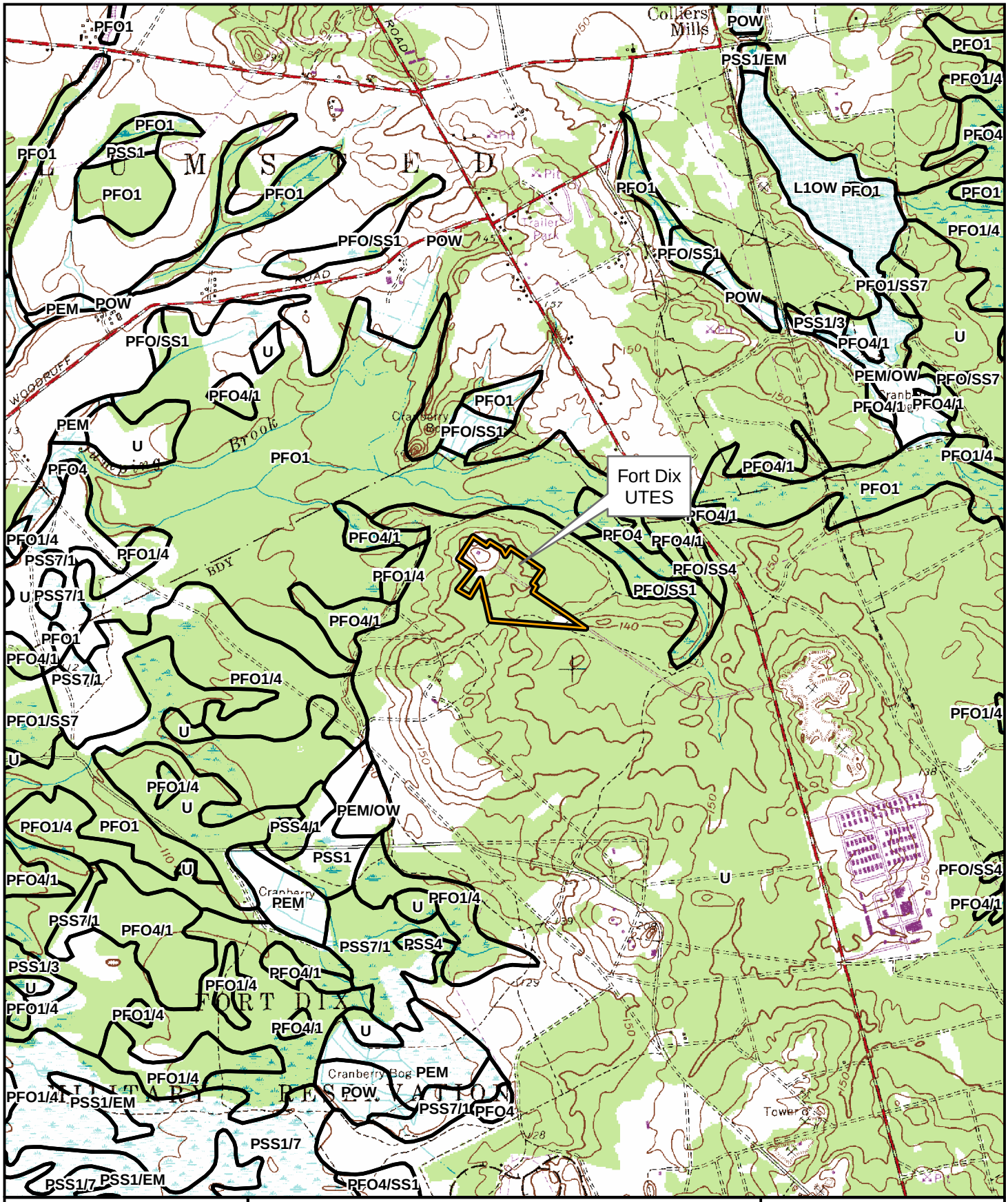




***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 502966.058616 Feet
Northing: 441364.440066 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Fort Dix UTES
Plumsted Twp.,
Ocean Co., NJ

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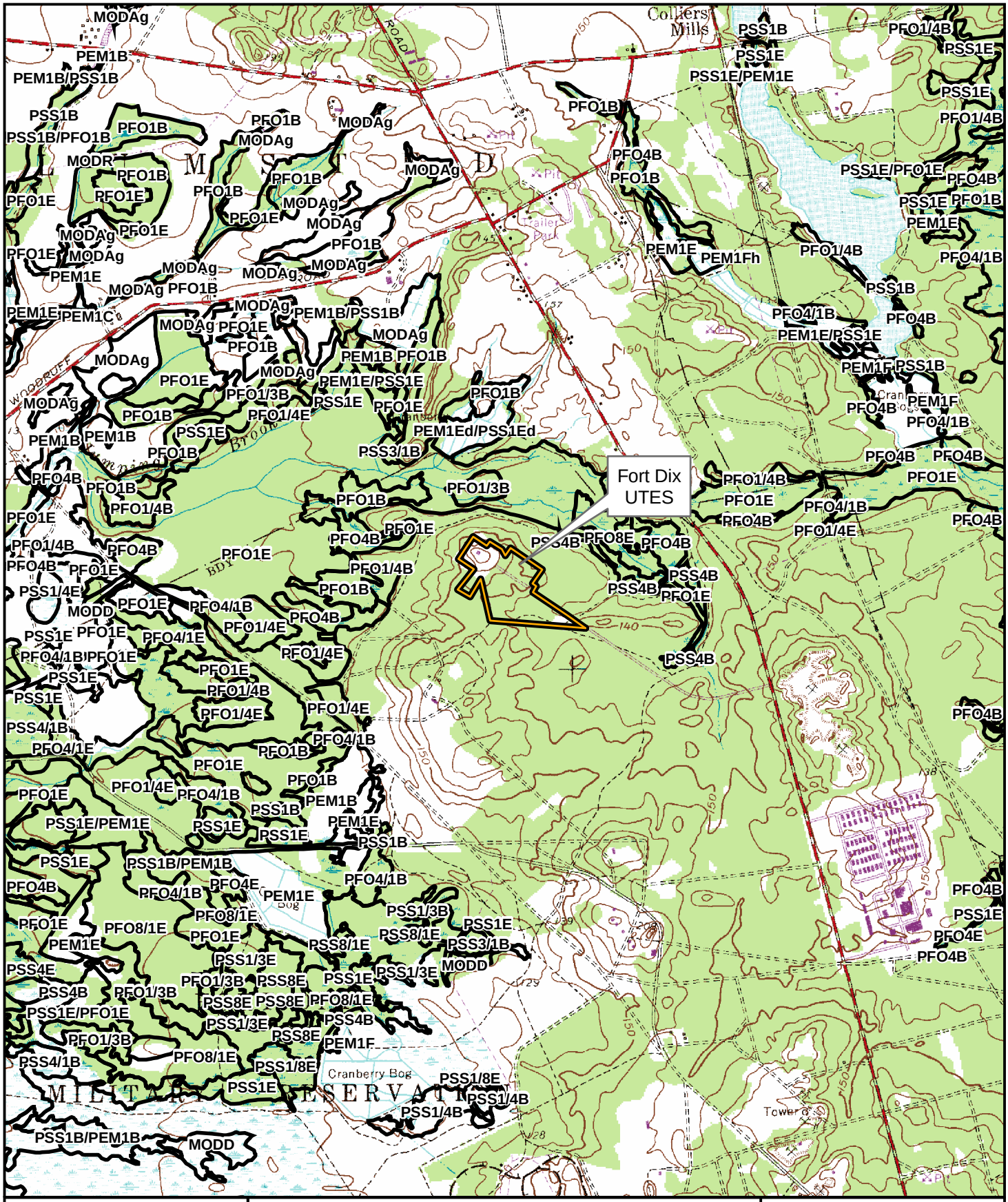
Fort Dix UTES
Colliers Mills
Cranberry Bog
MILITARY RESERVATION
MODAg
PEM1B
PEM1B/PSS1B
PSS1B
PFO1B
PSS1B/PFO1B
MODAg
MODR
PFO1B
PFO1E
PFO1E
PFO1B
PFO1B
MODAg
PFO1E
MODAg
MODAg
PFO1B
PFO1E
MODAg
PEM1E
MODAg
PFO1B
PEM1E
PEM1C
MODAg
PEM1B/PSS1B
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PFO1E
PFO1B
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MODAg
PEM1B
PFO1B
PFO1E
MODAg
PEM1E/PSS1E
PFO1B
PFO1E
PFO1/3B
PSS1E
PFO1E
MODAg
PFO1B
PFO1/4E
PEM1Ed/PSS1Ed
PEM1B
PEM1B
PSS1E
PFO1B
PSS3/1B
PFO4B
PFO1B
PFO1/3B
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PFO1/4B
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PSS1/4E
MODD
PFO1E
PFO4/1B
PFO4B
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PSS1/3E
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MODD
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PSS8/1E
MODD
PSS1/3E
PFO1/3B
PSS8E
PSS1E
PSS1/3E
PSS8E
PSS8E
PFO8/1E
PSS4B
PSS1/3E
PSS8E
PEM1F
PFO8/1E
PSS1/8E
PSS1E
PSS1/8E
PSS1/4B
PSS1/4B
MODD
PSS1B
PFO1/4B
PSS1E
PSS1E
PSS1E/PEM1E
PSS1E
PFO1B
PFO4/1B
PFO1/4B
PSS1E
PFO1B
PFO1B
PFO1E
PFO1B
PFO1E
PFO4B
PFO1E
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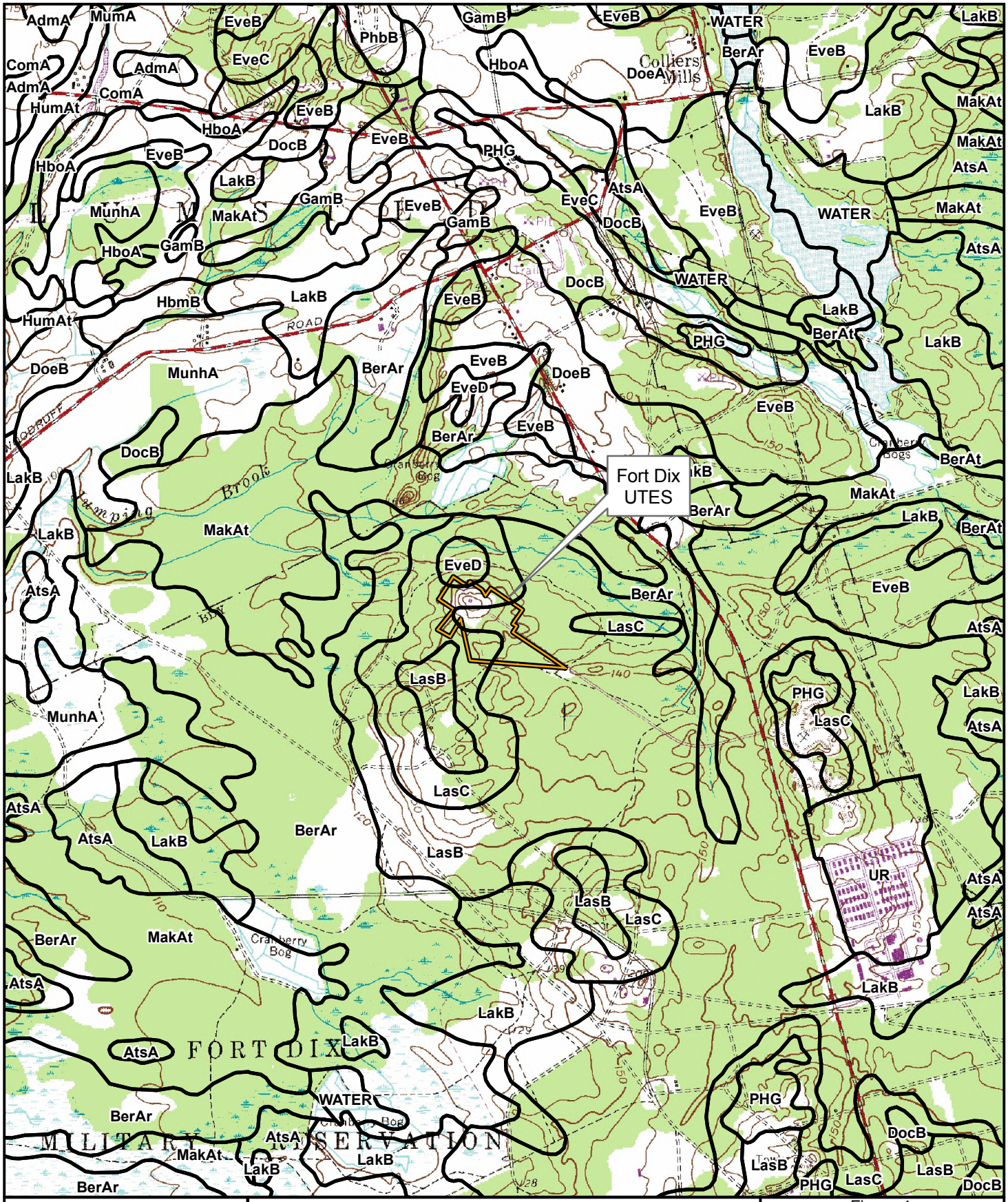
PFO4/1






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 502966.058616 Feet
Northing: 441364.440066 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Fort Dix UTES
Plumsted Twp.,
Ocean Co., NJ

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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 300' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 502966.058616 Feet
Northing: 441364.440066 Feet

1:3,322

Figure 5
Wetlands Location Map
Fort Dix UTES
Plumsted Twp.,
Ocean Co., NJ

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# 12.0 FRANKLIN ARMORY

This section of the report presents the results of the wetlands delineation for the Franklin Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 12.1 Site Location

The Franklin Armory installation is an approximately 10.19-acre parcel designated as Block 74, Lot 15 in Franklin Borough, Sussex County, New Jersey (**Figure 1**). It is located on the southbound side of State Route 23, between the intersections of County Route 631 and 517. The NJ State Plane Coordinates for the site are East 469301.642993 feet and North 826811.118541 feet. The site is located in the Ridge and Valley physiographic section of New Jersey, in the Walkill River watershed of Watershed Management Area 02 (WMA 2; Walkill).

The site is bound to the north and west by undeveloped land, to the east by residential properties and Route 23, and to the south by developed commercial/light industrial land. The surrounding land use is rural and light commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the east/southeast portion of the property, whereas the naturalized areas are generally to the west and north. A description of these areas is presented in Section 12.2.

## 12.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 12.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated around 580 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is an unnamed tributary to Franklin Pond. This unnamed tributary runs along the western site boundary. Net drainage on the site is to the west, towards this tributary.

### 12.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates the presence of the following two wetland communities on the site (**Figure 3A**):

- PFO1/SS1 – Palustrine, forested broad-leaved deciduous / scrub-shrub, broad-leaved, deciduous wetland, mapped to occur in the northwest portion of the property.
- PSS1/EM – Palustrine, scrub-shrub, broad-leaved, deciduous, emergent wetland, mapped to occur in the central and southwest portion of the property.

These wetlands are associated with the riparian and floodplain areas for the unnamed tributary to Franklin Pond.

### 12.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of the following three mapped wetland communities on the site (**Figure 3B**):

- Herbaceous wetlands – Mapped to occur in the south-western corner of the site, roughly coincident with the NWI's PSS1/EM community.
- Deciduous wooded wetlands – Mapped to occur in the north-western corner of the site, inclusive in the NWI's PFO1/SS1 community.
- Not applicable (non-freshwater wetlands) – Mapped to occur in the west-central portion of the site, roughly coincident with the PFO1/SS1 community.

### 12.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Fluvaquents, loamy, 0 to 3 percent slopes, occasionally flooded (FmhAs) – Mapped to occur as the dominant soil type for the site, occupying the central, eastern, and northern portions of the property.
- Fredon-Halsey complex, 0 to 3 percent slopes, very stony (FrdAb) – Mapped to occur in the southwest property corner.
- Urban land-Hazen-Hoosic complex, 0 to 8 percent slopes (USHAZB) – Mapped to occur in the south-central portion of the site.

Of the above soil types, the Fredon and Halsey series are listed by the USDA as hydric soils (USDA 1995). The Fredon series is classified as an Aeric Haplaquept and the Halsey series is classified as a Mollic Endoaquept.

### 12.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for four state-listed herptile species (one of which is federally-listed), five state-listed bird species, and three state-listed (one federal) mammal species to be present, or their habitats to be present, on the site. The results of Phase I and Phase II surveys of the site documented the following species to be present on the site:

- Wood turtle (*Clemmys insculpta*) – state threatened.

In addition, the Phase I and Phase II surveys indicated suitable habitat to be present for the following species:

- Long-tailed salamander (*Eurycea longicauda longicauda*) – state threatened

- Bog turtle (*Clemmys muhlenbergii*) – state endangered and federally threatened
- Red-headed woodpecker (*Melanerpes erythrocephalus*) – state threatened (breeding and migratory/winter populations)
- Barred owl (*Strix varia*) – state threatened (breeding and migratory/winter populations)
- Bobcat (*Lynx rufus*) – state endangered
- Indiana bat (*Myotis sodalis*) – state and federally endangered.

## 12.3 Results of the Field Assessment

As of September 2005, the Franklin Armory installation was composed of the following six distinct community types: open water, forested deciduous wetland, deciduous woodland, roadside depressional wetland, mowed lawn, and developed land. The wetlands delineated on this site were designated as Wetland Series A, B, and C and includes the open water, forested deciduous wetland, and roadside depression communities (**Figure 5**). Each of these six community types is described below.

The open water community is composed of two streams (Wetland Series B and C, in part); one that runs alongside the western property boundary and the other along the north-eastern property boundary. The stream channel on the west side is oriented in a north-south direction with flow to the north. It is part of a large wetland complex located off-site (farther to the west). Portions of this wetland complex are located on-site and are described below as the forested deciduous wetland. At its southern end on-site, the stream channel is relatively straight and narrow, and the wetlands boundary on the site side is oftentimes coincident with the top-of-bank. The channel width is approximately 3 to 5 feet at the southern end with a surface water depth ranging from 3 to 6 inches. A short "spur" of this stream extends from a perpendicular towards the east. This spur is a man-made drainage feature that conveys stormwater from the impervious surfaces to the east towards the stream. No surface water was observed in this spur during the time of the site visit.

The wetlands boundary expands as the stream flows to the north, encompassing the aforementioned forested deciduous wetland along certain segments, and then returning to the top-of-bank. Off-site (farther west), the wetlands boundary is located far from the top-of-bank, extending westward to include a mosaic of forested, scrub-shrub, and emergent wetlands. The stream channel is relatively wider at its northern end with greater surface water depth. Channel widths average 20 feet with surface water depths of about 12 to 14 inches. At the northern on-site end of the stream, the boundary between the stream and the site ranges from steeply-sloped banks to near- vertical bluffs.

The stream channel on the northeast side is oriented in a northwest-southeast direction with flow to the northwest. This stream is coincident with parts of the site boundary and abuts the rear yards of off-site private residential properties. This stream originates on site as a pipe culvert beneath Route 23. The channel is entrenched at this end, and at the time of the site visit, surface water depth was approximately 3 to 6 inches. The channel is relatively less entrenched as it progresses to the northwest and similar to the stream along the western edge of the site, the channel widens and the surface water deepens as it extends to the naturalized portions of the site.

An early- to mid-stage, forested deciduous wetland community is situated in portions of the floodplain for the above streams (Wetland Series B and C, in part). The largest areas of this community are located in the northern portion of the site, and along the east side of the western stream. This community generally occupies the low-lying, riparian zone along the streams and is vegetated with numerous tree species that are not typically considered hydrophytic. However, the hydrology of the landscape sustains a wetland system in areas where the elevations allow for the formation of hydric soil and wetland hydrology indicators. Similarly, areas at relatively higher elevations, described as the deciduous woodland community, exhibit comparable tree species, but with more characteristically upland understory species, and without hydric soil or wetland hydrology indicators. This forested wetland community is dominated by box elder (*Acer negundo*, FAC+), sugar maple (*Acer saccharum*, FACU-), red oak (*Quercus rubra*, FACU-), witch hazel (*Hamamelis virginiana*, FAC-), spicebush (*Lindera benzoin*, FACW-), southern arrowwood (*Viburnum dentatum*, FAC), stiff dogwood (*Cornus foemina*, FAC), Japanese honeysuckle (*Lonicera japonica*, FAC), poison ivy (*Toxicodendron radicans*, FAC), jewelweed (*Impatiens capensis*, FACW), tussock sedge (*Carex stricta*, OBL), grass-leaved goldenrod (*Euthamia graminifolia*, FAC), and Japanese stilt grass (*Microstegium vimineum*, FAC).

The drier, more elevated portions of the wooded community were identified as deciduous woodland and are generally located along the outer edge of the forested deciduous wetland. This community is dominated by sugar maple (FACU-), red oak (FACU-), Japanese barberry (*Berberis thunbergii*, FACU), Morrow's honeysuckle (*Lonicera morrowii*, FACU), common greenbrier (*Smilax rotundifolia*, FAC), and Japanese stilt grass (FAC).

A very small, former tank trail rut depressional wetland in the southwest portion of the site was identified and designated as Wetland Series A. Numerous former tank trail ruts and what appears to be linear-shaped, historic cut and fill areas are present throughout the site. This particular rut is well vegetated with herbaceous wetland species and exhibits field indicators of hydric soils. Vegetation in this depression includes tussock sedge (OBL), jewelweed (FACW), false nettle (*Boehmeria cylindrica*, FACW+), and dock-leaf smartweed (*Polygonum lapathifolium*, FACW+). A representative soil boring collected from this depression exhibited a very thin (1-inch) layer of black (10YR 2/1) loam, underlain by a dark gray (10YR 4/1) silt loam with approximately 60 percent pore linings.

The mowed lawn and developed land areas are generally in the east/south-east portions of the property. Drainage from these areas is approximately to the northeast and west, towards the two streams identified as parts of Wetland Series B and C. No wetland areas were identified within these two communities.

## 12.4 Conclusion

The results of the wetlands delineation of the Franklin Armory installation reveal the presence of a large, forested wetland area located along the western portion of the site that extends off-site. This wetland is depicted as Wetland Series A and B on **Figure 5**. A stream and associated wetland area, depicted as Wetland Series C, is also located along the east/northeast site boundary that is a component of the larger wetland system, however, the hydraulic connection between these two areas occurs well off-site, to the north. It is anticipated that a portion of Wetland Series C will be considered by the NJDEP to meet the definition of a State open water as per N.J.A.C. 7:7A-1.4, with no associated freshwater wetlands transition area (i.e. buffer).

The remainder of the wetland areas, however are anticipated to be classified by the NJDEP as exceptional-resource value wetlands, thus possessing a 150-foot transition area as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the findings of the April 20007 Rare Species Survey Report support the criteria for designating this wetland as a present habitat for threatened or endangered species, or as a documented habitat for threatened or endangered species, and which remains suitable for breeding, nesting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). The Rare Species Survey Report documented the presence of wood turtle (state threatened) and the presence of suitable habitat for long-tailed salamander (state threatened), bog turtle (state endangered and federally threatened), red-headed woodpecker (state threatened, breeding and migratory/winter populations only), barred owl (state threatened), bobcat (state endangered), and Indiana bat (state and federally endangered).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Franklin Armory

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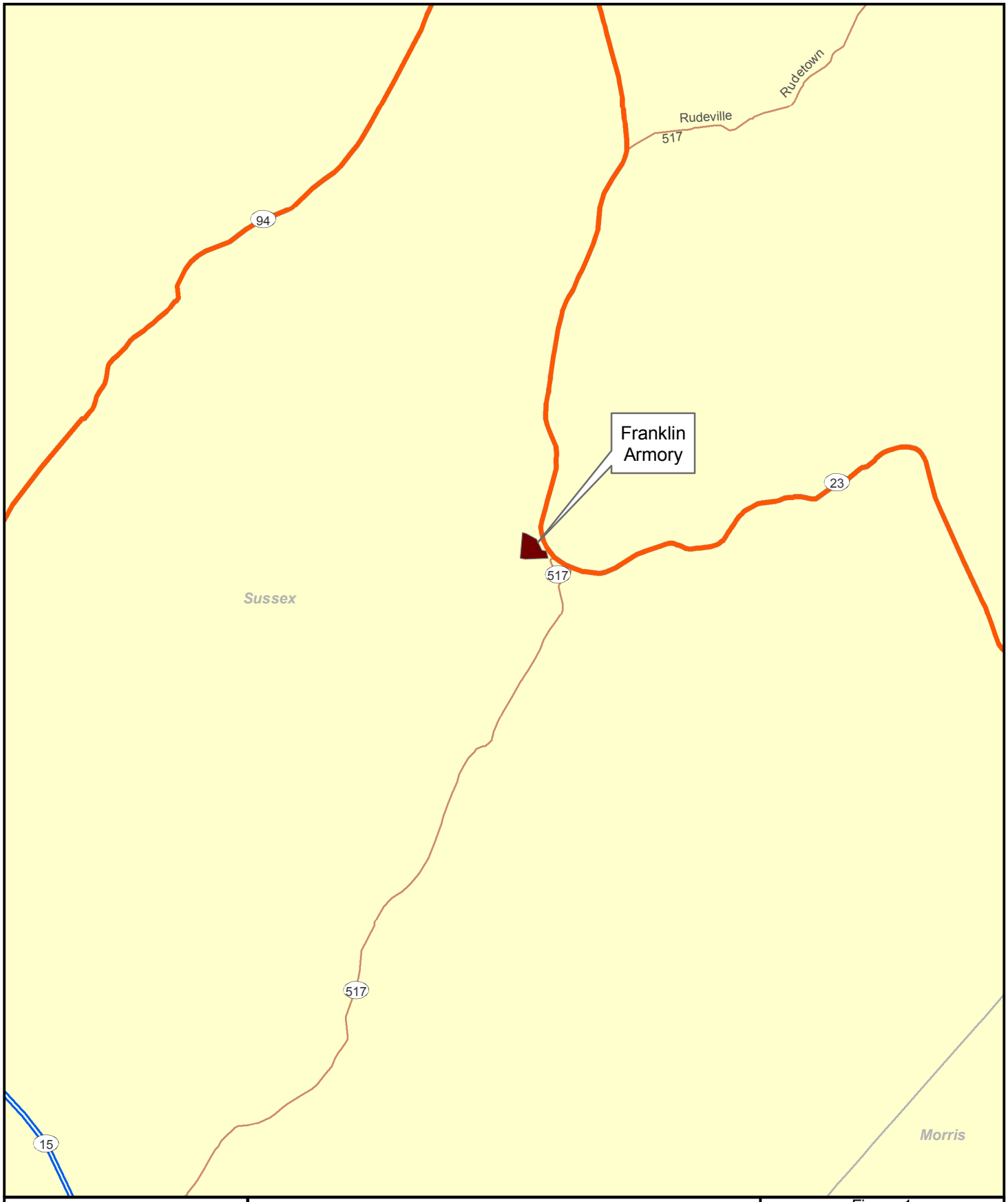




**Legend**

- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrian Way
- Installation Area

1:50,000

Figure 1
Site Location Map
Franklin Armory
Franklin Borough,
Sussex Co., NJ

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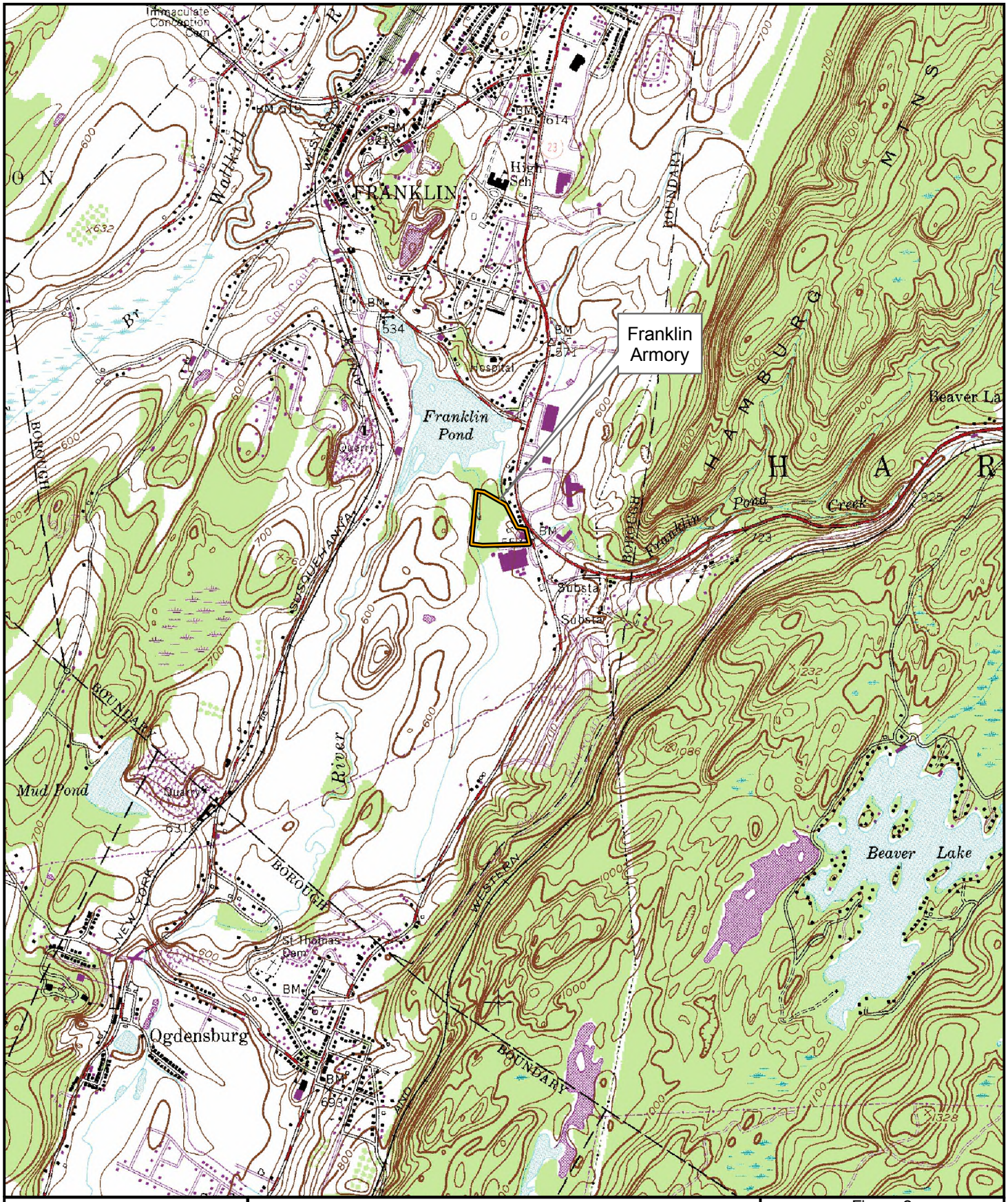
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJ State Plane Coordinates:
Easting: 469301.642993 Feet
Northing: 826811.118541 Feet

1:24,000

Figure 2
USGS Topographic Map
Franklin Armory
Franklin Borough,
Sussex Co., NJ

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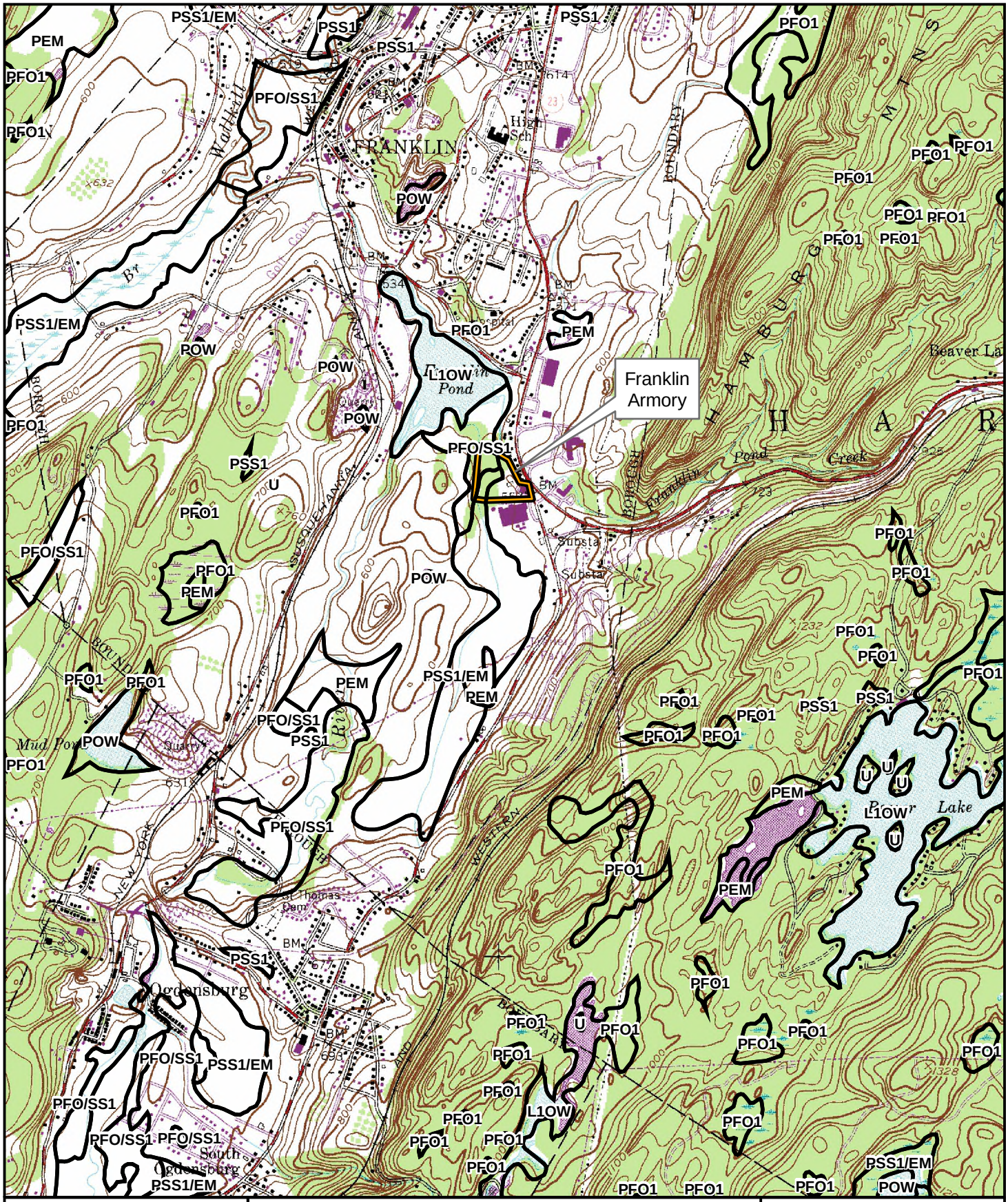




**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 469301.642993 Feet
Northing: 826811.118541 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Franklin Armory
Franklin Borough,
Sussex Co., NJ

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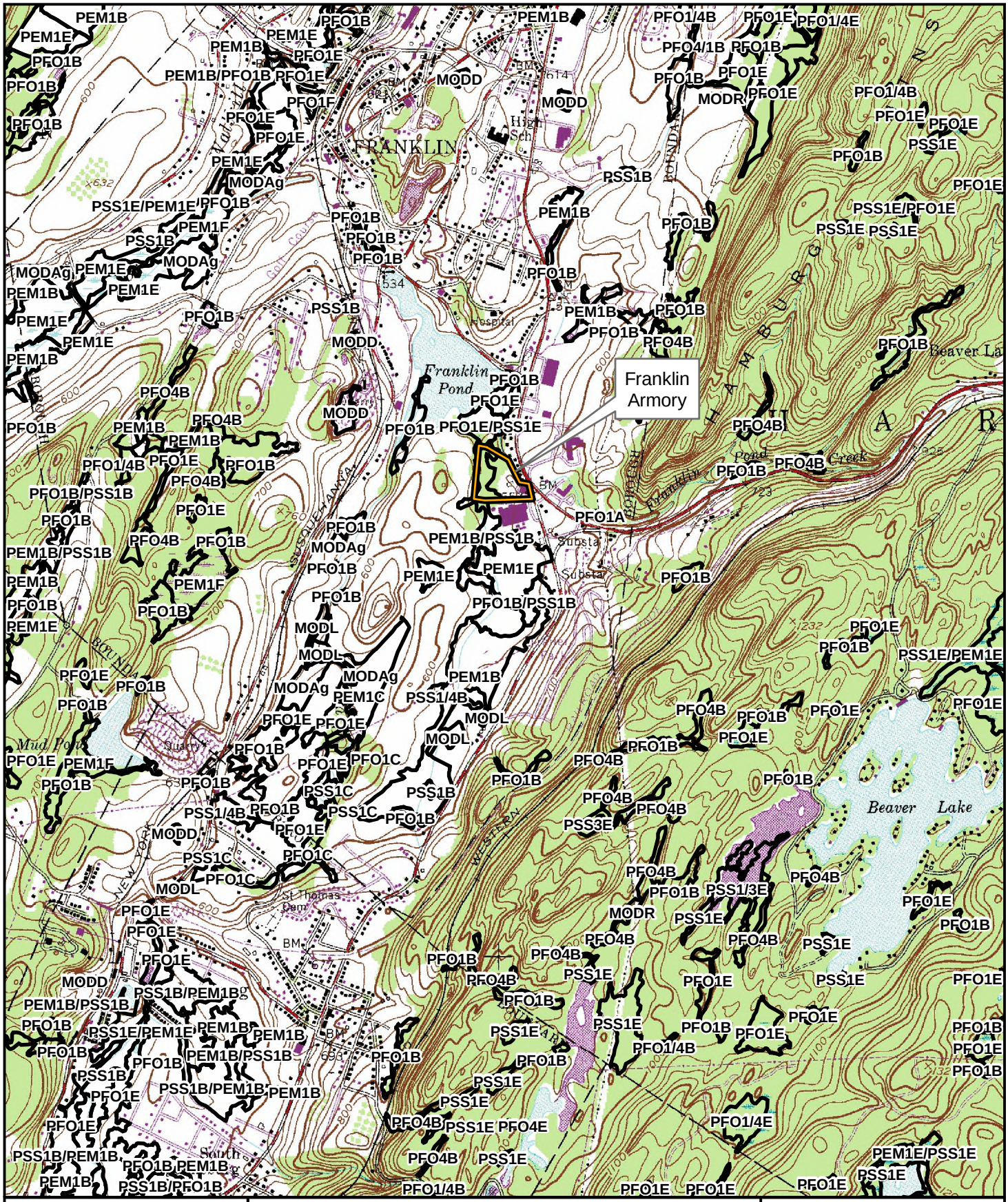
Plymouth Meeting, PA 19462


Franklin Armory
FRANKLIN
Franklin Pond
Mud Pond
Beaver Lake
Beaver La
Quarry
St Thomas Dam
South
Hospital
High Sch
Substa
Creek
BM
PEM1B
PEM1E
PEM1F
PFO1B
PFO1E
PFO1/4B
PFO1/4E
PFO4B
PFO4/1B
PFO1A
PFO1C
PFO1E/PSS1E
PEM1B/PSS1B
PFO1B/PSS1B
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PSS1/4B
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PSS1B/PFO1B
PSS1C
PSS3E
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MODL
MODR
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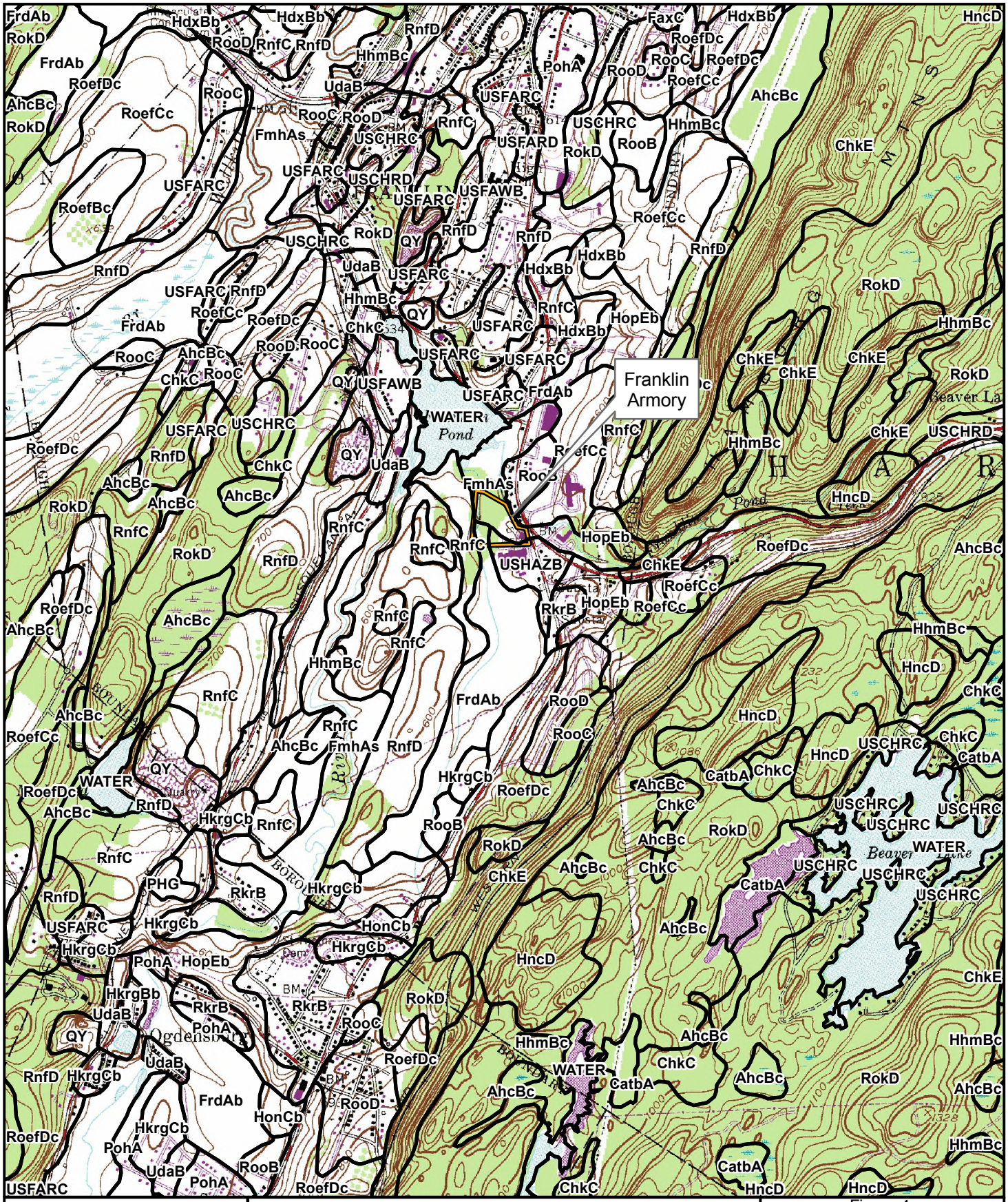




**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 469301.642993 Feet
Northing: 826811.118541 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Franklin Armory
Franklin Borough,
Sussex Co., NJ

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**Legend**

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 150' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 469301.642993 Feet
Northing: 826811.118541 Feet

1:1,726

Figure 5
Wetlands Location Map
Franklin Armory
Franklin Borough,
Sussex Co., NJ

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# 13.0 HACKETTSTOWN ARMORY

This section of the report presents the results of the wetlands delineation for the Hackettstown Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 13.1 Site Location

The Hackettstown Armory installation is an approximately 39.5-acre parcel designated as Block 44, Lot 2 in the Town of Hackettstown, Warren County, New Jersey (**Figure 1**). It is located on the southbound side of Willow Grove Street, also known as County Route 604, north of U.S. Highway 46 and east of the town center. The NJ State Plane Coordinates for the site are East 406132.032703 feet and North 743982.139366 feet. The site is located in the Highlands physiographic section of New Jersey, in the Pequest River watershed of Watershed Management Area 01 (WMA 1; Upper Delaware).

The site is a flag-shaped parcel bound to the north by undeveloped land, to the east by Willow Grove Street, to the south by a combination of undeveloped and developed land, and to the west by a Norfolk Southern/NJ Transit rail line. The surrounding land use is rural. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the southeast portion of the property, whereas the naturalized areas are generally to the west and north. A description of these areas is presented in Section 13.2.

## 13.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 13.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated on a mound at an elevation of around 600 to 700 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is the Musconetcong River. At its closest point, the river is approximately 800 to 1,000 feet to the east of the site, across Willow Grove Street. However, since the site is situated on a mound, net drainage on the eastern portion of the site is towards Willow Grove Street and net drainage on the western portion of the site is towards the Norfolk Southern/NJ Transit line.

### 13.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the site (**Figure 3A**). The nearest mapped community is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located approximately 100 feet

from the southwest corner of the property. This PFO1 wetland is mapped as an isolated community.

### 13.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates no wetland communities to be mapped on or adjacent to the site. However, in contrast to the NWI, the nearest mapped community is a deciduous wooded wetland located approximately 150 feet to the west/north-west of the site (**Figure 3B**).

### 13.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Hero gravely loam, 3 to 8 percent slopes – Mapped to occur in the northernmost portion of the site.
- Hazen gravely loam, 3 to 8 percent slopes – Mapped to occur in the remaining portions of the site.

Neither of these soil types is listed by the USDA as a hydric soil (USDA 1995).

## 13.3 Results of the Field Assessment

As of October 2005, the Hackettstown Armory installation was composed of the following four distinct communities: forested deciduous wetland, deciduous upland forest, mowed lawn, and developed land. The wetlands delineated were designated as Wetland Series A, B, and C and included three separate areas described as a forested deciduous wetland (**Figure 5**). Wetland Series A and C are located on-site; Wetland Series B is located off-site. Each of these four community types is described below.

A relatively small, linear, depressional, forested deciduous wetland, designated as Wetland Series A, is located along the western site boundary, adjacent to the railroad bed. This area receives drainage from the east and south. It is dominated by red maple (*Acer rubrum*, FAC) in the canopy layer, white ash (*Fraxinus americana*, FACU) in the sapling layer, stiff dogwood (*Cornus foemina*, FAC) in the shrub layer, grape (*Vitis* sp., NA) in the vine layer, and tussock sedge (*Carex stricta*, OBL) in the ground layer. A representative soil boring collected from this area exhibited a deep (10-inch) surface horizon of black 10YR 2/1 mucky loam with approximately 20 percent pore linings, underlain by an upper subsoil of gray (10YR 5/1) clay.

The off-site Wetland Series B part of a large, mid- to late-stage, forested deciduous wetland located on the other side of the rail line, that extends westward away from the property. This wetland is dominated by red maple (FAC) and black gum (*Nyssa sylvatica*, FAC) in the canopy layer; red maple (FAC), black gum (FAC), and white ash (FACU) in the sapling layer; stiff dogwood (FAC) and spicebush (*Lindera benzoin*, FACW-) in the shrub layer; grape (*Vitis* sp., NA) in the vine layer; and poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*, FAC-), and Japanese stilt grass (*Microstegium vimineum*, FAC) in the ground layer.

The on-site Wetland Series C is a relatively small, late-stage, forested deciduous wetland situated in a circular depression along the western site boundary. This community is dominated by red maple (FAC) and black gum (FAC) in the canopy layer; spicebush (FACW-) in the shrub layer; poison ivy (FAC) in the vine layer; and no ground layer. A representative soil boring collected from this community exhibited a similar profile to that of Wetland Series A – a thick (12-inch) surface horizon of black (10YR 2/1) mucky loam with approximately 20 percent pore linings, underlain by an upper subsoil of gray (10YR 5/1) clay.

The majority of the site is mixed-stage, forested deciduous upland. This community is densely vegetated and occupies very hilly terrain. There are different plant associations located throughout this community, likely situated on landforms that tend to support these associations over others (e.g., south-facing slopes, hollows, ridge-lines, etc.) although no clear pattern was observable during the site visit. Nevertheless, this community is dominated by red maple (FAC), white ash (*Fraxinus americana*, FACU), and eastern white pine (*Pinus strobus*, FACU) in the canopy layer; red maple (FAC), white ash (FACU), and flowering dogwood (*Cornus florida*, FACU-) in the sapling layer; multiflora rose (*Rosa multiflora*, FACU) in the shrub layer; Asiatic bittersweet (*Celastrus orbiculatus*, NL), Allegheny blackberry (*Rubus allegheniensis*, FACU-), red raspberry (*Rubus idaeus*, FAC-), and Virginia creeper (*Parthenocissus quinquefolia*, FACU) in the vine layer; and poison ivy (FAC), Japanese honeysuckle (FAC-), and Japanese stiltgrass (FAC) in the ground layer.

The mowed lawn and developed land communities are generally located in the southeast portion of the property. These areas drain to the southeast, towards Willow Grove Street. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 13.4 Conclusion

The results of the wetlands delineation of the Hackettstown Armory installation reveal the presence of two small, isolated wetlands along the western boundary and southwest corner of the site. These isolated wetlands are depicted as Wetland Series A and C on **Figure 5**. A relatively larger wetland system, depicted as Wetland Series B, is located off-site across the Norfolk Southern/NJ Transit rail line. It is anticipated that one (Wetland Series A) of the two on-site wetlands will be classified by the NJDEP as an ordinary-resource value wetland with no associated freshwater wetlands transition area (i.e. buffer). This conclusion was reached because Wetland Series A meets the definition of a swale at N.J.A.C. 7:7A-1.4.

In contrast, it is anticipated that Wetland Series B and C will be classified as intermediate-resource value wetlands, with a 50-foot transition area, as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because these wetlands do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4. The wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding

by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Hackettstown Armory

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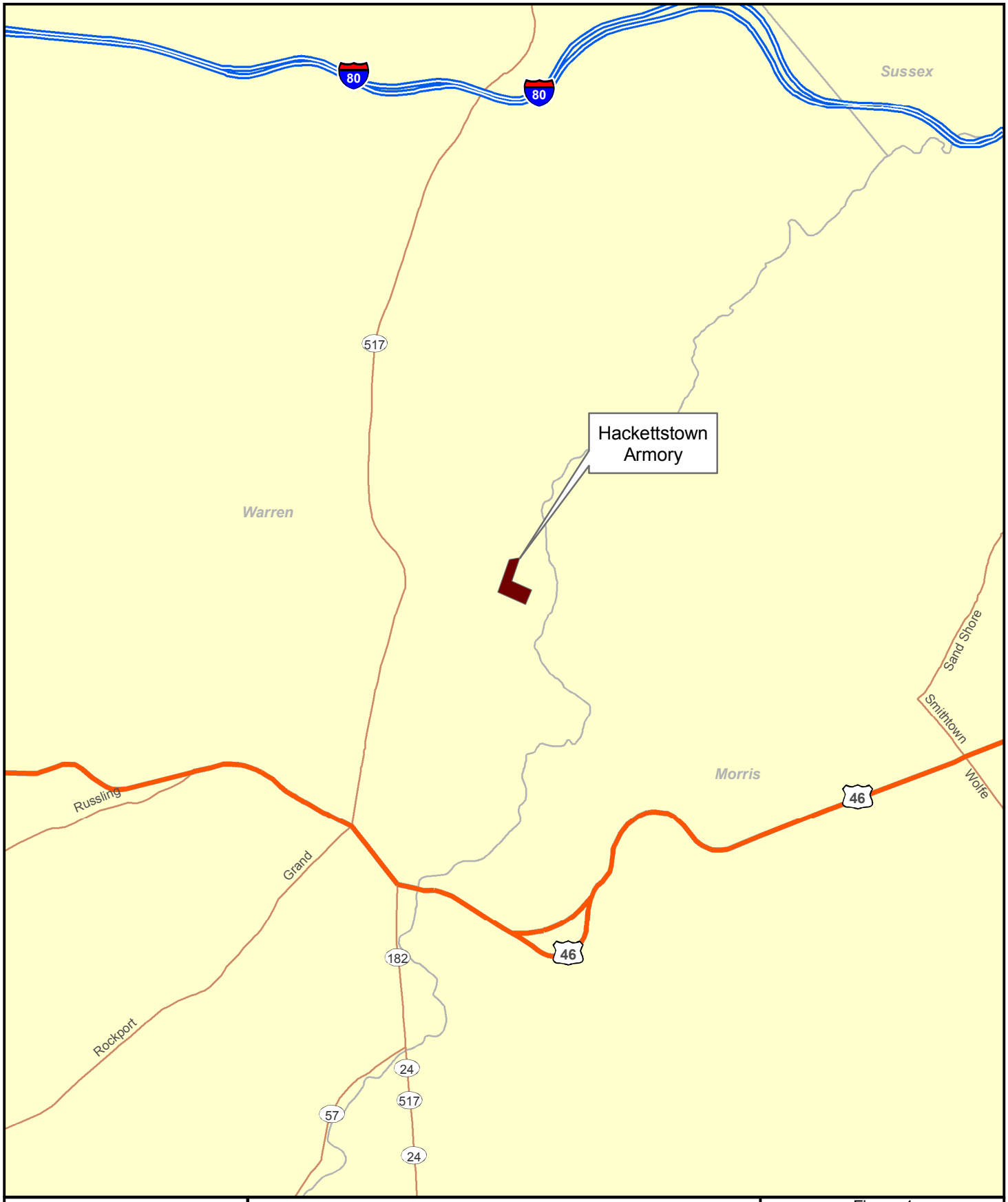




***Legend***

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Hackettstown Armory
Town of Hackettstown,
Warren Co., NJ

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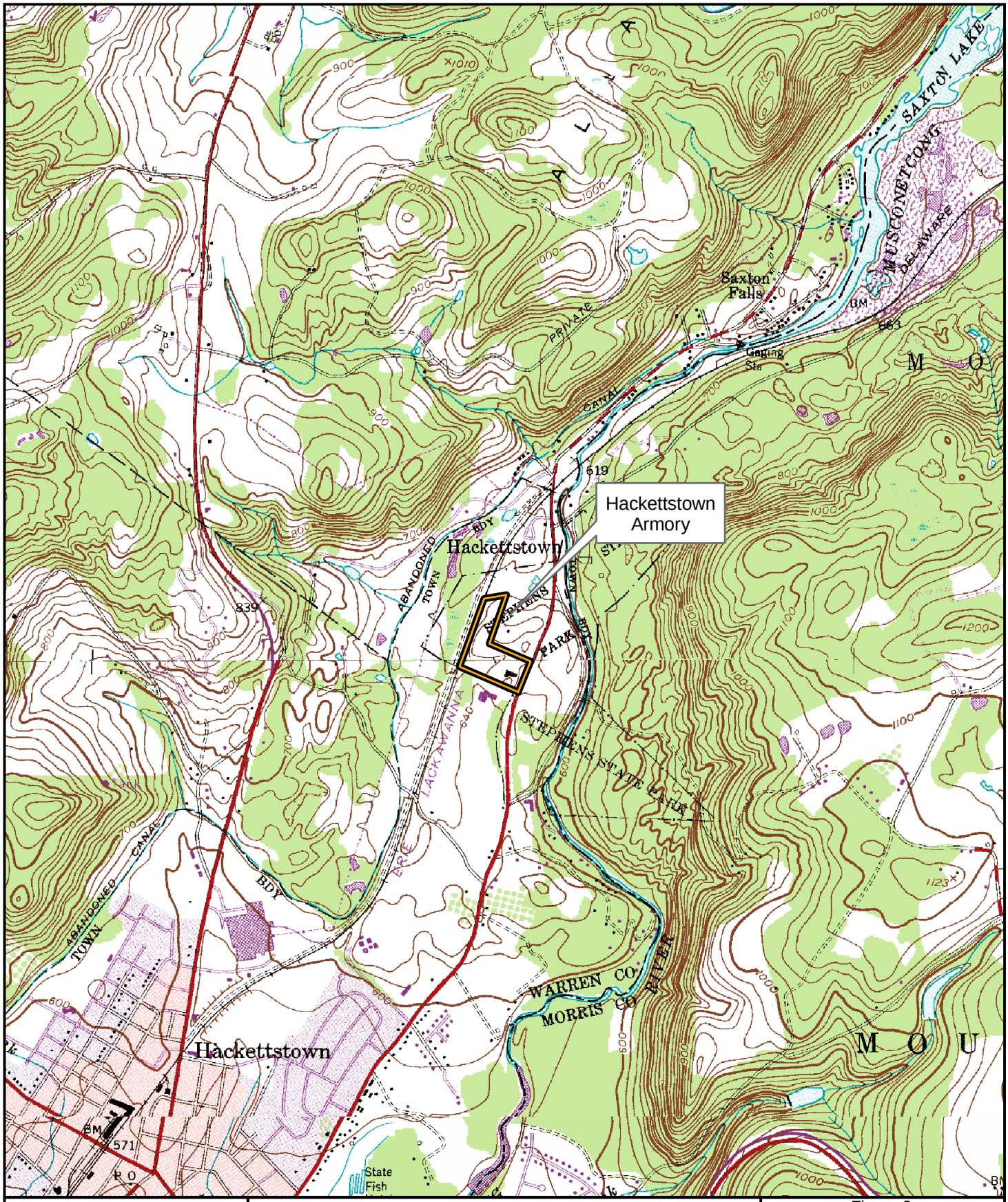
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJ State Plane Coordinates:
Easting: 406132.032703 Feet
Northing: 743982.139366 Feet

1:24,000

Figure 2
USGS Topographic Map
Hackettstown Armory
Town of Hackettstown,
Warren Co., NJ

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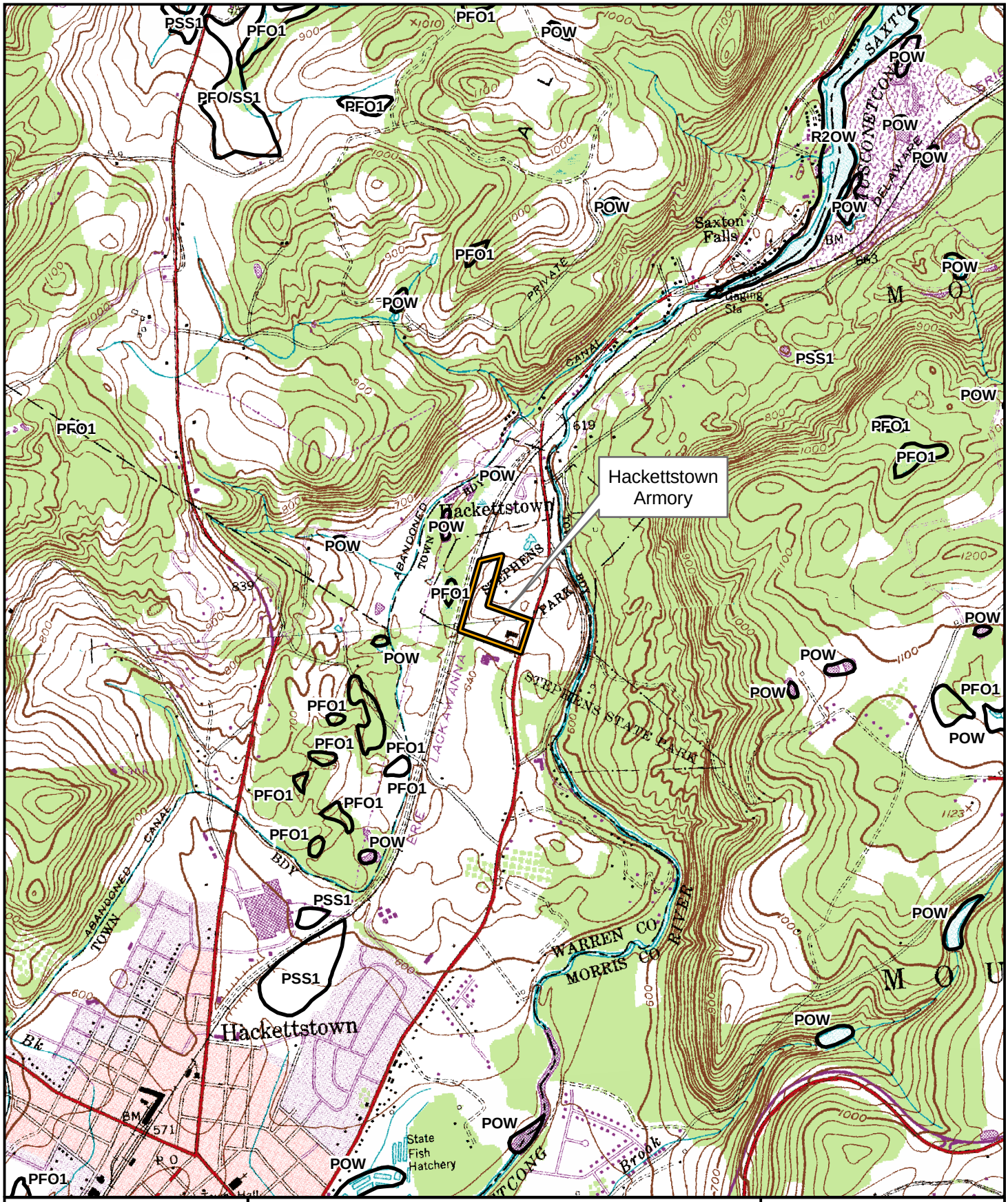
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 406132.032703 Feet
Northing: 743982.139366 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Hackettstown Armory
Town of Hackettstown,
Warren Co., NJ

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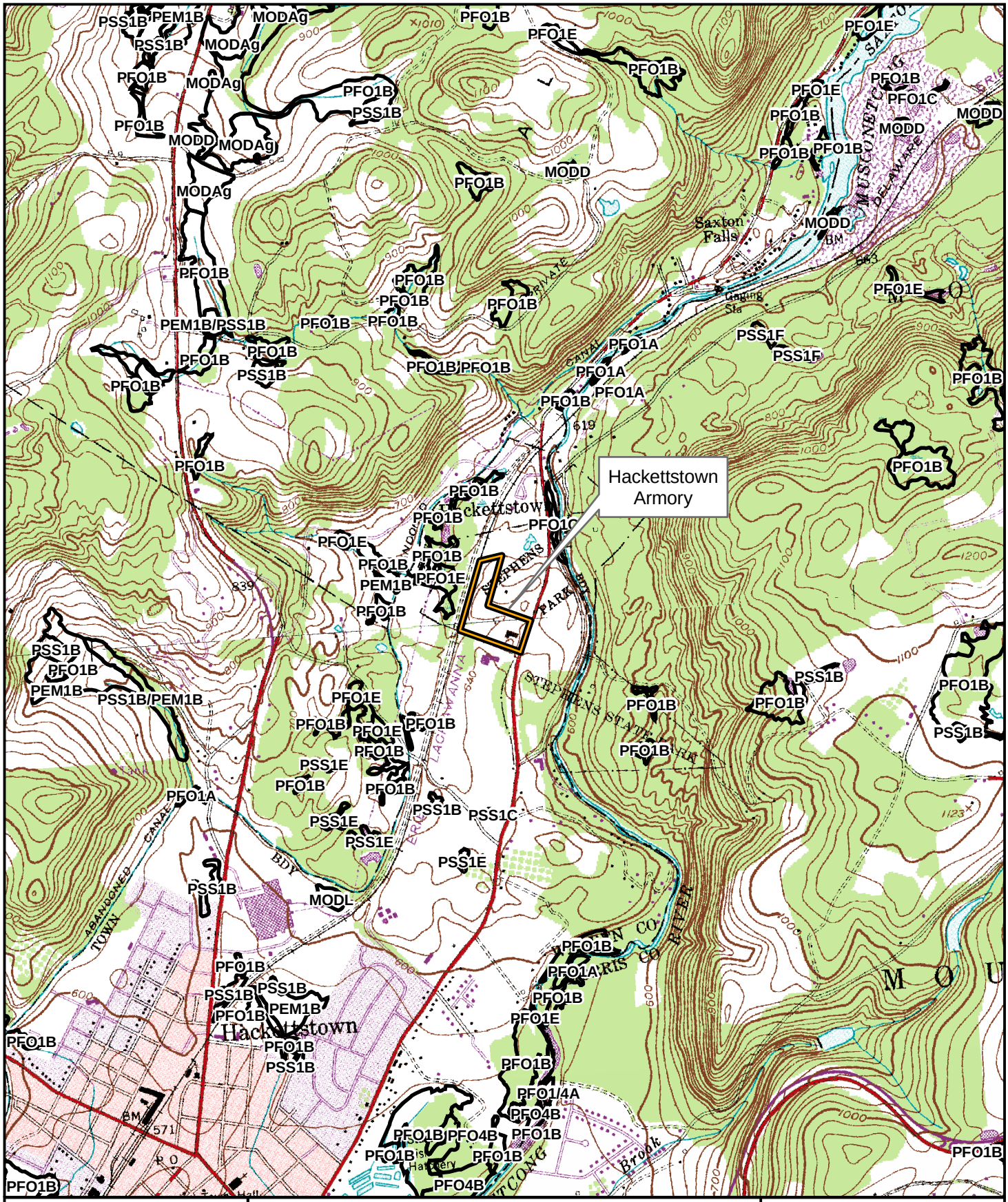




***Legend***

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 406132.032703 Feet
Northing: 743982.139366 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Hackettstown Armory
Town of Hackettstown,
Warren Co., NJ

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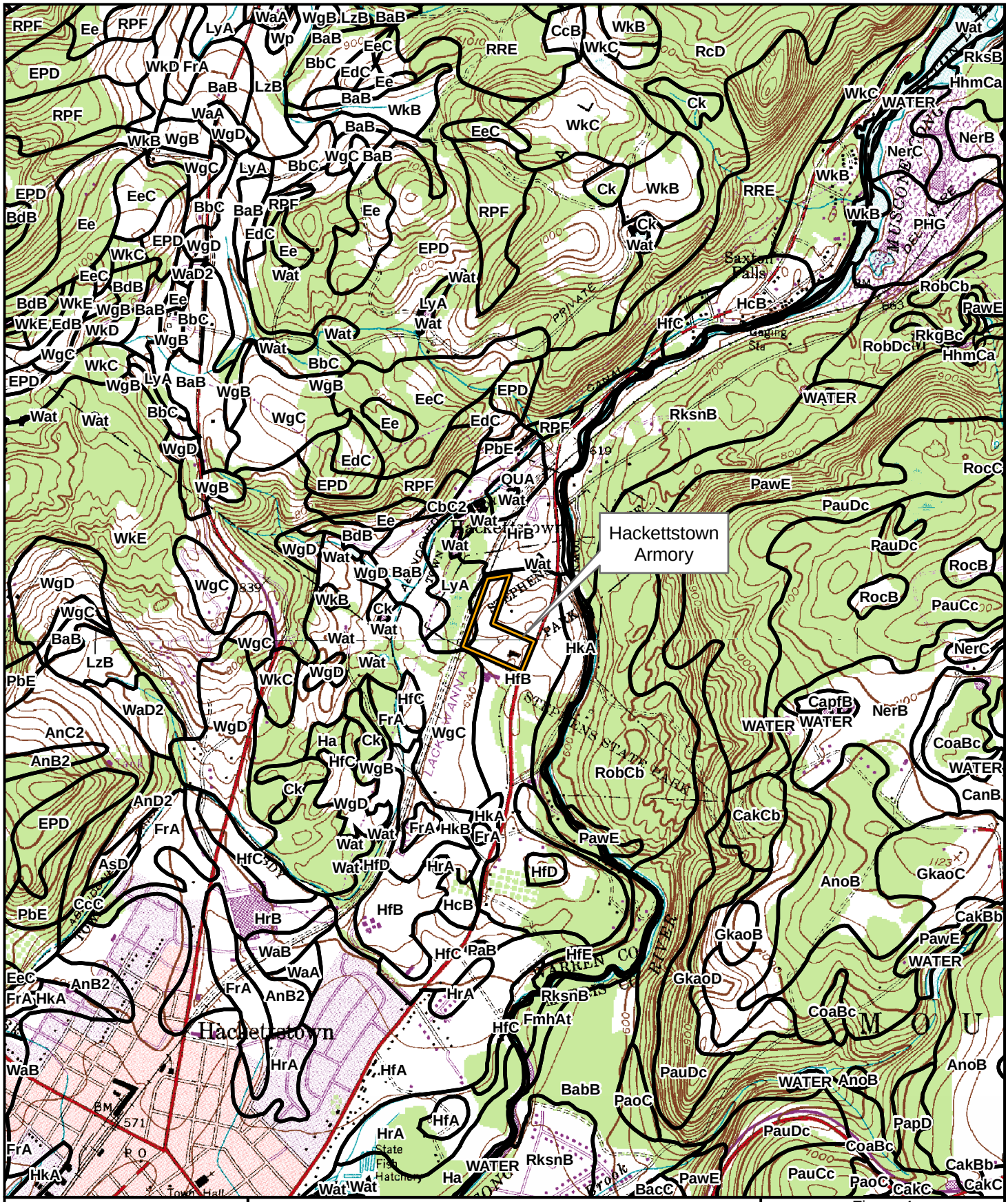




**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 406132.032703 Feet
Northing: 743982.139366 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Hackettstown Armory
Town of Hackettstown,
Warren Co., NJ

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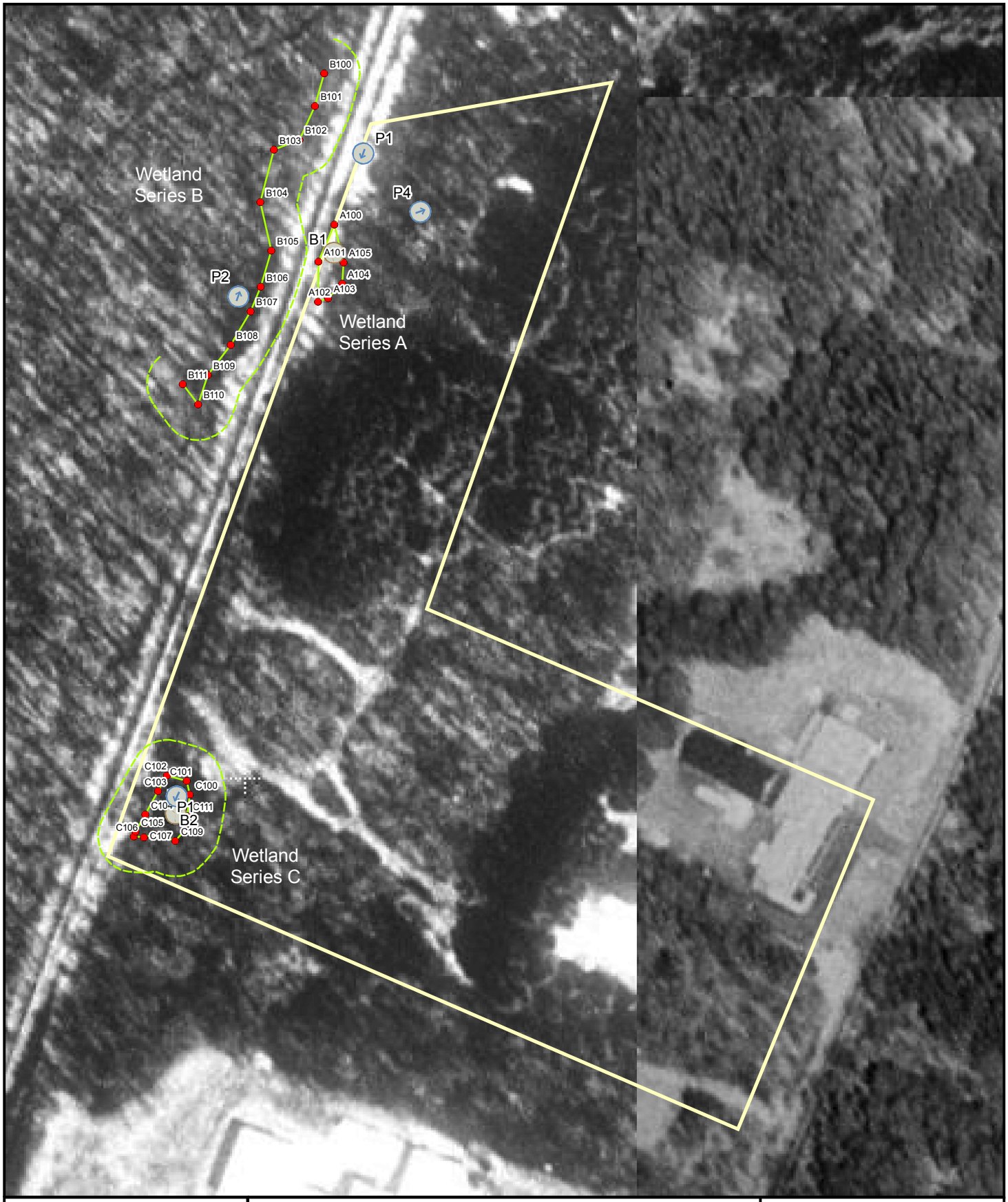




***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 406132.032703 Feet
Northing: 743982.139366 Feet

1:2,227

Figure 5
Wetlands Location Map
Hackettstown Armory
Town of Hackettstown,
Warren Co., NJ

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# 14.0 HAMMONTON ARMORY

This section of the report presents the results of the wetlands delineation for the Hammonton Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 14.1 Site Location

The Hammonton Armory installation is an approximately 9.33-acre parcel designated as Block 3702, Lot 3 in the Town of Hammonton, Atlantic County, New Jersey (**Figure 1**). It is located on the south-eastbound side of County Route 602, west of the intersection of U.S. Highway 30. The NJ State Plane Coordinates for the site are East 410249.328018 feet and North 289038.945888 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Great Egg Harbor River watershed of Watershed Management Area 15 (WMA 15; Great Egg Harbor).

The site is a rectangle-shaped parcel bound to the north by County Route 602, to the east and west by developed land, and to the south by a Southern Railroad of New Jersey rail line. The surrounding land use is rural. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northwest portion of the property, whereas the naturalized areas are generally to the southeast. A description of these areas is presented in Section 14.2.

## 14.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 14.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated around 90 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Hammonton Lake which is located approximately 200 feet to the northeast of the site, across County Route 602. Net drainage on the site is to the northeast, towards Route 602 and Hammonton Lake.

### 14.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates a palustrine, scrub-shrub, broad-leaved, deciduous wetland (PSS1) to occur in the eastern corner of the property (**Figure 3A**). Additionally, a palustrine, forested, needle-leaved, evergreen, forested/ broad-leaved, deciduous wetland community (PFO4/1) is mapped to occur along the southwest property boundary. These wetlands are associated with the drainage pathway to Hammonton Lake.

### 14.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of the following two wetland community types on the site (**Figure 3B**):

- Atlantic white cedar wetlands – Mapped to occur in the south-western portion of the site. This community is not depicted on the NWI.
- Deciduous scrub-shrub wetlands – Mapped to occur in the south-eastern portion of the site. This community is also not depicted on the NWI.

Additionally, a deciduous wooded wetland is mapped to occur to the southwest of the site, roughly coincident with the NWI's PFO4/1 community.

### 14.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Lakehurst sand, 0 to 3 percent slopes – Mapped to occur in the northern portion of the site.
- Berryland sand – Mapped to occur as a small finger extending into the site from the western property boundary.
- Muck – Mapped to occur in the southern portion of the site.

The Berryland series is classified as a Typic Haplaquod, and is therefore listed by the USDA as a hydric soil (USDA 1995). Although Muck is not an official USDA soil series and is therefore not listed as a hydric soil, it is generally assumed that areas mapped as Muck do indeed contain hydric soils.

### 14.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for two state and federally listed plant species to be present or suitable habitat for these species to be present, on the site. The results of Phase I and Phase II surveys of the site did not document the presence of these species on the site, but did indicate that suitable habitat is present for the following:

- Swamp pink (*Helonias bullata*) – state endangered and federally threatened

## 14.3 Results of the Field Assessment

As of October 2005, the Hammonton Armory installation was composed of the following five distinct community types: open water, mixed forested wetland, mixed woodland, mowed lawn, and developed land. The wetlands delineated on this site were designated as Wetland Series A and includes the open water and mixed forested wetland communities (**Figure 5**). Each of these five community types is described below.

The open water community varies in its morphology from a straight and narrow drainage ditch along the north-western property boundary, to a broad and diffuse shallow-swamp area in the center of the wetland, and back to a distinct stream channel at the south-eastern property line where it discharges through a culvert beneath Route 602. This community was identified as wetland and designated, in part, as Wetland Series A.

An early- to mid-stage, mixed forested wetland community surrounds most the open water area and dominates the south/south-eastern portion of the site. This community is dominated by red maple (*Acer rubrum*, FAC), Atlantic white cedar (*Chamaecyparis thyoides*, OBL), and black gum (*Nyssa sylvatica*, FAC) in the canopy and sapling layers; coast pepperbush (*Clethra alnifolia*, FAC+) in the shrub layer; and common greenbrier (*Smilax rotundifolia*, FAC) in the vine layer. The ground layer is sparsely vegetated with various forbs and woody seedlings of the aforementioned species with no clear dominants.

Also abundant, but not dominant, in this community are swamp white oak (*Quercus bicolor*, FACW+) and highbush blueberry (*Vaccinium corymbosum*, FACW-). In addition, there are some isolated pockets of common reed (*Phragmites australis*, FACW) and ostrich fern (*Matteuccia struthiopteris*, FACW) in the disturbed portions of this community. A representative soil boring collected from this community typically exhibited a thin (1-inch) fibric layer over a surface horizon of black (2.5Y 2/1) medium to fine sand; underlain by an upper subsoil of light brownish-gray (10YR 6/2) medium sand. This community was identified as a wetland and designated, in part, with the aforementioned open water community as Wetland Series A.

An early- to mid-stage, mixed woodland community occupies the higher elevations on the site, around the edge of Wetland Series A. This community is vegetated with red maple (FAC), pitch pine (*Pinus rigida*, FAC), black oak (*Quercus velutina*, NI), and black cherry (*Prunus serotina*, FACU) in the canopy and sapling layers, and Virginia creeper (*Parthenocissus quinquefolia*, FACU) in the vine and ground layer. A distinct shrub layer was not apparent at the time of the site visit.

The mowed lawn and developed land communities are generally located in the northwest portion of the property. These areas drain to the southeast, towards Wetland Series A. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 14.4 Conclusion

The results of the wetlands delineation of the Hammonton Armory installation reveal that the undeveloped wooded portion of the site is mixed deciduous and evergreen forested wetland depicted as Wetland Series A on **Figure 5**. It is anticipated that this wetland may initially be classified by the NJDEP as an exceptional-resource value wetland, thus possessing a 150-foot transition area (i.e. buffer). This conclusion was reached based on the findings of the April 2007 Rare Species Report which indicated the presence of suitable habitat for swamp pink (state endangered and federally threatened) on the site. The NJDEP defines, in part, exceptional resource value wetlands as those that are present habitat for threatened or endangered species, or is a documented habitat for threatened or endangered species (N.J.A.C. 7:7A-

2.4(b). This initial classification as an exceptional resource value wetland may be revised to be an intermediate-resource value wetland if the NJDEP concurs with the April 2007 Rare Species Survey Report finding that no specimens occur on the site and finds that suitable habitat is not present on the site.

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Hammonton Armory

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**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Hammonton Armory
Town of Hammonton,
Atlantic Co., NJ

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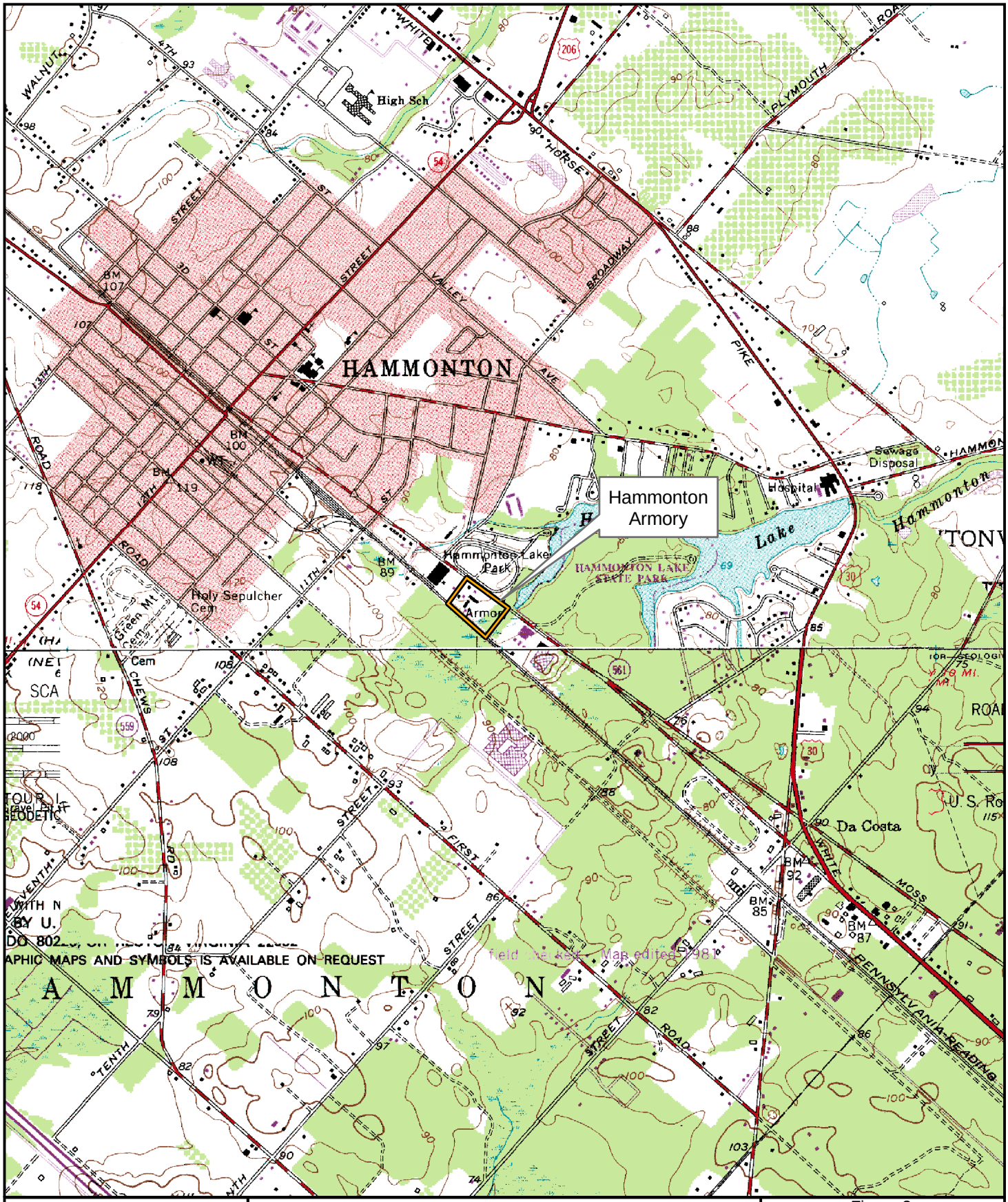
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJ State Plane Coordinates:
Easting: 410249.328018 Feet
Northing: 289038.945888 Feet

1:24,000

Figure 2
USGS Topographic Map
Hammonton Armory
Town of Hammonton,
Atlantic Co., NJ

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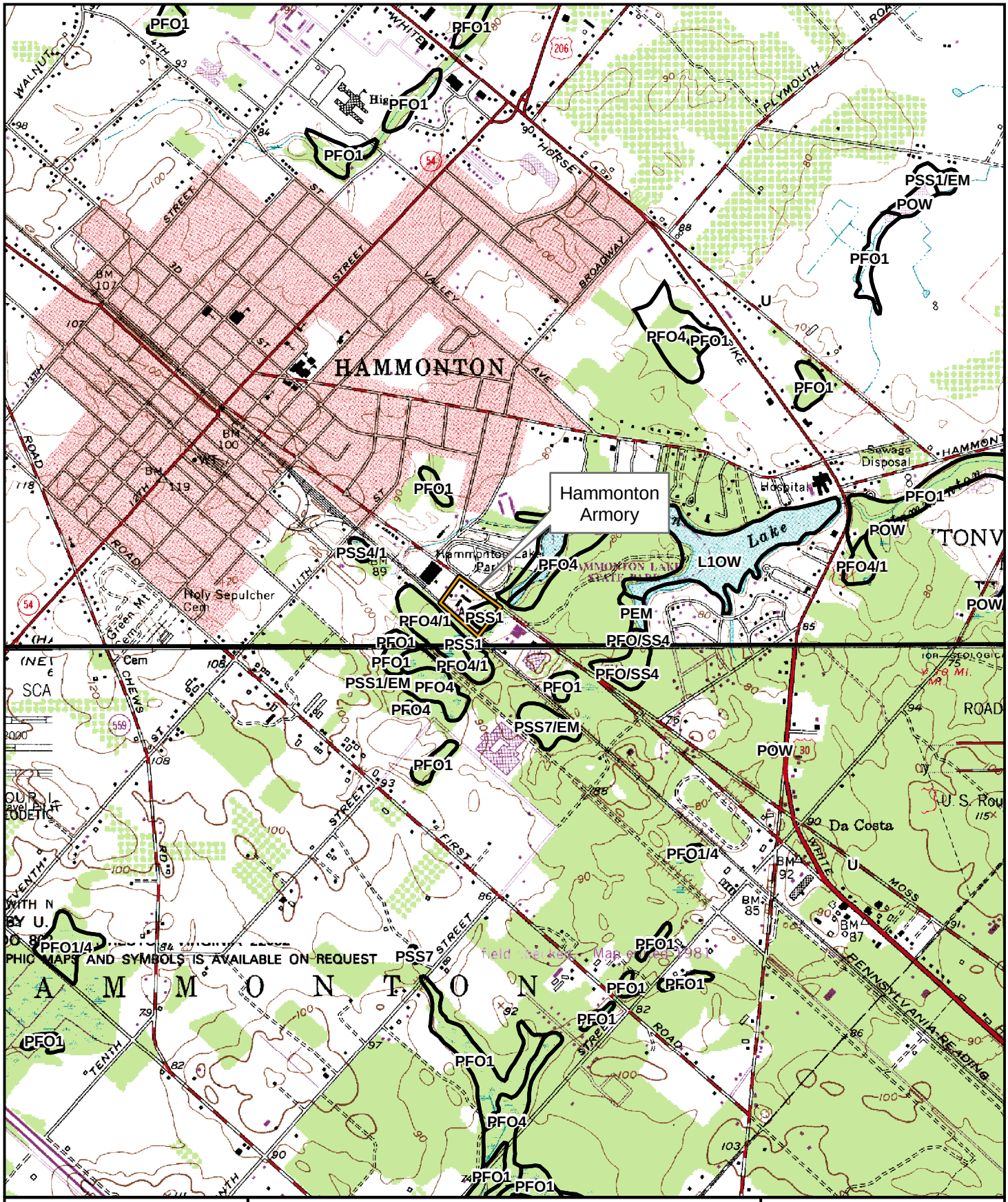
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 410249.328018 Feet
Northing: 289038.945888 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Hammonton Armory
Town of Hammonton,
Atlantic Co., NJ

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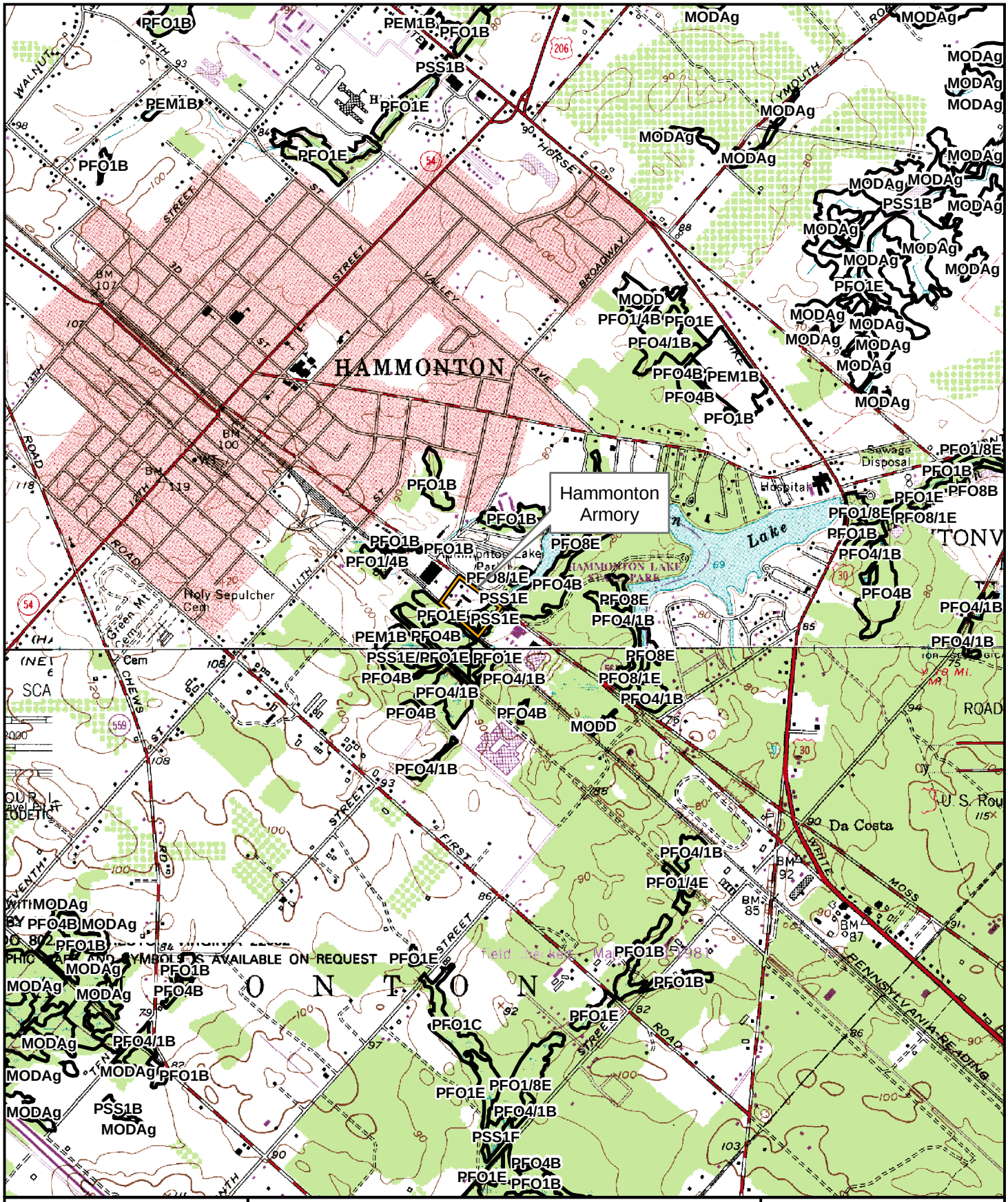




**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 410249.328018 Feet
Northing: 289038.945888 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Hammonton Armory
Town of Hammonton,
Atlantic Co., NJ

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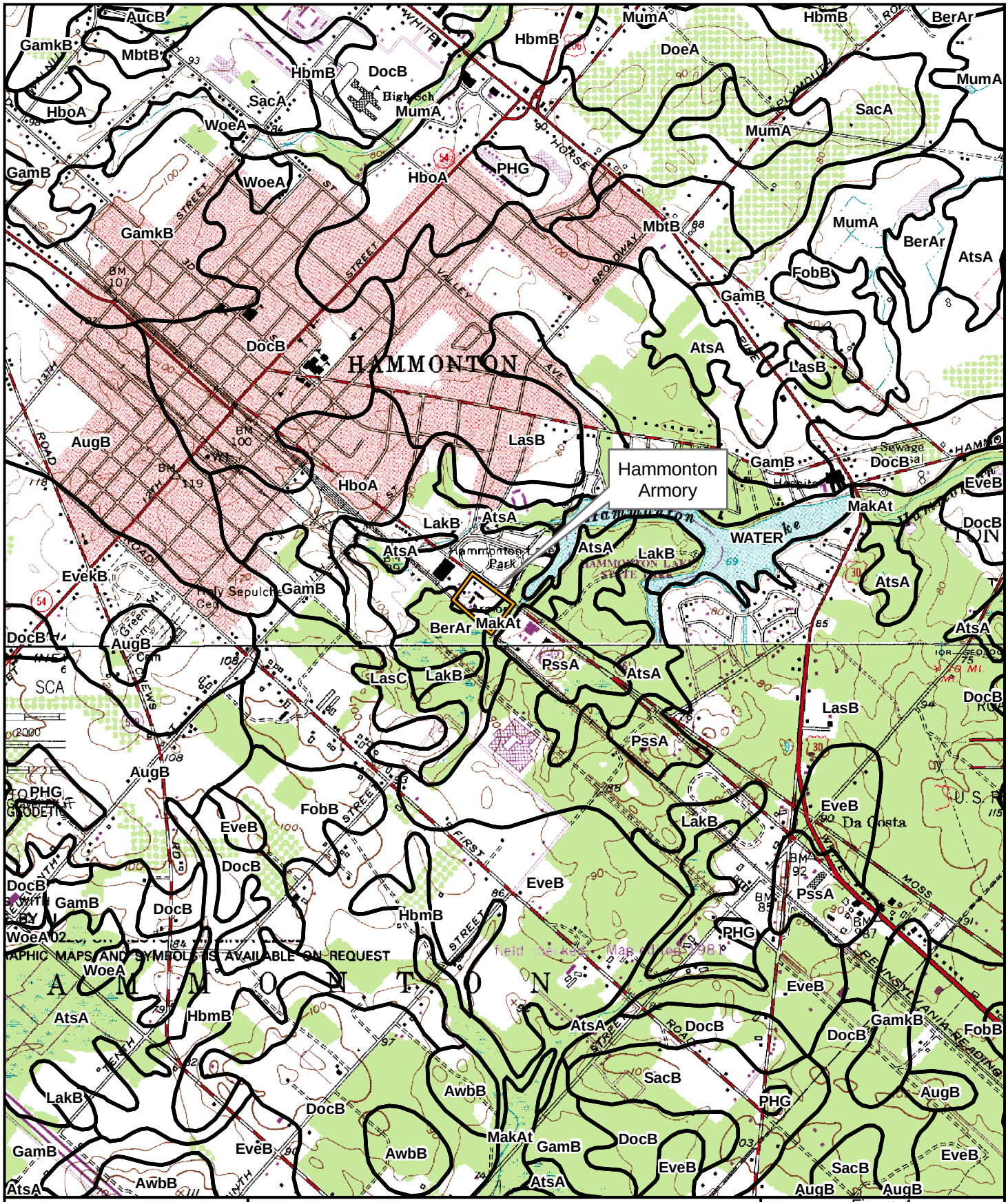
Plymouth Meeting, PA 19462






***Legend***

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 410249.328018 Feet
Northing: 289038.945888 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Hammonton Armory
Town of Hammonton,
Atlantic Co., NJ

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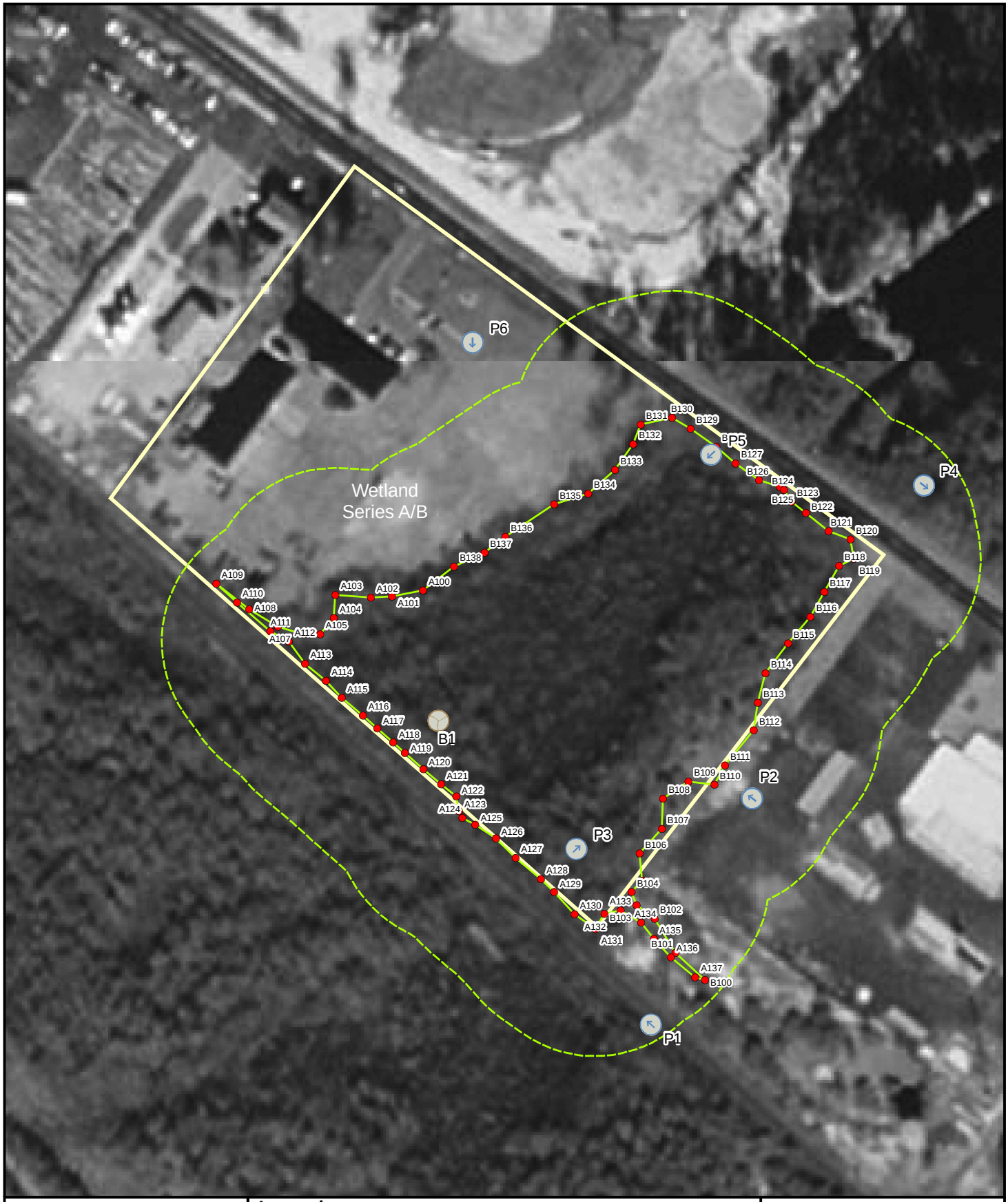
Plymouth Meeting, PA 19462






***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

150' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 410249.328018 Feet
Northing: 289038.945888 Feet

1:1,875

Figure 5
Wetlands Location Map
Hammonton Armory
Town of Hammonton,
Atlantic Co., NJ

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Plymouth Meeting, PA 19462

# 15.0 LAWRENCEVILLE COMPLEX

This section of the report presents the results of the wetlands delineation for the Lawrenceville Complex installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 15.1 Site Location

The Lawrenceville Complex installation is a 71.99-acre parcel designated as Block 2312, Lots 8, 14, 130, 131, and 132 in Lawrence Township, Mercer County, New Jersey (**Figure 1**). It is located on the eastbound side of Eggerts Crossing Road, west of the intersection of U.S. Highway 206. The NJ State Plane Coordinates for the site are East 423840.454271 feet and North 523283.799043 feet. The site is located in the Inner Coastal Plain physiographic section of New Jersey, in the Assunpink Creek watershed of Watershed Management Area 11 (WMA 11; Central Delaware).

The site is an irregular-shaped parcel bound to the north by Eggerts Crossing Road, to the east and south by residential properties, and to the west by residential properties and undeveloped land. The surrounding land use is mixed rural and residential. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the central and northern portion of the property, whereas the naturalized areas are generally to the south. A description of these areas is presented in Section 15.2.

## 15.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 15.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 100 and 120 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Shabakunk Creek. At its closest point, Shabakunk Creek is located approximately 1,300 feet to the southwest of the site, across numerous residential developments. Net drainage on the site is to the southwest, towards Shabakunk Creek.

### 15.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetlands to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped wetland is a palustrine, forested, broad-leaved, deciduous community (PFO1) located approximately 700 feet to the southwest of the site. This PFO1 community is associated with the riparian and floodplain areas of Shabakunk Creek.

### 15.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of the following two community types on the site (**Figure 3B**):

- Deciduous wooded wetlands – Mapped to occur as extensive areas located in the southern portion of the site. These areas were not depicted as wetlands on the NWI map.
- Managed wetlands (Modified) – Mapped to occur in the north-eastern corner of the site. This community was not depicted on the NWI map.

### 15.2.4 USDA Soils

A review of the USDA soils GIS data indicate the site to be underlain by the following soil types (**Figure 4**):

- Aura sandy loam, moderately firm, 0 to 5 percent slopes (AugmB) – Mapped to occur as a small finger extending into the site from the northeast corner of the property.
- Matapeake loam, 2 to 5 percent slopes (MbpB) – Mapped to occur as the dominant soil type in the central portion of the site.
- Matapeake loam, 5 to 10 percent slopes, eroded (MbpC2) – Mapped to occur as a very narrow portion along the northeast site boundary.
- Mattapex and Bertie loams (MBYB) – Mapped to occur as a small finger extending into the site from the northeast corner of the property, and as the dominant soil type in the southern portion of the site.
- Othello silt loam (OthA) – Mapped to occur as a small finger extending into the site from the northeast corner of the property.
- Sassafras gravely loam, 2 to 5 percent slopes (SacC2) – Mapped to occur along the northern and western property boundaries, and as a linear band through the south-central portion of the site.

The Othello series is classified as a Typic Ochraquult and is therefore listed by the USDA as a hydric soil (USDA 1995).

## 15.3 Results of the Field Assessment

As of September 2005, the Lawrenceville Complex installation was composed of the following seven distinct communities: open water, forested deciduous wetland, scrub-shrub wetland, emergent wetland, deciduous upland woods, mowed lawn, and developed land. The wetlands delineated on this site were designated as Wetland Series A, B, C, and D, which includes the open water, forested deciduous wetland, scrub-shrub wetland, and emergent wetland communities (**Figure 5**). Each of these seven community types is described below.

The open water community, designated in part as Wetland Series A, B, and C, consists of a narrow stream that traverses portions of the southern side of the property in a general east-west

direction. This stream generally runs along the southern property line between the installation and the rear yards of private residential properties. The morphology of this stream varies from a depressed drainage pathway through upland woods, to a straight and entrenched drainage ditch, to a somewhat meandering channel with depositional features on the bottom. Similarly, surface water in this stream ranged from not present to flowing water approximately 4 inches deep. The outer boundaries of Wetland Series A are generally coincident with the top-of-bank of the stream, although some fringe wetlands were identified and are described below as forested deciduous wetland.

The forested deciduous wetland community, designated in part as Wetland Series A, B, and C, are fringes of mixed-stage wetlands along the sides of the open water community. These areas are dominated by red maple (*Acer rubrum*, FAC) in the canopy and sapling layers; silky dogwood (*Cornus amomum*, FACW) and southern arrowwood (*Viburnum dentatum*, FAC) in the shrub layer; and Japanese honeysuckle (*Lonicera japonica*, FAC-) in the vine and ground layers. A representative soil boring collected from this community typically exhibited a depositional soil of grayish-brown (10YR 5/2) silt loam with faint, light brownish-gray (10YR 6/2) mottles averaging 20 percent in frequency.

The majority of the wooded portion of the site is mid-stage, upland deciduous woods. This community is vegetated with sugar maple (*Acer saccharum*, FACU-), American beech (*Fagus grandifolia*, FACU), red oak (*Quercus rubra*, FACU-), white ash (*Fraxinus americana*, FACU), and black cherry (*Prunus serotina*, FACU) in the canopy and sapling layers; Japanese barberry (*Berberis thunbergii*, FACU), multiflora rose (*Rosa multiflora*, FACU), Allegheny blackberry (*Rubus allegheniensis*, FACU), and Virginia creeper (*Parthenocissus quinquefolia*, FACU) in the shrub and vine layers. A ground layer was not apparent at the time of the site visit. A representative soil boring collected from a relatively dry portion of this community typically exhibits a depositional profile of brown (10YR 5/3) blocky silt that transitions to brownish-yellow (10YR 6/6) blocky silt with increasing depth. A representative soil boring collected from a relatively moist portion of this community typically exhibits a depositional profile of yellowish-brown (10YR 5/4) friable silt to silt loam that transitions to a dark yellowish-brown (10YR 4/4) friable silt to silt loam with increasing depth.

A scrub-shrub and emergent wetland community, designated as Wetland Series D, is located in the northeast corner of the property, near adjacent to Eggerts Crossing Road. This wetland is a circular depression within the mowed lawn community and may be a constructed wetland for stormwater management. The scrub-shrub portion of this community is dominated by black locust (*Robinia pseudo-acacia*, FACU), silky dogwood (*Cornus amomum*, FACW), multiflora rose (FACU), poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (FAC-), and summer grape (*Vitis aestivalis*, FACU). The emergent portion of this community is located in the near center of the wetland. This community was dominated by halberd-leaved tearthumb (*Polygonum arifolium*, OBL) and sensitive fern (*Onoclea sensibilis*, FACW). A representative soil boring collected from this community typically exhibited a depositional profile of dark grey (7.5YR 4.1) loamy clay with strong brown (7.5YR 4/6) distinct mottles averaging 40 percent in frequency, approximately 60 percent pore linings, and approximately 5 percent round quartzose pebbles.

The mowed lawn and developed land communities are generally located in the northwest portion of the property. These areas drain to the southeast, towards Wetland Series A. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa*

sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 15.4 Conclusion

The results of the wetlands delineation of the Lawrenceville Complex installation reveal the presence of three distinct wetland areas on the site. Two, Wetland Series A, B, and C on **Figure 5**, are located in the undeveloped wooded southern portion of the site; the other, Wetland Series D, is a constructed wetland located in the northeast corner of the site. It is anticipated that Wetland Series B, C, D, and the majority of Wetland Series A will be classified by the NJDEP as intermediate-resource value wetlands, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer) as per Subchapter 2 of N.J.A.C. 7:7A, where a small upgradient portion of this wetland is anticipated to meet the definition of a State open water at N.J.A.C. 7:7A-1.4 with no associated transition area.

The conclusion regarding the intermediate resource value designation was reached because the wetlands do not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Lawrenceville Complex

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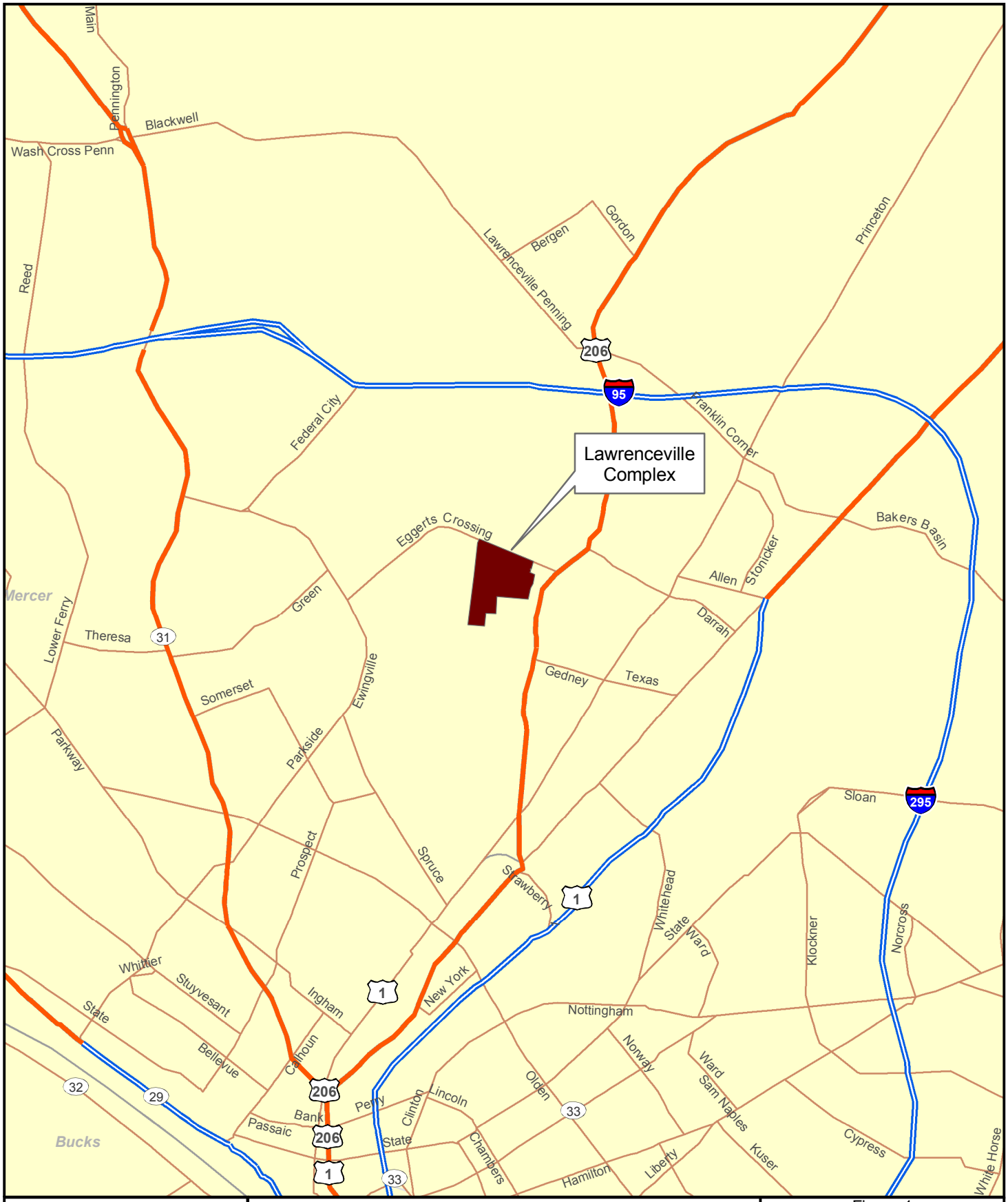




**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Lawrenceville Armory
Lawrence Twp.,
Mercer Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 423840.454271 Feet
Northing: 523283.799043 Feet

1:24,000

Figure 2
USGS Topographic Map
Lawrenceville Armory
Lawrence Twp.,
Mercer Co., NJ

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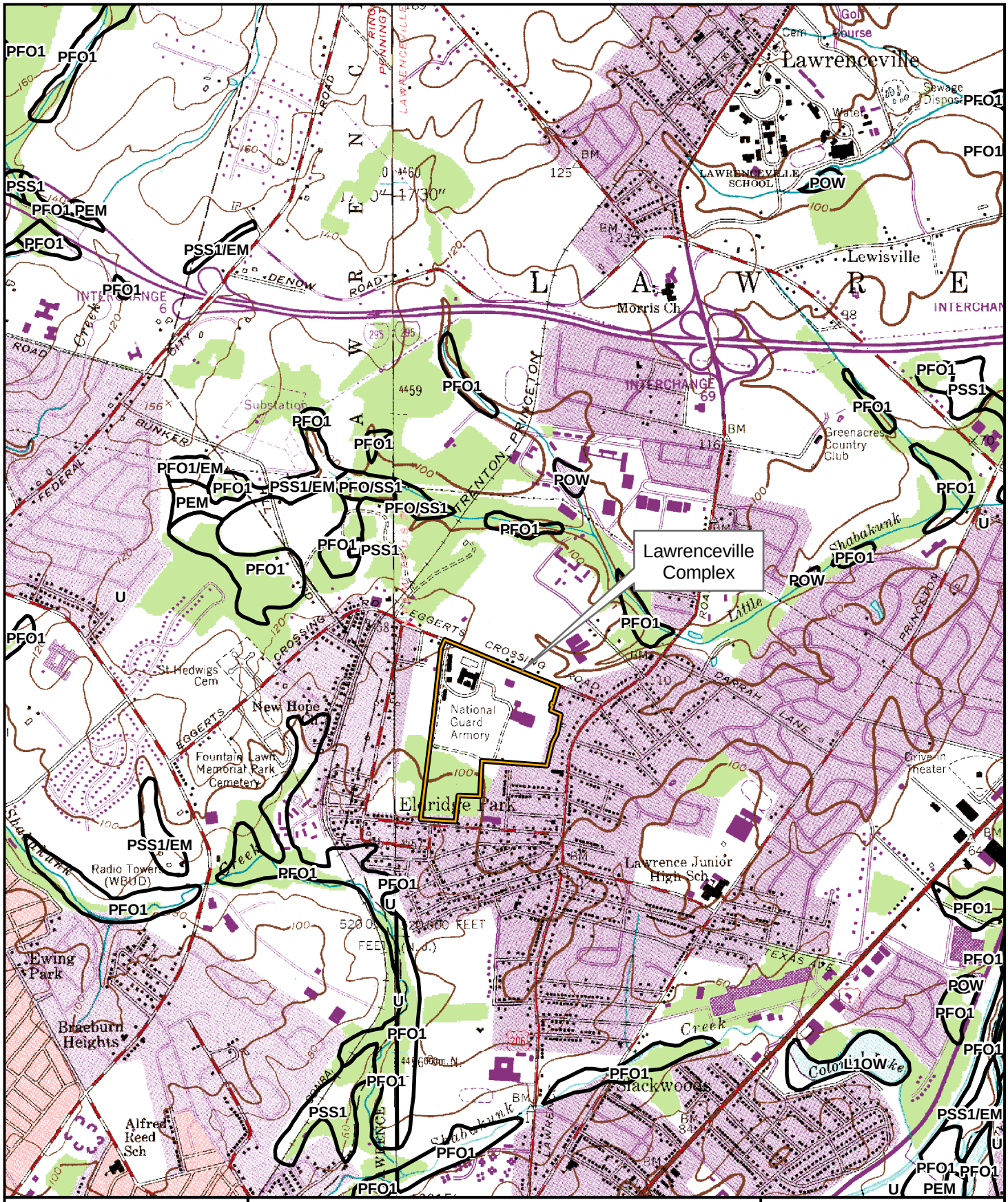
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 423840.454271 Feet
Northing: 523283.799043 Feet

*See report text for wetland description.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Lawrenceville Armory
Lawrence Twp.,
Mercer Co., NJ

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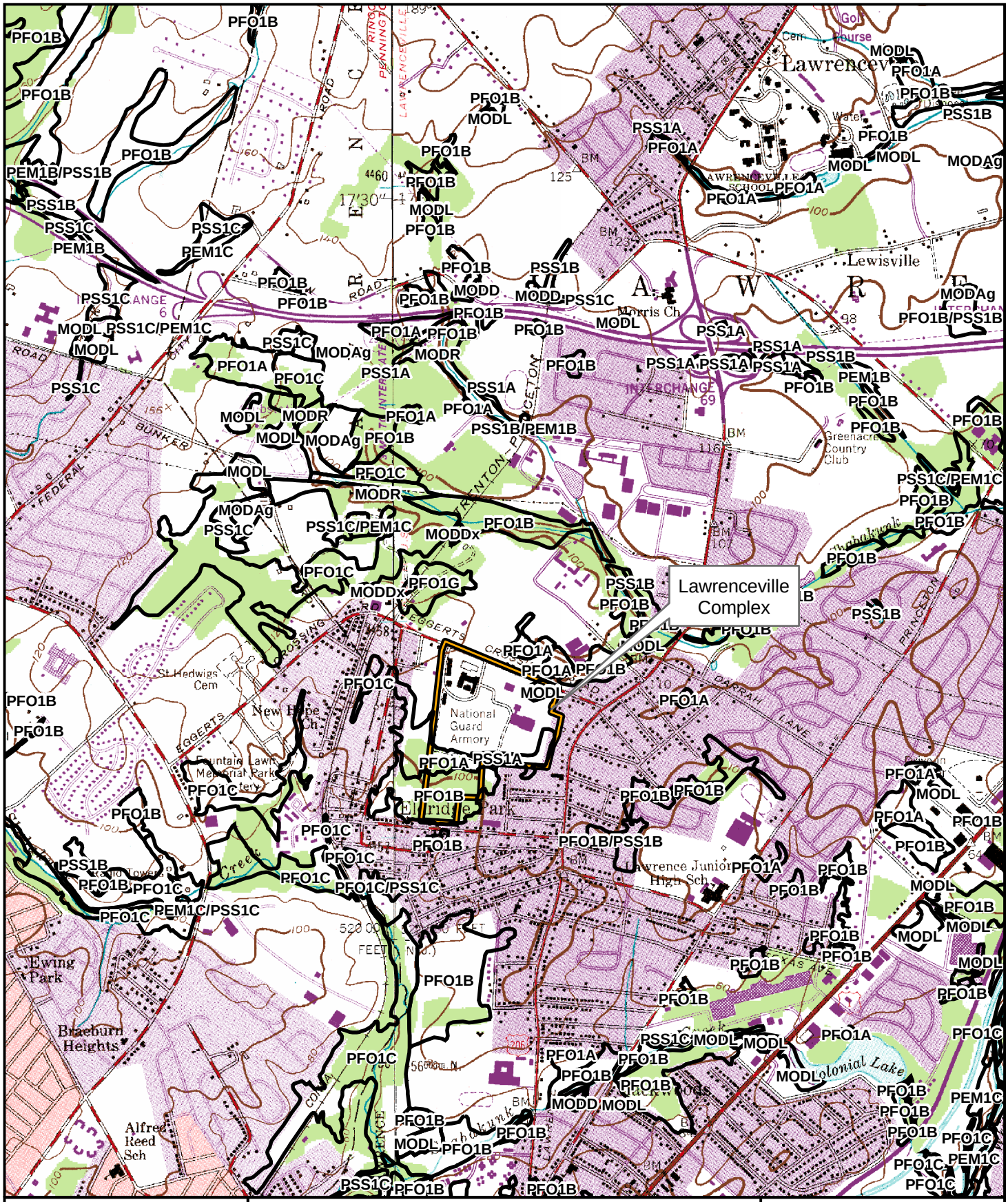




***Legend***

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 423840.454271 Feet
Northing: 523283.799043 Feet

*See report text for wetland description.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Lawrenceville Armory
Lawrence Twp.,
Mercer Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 423840.454271 Feet
Northing: 523283.799043 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Lawrenceville Armory
Lawrence Twp.,
Mercer Co., NJ

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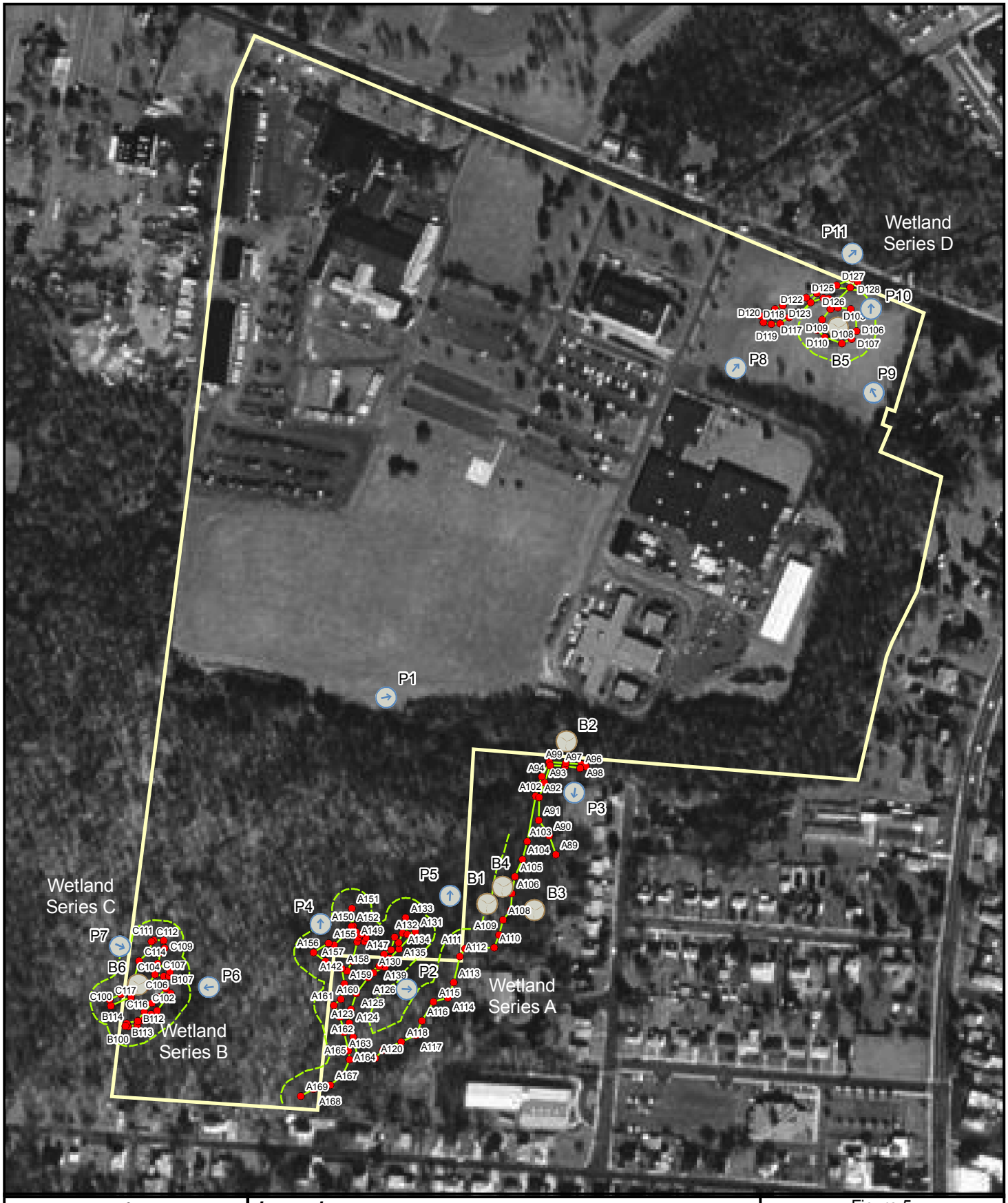
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 423840.454271 Feet
Northing: 523283.799043 Feet

1:4,056

Figure 5
Wetlands Location Map
Lawrenceville Armory
Lawrence Twp.,
Mercer Co., NJ

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# 16.0 MORRISTOWN ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Morristown Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 16.1 Site Location

The Morristown Armory FMS installation is an approximately 43.40-acre parcel designated as Block 4801, Lot 1 in Morris Township, Morris County, New Jersey (**Figure 1**). It is located on the northbound side of Jockey Hollow Road, south of the intersection of State Route 24. The NJ State Plane Coordinates for the site are East 489789.405802 feet and North 709289.536552 feet. The site is located in the Piedmont physiographic section of New Jersey, in the Whippany River watershed of Watershed Management Area 06 (WMA 6; Upper Passaic, Whippany, and Rockaway).

The site is a roughly rectangle-shaped parcel bound to the north by Jockey Hollow Road, to the east and south by residential properties, and to the west by a township road. The surrounding land use is rural and residential. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the central portion of the property, whereas the naturalized areas are generally to the east and west. A description of these areas is presented in Section 16.2.

## 16.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 16.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated on a topographic ridge at an elevation around 650 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature for the western portion of the site is an unnamed tributary to the Whippany River. At its closest point, this unnamed tributary is located approximately 2,500 feet to the west of the site. The nearest mapped open water feature for the eastern portion of the site is also an unnamed tributary, although this watercourse is depicted to subside at the toe of Kemble Mountain. At its closest point, this unnamed tributary is located approximately 2,000 feet to the east of the site.

### 16.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates a palustrine, forested, broad-leaved, deciduous wetland (PFO1) to occur in the southwest portion of the property (**Figure**

**3A**). This PFO1 wetland is depicted on the NWI map as an isolated community. No other wetland communities are mapped on or immediately adjacent to the site.

### 16.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of the following three wetland community types on the site (**Figure 3B**):

- Deciduous wooded wetlands – Mapped to occur in the western portion of the site, roughly coincident with the NWI's PFO1 community.
- Disturbed wetlands (Modified) – Mapped to occur near the center of the site. This community was not depicted on the NWI map.
- Herbaceous wetlands – Mapped to occur in the eastern portion of the site. This community was not depicted on the NWI map.

### 16.2.4 USDA Soils

A review of the USDA soils GIS data indicate the site to be underlain by the following soil types (**Figure 4**):

- Urban Land – Edneyville Complex (USGKAC) – Mapped to occur in the north-central portion of the site, coincident with the developed portion of the property, and in the southeast property corner.
- Califon loam, 3 to 8 percent slopes (CakB) – Mapped to occur in the western end of the site.
- Califon loam, friable, subsoil variant, 3 to 8 percent slopes (CapfB) – Mapped to occur as a finger extending into the site from near the northeast property corner.
- Edneyville gravely loam, 3 to 8 percent slopes (GkaoB) – Mapped to be the dominant soil type in the central portion of the site.
- Parker gravely sandy loam, 3 to 15 percent slopes (PaoC) – Mapped to occur in the southeast portion of the site.

None of the above soil types are listed by the USDA as a hydric soil (USDA 1995).

### 16.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for four state-listed bird species and three state-listed herptile species (one federal) to be present or suitable habitats present, on the site. The results of Phase I and Phase II surveys indicate the documented presence of the following herptile species at the site:

- Eastern box turtle (*Terrapene carolina carolina*) – state species of special concern.

In addition, the results of the Phase I and Phase II surveys indicate the presence of suitable habitat for the following species to be present on the site:

- Wood turtle (*Clemmys insculpta*) – state threatened.

## 16.3 Results of the Field Assessment

As of September 2005, the Morristown Armory FMS installation was composed of the following seven distinct communities: open water, forested deciduous wetland, emergent wetland, upland deciduous woods, successional old-field, mowed lawn, and developed land. The wetland areas delineated on the site were designated as Wetland Series A, B, and C/D which comprised the open water, forested deciduous wetland, and emergent wetland communities (**Figure 5**). Each of these seven community types is described below.

The open water community includes a series of linear drainages located in the eastern and western portions of the site. (The main facility is situated on a topographic ridge and drainage is to the east and west.) These linear drainages vary from dry, erosional features to well-developed stream channels with flowing water. Similarly, the bed and banks of these drainages exhibit wide variability including small cobble, gravel, sand, silt, and muck. All of the drainages and any associated wetlands that surround them were delineated as Wetland Series A, B, and C/D.

The forested deciduous wetland community in the eastern portion of the site, designated as Wetland Series A, is limited to fringe areas at the up-gradient ends of the open water drainage channels, but expand to broad, expansive areas at the down-gradient end of the channels. In contrast, the forested deciduous wetland community in the western portion of the site, designated as Wetland Series C/D, is mostly limited to fringe areas alongside the channels. These communities are vegetated with non-typical wetland species in the canopy and sapling layers such as sugar maple (*Acer saccharum*, FACU-), flowering dogwood (*Cornus florida*, FACU-), and black locust (*Robinia pseudo-acacia*, FACU-), but also include some pin oak (*Quercus palustris*, FACW), American sycamore (*Platanus occidentalis*, FACW-), and American elm (*Ulmus americana*, FACW-). A distinct shrub layer was not apparent at the time of the site visit, but the vine and ground layers are dominated by poison ivy (*Toxicodendron radicans*, FAC), Japanese stilt grass (*Microstegium vimineum*, FAC), and dock-leaf smartweed (*Polygonum lapathifolium*, FACW+). A representative soil boring collected from this community typically exhibits a dark grey (10YR 4/1) silt loam surface horizon, underlain by an upper subsoil of grey (10YR 6/1) silty clay loam with prominent strong brown mottles averaging 10 percent in frequency.

Two emergent wetland communities, one in each wetland system (east and west of the topographic ridge), are located as small pockets within the open water/forested deciduous wetland systems. In the eastern portion of the site (Wetland Series A), this emergent pocket is dominated by tussock sedge (*Carex stricta*, OBL) and soft rush (*Juncus effusus*, FACW+). In the western portion of the site (Wetland Series C/D), this emergent pocket is dominated by sweet flag (*Acorus calamus*, OBL) and halberd-leaved tearthumb (*Polygonum arifolium*, OBL). A representative soil boring collected from this community typically exhibits a dark grayish-brown (10YR 4/2) surface horizon of silt loam with approximately 15 percent pore linings, underlain by an upper subsoil of brown (10YR 4/3) silt loam with approximately 30 percent pore

linings. Beneath this upper subsoil was a light gray (10YR 7/2) silt loam with distinct gray (10YR 5/1) mottles averaging 10 percent in frequency and approximately 20 percent pore linings.

The upland deciduous woods community generally occurs as the outer edge of the forested deciduous wetlands community and the relatively higher elevations on the site. Most notably, a large tract of mid- to late-stage, upland deciduous woods is located in the north/north-western portion of the site. These communities are dominated by sugar maple (FACU-), black locust (FACU-), red oak (*Quercus rubra*, FACU-), and black cherry (*Prunus serotina*, FACU) in the canopy and sapling layers; multiflora rose (*Rosa multiflora*, FACU) in the shrub layer; poison ivy (*Toxicodendron radicans*, FAC) in the vine layer; and Japanese stilt grass (*Microstegium vimineum*, FAC) in the ground layer.

A successional old-field community is located west of the developed portion of the site. This community exhibits an assemblage typical of disturbed land areas, vegetated with early-successional and ruderal species such as common milkweed (*Asclepias syriaca*, FACU), chicory (*Cichorium intybus*, NI), Canada thistle (*Cirsium arvense*, FACU), various species of goldenrod (*Solidago* spp., NA), yellow-nut sedge (*Cyperus esculentes*, FACW), path rush (*Juncus tenuis*, FAC-), common pokeweed (*Phytolacca americana*, FACU+), deer-tongue grass (*Panicum clandestinum*, FAC+), bristly foxtail (*Setaria* sp., NA), curly dock (*Rumex crispus*, FACU), wild carrot (*Daucus carota*, NL), and various species of violet (*Viola* spp., NA).

The mowed lawn and developed land communities are generally located in the central portion of the property. These areas are located along the topographic ridge, and therefore, drainage is to the east and west depending upon what side of the ridge stormwater is present. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 16.4 Conclusion

The results of the wetlands delineation of the Morristown Armory FMS installation reveal the presence of two groups of wetland areas located on opposite sides of the site. A large forested wetland and stream system, depicted as Wetland Series A on **Figure 5**, is located in the western half of the site. A smaller group of wetland areas, depicted as Wetland Series B, C, and D on **Figure 5**, is located at the eastern end of the site. It is anticipated that the majority of Wetland Series A, and portions of Wetland Series C may be initially classified by the NJDEP as an exceptional-resource value wetland, thus possessing a 150-foot freshwater wetlands transition area (i.e. buffer). This conclusion was reached based on the presence of suitable habitat for wood turtle (state threatened) on the site. The NJDEP defines, in part, exceptional resource value wetlands as those that are present habitat for threatened or endangered species, or is a documented habitat for threatened or endangered species (N.J.A.C. 7:7A-2.4(b). It is possible that this initial classification as an exceptional resource value wetland may be revised to be an intermediate-resource value wetland should the NJDEP concur with the April 2007 Rare Species Survey Report finding that this species is not documented on the site and determines that suitable habitat is also not present on the site.

It is also anticipated that Wetland Series B will be considered by the NJDEP to meet the definition of a swale at N.J.A.C. 7:7A-1.4, thus classified as an ordinary-resource value wetland

with no associated buffer, and that Wetland Series D will be considered to meet the definition of a State open water at N.J.A.C. 7:7A-1.4 with no associated transition area.

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Morristown Armory FMS

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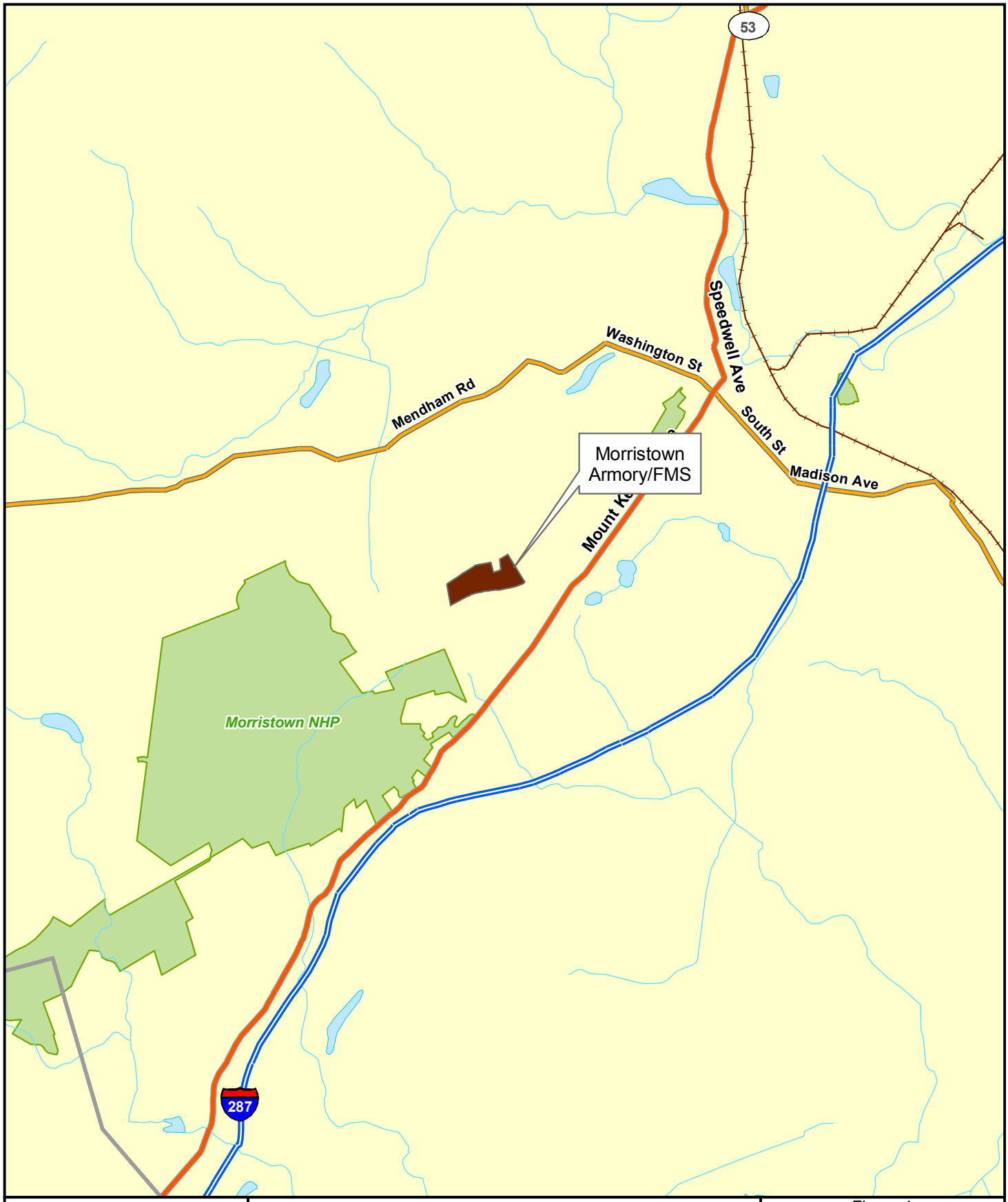




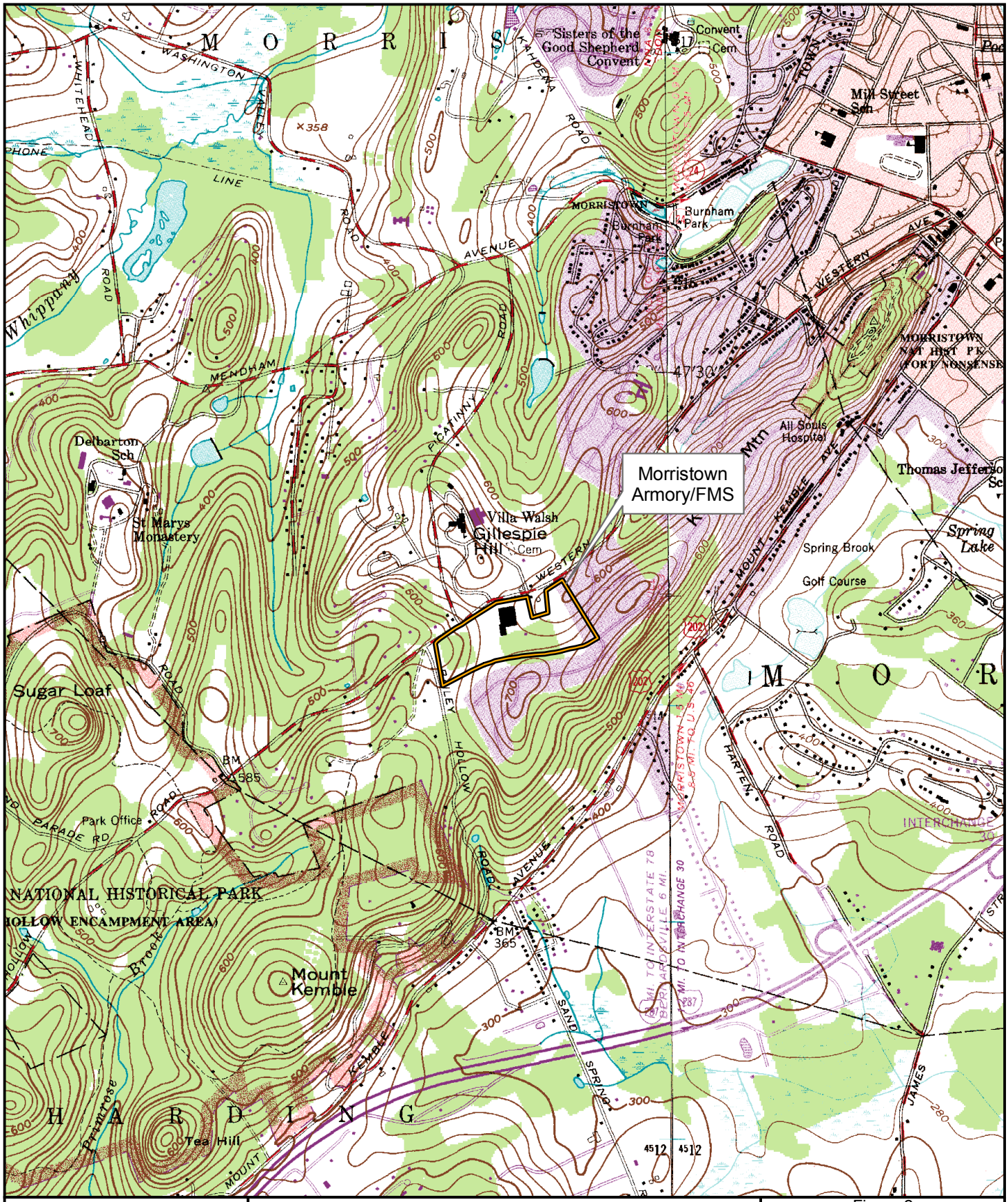

***Legend***

Installation Area

1:50,000

Figure 1
Site Location Map
Morristown Armory/FMS
Morris Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

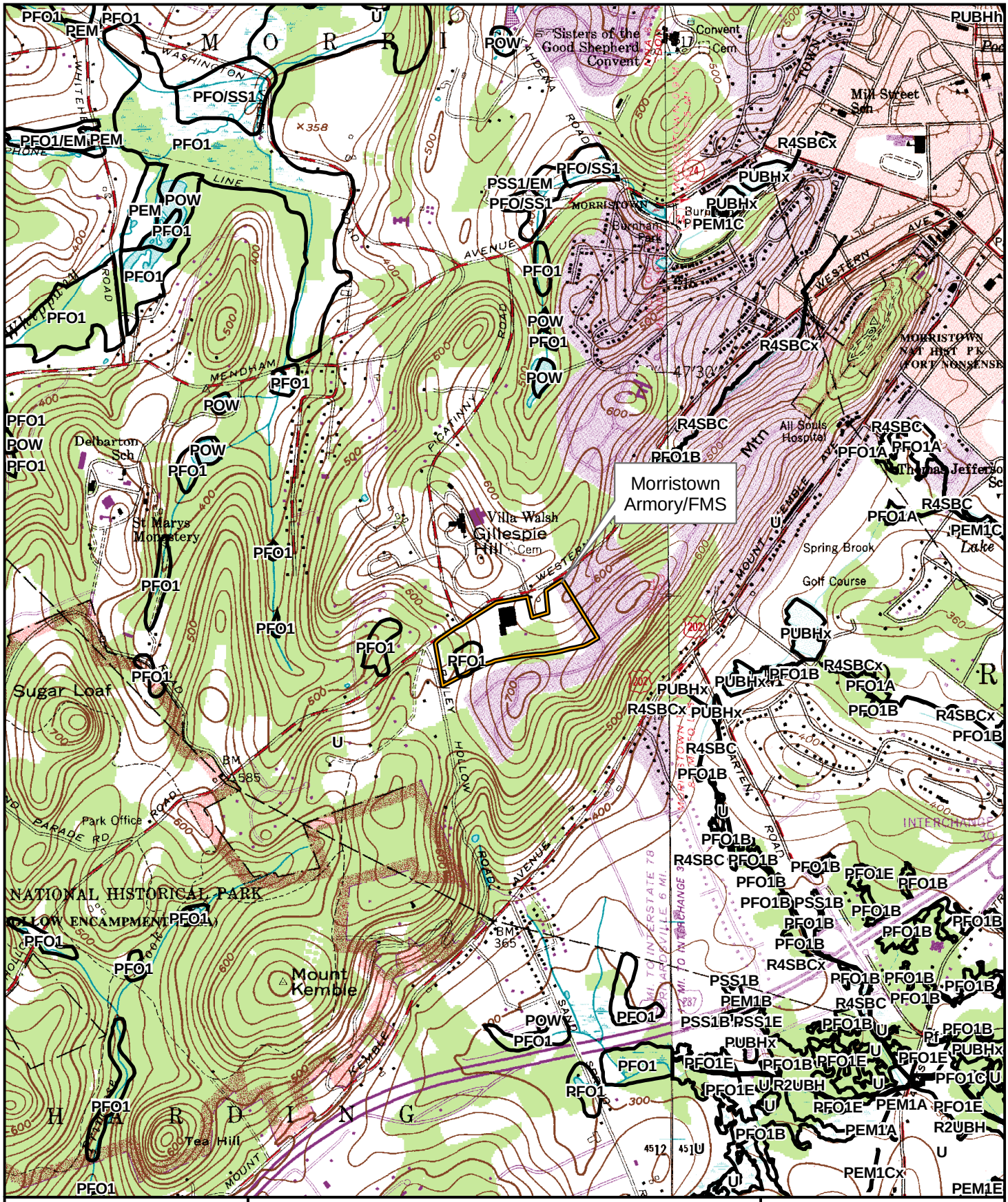
Installation Area

NJ State Plane Coordinates:
Easting: 489789.405802 Feet
Northing: 709289.536552 Feet

1:24,000

Figure 2
USGS Topographic Map
Morristown Armory/FMS
Morris Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 489789.405802 Feet
Northing: 709289.536552 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Morristown Armory/FMS
Morris Twp.,
Morris Co., NJ

amec
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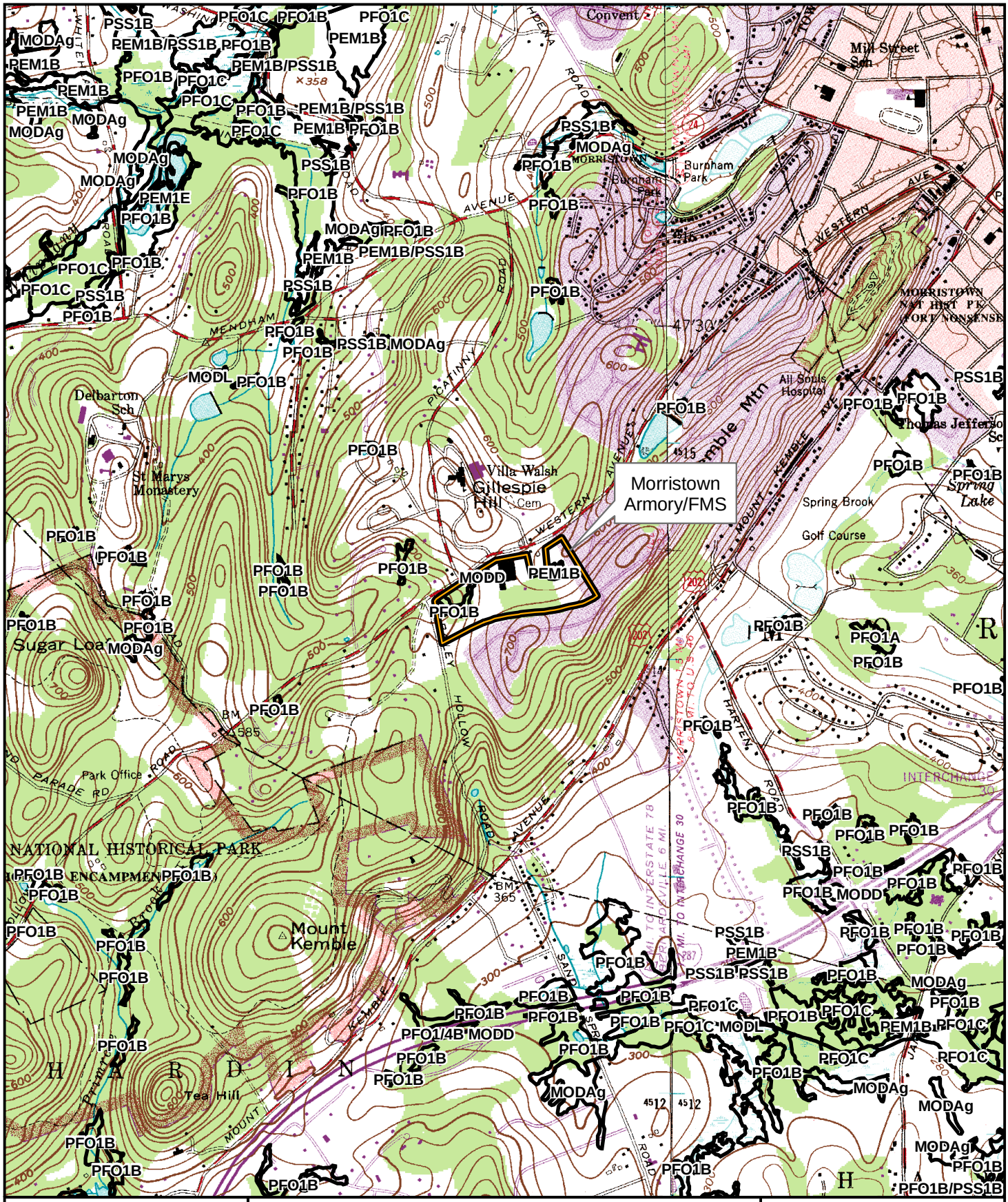
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

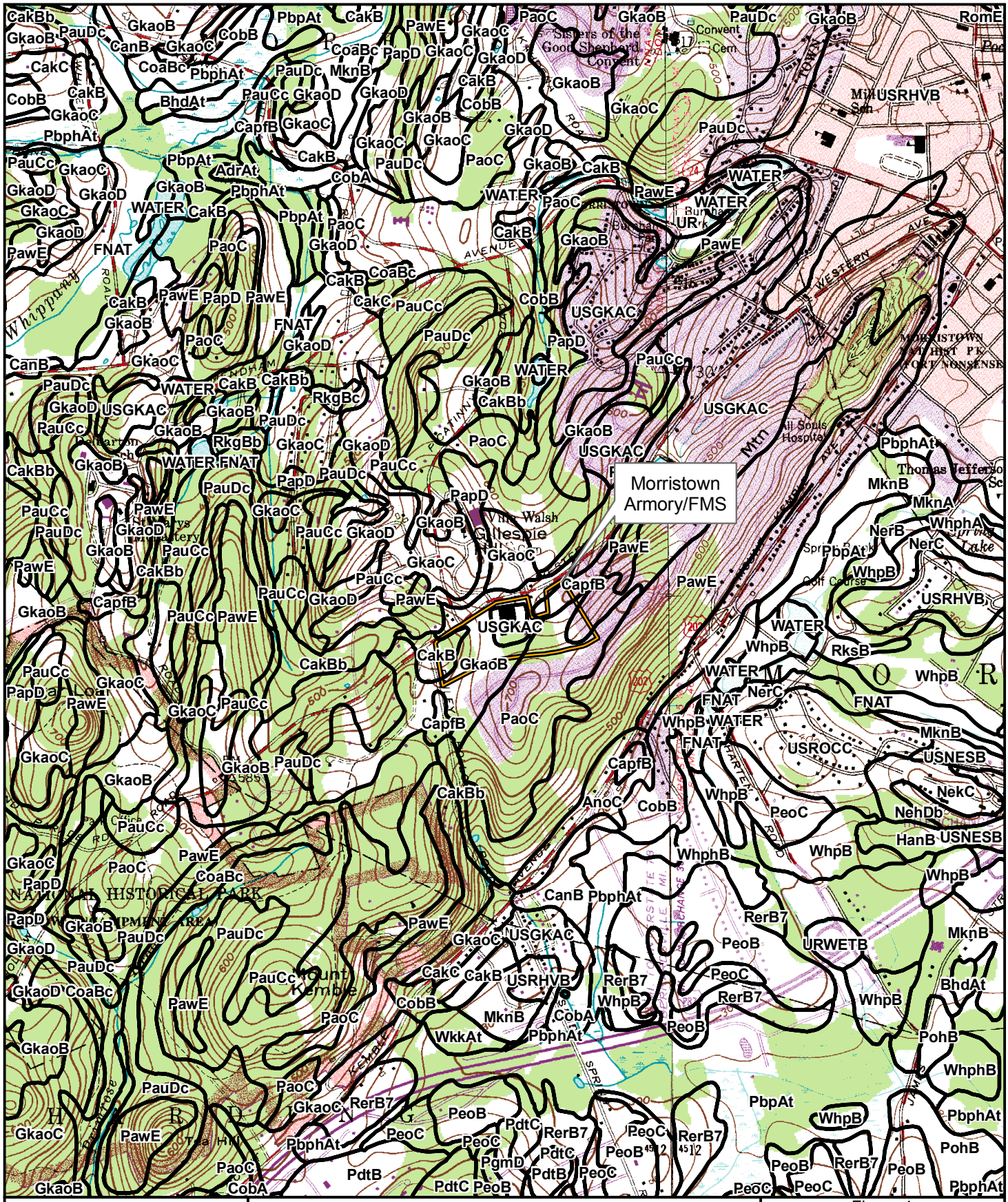
NJ State Plane Coordinates:
Easting: 489789.405802 Feet
Northing: 709289.536552 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Morristown Armory/FMS
Morris Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 489789.405802 Feet
Northing: 709289.536552 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Morristown Armory/FMS
Morris Twp.,
Morris Co., NJ

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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 150' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 489789.405802 Feet
Northing: 709289.536552 Feet

1:4,285

Figure 5
Wetlands Location Map
Morristown Armory/FMS
Morris Twp.,
Morris Co., NJ

amec
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Plymouth Meeting, PA 19462

# 17.0 NEWTON ARMORY

This section of the report presents the results of the wetlands delineation for the Newton Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 17.1 Site Location

The Newton Armory installation is an approximately 5.58-acre parcel designated as Block 801, Lot 49.01 in the Town of Newton, Sussex County, New Jersey (**Figure 1**). It is located on the north side of South Park Drive, east of the intersection of U.S. Highway 206 and State Route 94. The NJ State Plane Coordinates for the site are East 424902.509568 feet and North 812863.291685 feet. The site is located in the Ridge and Valley physiographic section of New Jersey, in the Paulins Kill watershed of Watershed Management Area 1 (WMA 1; Upper Delaware).

The site is a rectangle-shaped parcel bound to the northeast and northwest by developed land, to the southwest by South Park Drive, and to the southeast by an active construction site. The surrounding land use is commercial and light industrial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northwest portion of the property, whereas the naturalized areas are generally to the southeast. A description of these areas is presented in Section 17.2.

## 17.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 17.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 570 and 600 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Paulins Kill River. At its closest point, Paulins Kill River is located approximately 1,800 feet to the south of the site. Net drainage on the site however, is towards the center of the site, into an on-site topographic depression.

### 17.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped wetland is a palustrine, open water community (POW) located approximately 300 feet to the southeast of the site. This POW wetland is associated with an extensive wetland system for the Paulins Kill River.

### 17.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of an herbaceous wetland community in the south-southwest portion of the site (**Figure 3B**). This community is not depicted on the NWI map. Additionally, an off-site, deciduous wooded wetland community is mapped to the east of the site, roughly coincident with a palustrine, forested, broad-leaved, deciduous wetland (PFO1) depicted on the NWI map.

### 17.2.4 USDA Soils

A review of the USDA soils GIS data indicate the site to be underlain by the following soil types (**Figure 4**):

- Udorthents-Urban land complex, 0 to 8 percent slopes (UdauB) – This soil underlies the entire site

.
The above soil type is not listed by the USDA as a hydric soil (USDA 1995).

## 17.3 Results of the Field Assessment

As of October 2005, the Newton Armory installation was composed of the following four distinct community types: emergent wetland, upland deciduous woods, mowed lawn, and developed land. The emergent wetland was the only community identified on the site as wetlands, and were designated as Wetland Series A (**Figure 5**). Each of these four community types is described below.

The emergent wetland is located in the southern corner of the property. It is a roughly circular depression that receives drainage from primarily from the north (on-site) and from the southeast (off-site). This community is dominated by grass-leaved goldenrod (*Euthamia graminifolia*, FAC), stalk-grain sedge (*Carex stipata*, OBL), woolgrass (*Scirpus cyperinus*, FACW+), soft rush (*Juncus effusus*, FACW+), and reed canary grass (*Phalaris arundinaceae*, FACW+). A representative soil boring collected from this community typically exhibits a depositional profile of grayish-brown (2.5Y 5/2) fine sandy loam averaging 30 to 40 percent pore linings.

The upland deciduous woods community encircles the emergent wetland, occupying a moderate to moderately-steep slope towards the depression. This early- to mid-stage wooded community exhibits a mixed species assemblage with no clear dominants, although the relatively more mesic species tend to occupy the lower elevations farther down the slope. Species within this community are box elder (*Acer negundo*, FAC+), white ash (*Fraxinus americana*, FACU), eastern white pine (*Pinus strobes*, FACU), black cherry (*Prunus serotina*, FACU), common catalpa (*Catalpa bignonioides*, NL), Tartarian honeysuckle (*Lonicera tartarica*, FACU), Asiatic bittersweet (*Celastrus orbiculatus*, NL), multiflora rose (*Rosa multiflora*, FACU), witch hazel (*Hamamelis virginiana*, FAC-), stiff dogwood (*Cornus foemina*, FAC), grape (*Vitis* sp., NA), Virginia creeper (*Parthenocissus quinquefolia*, FACU), Japanese honeysuckle (*Lonicera japonica*, FAC-), poison ivy (*Toxicodendron radicans*, FAC), and teasel (*Dipsacus sylvestris*, FACU-).

The mowed lawn and developed land communities are generally located in the northwest portion of the property. Drainage from these areas is generally to the south/southeast, towards Wetland Series A. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 17.4 Conclusion

The results of the wetlands delineation conducted for the Newton Armory installation reveal the presence of a depressional wetland that occupies the majority of the undeveloped portion of the site. This wetland is depicted as Wetland Series A on **Figure 5**. It is anticipated to be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer), as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the wetland does not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

This wetland does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetland that has 50 percent or more of the area within 50 feet of the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Newton Armory

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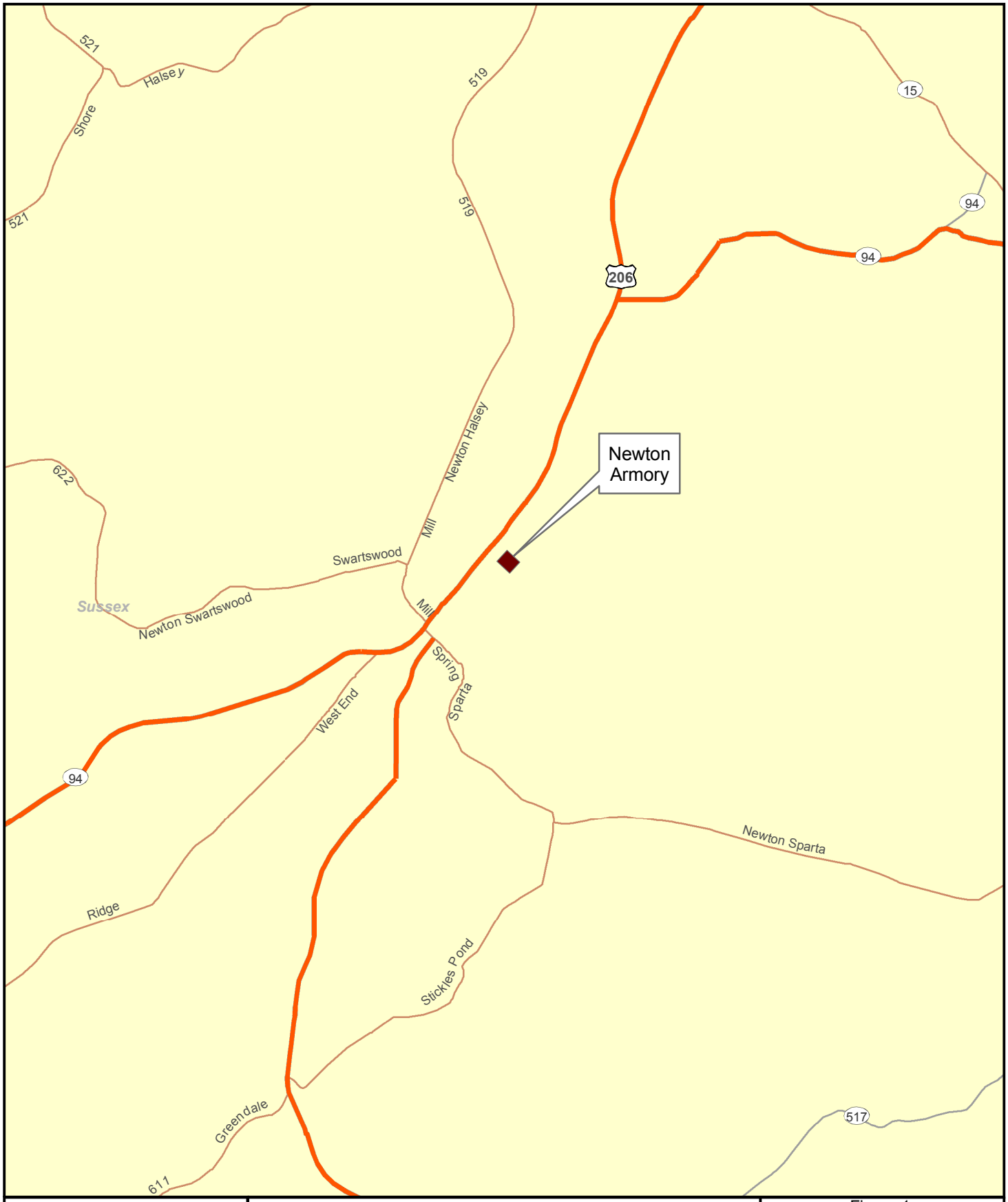




**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Newton Armory
Town of Newton,
Sussex Co., NJ

amec
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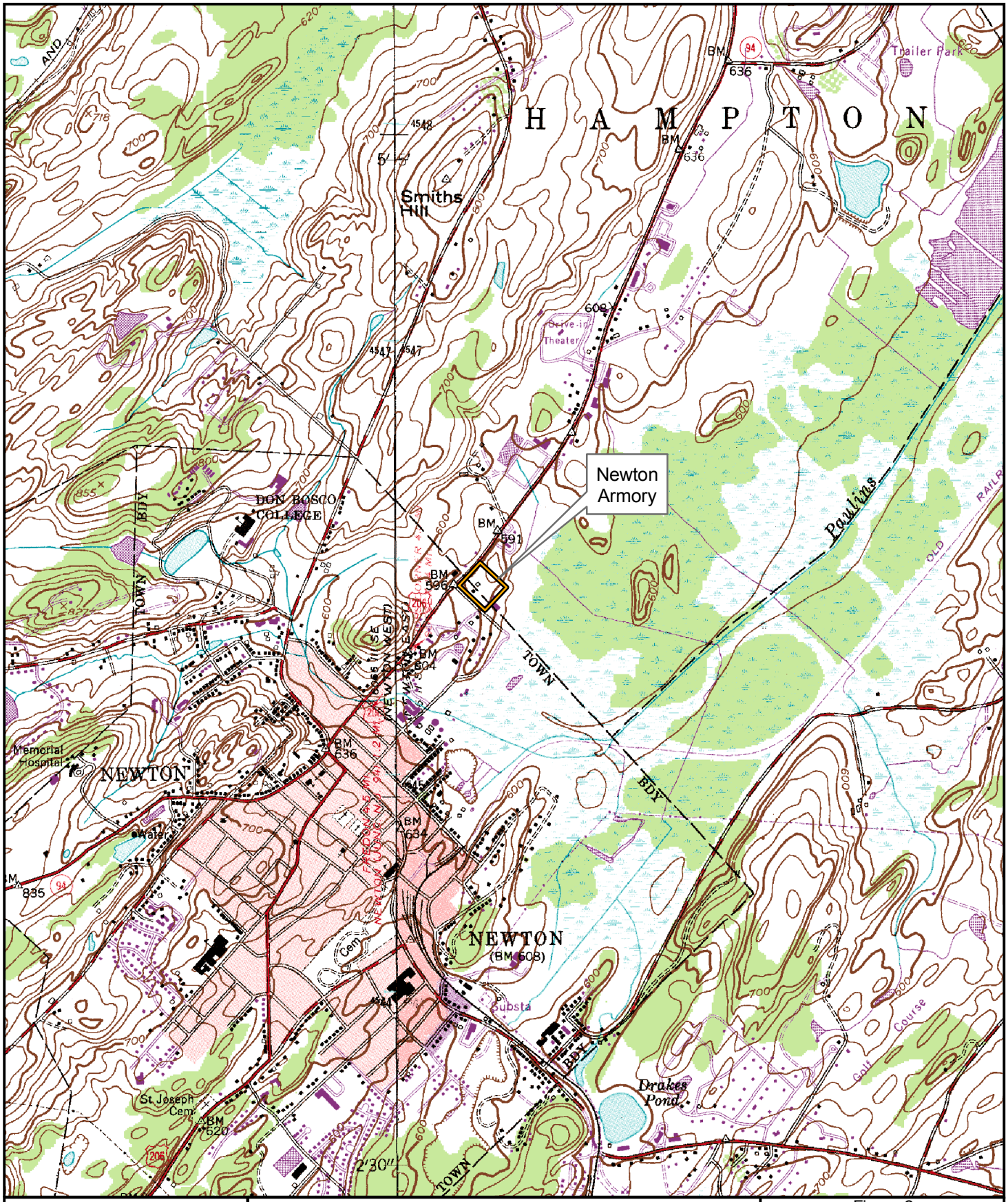
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 424902.509568 Feet
Northing: 812863.291685 Feet

1:24,000

Figure 2
USGS Topographic Map
Newton Armory
Town of Newton,
Sussex Co., NJ

amec
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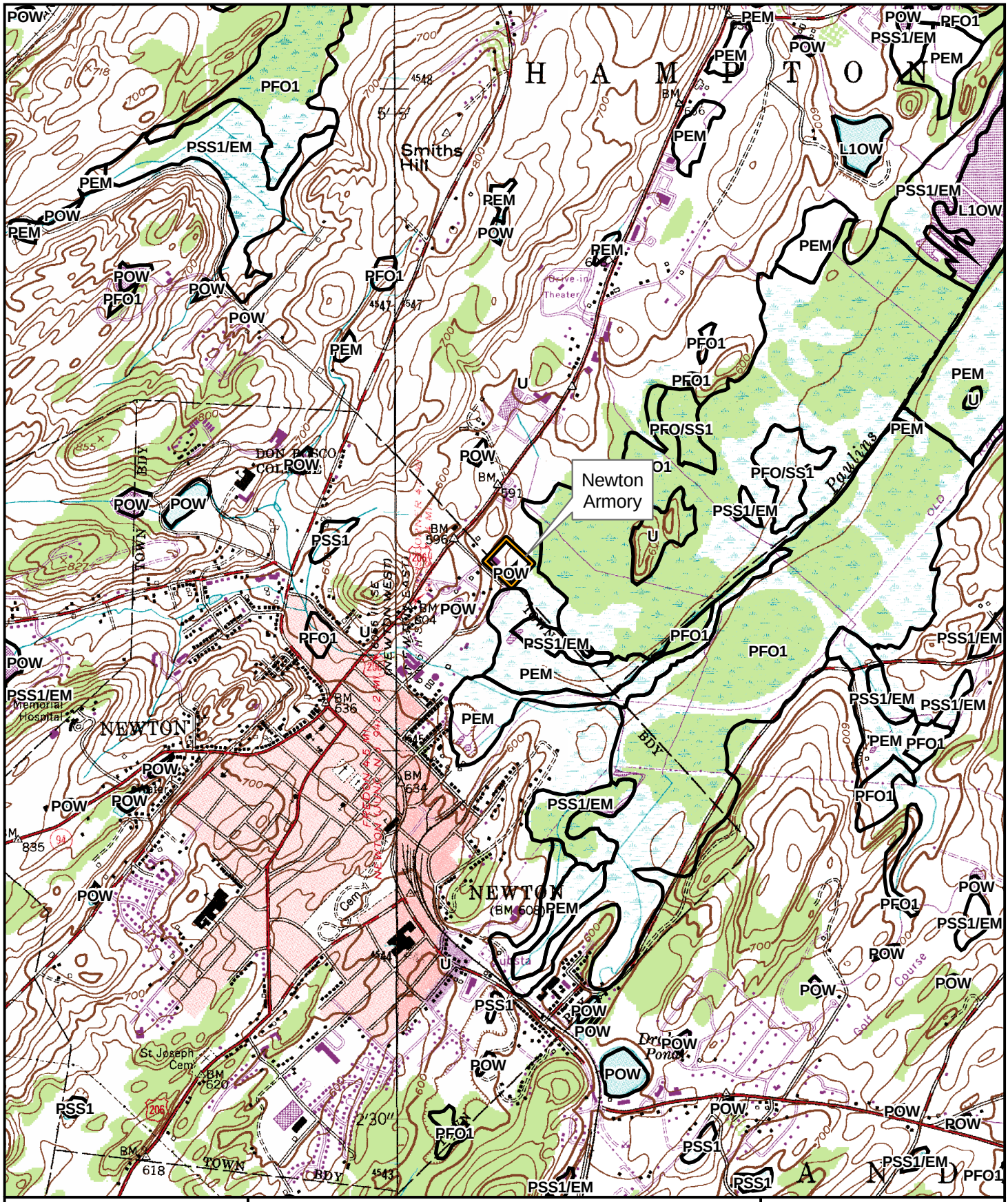
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 424902.509568 Feet
Northing: 812863.291685 Feet

*See report text for wetland description.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Newton Armory
Town of Newton,
Sussex Co., NJ

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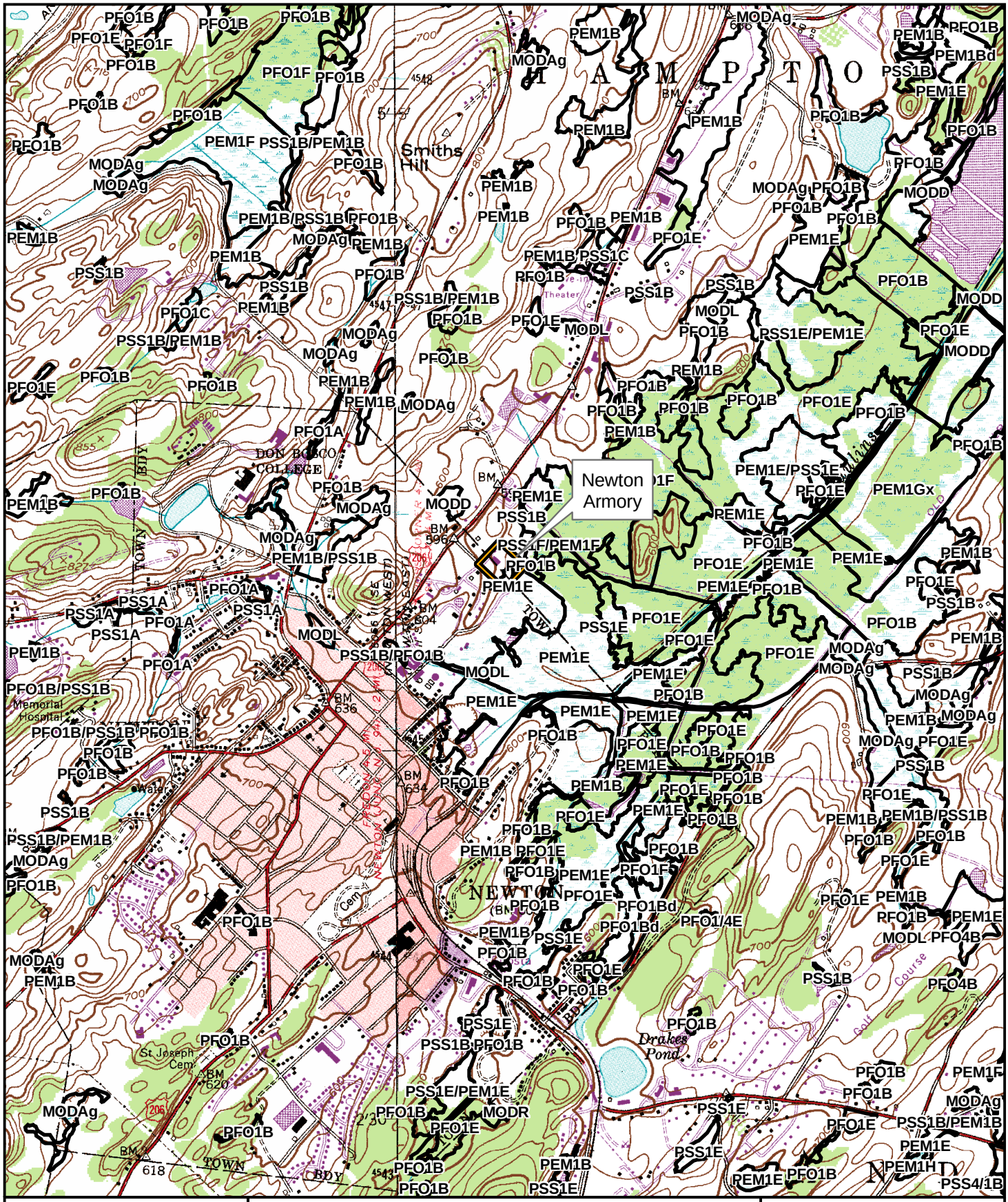
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462




## Legend

- Installation Area
- NJDEP Wetland

NJ State Plane Coordinates:
Easting: 424902.509568 Feet
Northing: 812863.291685 Feet

*See report text for wetland description.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Newton Armory
Town of Newton,
Sussex Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 424902.509568 Feet
Northing: 812863.291685 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Newton Armory
Town of Newton,
Sussex Co., NJ

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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 424902.509568 Feet
Northing: 812863.291685 Feet

1:1,231

Figure 5
Wetlands Location Map
Newton Armory
Town of Newton,
Sussex Co., NJ

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Plymouth Meeting, PA 19462

# 18.0 PICATINNY FMS

This section of the report presents the results of the wetlands delineation for the Picatinny FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 18.1 Site Location

The Picatinny FMS installation is an approximately 6271.8-acre parcel designated as Block 7001, Lot 1 in Rockaway Township, Morris County, New Jersey (**Figure 1**). It is located within the boundaries of the Picatinny Arsenal, south of Lake Denmark and the Conrail rail line that runs along the south-eastern boundary of the lake. The NJ State Plane Coordinates for the site are East 484810.095014 feet and North 775013.449846 feet. The site is located in the Highlands physiographic section of New Jersey, in the Rockaway River watershed of Watershed Management Area 6 (WMA 6; Upper Passaic, Whippany, and Rockaway).

The site is roughly a rectangle-shaped parcel bound to the northwest, north, and northeast by undeveloped land, to the southeast by developed government military land, and to the southwest by the paved access road. The surrounding land use is rural and government-related. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the southwest, south, and southeast portions of the property, whereas the naturalized areas are generally in the northern corner. A description of these areas is presented in Section 18.2.

## 18.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 18.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated on a topographic mound at an elevation between 870 and 900 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Lake Denmark which is located approximately 400 feet to the north of the site; however, since the site is situated on a mound, net drainage is to all areas downslope of the mound.

### 18.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on the property (**Figure 3A**). The nearest mapped wetland is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located immediately adjacent to the eastern property corner. This PFO1 wetland is associated with Lake Denmark.

### 18.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site area indicates no wetland communities to be mapped on the site; however, a deciduous wooded wetland is mapped to the east of the site, roughly coincident with the NWI's PFO1 community (**Figure 3B**).

### 18.2.4 USDA Soils

A review of the USDA soils GIS data indicate the site to be underlain by the following soil types (**Figure 4**):

- Rockaway very stony sandy loam, 3 to 15 percent slopes (RobCb) – Mapped to be the dominant soil type on the site.
- Rockaway extremely stony sandy loam, 15 to 25 percent slopes (RkgBc) – Mapped to occur along a small portion of the northwest property boundary and at the northeast property corner.

Neither of these soil types is listed by the USDA as a hydric soil (USDA 1995).

## 18.3 Results of the Field Assessment

As of September 2005, the Picatinny FMS installation was composed of the following five community types: successional field, late-stage scrub-shrub upland, deciduous woods, mowed lawn, and developed land. No wetland areas were identified on the site, and with the exception of the northeast corner of the site, within 150 feet of the site boundaries (**Figure 5**). Each of these five community types is described below.

An early- to late-stage successional field community occupies the western portion of the site. Portions of this community appeared to be periodically mowed. The south-western side of this community is in an earlier successional stage than areas to the northeast. This earlier stage was dominated by little bluestem (*Schizachyrium scoparium*, FACU-) and autumn olive (*Elaeagnus umbellatum*, NL) seedlings. Areas to the northeast are also dominated by little bluestem (FACU-) and autumn olive (NL) seedlings, but also contained abundant goldenrod (*Solidago* sp., NA), bush clover (*Lespedeza* sp., NA), downy brome (*Bromus tectorum*, NL), prickly dewberry (*Rubus flagellaris*, NL), and wild carrot (*Daucus carota*, NL). A representative soil boring collected from a low-lying area typically exhibits a single-horizon profile of dark yellowish-brown (10YR 4/6) silt loam. No portions of this community were identified as wetland.

The above successional field community exhibits progressively advanced stages of vegetative succession towards the interior of the site, at which point it is more accurately described as a late-stage scrub-shrub upland. These areas are also higher in elevation relative to the early-stage successional field community. This scrub-shrub community is dominated by gray birch (*Betula populifolia*, FAC) and quaking aspen (*Populus tremuloides*, FACU), but also contains abundant staghorn sumac (*Rhus typhina*, NL) and autumn olive (NL). No portions of this community were identified as wetland.

A deciduous woods community is present along the site boundaries and continues off-site as large, expansive tracts of deciduous forest. The species assemblage is mixed in this

community and included staghorn sumac (NL), gray birch (FAC), black birch (*Betula lenta*, FACU), scrub oak (*Quercus ilicifolia*, NL), multiflora rose (*Rosa multiflora*, FACU), Allegheny blackberry (*Rubus allegheniensis*, FACU), prickly dewberry (NL), grape (*Vitis* sp., NA), and sweetfern (*Comptonia peregrine*, NL). No portions of this community were identified as wetland.

Access was restricted to the northeast portion of the site where potential off-site wetland areas may occur. Off-site wetlands are depicted on both the NWI map and the NJDEP freshwater wetlands GIS data. A visual examination of these off-site areas from on-site vantage points using binoculars did not reveal any overt or obvious indications of nearby wetlands.

The mowed lawn and developed land communities are generally located in the southern portion of the property. Drainage from these areas is generally to the north. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species. One particular linear-shaped, low-lying area adjacent to a paved parking lot was investigated further for its potential to exhibit wetland characteristics. This low-lying area was dominated by dock-leaf smartweed (*Polygonum lapathifolium*, FACW+) and little bluestem (FACU-). An examination of the soils in this area exhibited a single-horizon profile of dark yellowish-brown (10YR 4/6) silt loam. Based on these findings, this area was not considered to be a wetland.

## 18.4 Conclusion

The results of the wetlands delineation conducted for the Picatinny FMS installation reveal no wetlands to be present on the site. The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Picatinny FMS

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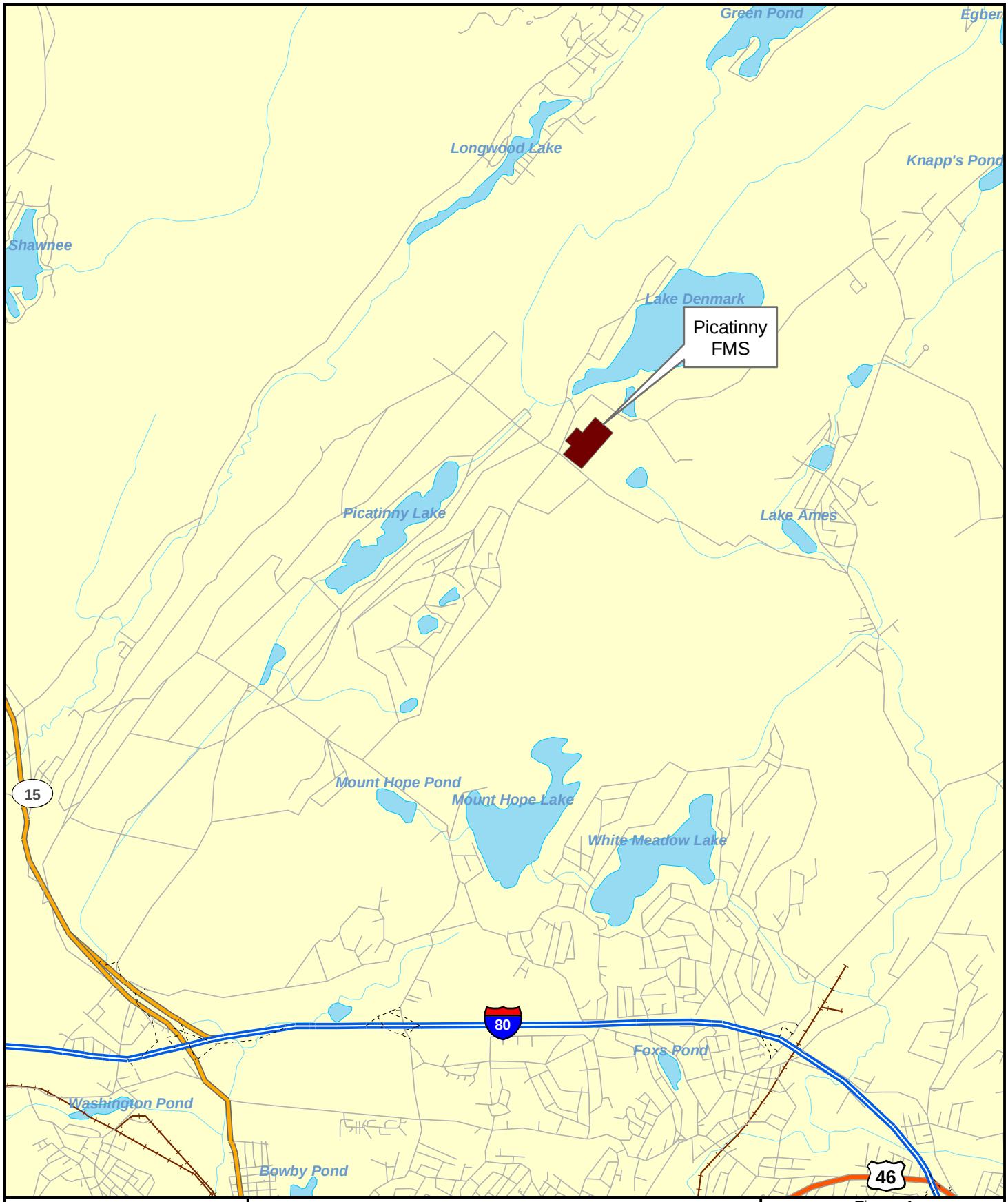




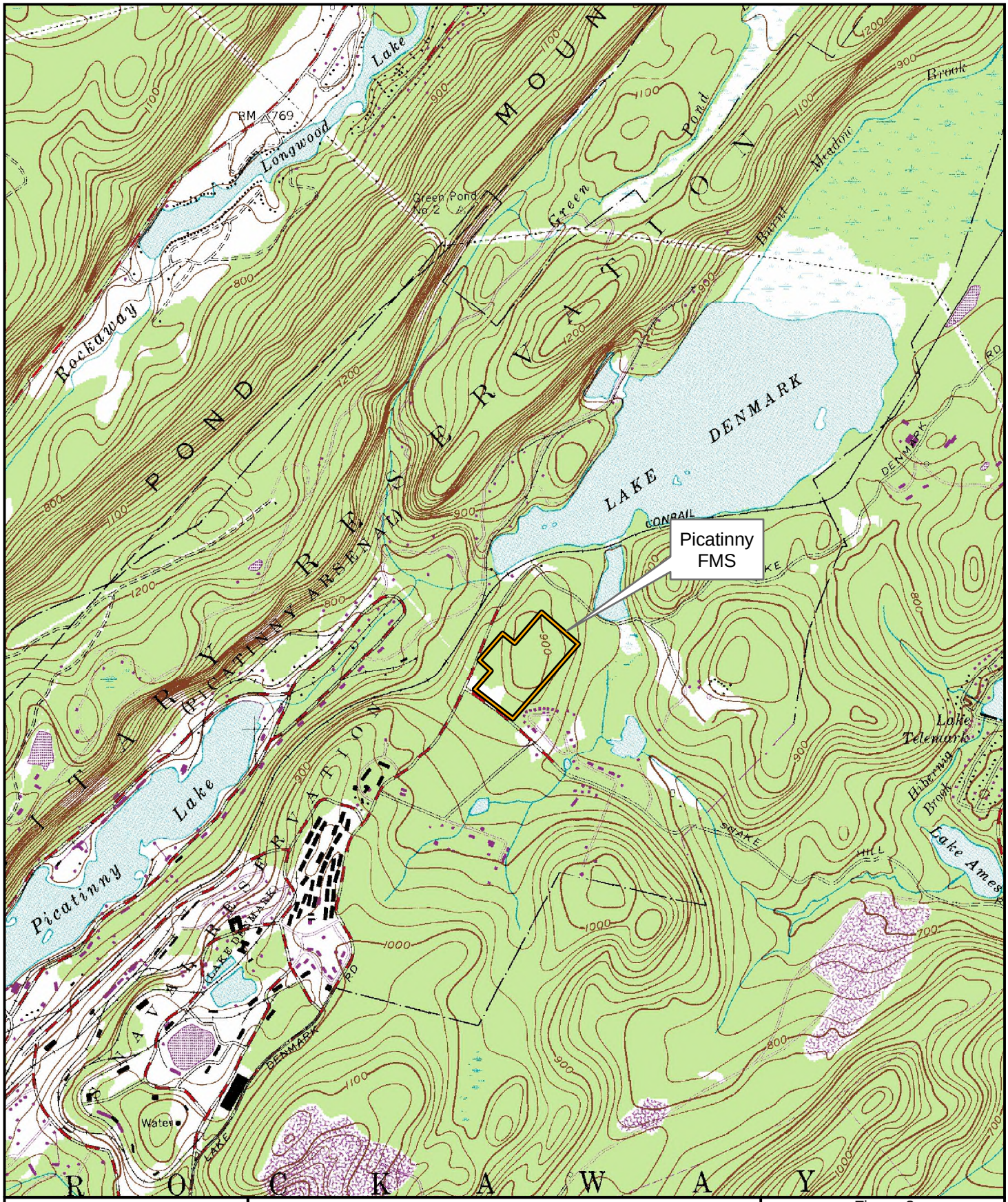

**Legend**

- Installation Area
- Limited Access
- Highway
- Major
- Local
- Minor
- Ramp
- Other

1:50,000

Figure 1
Site Location Map
Picatinny FMS
Rockaway Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJ State Plane Coordinates:
Easting: 484810.095014 Feet
Northing: 775013.449846 Feet

1:24,000

Figure 2
USGS Topographic Map
Picatinny FMS
Rockaway Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

NWI Wetland

Installation Area

NJ State Plane Coordinates:
Easting: 484810.095014 Feet
Northing: 775013.449846 Feet

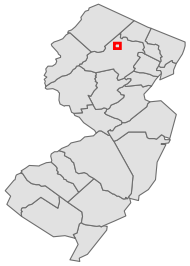
*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Picatinny FMS
Rockaway Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462



**Legend**

Installation Area

NJDEP Wetland

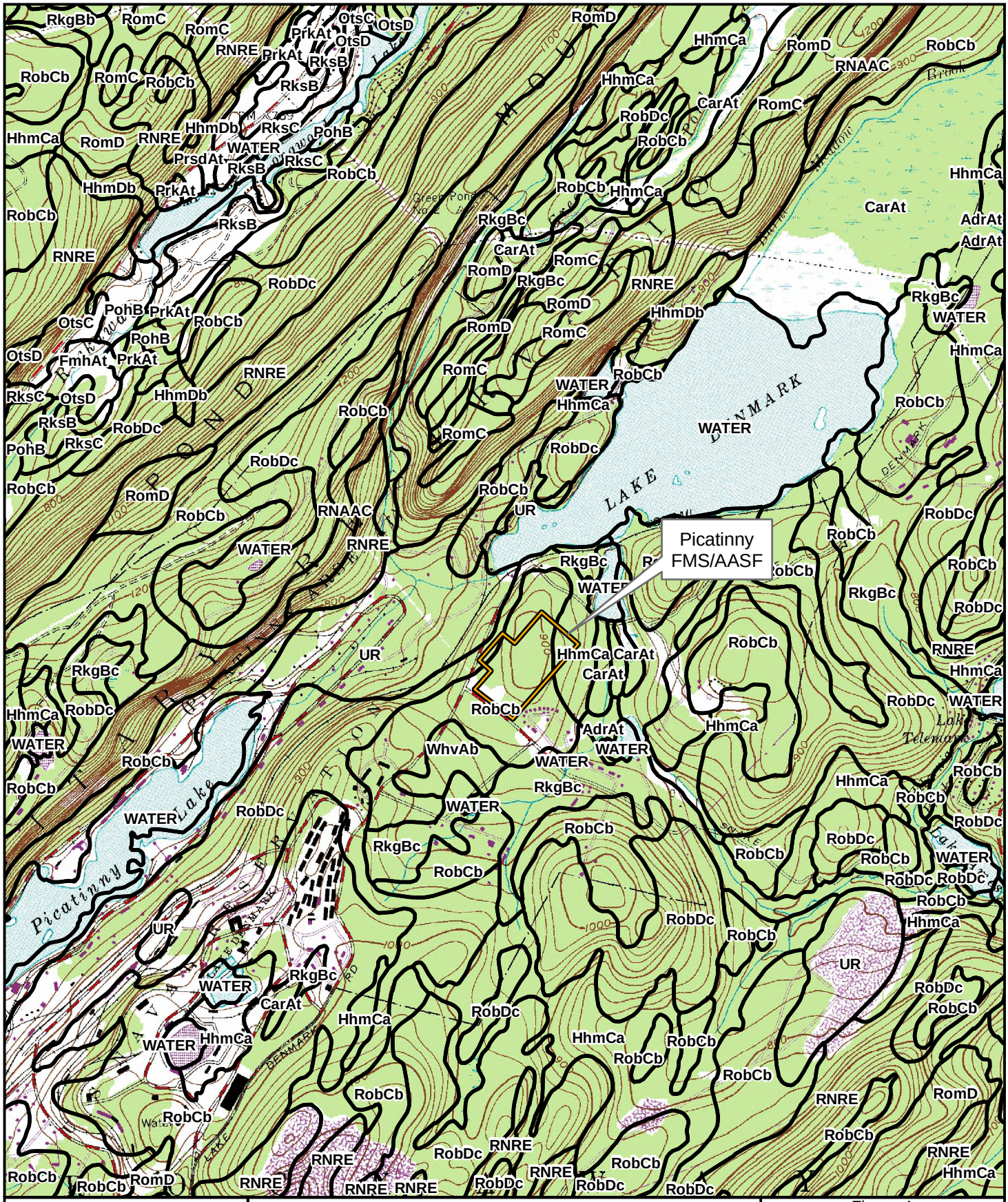
NJ State Plane Coordinates:
Easting: 484810.095014 Feet
Northing: 775013.449846 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Picatinny FMS
Rockaway Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

USDA Soils

Installation Area

NJ State Plane Coordinates:
Easting: 484810.095014 Feet
Northing: 775013.449846 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Picatinny FMS/AAFS
Rockaway Twp.,
Morris Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Soil Boring

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 484810.095014 Feet
Northing: 775013.449846 Feet

1:2,587

Figure 5
Wetlands Location Map
Picatinny FMS
Rockaway Twp.,
Morris Co., NJ

amec
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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462

# 19.0 PITMAN ARMORY

This section of the report presents the results of the wetlands delineation for the Pitman Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 19.1 Site Location

The Pitman Armory installation is an approximately 7-acre parcel designated as Block 166, Lot 1 in Washington Township, Gloucester County, New Jersey (**Figure 1**). It is located on the southbound side (west) of State Route 47, also known as Delsea Drive, north of the Borough of Pitman. The NJ State Plane Coordinates for the site are East 318771.635027 feet and 326886.441699 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Maurice River watershed of Watershed Management Area 17 (WMA 17; Maurice, Salem, and Cohansey).

The site is roughly a trapezoid-shaped parcel bound to the north and west by residential properties, to the south by undeveloped land, and to the east by Route 47. The surrounding land use is mixed rural, residential, and commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northern portion of the property, whereas the naturalized areas are generally in the south. A description of these areas is presented in Section 19.2.

## 19.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 19.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 125 and 175 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Mantua Creek. At its closest point, Mantua Creek is located approximately 1,200 feet to the northeast of the site, across Delsea Drive. Net drainage on the site is to the east, towards Mantua Creek.

### 19.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped wetland is a palustrine, forested, scrub-shrub, broad-leaved, deciduous community (PSS1) located approximately 1,000 feet to the northeast of the site. This PSS1 wetland is associated with the riparian and floodplain areas for Mantua Creek.

### 19.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site area indicates the presence of a deciduous wooded wetland community to be mapped in the central and south-eastern portions of the site (**Figure 3B**). This community is not depicted on the NWI map.

### 19.2.4 USDA Soils

A review of the USDA soils GIS data indicate the site to be underlain by the following soil types (**Figure 4**):

- Aura-Urban Land Complex (AvuC) – Mapped to be the dominant soil type on the site.
- Urban Land – Aura Complex, 0 to 5 percent slopes (USAURB) – Mapped to occur in the northwest portion of the site, and along a portion of the northern site boundary.

Neither of these soil types is listed by the USDA as a hydric soil (USDA 1995).

## 19.3 Results of the Field Assessment

As of October 2005, the Pitman Armory installation was composed of the following five community types: open water, forested deciduous wetland, deciduous woods, mowed lawn, and developed land. The wetlands identified on the site were designated as Wetland Series A and included the open water and forested deciduous wetland communities (**Figure 5**). Each of these five community types is described below.

The open water community is an intermittent stream channel that bisects a portion of the site. It originates near the western property boundary as a subtle linear depression within the deciduous woods community, and then progressively develops distinct bed and banks farther downgradient, to the east. The stream leaves the site at a concrete pipe-culvert beneath Delsea Drive. A partially-obscured culvert and headwall leading to this stream are also located near the center of the site. At the time of the site visit, surface water was present only at the downgradient end of the stream. This community was designated, in part, as Wetland Series A. At the up-gradient end of the stream, this wetlands boundary is generally coincident with the top-of-bank, whereas farther downstream, a forested deciduous wetland community (described below) intermittently occupies areas adjacent to the stream.

The forested deciduous wetland community is generally associated with the down-gradient portion of the aforementioned stream. This mid-stage community was mixed in its assemblage and included species such as red maple (*Acer rubrum*, FAC), black gum (*Nyssa sylvatica*, FAC), pin oak (*Quercus palustris*, FACW), black walnut (*Juglans cinerea*, FACU), black cherry (*Prunus serotina*, FACU), and American elm (*Ulmus americana*, FACW-) in the canopy and sapling layers; southern arrowwood (*Viburnum dentatum*, FAC) in the shrub layer; poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*, FAC-), and common greenbrier (*Smilax rotundifolia*, FAC) in the vine layer; and sensitive fern (*Onoclea sensibilis*, FACW) in the ground layer. A representative soil boring collected from this community typically exhibits a surface horizon of dark brown (10YR 3/3) silt loam, underlain by an olive-brown (2.5Y 4/4) silt loam that exhibits mottling with depth. The mottling typically occurs around seven inches below the ground surface as distinct, strong brown (7.5YR 4/6)

mottles averaging 3 percent in frequency. The lower subsoil is typically a reddish-brown (2.5Y 5/4) loam with distinct, strong brown (7.5YR 4/6) mottles at an average frequency of 10 percent. This community, along with the open water community, was designated as Wetland Series A.

A deciduous woods community occupies the relatively higher elevations on the site and generally surrounds Wetland Series A. This community is dominated by black walnut (FACU), black cherry (FACU), and shagbark hickory (*Carya ovata*, FACU) in the canopy and sapling layers; multiflora rose (*Rosa multiflora*, FACU) in the shrub layer; Asiatic bittersweet (*Celastrus orbiculatus*, NL) in the vine layer; and no apparent ground layer.

The mowed lawn and developed land communities are generally located in the northern portion of the property. Drainage from these areas is generally to the south. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 19.4 Conclusion

The results of the wetlands delineation conducted for the Pitman Armory installation reveal the presence of a stream and associated forested wetlands in the central and eastern portions of the site. This wetland system is depicted as Wetland Series A on **Figure 5**. It is anticipated that the up-gradient end of this system will be considered by the NJDEP to meet the definition of a State open water at N.J.A.C. 7:7A-1.4, with no associated freshwater wetlands transition area. The remainder of the wetland system is anticipated to be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot transition area as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the wetlands do not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

The wetland also does not meet the criteria for an ordinary resource value wetland because t it is not an isolated wetland that has 50 percent or more of the area within 50 feet of the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Pitman Armory

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Figure 1
Site Location Map
Pitman Armory
Washington Twp.,
Gloucester Co., NJ

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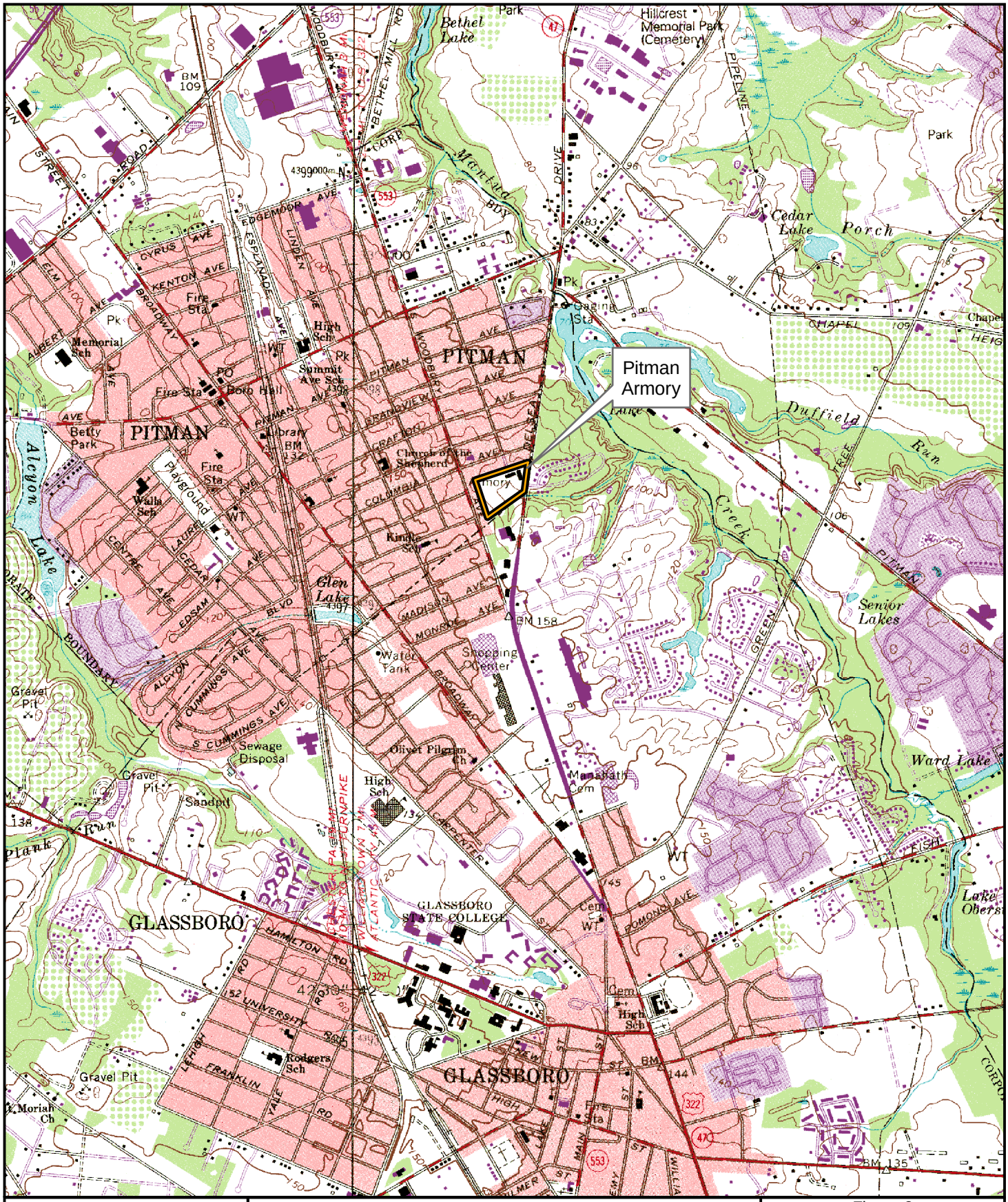
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJ State Plane Coordinates:
Easting: 318771.635027 Feet
Northing: 326886.441699 Feet

1:24,000

Figure 2
USGS Topographic Map
Pitman Armory
Washington Twp.,
Gloucester Co., NJ

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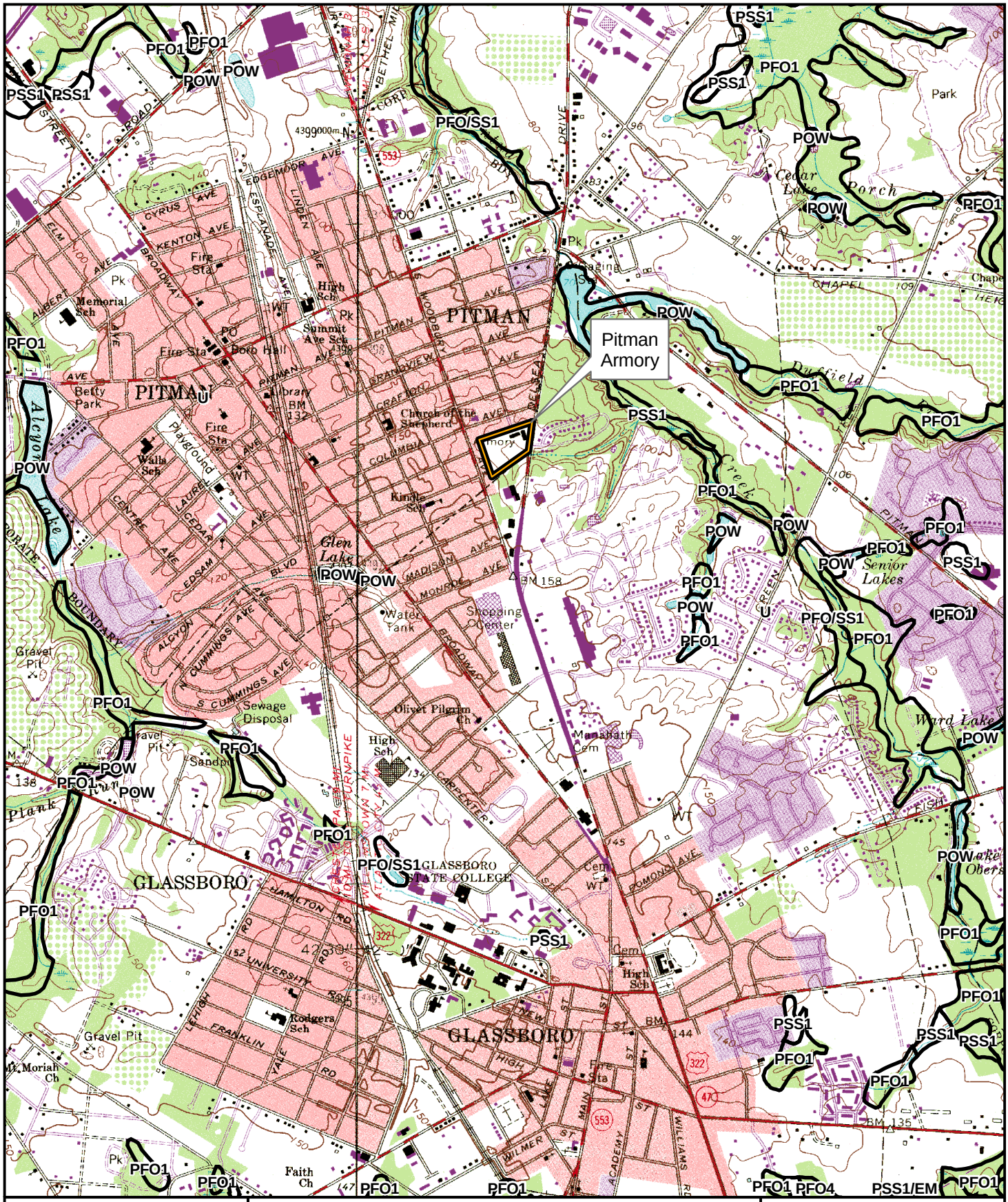
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 318771.635027 Feet
Northing: 326886.441699 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Pitman Armory
Washington Twp.,
Gloucester Co., NJ

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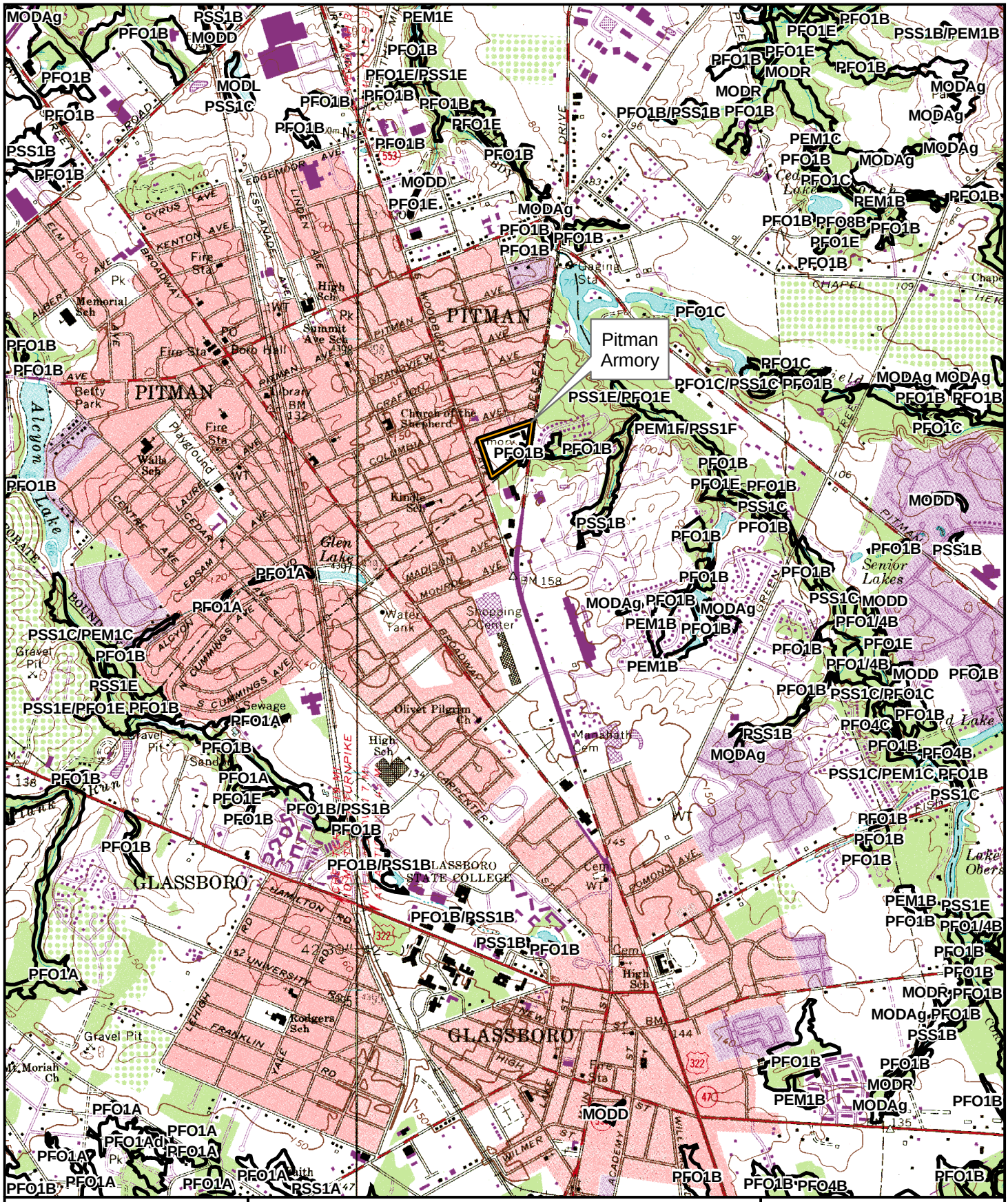
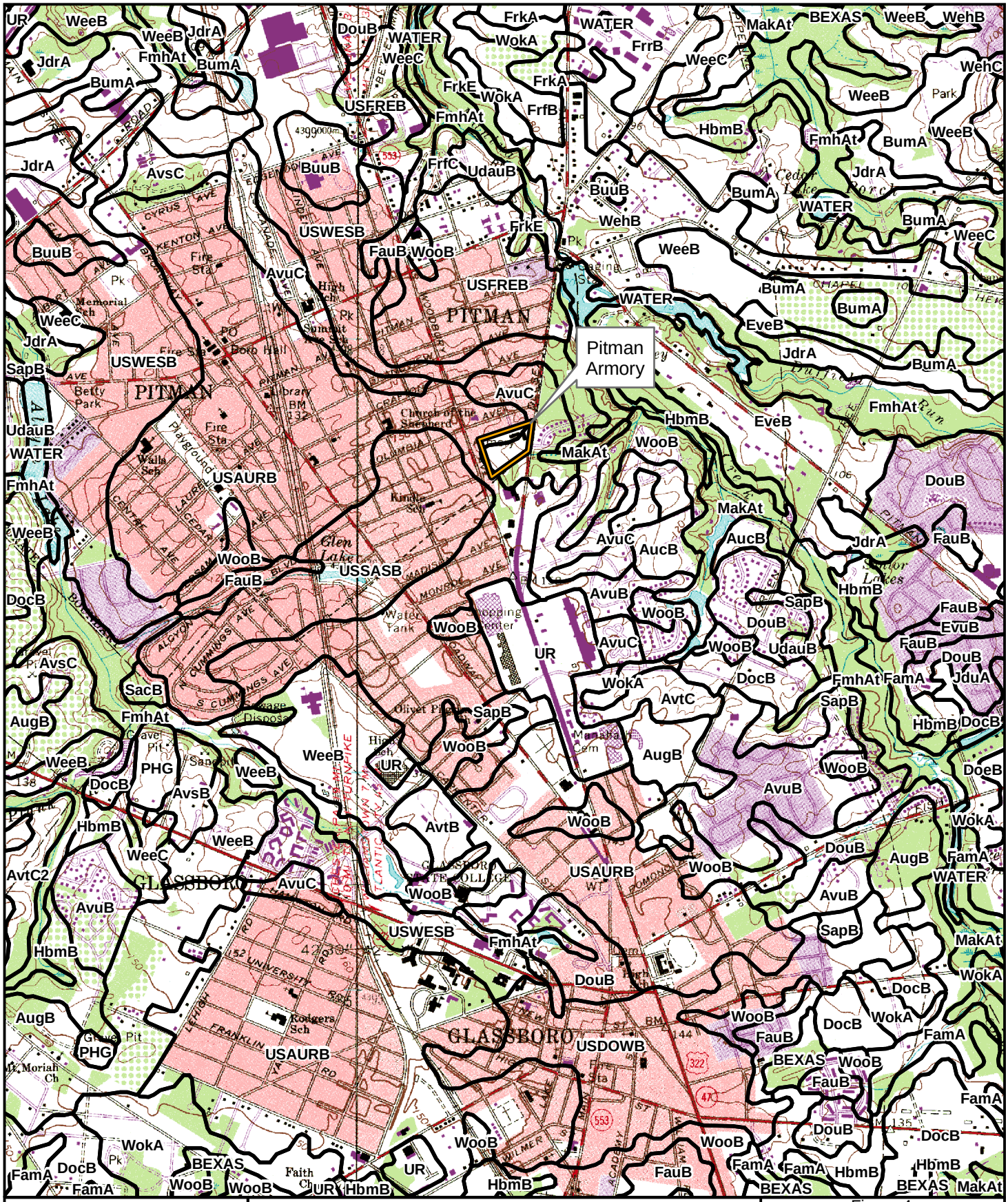

Pitman Armory
PITMAN
GLASSBORO
GLASSBORO STATE COLLEGE
Glen Lake
Alcyon Lake
Senior Lakes
Lake Obers
Gravel Pit
Fire Sta
Memorial Sch
Summit Ave Sch
High Sch
Kindle Sch
Walls Sch
Rodgers Sch
Church of the Shepherd
Olivet Pilgrim Ch
Mt. Moriah Ch
Manahath Cem
Shopping Center
Water Tank
Sewage
Boro Hall
Library
Playground
Betty Park
Pk
PO
Cem
Gagine Sta
BROADWAY
BLACKHORSE PIKE
HIGH ST
WILMER ST
ACADEMY ST
NEW ST
DELSEA DRIVE
HAMILTON RD
UNIVERSITY RD
FRANKLIN
LINCOLN
ESPLANADE AVE
EDGEMOOR AVE
CRAFTON AVE
GRANDVIEW AVE
COLUMBIA AVE
MADISON AVE
MONROE AVE
CUMMINGS AVE
CARPENTER
POMONA AVE
PENN
PIPER
CHAPEL
PFO1B
PFO1E
PFO1C
PFO1A
PFO1/4B
PFO4B
PFO4C
PFO8B
PEM1B
PEM1C
PEM1E
PEM1F/PSS1F
PSS1B
PSS1C
PSS1E
PSS1A
PSS1B/PEM1B
PSS1C/PEM1C
PSS1C/PFO1C
PSS1E/PFO1E PFO1B
PFO1E/PSS1E
PFO1B/PSS1B
PFO1C/PSS1C
PFO1B/PSS1B
MODAg
MODD
MODL
MODR
PSS1C
PFO1A
PFO1E
PFO1B/PSS1B
PFO1B/PSS1B
PFO1B/PSS1B






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 318771.635027 Feet
Northing: 326886.441699 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Pitman Armory
Washington Twp.,
Gloucester Co., NJ

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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 318771.635027 Feet
Northing: 326886.441699 Feet

1:1,147

Figure 5
Wetlands Location Map
Pitman Armory
Washington Twp.,
Gloucester Co., NJ

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# 20.0 PRINCETON WAREHOUSE

This section of the report presents the results of the wetlands delineation for the Princeton Warehouse installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 20.1 Site Location

The Princeton Warehouse installation is an 8.10-acre parcel designated as Block 1503, Lot 10 in Princeton Township, Mercer County, New Jersey (**Figure 1**). It is located on the southbound side (west) of County Route 605, also known as River Road, north of the intersection with State Route 27. The NJ State Plane Coordinates for the site are East 457933.217401 feet and North 563246.051930 feet. The site is located in the Piedmont physiographic section of New Jersey, in the Millstone River watershed of Watershed Management Area 10 (WMA 10; Millstone).

The site is an L-shaped parcel bound to the north and south by undeveloped land, to the east by Route 605, and to the west by a water authority property. The surrounding land use is rural and residential. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northern portion of the property, whereas the naturalized areas are generally in the south, and along the northern property boundary. A description of these areas is presented in Section 20.2.

## 20.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 20.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 60 and 100 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is the Millstone River. At its closest point, the Millstone River is located approximately 900 feet to the east of the site, across River Road. Net drainage on the site is to the east, towards the river.

### 20.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetlands to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped wetland is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located approximately 300 feet to the east of the site. This PFO1 wetland is associated with the riparian and floodplain areas for the Millstone River.

### 20.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetland GIS data for the site indicates the presence of a deciduous wooded wetlands community along the western and northern site boundaries. (**Figure 3B**) This wetland is not depicted on the NWI map.

### 20.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Birdsboro soils, sandy subsoil variants, 2 to 6 percent slopes (BHRSB) – Mapped to be the dominant soil type on the site.
- Bucks silt loam, 2 to 6 percent slopes (BucB) – Mapped to occur as a narrow fringe along a portion of the western site boundary.
- Lansdale channery loam, 6 to 12 percent slopes (LbnC2) – Mapped to occur in the northwest property corner.

None of the above soil types are listed by the USDA as a hydric soil (USDA 1995).

### 20.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for one state-listed herptile species and three state-listed bird species to be present or suitable habitat for these species to be present on the site. The results of Phase I and Phase II surveys indicate no documented specimens or suitable habitat for these species to be present on the site.

## 20.3 Results of the Field Assessment

As of October 2005, the Princeton Warehouse installation was composed of the following six distinct community types: open water, forested deciduous wetland, emergent wetland, deciduous woods, mowed lawn, and developed land. The wetlands identified and delineated on the site were designated as Wetland Series A which includes the open water, forested deciduous wetland, and emergent wetland communities (**Figure 5**). Each of the six community types are described below.

The open water community includes a number of drainage features that range from subtle, linear depressions to stream channels with distinct bed and banks. The linear depressions are typically situated higher in elevation and are found either as part of the forested deciduous wetland community or within the non-wetland, deciduous woods community. These depressions did not contain any surface water at the time of the site visit, but likely convey stormwater during rainfalls. Farther down-gradient, these depressions develop distinctive bed and banks with surface water present at the lowest elevations. These drainage features were designated, in part, as Wetland Series A. The wetland boundaries associated with these drainages varied from the top-of-bank to the surrounding forested deciduous wetland.

Forested deciduous wetland is the dominant wetland type found on this site. This mid-stage wooded community is dominated by green ash (*Fraxinus pensylvanica*, FACW), American elm (*Ulmus americana*, FACW-), and box elder (*Acer negundo*, FAC+) in the canopy and sapling layers; silky dogwood (*Cornus amomum*, FACW) and spicebush (*Lindera benzoin*, FACW-) in the shrub layer; grape (*Vitis* sp., NA), poison ivy (*Toxicodendron radicans*, FAC), and Japanese honeysuckle (*Lonicera japonica*, FAC-) in the vine layer; and grass-leaved goldenrod (*Euthamia graminifolia*, FAC), dock-leaf smartweed (*Polygonum lapathifolium*, FACW+), jumpseed (*Tovara virginiana*, FAC), Japanese stiltgrass (*Microstegium vimineum*, FAC), and false nettle (*Boehmeria cylindrica*, FACW+) in the ground layer. A representative soil boring collected from this community typically exhibits a surface horizon of grayish-brown (10YR 5/2) fine sandy loam with approximately 10 to 20 percent pore linings. Consistent refusal at an average depth of 12 to 16 inches below the ground surface is also typically encountered.

A small pocket of emergent wetland within the forested deciduous wetland community is located to the south of the parking area, just within the tree-line. This community was dominated by Japanese stiltgrass (FAC), false nettle (FACW+), grass-leaved goldenrod (FAC), and poison ivy (FAC). Soil borings collected from this community were nearly identical to those collected from the surrounding forested deciduous wetland.

The deciduous woods community typically occupies the higher elevations relative to the forested deciduous wetland. This community is dominated by white ash (*Fraxinus americana*, FACU) and red oak (*Quercus rubra*, FACU-) in the canopy and sapling layers; Tartarian honeysuckle (*Lonicera tatarica*, FACU), multiflora rose (*Rosa multiflora*, FACU) in the shrub layer; Asiatic bittersweet (*Celastrus orbiculatus*, NL) and Allegheny blackberry (*Rubus allegheniensis*, FACU-) in the vine layer; and a mixed ground layer. An additional distinct deciduous woods pocket is located in the northern portion of the site, dominated by eastern white pine (*Pinus strobus*, FACU).

The mowed lawn and developed land communities are generally located in the northern portion of the property. Drainage from these areas is generally to the south, although some drainage to the north is also apparent. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 20.4 Conclusion

The results of the wetlands delineation conducted for the Princeton Warehouse installation reveal a forested wetland complex that occupies various areas within the undeveloped portions of the site. This wetland, depicted as Wetland Series A on **Figure 5**, exhibits a somewhat sinuous boundary and includes a stream channel and roadside drainage ditch. It is anticipated that the stream channel portion of this wetland, located in the northern portion of the site, will be considered by the NJDEP to meet the definition of a State open water at N.J.A.C. 7:7A-1.4, with no associated freshwater wetlands transition area (i.e. buffer). It is also anticipated that the drainage ditch portion of this wetland, located along the southeast property boundary, will be considered by the NJDEP to meet the definition of a ditch at N.J.A.C. 7:7A-1.4, and thus be classified as an ordinary-resource value wetland with no associated freshwater wetlands transition area. The remainder of the wetland system is anticipated to be classified by the

NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot transition area as per Subchapter 2 of N.J.A.C. 7:7A.

This conclusion was reached because the wetlands do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). This conclusion is further supported by the findings of the April 2007 Rare Species Survey Report.

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Princeton Warehouse

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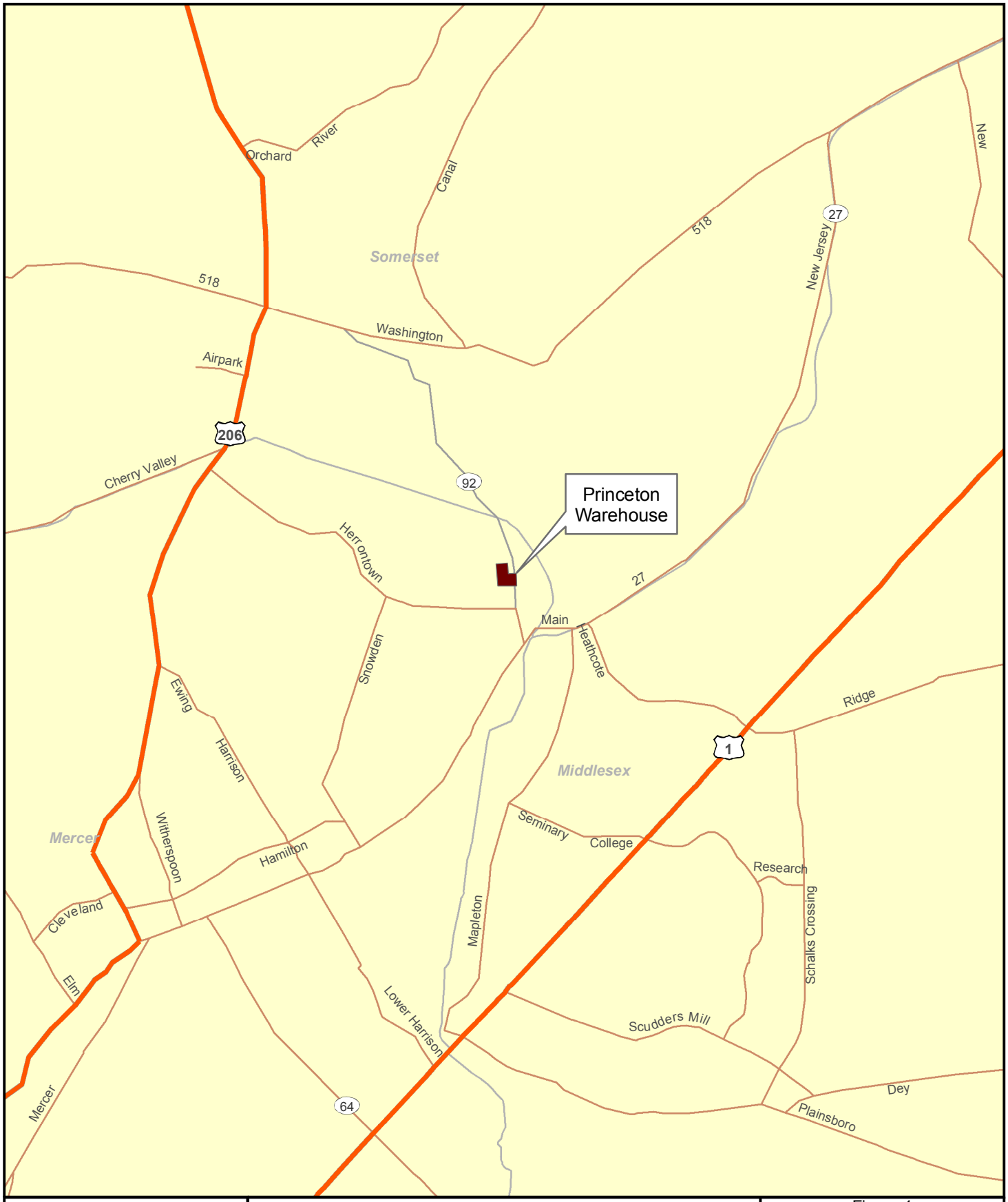




**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Princeton Warehouse
Princeton Twp.,
Mercer Co., NJ

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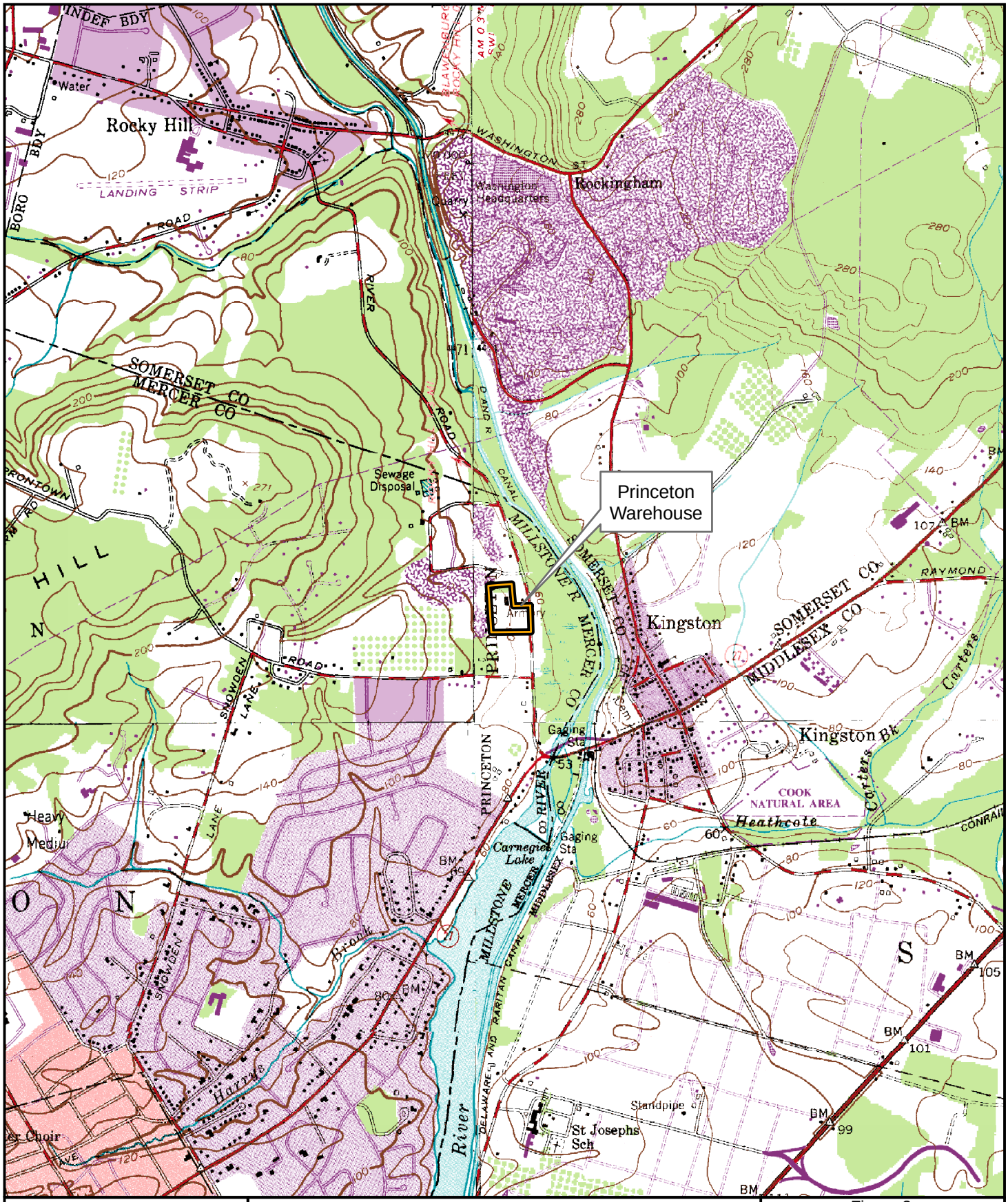
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 457933.217401 Feet
Northing: 563246.051930 Feet

1:24,000

Figure 2
USGS Topographic Map
Princeton Warehouse
Princeton Twp.,
Mercer Co., NJ

amec
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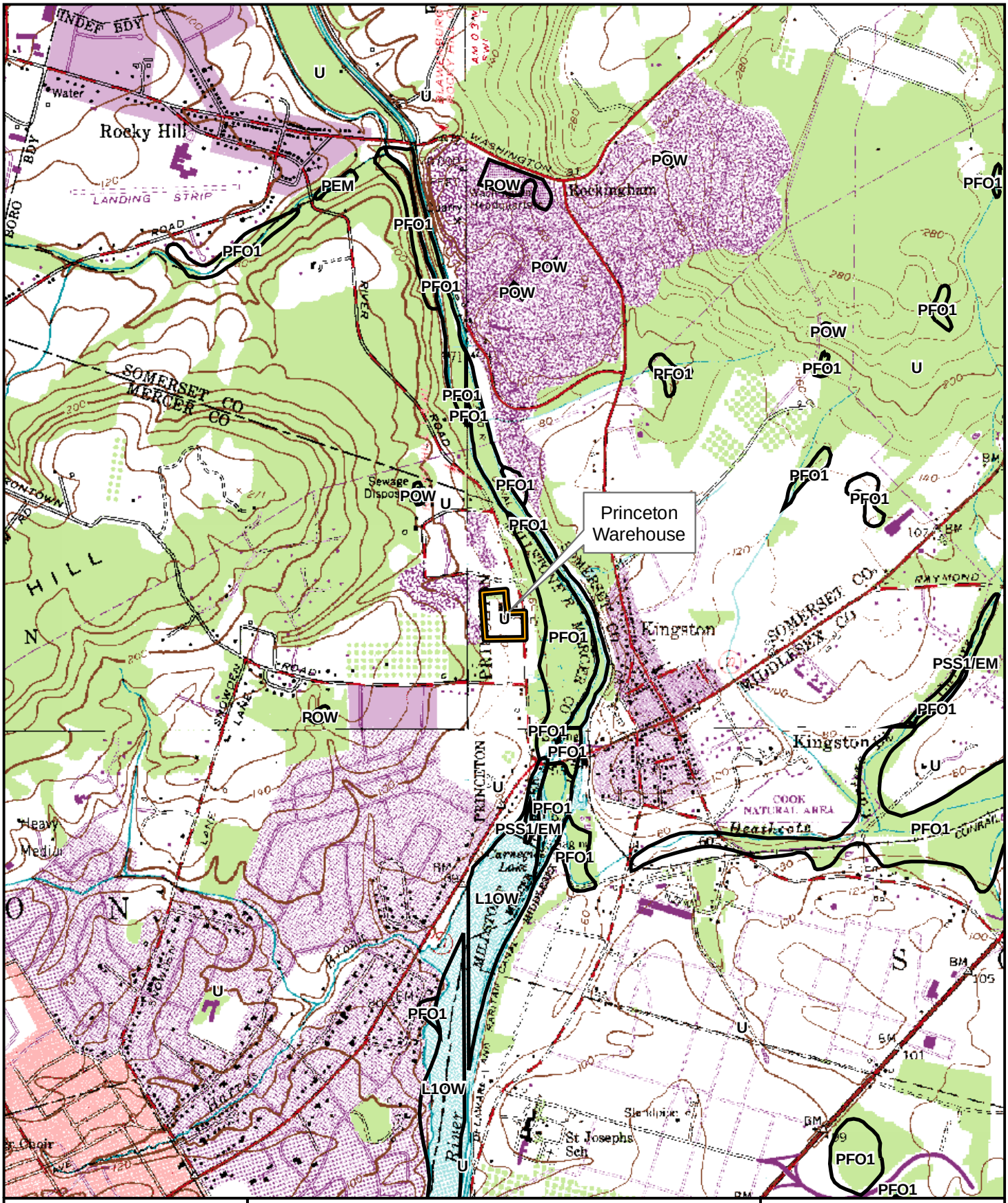
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 457933.217401 Feet
Northing: 563246.051930 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Princeton Warehouse
Princeton Twp.,
Mercer Co., NJ

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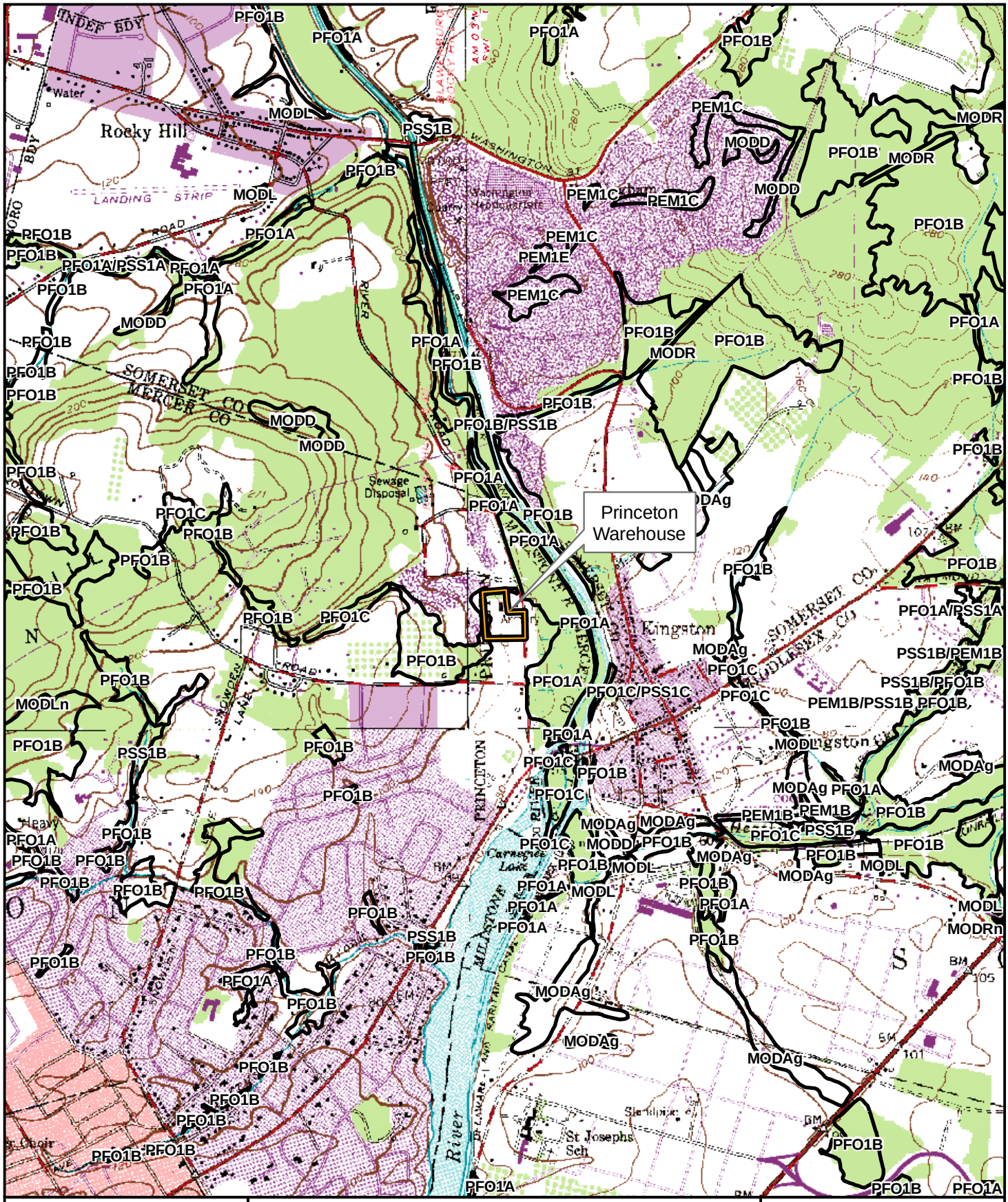
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 457933.217401 Feet
Northing: 563246.051930 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Princeton Warehouse
Princeton Twp.,
Mercer Co., NJ

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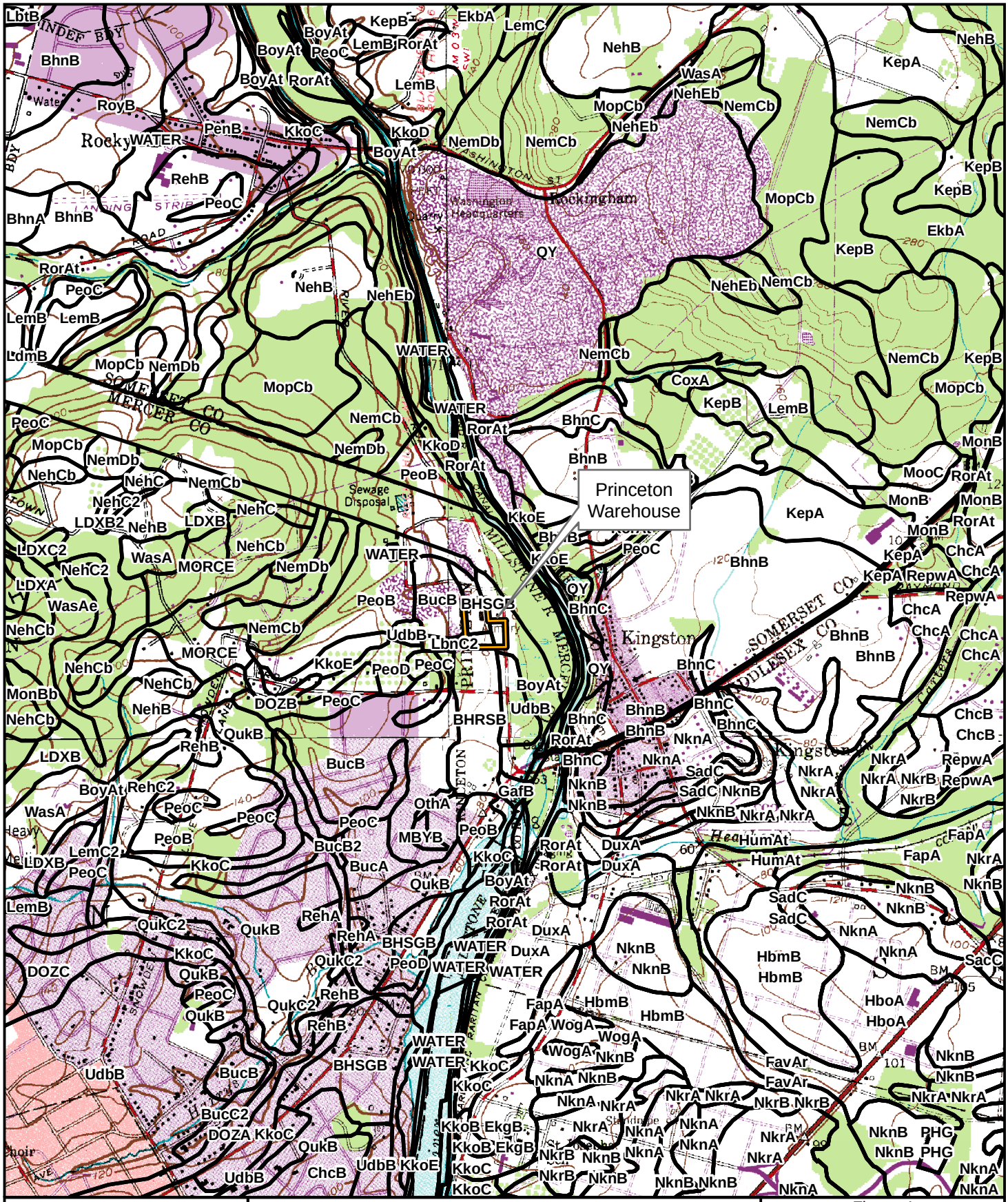
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates
Easting: 457933.217401 Feet
Northing: 563246.051930 Feet

* See report text for soil descriptions.

1:24,001

Figure 4
USDA Soils Map
Princeton Warehouse
Princeton Twp.,
Mercer Co., NJ

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Plymouth Meeting, PA 19462






***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

50' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 457933.217401 Feet
Northing: 563246.051930 Feet

1:1,565

Figure 5
Wetlands Location Map
Princeton Warehouse
Princeton Twp.,
Mercer Co., NJ

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Plymouth Meeting, PA 19462

# 21.0 SEA GIRT NGTC

This section of the report presents the results of the wetlands delineation for the Sea Girt NGTC installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 21.1 Site Location

The Sea Girt NGTC installation is a 164.35-acre parcel designated as Block 85, Lot 1 in Sea Girt Borough, Monmouth County, New Jersey (**Figure 1**). It is located on the eastbound side (south) of Sea Girt Avenue, east of State Route 71. The NJ State Plane Coordinates for the site are East 621524.851471 feet and North 470331.008063 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Atlantic Ocean watershed of Watershed Management Area 12 (WMA 12; Monmouth).

The site is a waterfront, rectangle-shaped parcel bound to the north by Sea Girt Avenue, to the east by the Atlantic Ocean, to the south by a tidal water body (Stockton Lake), and to the west by a NJ Transit rail line. The surrounding land use is residential and commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the eastern, southern, and western portions of the property, whereas the naturalized areas are generally in the central and northern portion of the property, although most of these areas are maintained lawn. A description of these areas is presented in Section 21.2.

## 21.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and an existing wetlands map conducted for the facility from a prior consultant. The results of this review are presented below.

### 21.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 10 and 15 feet above mean sea level (MSL) (**Figure 2**). As described above, the site is bound to the east by the Atlantic Ocean and to the south by Stockton Lake. The site is a waterfront property with net drainage to the east, towards the Atlantic Ocean.

### 21.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no mapped wetlands to occur on the site (**Figure 3A**). The nearest mapped wetlands are as follows:

- M1OW – Marine, subtidal, open water/unknown bottom, mapped to be coincident with the tidally-influenced Stockton Lake which forms the southern site boundary.

- M2BB **–** Marine, intertidal beach/bar, mapped to be coincident with the shoreline of the Atlantic Ocean, which forms the eastern site boundary.

### 21.2.3 NJDEP Freshwater Wetlands

According to the NJDEP GIS database (**Figure 3B**), the following three wetland communities are mapped on the site, and one additional community is mapped adjacent to the site:

- Deciduous scrub/shrub wetland – Mapped to occur in the western corner of the site. This community is not depicted on the NWI map.
- Managed wetlands (Modified) – Mapped to occur in the southeast portion of the site. This community is not depicted on the NWI map.
- Not Applicable (non-freshwater wetland) – Mapped to be coincident with (1) the shoreline of the Atlantic Ocean, along the eastern site boundary, and (2) the NWI's M2BB community.
- Salt marsh – Mapped to occur outside of the south-eastern site boundary. This community is not depicted on the NWI map.

### 21.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Downer sandy loam – Urban land complex (DouB) – Mapped to be the dominant soil type on the site.
- Udorthents – Urban land complex, 0 to 5 percent slopes (UdauB) – Mapped to occupy a portion of the eastern end of the site.
- Hooksan sand, 0 to 5 percent slopes (HorBr) – Mapped as a linear band along the eastern edge of the site.
- Humaquepts, frequently flooded (HumAt) – Mapped to occur in the southwest property corner.

Humaquepts is not considered to be an official distinct soil series, and therefore, is not listed by the USDA as a hydric soil (USDA 1995). However, it is generally understood that these deposits are hydric.

## 21.3 Results of the Field Assessment

As of August 2005, the Sea Girt NGTC installation was composed of the following seven distinct community types: open water, salt marsh, forested deciduous wetland, freshwater emergent wetland, riparian deciduous woods, mowed lawn, and developed land. The wetlands identified and delineated on the site were designated as Wetland Series A and C and includes the open water, freshwater emergent wetland, and salt marsh communities (**Figure 5**). Each of the seven community types is described below.

The open water community is the Atlantic Ocean that bounds the site to the east, and the tidally-influenced Stockton Lake which bounds the site to the south. The wetlands boundary associated with the Atlantic Ocean is the estimated High Tide Line (HTL), and the wetlands boundary associated with Stockton Lake is the limits of the bulk-headed shoreline. These open water systems, in conjunction with the forested deciduous wetland and salt marsh described below, were designated as Wetland Series A.

Two small, salt marsh communities are located at the eastern end of Stockton Lake. One community is dominated by saltmarsh cordgrass (*Spartina alterniflora*, OBL); the other by common reed (*Phragmites australis*, FACW). Access to these areas for closer examination was restricted by chain-link fencing, however, other species expected to be present within these communities are groundsel tree (*Baccharis halimifolia*, FACW), seaside goldenrod (*Solidago sempervirens*, FACW), and Asiatic bittersweet (*Celastrus orbiculatus*, NL) based on its abundance in other parts of the site. At the opposite end of Stockton Lake, a forested deciduous wetland community is located on the western portion of the site. Access to this community was also restricted by chain-link fencing, but examination of the vegetation community by binoculars revealed a mixed assemblage of box elder (*Acer negundo*, FAC+), black gum (*Nyssa sylvatica*, FAC), and black willow (*Salix nigra*, FACW+) in the canopy and sapling layers; groundsel tree (FACW) and southern arrowwood (*Viburnum dentatum*, FAC) in the shrub layer; and Japanese honeysuckle (*Lonicera japonica*, FAC-) and grape (*Vitis* sp., NA) in the vine layer.

The riparian deciduous woods community occupies the non-wetland fringe areas along the bulk-headed shoreline of Stockton Lake. This mixed community is vegetated with numerous species that are typical of frequently-disturbed areas, such as black locust (*Robinia pseudo-acacia*, FACU-), eastern cottonwood (*Populus deltoides,* FAC), white mulberry (*Morus alba*, NL), Norway maple (*Acer platanoides*, NL), winged sumac (*Rhus copallina*, NI), groundsel tree (FACW), multiflora rose (*Rosa multiflora*, FACU), Japanese honeysuckle (FAC-), Asiatic bittersweet (NL), poison ivy (*Toxicodendron radicans*, FAC), common mugwort (*Artemisia vulgaris*, NL), and Japanese knotweed (*Polygonum cuspidatum*, FACU-).

A freshwater emergent wetland is located in the south-eastern portion of the site, within a mowed lawn area. Education signage is present along the perimeter of the area. This rectangular-shaped wetland is dominated by grass-leaved goldenrod (*Euthamia graminifolia*, FAC), twig rush (*Cladium mariscoides*, OBL), spike rush (*Eleocharis* sp., NA), woolgrass (*Scirpus cyperinus*, FACW+), common three-square (*Scirpus pungens*, FACW+), yellow-nut sedge (*Cyperus esculentes*, FACW), soft rush (*Juncus effusus*, FACW+), pinkweed (*Polygonum pensylvanicum*, FACW), dock-leaf smartweed (*Polygonum lapathifolium*, FACW+), and path rush (*Juncus tenuis*, FAC-). A representative soil boring collected from this community typically exhibits a grayish-brown (10YR 5/2) to very dark grayish-brown (10YR 3/2) surface horizon of medium to fine sand, underlain by an upper subsoil of brown (10YR 4/3) to light brownish-gray (10YR 6/2) medium to fine sand with varying amounts of pore linings. The lower subsoil varies from a dark yellowish-brown (10YR 4/6) clay loam with distinct, brown (10YR 5/3) mottling averaging 20 percent in frequency, to very dark gray (10YR 3/1) medium to fine sand with no mottling. This wetland was designated as Wetland Series C.

The mowed lawn and developed land communities occupy the majority of the site area. Drainage from these areas is generally to the south, although some drainage to the north is also apparent. The mowed lawn community is dominated by a mix of typical lawn grasses such as

bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 21.4 Conclusion

The results of the wetlands delineation conducted for the Sea Girt NGTC installation reveal the presence of a tidal waterway and associated tidal and non-tidal wetlands along the southern site boundary, coincident with the northern shoreline of Stockton Lake. This wetland area is depicted as Wetland Series A on **Figure 5**. The eastern site boundary is beachfront and this tidal open water is depicted as coincident with the high tide line (HTL). It is anticipated that Wetland Series A will be designated by the NJDEP as a State open water as defined at N.J.A.C. 7:7A-1.4 and will thus possess no freshwater wetlands transition area (i.e., buffer).

An isolated emergent wetland is also located in the southeast portion of the site, depicted as Wetland Series C. It is anticipated that Wetland Series C will be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer). This conclusion was reached because this wetland does not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

This wetland also does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetlands that has 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, their respective associated transition areas, and their potential for regulation under additional CZM rules are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Sea Girt NGTC

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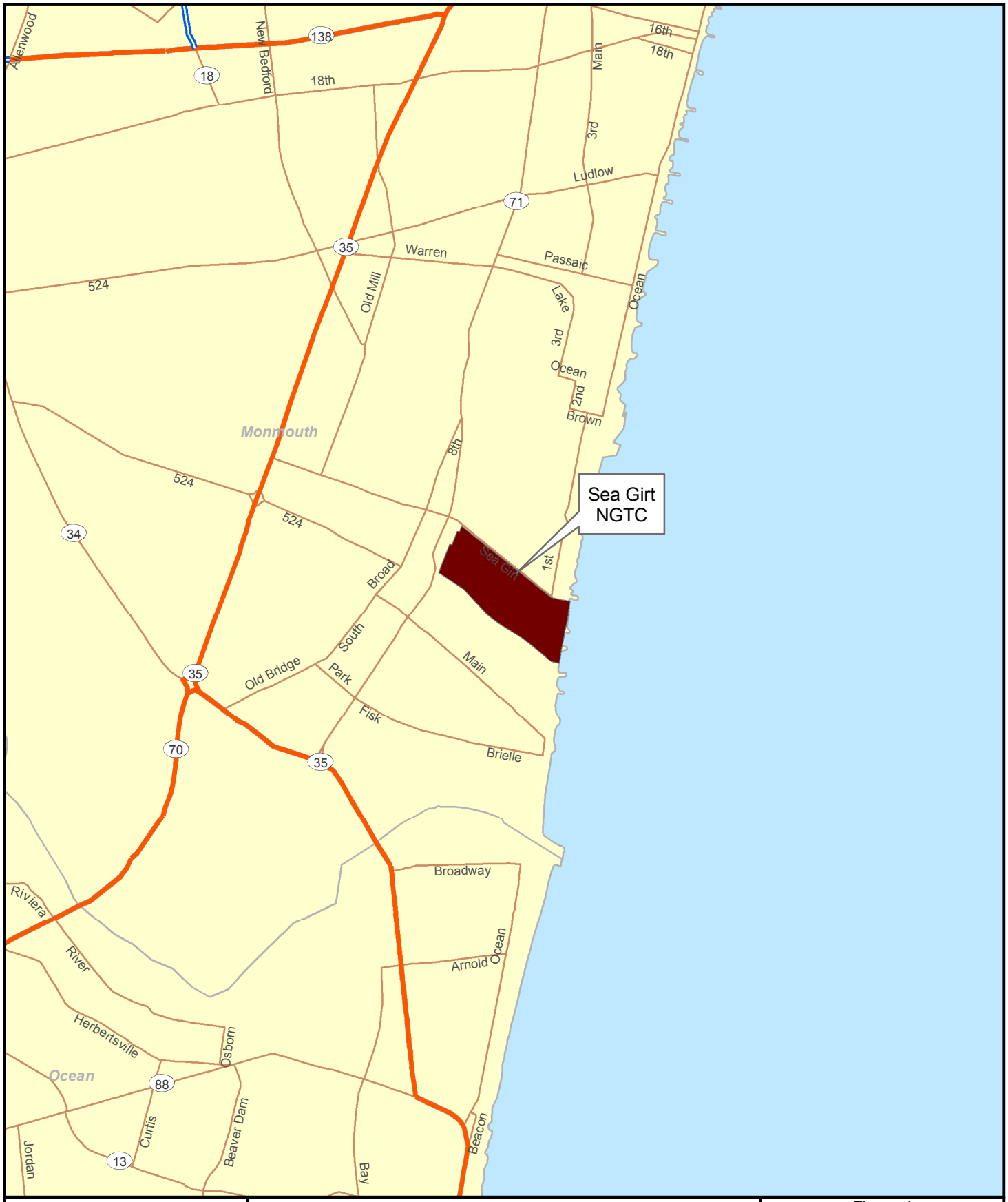




**Legend**

| | |
|---|---|
| Limited Access | Other Road |
| Highway | Ramp |
| Major Road | Ferry |
| Local Road | Pedestrian Way |
| Minor Road | Installation Area |

1:50,000

Figure 1
Site Location Map
Sea Girt NJ NGTC
Sea Girt Borough,
Monmouth Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 621524.851471 Feet
Northing: 470331.008063 Feet

1:24,000

Figure 2
USGS Topographic Map
Sea Girt NJ NGTC
Sea Girt Borough,
Monmouth Co., NJ

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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 621524.851471 Feet
Northing: 470331.008063 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Sea Girt NJ NGTC
Sea Girt Borough,
Monmouth Co., NJ

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Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 621524.851471 Feet
Northing: 470331.008063 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Sea Girt NJ NGTC
Sea Girt Borough,
Monmouth Co., NJ

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Plymouth Meeting, PA 19462






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 621524.851471 Feet
Northing: 470331.008063 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Sea Girt NJ NGTC
Sea Girt Borough,
Monmouth Co., NJ

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One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 621524.851471 Feet
Northing: 470331.008063 Feet

1:7,025

Figure 5
Wetlands Location Map
Sea Girt NJ NGTC
Sea Girt Borough,
Monmouth Co., NJ

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# 22.0 SOMERSET ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Somerset Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 22.1 Site Location

The Somerset Armory FMS installation is an approximately 5.31-acre parcel designated as Block 103, Lot 1 in Franklin Township, Somerset County, New Jersey (**Figure 1**). It is located on the eastbound side (south) of Amwell Avenue, north of State Route 27. The NJ State Plane Coordinates for the site are East 494514.019624 feet and North 601499.031763 feet. The site is located in the Piedmont physiographic section of New Jersey, in the Lower Raritan River watershed of Watershed Management Area 9 (WMA 9; Lower Raritan, South River, and Lawrence).

The site is a rectangle-shaped parcel bound to the north by Amwell Avenue, to the east by developed commercial/industrial land, to the south by residential properties, and to the west by undeveloped land. The surrounding land use is residential and commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the north-eastern, south-western, and central portions of the property, whereas the naturalized areas are generally in the north-western and south-eastern portions of the property. A description of these areas is presented in Section 22.2.

## 22.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 22.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated at approximately 130 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is an unnamed tributary to the Millstone River. At its closest point, the unnamed tributary is located approximately 2,500 feet to the southwest of the site. Net drainage on the site is to the south.

### 22.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates a palustrine, forested, broad-leaved, deciduous wetland (PFO1) to occur in the central and south-western portion of the property (**Figure 3A**). This PFO1 wetland is depicted as an isolated community. Additionally, a palustrine, forested, broad-leaved, deciduous/scrub-shrub wetland (PFO/SS1) is mapped to

occur adjacent to the eastern site boundary. This wetland is also depicted as an isolated community.

### 22.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site indicates the presence of the following two on-site wetland communities and one off-site wetland community (**Figure 3B**):

- Deciduous scrub-shrub wetland – Mapped to occur along the western and southern site boundaries. Portions of this community are roughly coincident with portions of the PFO1 community depicted on the NWI.
- Managed wetlands (Modified) – Mapped to occur in the south-eastern portion of the site. This community is not depicted on the NWI map.
- Off-site deciduous wooded wetlands – Mapped to occur adjacent to the eastern site boundary. This community is coincident with the PFO/SS1 community depicted on the NWI map.

### 22.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Royce silt loam, 2 to 6 percent slopes (RoyB) – Mapped to occur along the northern end of the site.
- Lansdowne silt loam, 0 to 2 percent slopes (LbtA) – Mapped to occur as the dominant soil type in the central portion of the site.
- Norton loam, 2 to 6 percent slopes (NotB) – Mapped to occur in the southeast corner of the site.

None of the above soil types are listed by the USDA as a hydric soil (USDA 1995).

## 22.3 Results of the Field Assessment

As of October 2005, the Somerset Armory FMS installation was composed of the following three distinct community types: deciduous woods, mowed lawn, and developed land. An off-site forested deciduous wetland community was also identified and designated as Wetland Series A (**Figure 5**). Each of these four community types is described below.

A deciduous woods community is located along the site perimeter. This community varies in width from narrow fringe areas to relatively larger wooded stands. This community is dominated by Norway maple (*Acer platanoides*, NL), sugar maple (*Acer saccharum*, FACU-), black locust (*Robinia pseudo-acacia*, FACU-), red oak (*Quercus rubra*, FACU-), sassafras (*Sassafras albidum*, FACU-), tulip poplar (*Liriodendron tulipifera*, FACU), and black cherry (*Prunus serotina*, FACU) in the canopy and sapling layers; multiflora rose (*Rosa multiflora*, FACU) in the shrub layer; poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*,

FAC-), common greenbrier (*Smilax rotundifolia*, FAC), and Allegheny blackberry (*Rubus allegheniensis*, FACU-) in the vine and ground layers.

A representative soil boring collected from this community in the northwest portion of the site typically exhibits a deep surface horizon of red (2.5YR 4/6) coarse to medium sandy loam, with refusal typically encountered at a depth of 16 inches below the ground surface. A representative soil boring collected from this community in the southern portion of the site typically exhibits a deep surface horizon of yellowish-red (5YR 4/6) medium sandy loam with refusal typically encountered at depth of 12 inches below the ground surface. A representative soil boring collected from this community in the eastern portion of the site typically exhibits a deep surface horizon of red (2.5YR 4/6) medium sandy loam with refusal typically encountered at a depth of 16 inches below the ground surface. None of these red parent material soils were considered to exhibit field indicators of hydric soils.

The mowed lawn and developed land communities occupy the majority of the site area. Drainage from these areas is generally to the northeast. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

An off-site forested deciduous wetland community is located on the adjacent property to the east of the site. This adjacent property was operating as a salvage yard at the time of the site visit, and the wetland area was located in a wooded portion along the driveway. This early-stage community was dominated by pin oak (*Quercus palustris*, FACW) in the canopy and sapling layers; multiflora rose (FACU) in the shrub layer; poison ivy (FAC) and grape (*Vitis* sp., NA) in the vine layer; and violet (*Viola* sp., NA) in the ground layer. Although not dominant, sweetgum (*Liquidambar styraciflua*, FAC) was abundant in this community. This off-site wetland was designated as Wetland Series A.

## 22.4 Conclusion

The results of the wetlands delineation conducted for the Somerset Armory FMS installation reveal no wetlands to be present on the site; however, an off-site forested deciduous wetland is located on the abutting property to the east. This off-site wetland is depicted as Wetland Series A on **Figure 5**. It is anticipated that this wetland will be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot transition area (i.e. buffer), as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the off-site wetland does not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

The off-site wetland also does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetland that has 50 percent or more of the area within 50 feet of

the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditches, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, its classification, and associated transition area, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Somerset Armory FMS

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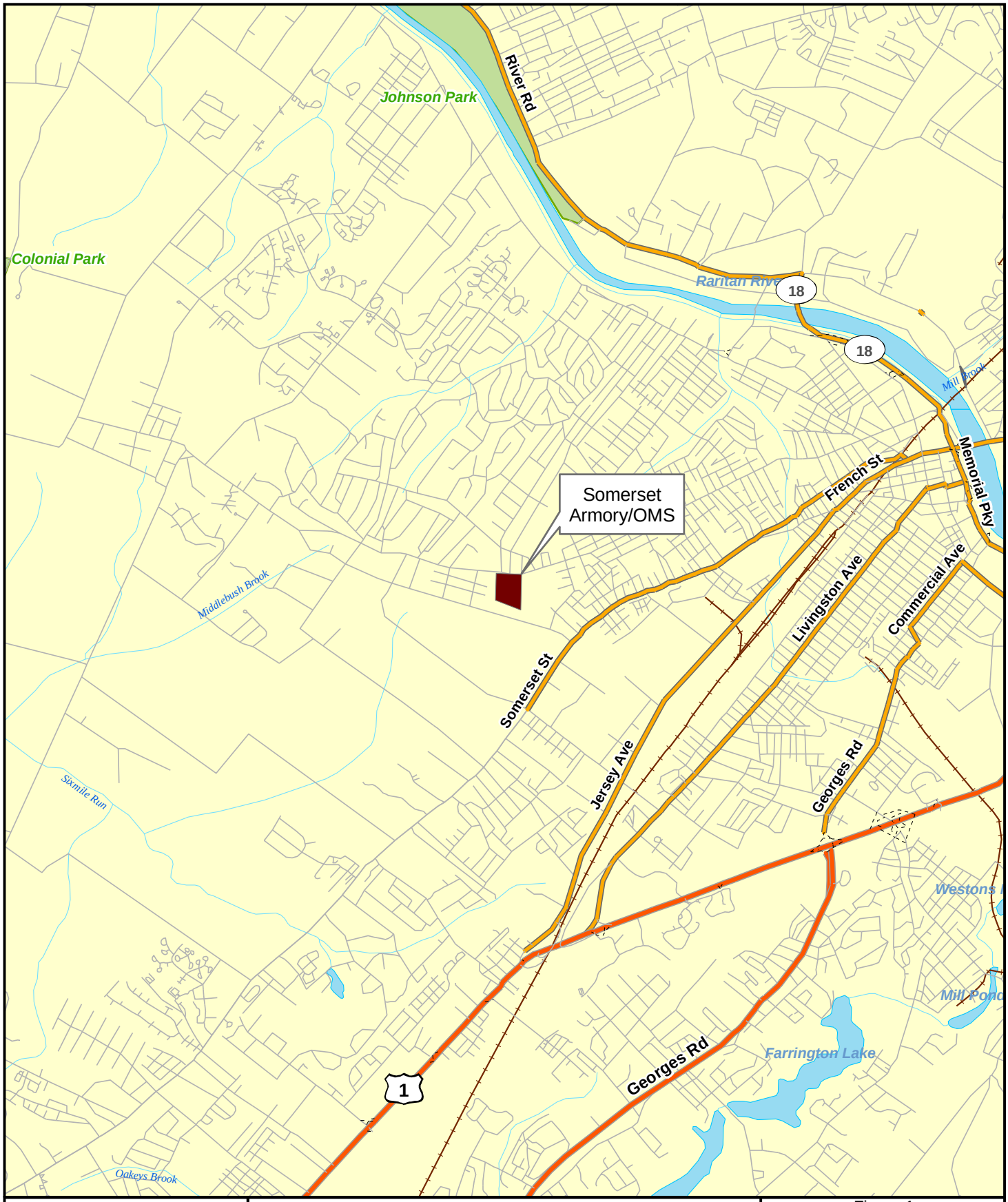




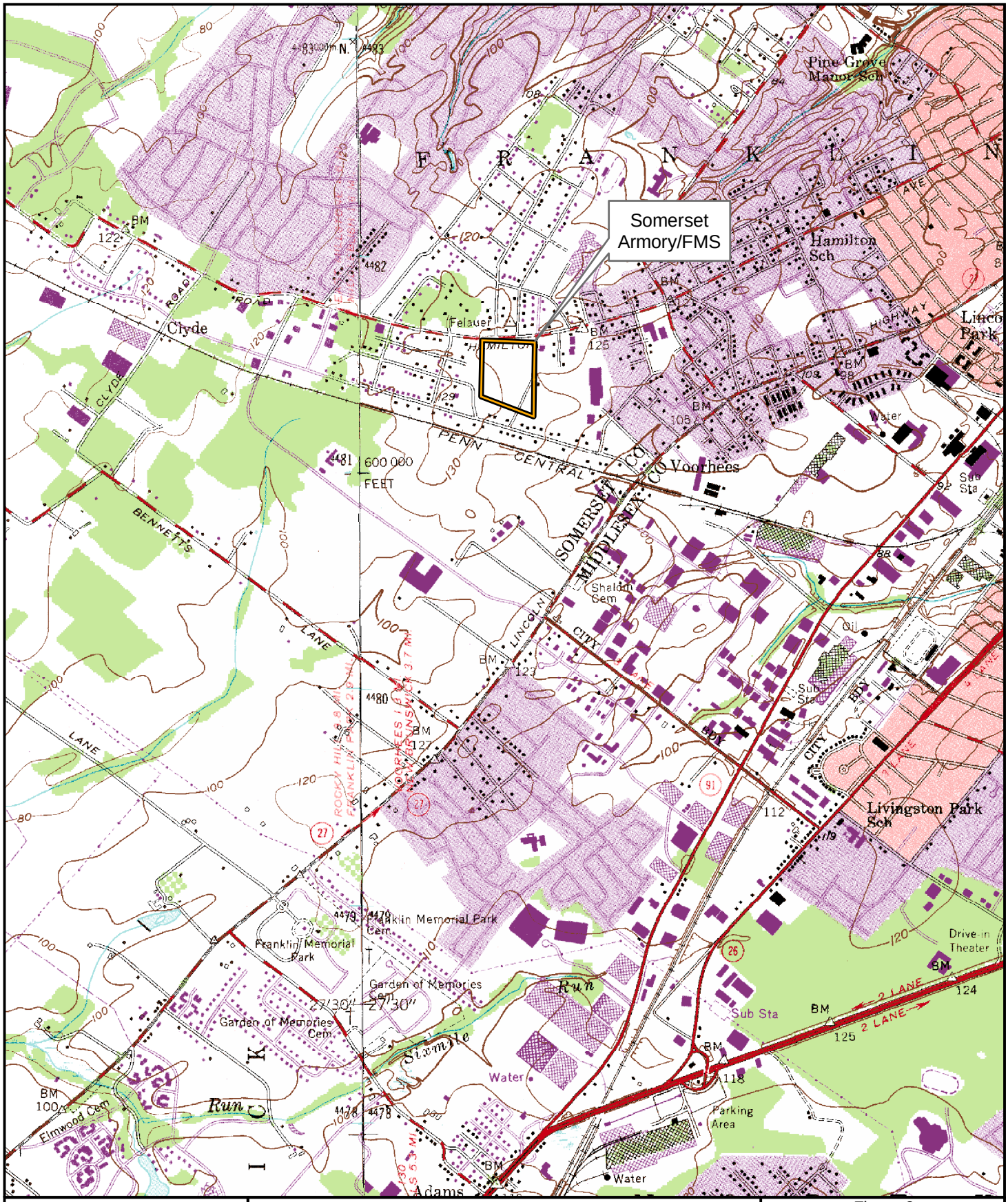

**Legend**

| | |
|---|---|
| Installation Area | Local |
| Limited Access | Minor |
| Highway | Ramp |
| Major | Other |

1:50,000

Figure 1
Site Location Map
Somerset Armory/OMS
Franklin Twp.,
Somerset Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 494514.019624 Feet
Northing: 601499.031763 Feet

1:24,000

Figure 2
USGS Topographic Map
Somerset Armory/FMS
Franklin Twp.,
Somerset Co., NJ

amec
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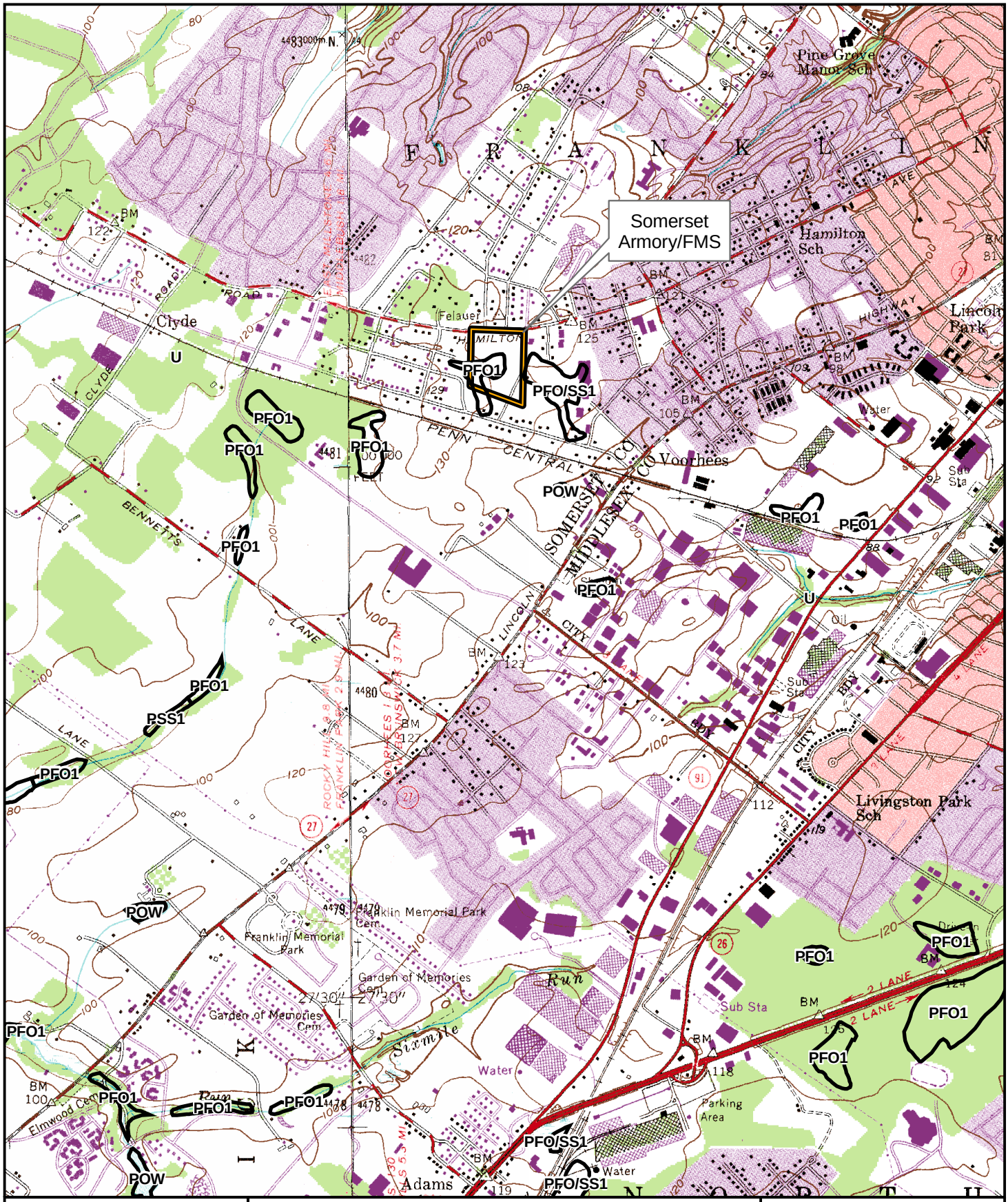
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 494514.019624 Feet
Northing: 601499.031763 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Somerset Armory/FMS
Franklin Twp.,
Somerset Co., NJ

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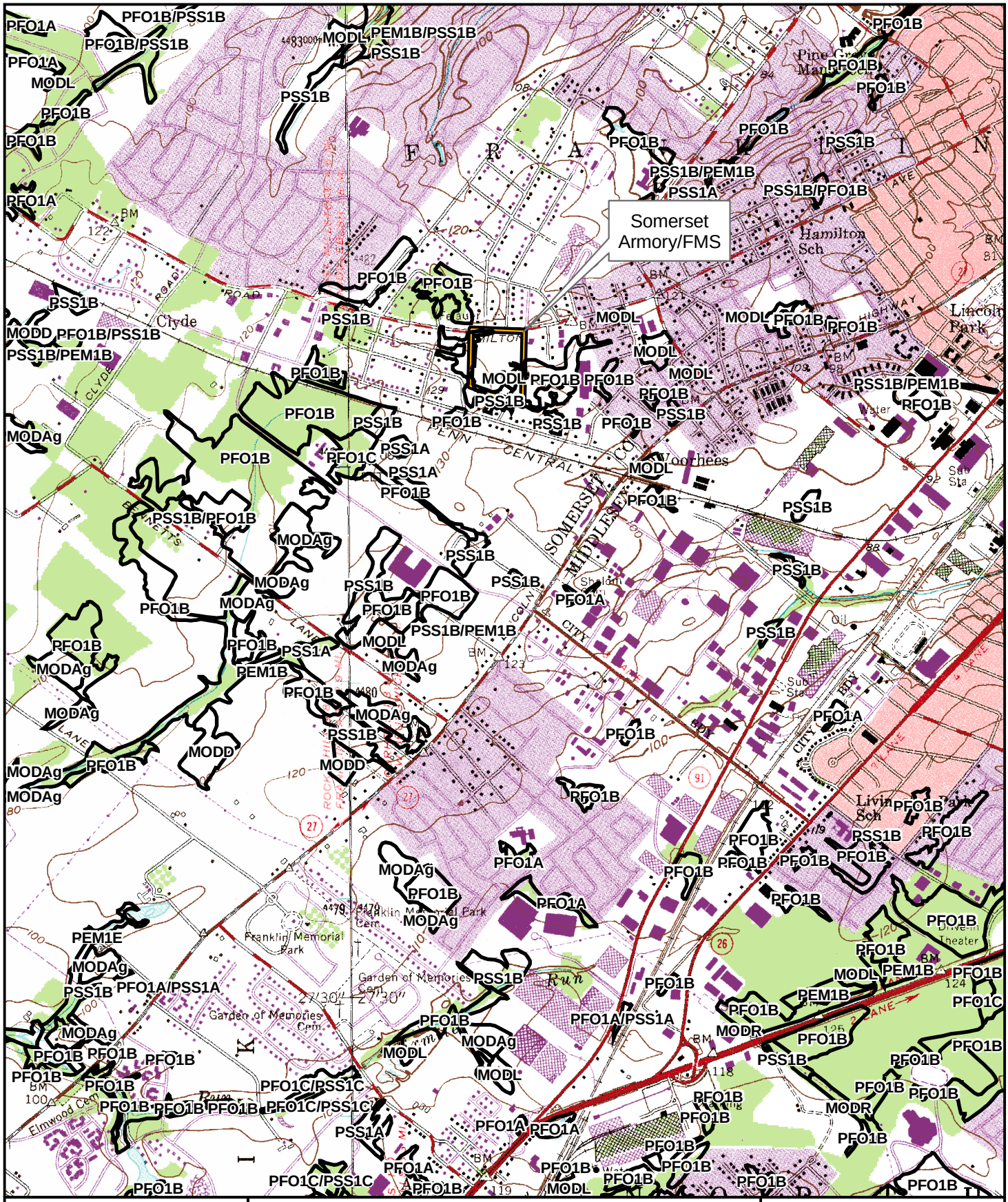
Plymouth Meeting, PA 19462






**Legend**

Installation Area

NJDEP Wetlands

NJ State Plane Coordinates:
Easting: 494514.019624 Feet
Northing: 601499.031763 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Somerset Armory/FMS
Franklin Twp.,
Somerset Co., NJ

amec
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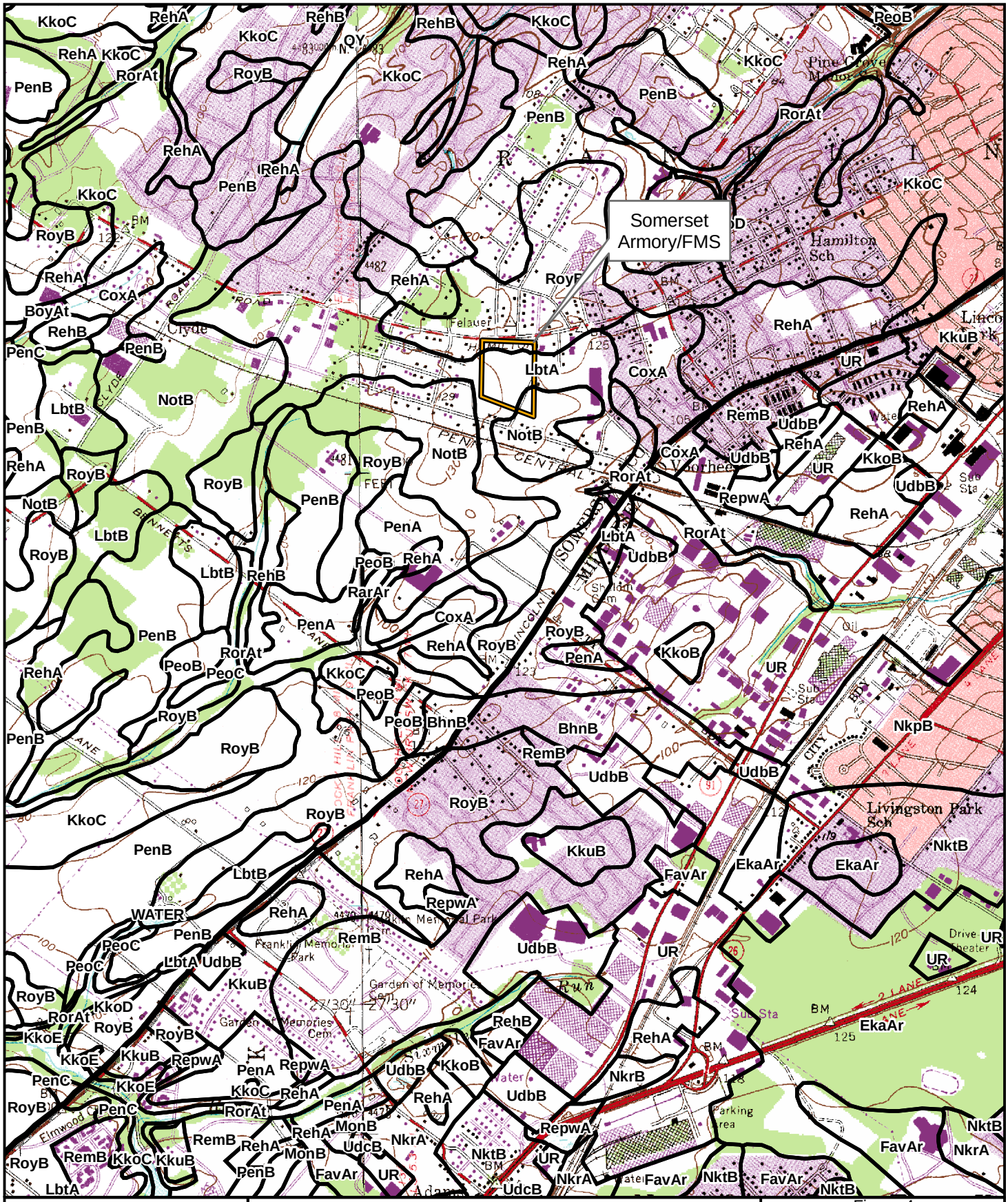
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 494514.019624 Feet
Northing: 601499.031763 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Somerset Armory/FMS
Franklin Twp.,
Somerset Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

50' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 494514.019624 Feet
Northing: 601499.031763 Feet

1:2,000

Figure 5
Wetlands Location Map
Somerset Armory/OMS
Franklin Twp.,
Somerset Co., NJ

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Plymouth Meeting, PA 19462

# 23.0 TOMS RIVER ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Toms River Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 23.1 Site Location

The Toms River Armory FMS installation is a 24.9-acre parcel designated as Block 409, Lot 30.02 in Dover Township, Ocean County, New Jersey (**Figure 1**). The NJ State Plane Coordinates for the site are East 571542.183371 feet and North 419455.832761 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Toms River watershed of Watershed Management Area 13 (WMA 13; Barnegat Bay).

The site is bound to the north by Whitesville Road, to the east by the Garden State Parkway, and to the south and west by the Winding River Park. The surrounding land use is rural. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the northern corner of the property, whereas the naturalized areas are generally in the western, southern, and eastern portions of the property. A description of these areas is presented in Section 23.2.

## 23.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 23.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 25 and 40 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is the Winding River. At its closest point, the Winding River is located approximately 1,000 feet to the east of the site. Net drainage on the site is to the south, towards the Winding River.

### 23.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates the presence of a palustrine, forested, broad-leaved, deciduous wetland (PFO1) occupying the western half of the site (**Figure 3A**). This community is a component of the wetland complex associated with the Winding River, located to the west of the site.

### 23.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetland GIS data for the site (**Figure 3B**) indicates the presence of the following five community types on the site:

- Mixed forested wetlands (deciduous dominant) – Mapped to occur as extensive areas along the western portion of the site, roughly coincident with portions of the PFO1 community depicted on the NWI map.
- Mixed forested wetlands (coniferous dominant) – Mapped to occur in the south-western corner of the site, roughly coincident with portions of the PFO1 community depicted on the NWI map.
- Herbaceous wetlands – Mapped to occur in the south-western corner of the site, roughly coincident with portions of the PFO1 community depicted on the NWI map.
- Wetlands rights-of-way (Modified) – Mapped to occur n the south/south-western portion of the site, roughly coincident with the PFO1 community depicted on the NWI map.

### 23.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Downer loamy sand, 0 to 5 percent slopes (DocB) – Mapped to occupy the central and eastern portions of the site.
- Berryland sand, frequently flooded (BerAt) – Mapped to occupy the western portion of the site.

The Berryland series is classified as a Typic Haplaquod and is therefore listed by the USDA as a hydric soil (USDA 1995).

### 23.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for four state-listed bird species or suitable habitat for these species, to be present on the site. The results of Phase I and Phase II surveys did not document the presence of any of these species on the site, however, suitable habitat for the following species was found to be present:

- Cooper's hawk (*Accipiter cooperii*) – state threatened (breeding and migratory/winter population)
- Red-shouldered hawk (*Buteo lineatus*) – state endangered (breeding population) and state threatened (migratory/winter population)
- Barred owl (*Strix varia*) – state threatened (breeding and migratory/winter population).

## 23.3 Results of the Field Assessment

As of September 2004, the Toms River Armory FMS installation was composed of the following seven distinct community types: open water, mixed forested wetland, scrub-shrub wetland, emergent marsh, deciduous woodland, mowed lawn, and developed land. The wetlands identified and delineated on the site are designated as Wetland Series A, B, and C and includes the open water, mixed forested wetland, and emergent marsh (**Figure 5**). In addition, portions of these wetlands that occur off-site were delineated as Wetland Series D. Each of these six community types are described below.

The open water community includes a stream that runs in a northwest to southeast direction in the western portion of the site. Flowing water was present throughout the length of the stream during the site visit. The up-gradient end of the stream exhibits the greatest width of approximately 15 feet, and the channel is broad and diffuse with emergent vegetation on sand deposits. The stream considerably narrows at it progresses southward, to widths averaging 2 feet. This stream is designated, in part, as Wetland Series A and D (off-site portion). The wetlands boundary associated with this stream varied from the top-of-bank to larger areas associated with the mixed forested wetland described below.

The mixed forested wetland community ranged from narrow fringes along the aforementioned stream to large, expansive areas in the southern portion of the site. This community is dominated by red maple (*Acer rubrum*, FAC), black gum (*Nyssa sylvatica*, FAC), and Atlantic white cedar (*Chamaecyparis thyoides*, OBL) in the canopy and sapling layers; coast pepperbush (*Clethra alnifolia*, FACW-) in the shrub layer; and bristly dewberry (*Rubus hispidus*, FACW) in the ground layer; no distinct vine layer was apparent at the time of the site visit. A representative soil boring collected from the wettest portions of this community typically exhibits a floating root mat of black (10YR 2/1) mucky silt loam, underlain by a pocket of open water.

The mixed forested wetland community transitions to a scrub-shrub community in the eastern portion of the site, within the proximity of the sand road network and the utility right-of-way. This community is vegetated with a mix of species that suggests frequent disturbance to this area. These species include coast pepperbush (FACW-), autumn olive (*Elaeagnus umbellata*, NL), black huckleberry (*Gaylussacia baccata*, FAC-), switchgrass (*Panicum virgatum*, FAC), and common reed (*Phragmites australis*, FACW). Within this community, a small pocket of emergent vegetation is located in the eastern portion of the site near the property boundary. This somewhat boggy area is dominated by tussock sedge (*Carex stricta*, OBL), sphagnum moss (*Sphagnum* sp., NA), and spatulate-leaved sundew (*Drosera intermedia*, OBL). This scrub-shrub and emergent wetland was designated, in part, as Wetland Series C; a small portion of forested mixed wetland was also included in Wetland Series C.

An early- to mid-stage, mixed woodland community occupies the higher elevations on the site, generally between the developed areas and the mixed forested wetland. This community is dominated by sassafras (*Sassafras albidum*, FACU-), white oak (*Quercus alba*, FACU), post oak (*Quercus stellata*, NL), and red oak (*Quercus rubra*, FACU-) in the canopy and sapling layers; and scrub oak (*Quercus ilicifolia*, NL) and black huckleberry (*Gaylussacia baccata*, FAC-) in the shrub layer. No vine or ground layer was apparent at the time of the site visit.

The mowed lawn and developed land communities occupy the northern portion of the site area. Drainage from these areas is generally to the south. The mowed lawn community is dominated

by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 23.4 Conclusion

The results of the wetlands delineation conducted for the Toms River Armory FMS installation reveal the presence of a large forested wetland system occupying the western portion of the site. This wetland system, depicted on **Figure 5** as Wetland Series A, B, and C, includes mixed forested, scrub-shrub, emergent, and open water wetland communities. It is anticipated that this wetland system will be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot transition area as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the wetlands do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4. The wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). This conclusion is further supported by the findings of the April 2007 Rare Species Survey Report.

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Toms River Armory FMS

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**Legend**

- Installation Area
- Limited Access
- Highway
- Major
- Local
- Minor
- Ramp
- Other

1:50,000

Figure 1
Site Location Map
Toms River Armory/FMS
Dover Twp.,
Ocean Co., NJ

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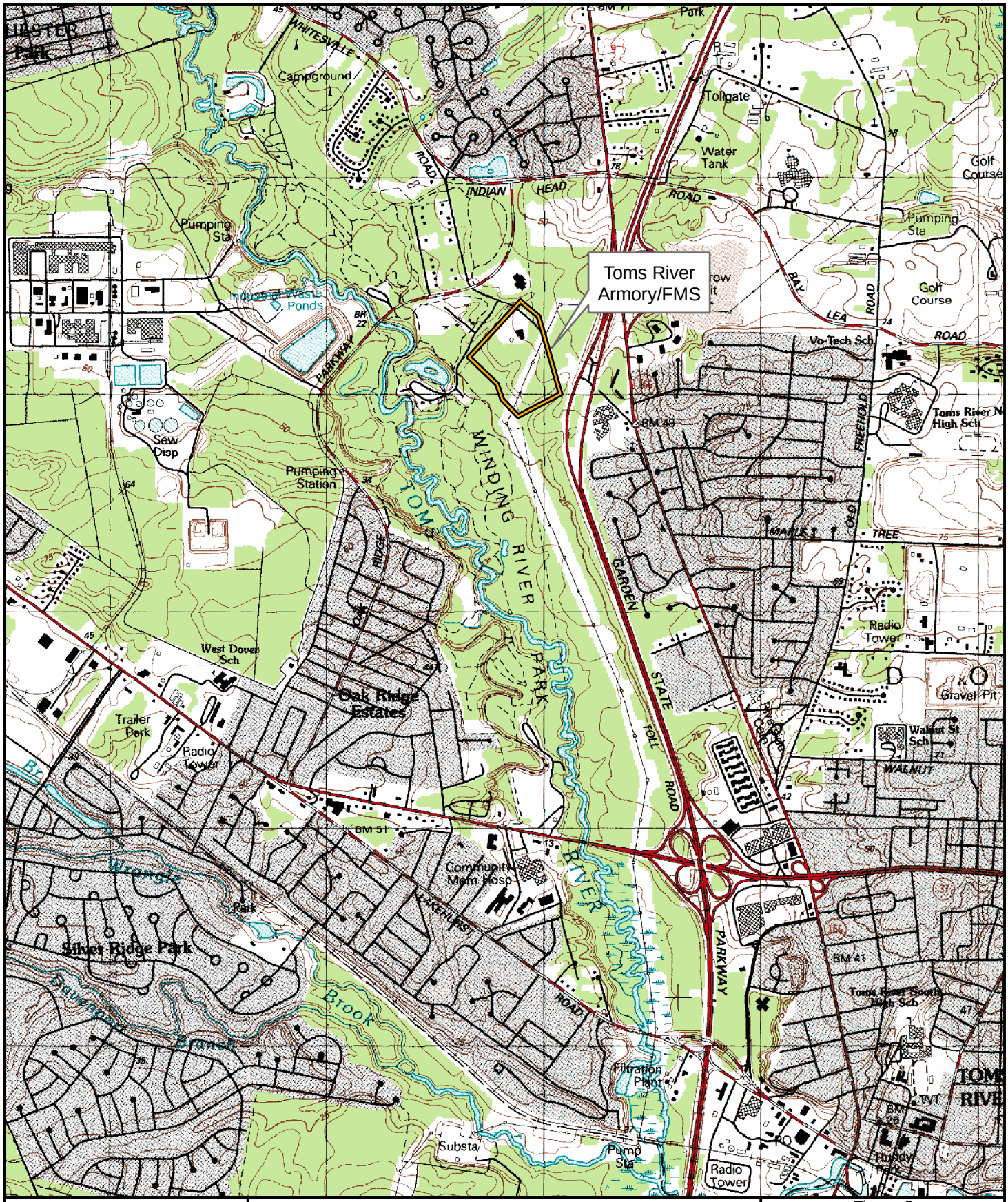




***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 571542.183371 Feet
Northing: 419455.832761 Feet

1:24,000

Figure 2
USGS Topographic Map
Toms River Armory/FMS
Dover Twp.,
Ocean Co., NJ

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**Legend**

NWI Wetland

Installation Area

NJ State Plane Coordinates:
Easting: 571542.183371 Feet
Northing: 419455.832761 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Toms River Armory/FMS
Dover Twp.,
Ocean Co., NJ

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***Legend***

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 571542.183371 Feet
Northing: 419455.832761 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Toms River Armory/FMS
Dover Twp.,
Ocean Co., NJ

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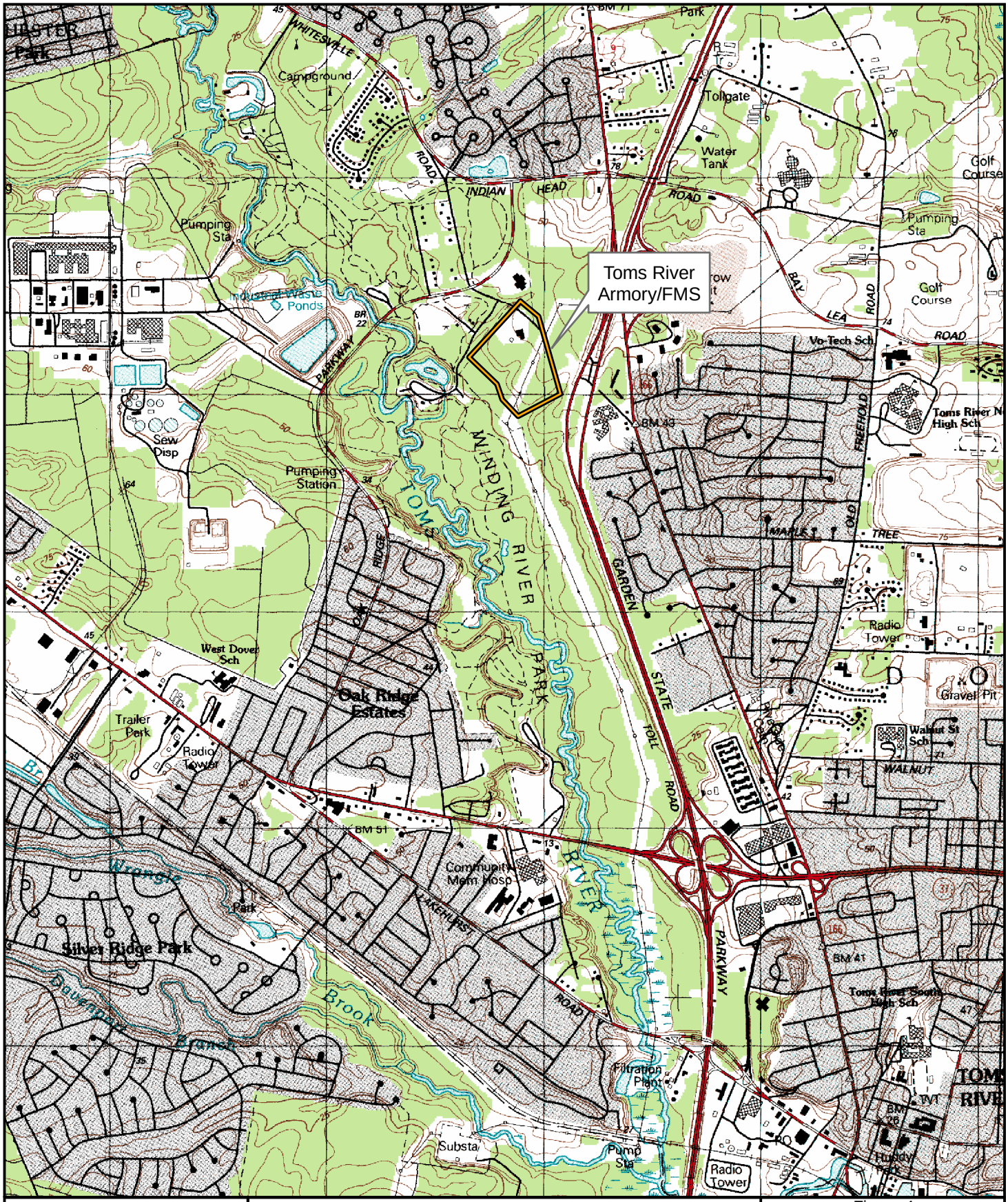




**Legend**

USDA Soils

Installation Area

NJ State Plane Coordinates:
Easting: 571542.183371 Feet
Northing: 419455.832761 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Toms River Armory/FMS
Dover Twp.,
Ocean Co., NJ

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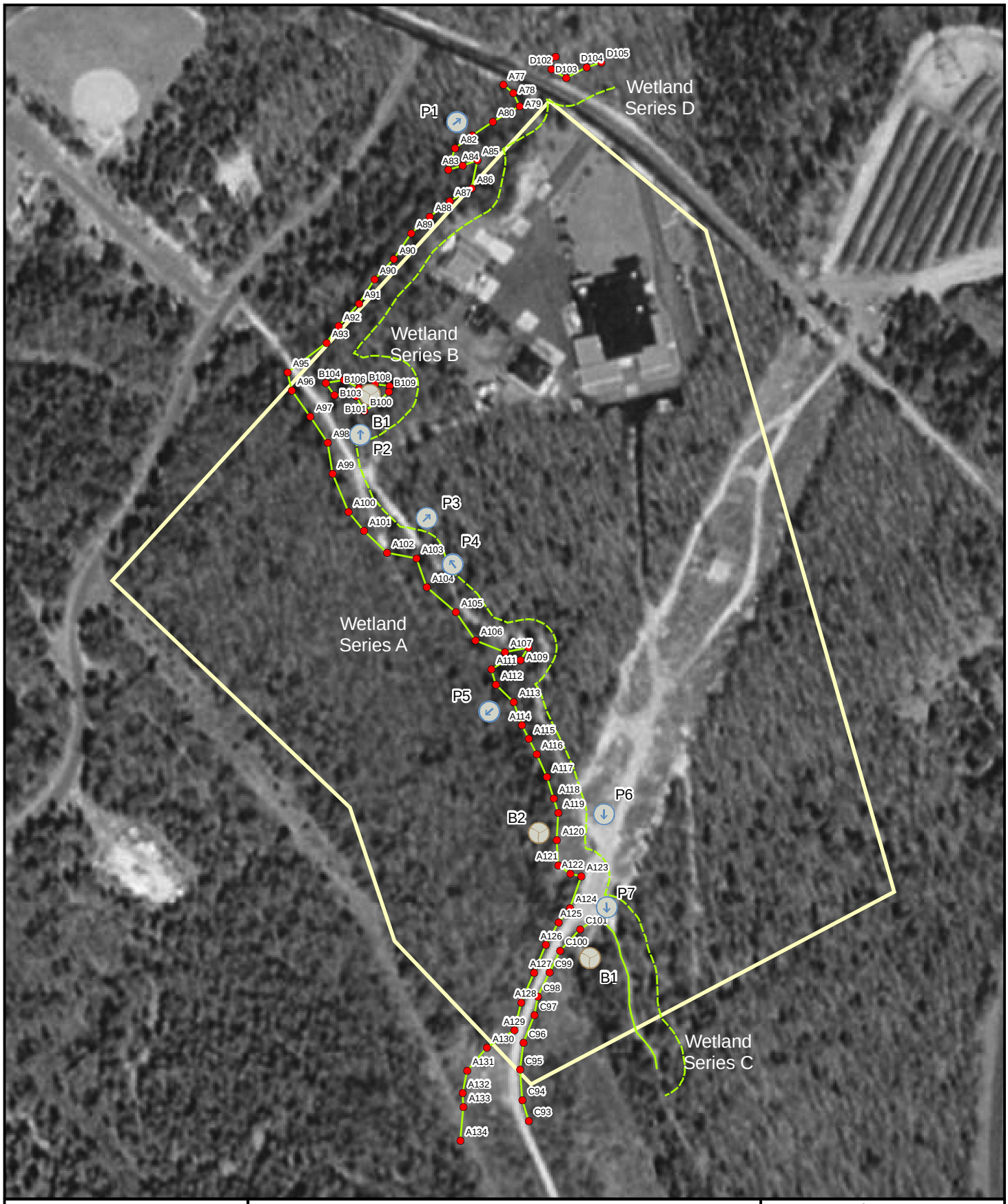




**Legend**

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 571542.183371 Feet
Northing: 419455.832761 Feet

1:2,808

Figure 5
Wetlands Location Map
Toms River Armory/FMS
Dover Twp.,
Ocean Co., NJ

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# 24.0 TUCKERTON ARMORY

This section of the report presents the results of the wetlands delineation for the Tuckerton Armory installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 24.1 Site Location

The Tuckerton Armory installation is a 16.25-acre parcel designated as Block 49, Lot 3 in Tuckerton Borough, Ocean County, New Jersey (**Figure 1**). It is located on the southbound side (west side) of U.S. Highway 9, north of the intersection of County Route 539. The NJ State Plane Coordinates for the site are East 540726.707874 feet and North 283066.930037 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Forked River watershed of Watershed Management Area 13 (WMA 13, Barnegat Bay).

The site is a rectangle-shaped parcel bound to the north by a mobile home park, to the east by Route 9, to the south by undeveloped land and a residential property, and to the west by undeveloped land. The surrounding land use is rural and residential. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the south-central portion of the property, whereas the naturalized areas are generally in the northern, western, and southern portions of the property. A description of these areas is presented in Section 24.2.

## 24.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 24.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 20 and 30 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is Thompson Creek, a tidal stream that is part of an extensive coastal marsh. At its closest point, Thompson Creek is located approximately 1,400 feet to the southeast of the site; however, net drainage on the site is to the northwest, towards a topographic depression away from Thompson Creek.

### 24.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates a palustrine, emergent wetland (PEM) community to occur in the southern portion of the property (**Figure 3A**). This area is coincident with a circular sand road on the site, a non-wetland area (see Section 23.3). No other wetlands are mapped to occur on or immediately adjacent to the site. Aside from the PEM wetland, the nearest mapped wetland is a palustrine, forested, broad-leaved, deciduous wetland

(PFO1) located approximately 300 feet to the southwest of the site. This community is depicted on the NWI map as an isolated community.

### 24.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates no wetland communities to be present on or adjacent to the site (**Figure 3B**).

### 24.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Woodmansie sand, 0 to 5 percent slopes (WobB) – Mapped to generally occupy the central and western portions of the site.
- Hammonton loamy sand, 0 to 5 percent slopes (HdmB) – Mapped to occupy the northern and southern ends of the site.

Neither of these soil types are listed by the USDA as a hydric soil (USDA 1995).

### 24.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for three state-listed herptile species, four state-listed bird species, and one state- and federally-listed plant species to be present or suitable habitat for these species to be present, on the site. The results of Phase I and Phase II surveys did not document any of these species on the site, however, suitable habitat was found to be present for the following species:

- Fowler's toad (*Bufo woodhousii*) – state species of special concern
- Timber rattlesnake (*Crotalus horridus horridus*) – sate endangered
- Northern pine snake (*Pituophis melanoleucus melanoleucus*) – state threatened.

## 24.3 Results of the Field Assessment

As of October 2005, the Tuckerton Armory installation was composed of the following three distinct community types: mixed woodland, mowed lawn, and developed land. No wetland areas were identified on the site or within 150 feet of the site boundaries (**Figure 5**). Each of these three community types is described below.

An early- to mid-stage, mixed woodland is the dominant community type on and around the site. The species assemblage varies somewhat however, between the northern and southern ends of the site. This community is clearly dominated by chestnut oak (*Quercus dentate*, NL), pitch pine (*Pinus rigida*, FACU), and black huckleberry (*Gaylussacia baccata*, FACU) in the northern and north-central portions of the site. The species assemblage becomes richer towards the southern end of the site where these species are mixed with white oak (*Quercus alba*, FACU), red oak (*Quercus rubra*, FACU-), black oak (*Quercus velutina*, NI), eastern red cedar (*Juniperus virginiana*, FACU), mountain laurel (*Kalmia latifolia*, FACU), and dwarf huckleberry (*Gaylussacia dumosa*, FAC).

The mowed lawn and developed land communities occupy the south-central portion of the site. Drainage from these areas is generally to the south. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 24.4 Conclusion

The results of the wetlands delineation conducted for the Tuckerton Armory installation revealed no wetlands to be present on or within the immediate vicinity of the site. This determination is subject to review by the NJDEP, and as such, the above finding should not be considered final until approval from the NJDEP.

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# FIGURES

## Tuckerton Armory

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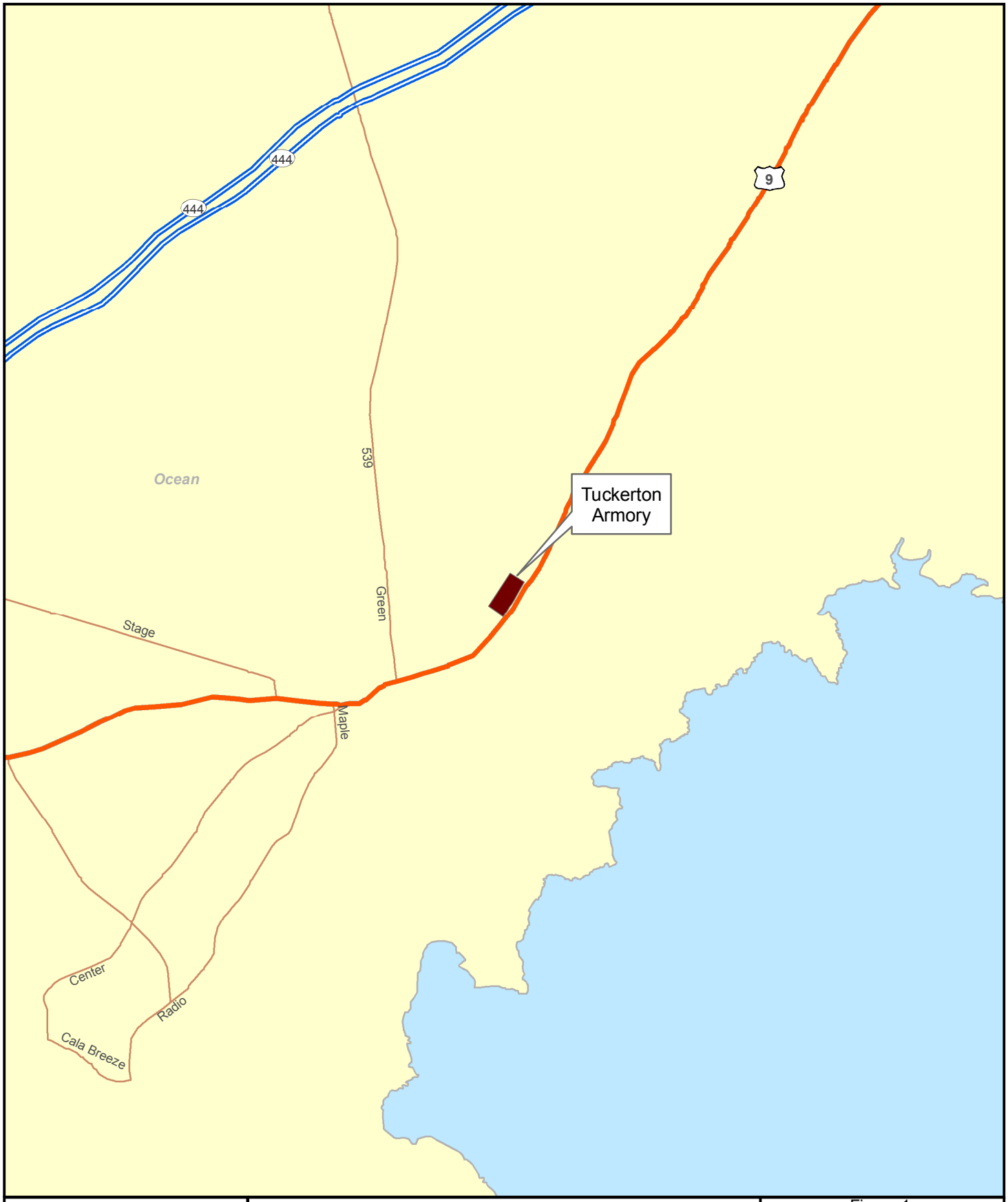




**Legend**

- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrian Way
- Installation Area

1:50,000

Figure 1
Site Location Map
Tuckerton Armory
Tuckerton Borough,
Ocean Co., NJ

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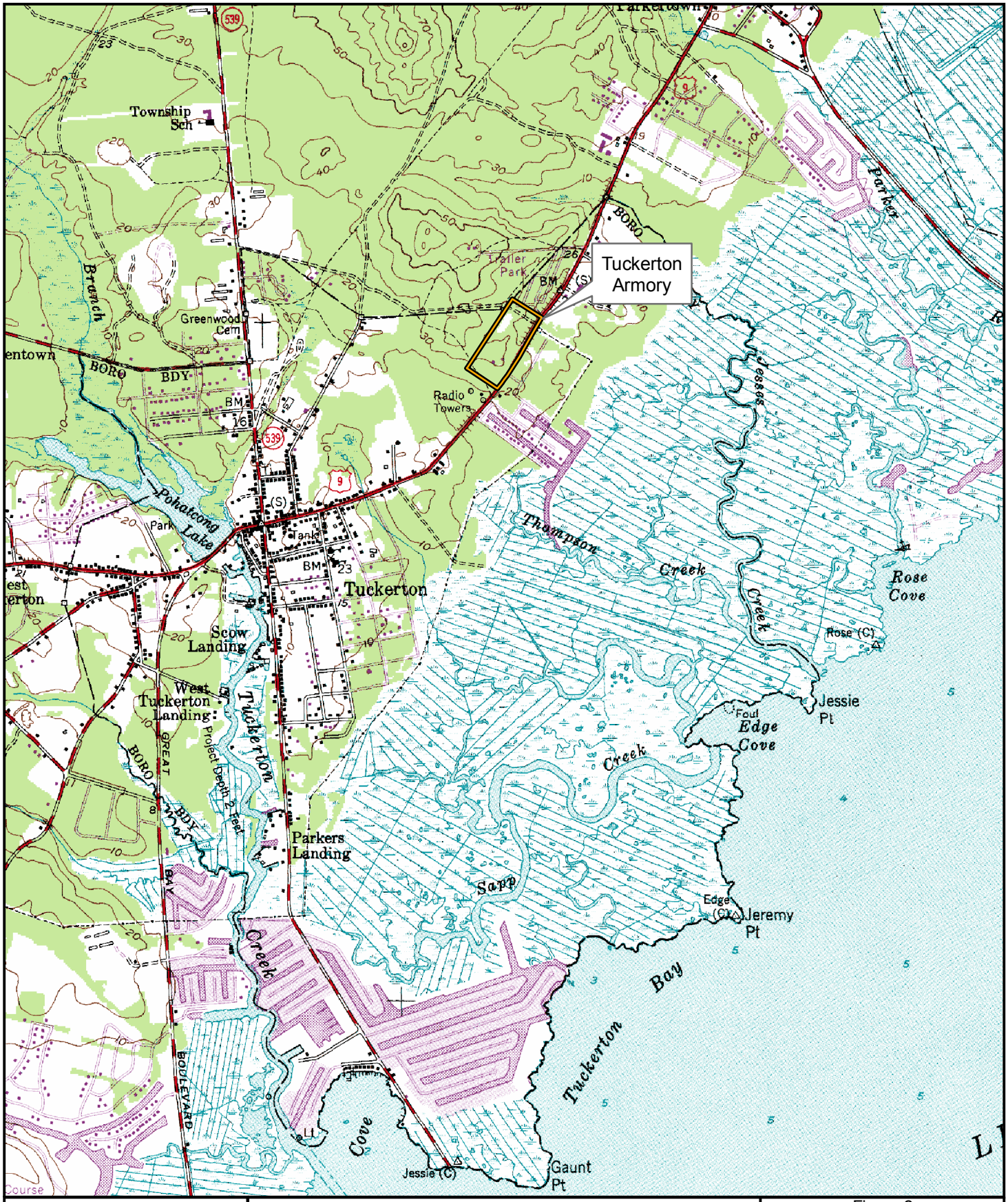
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 540726.707874 Feet
Northing: 283066.930037 Feet

1:24,000

Figure 2
USGS Topographic Map
Tuckerton Armory
Tuckerton Borough,
Ocean Co., NJ

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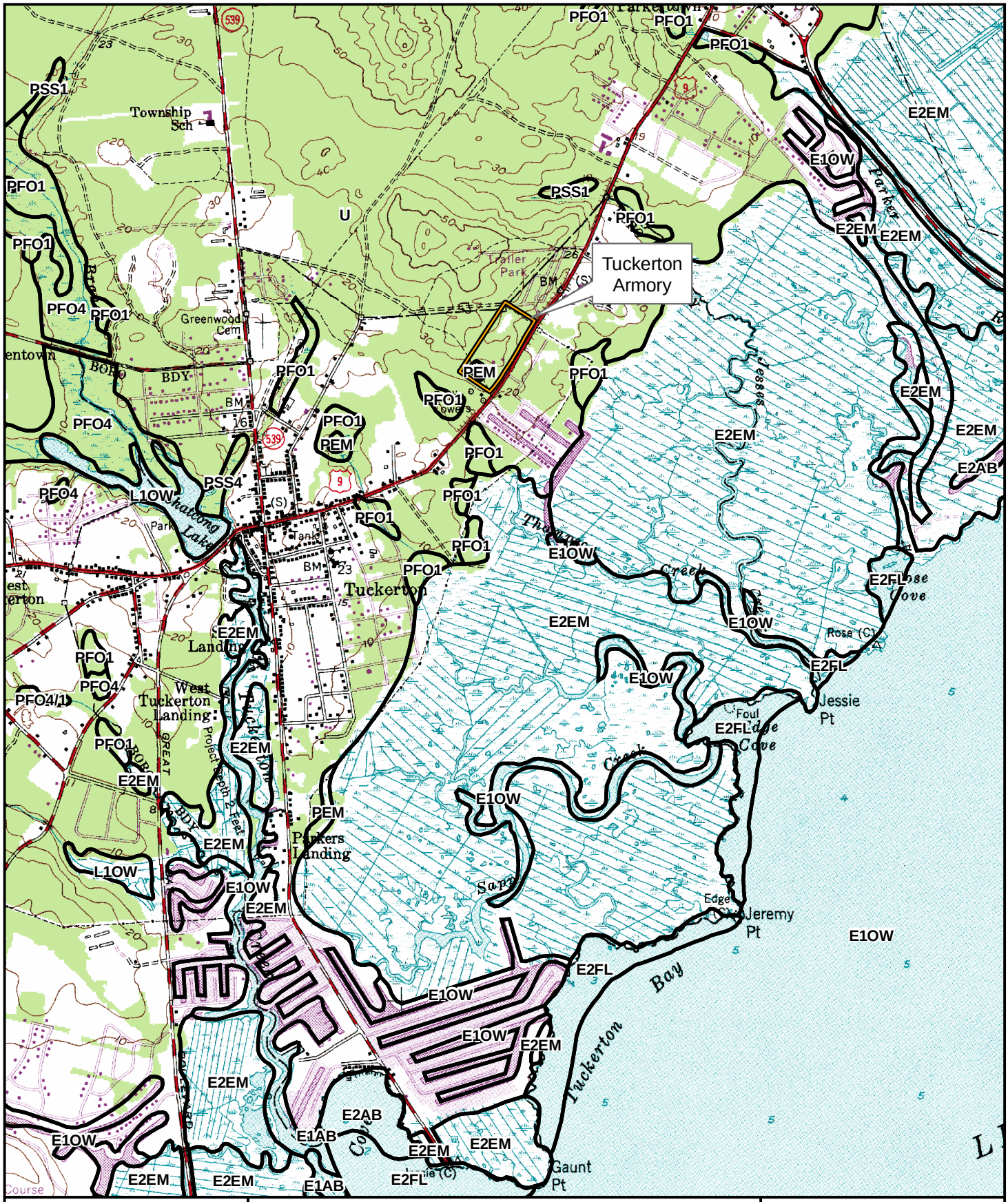




**Legend**

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 540726.707874 Feet
Northing: 283066.930037 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Tuckerton Armory
Tuckerton Borough,
Ocean Co., NJ

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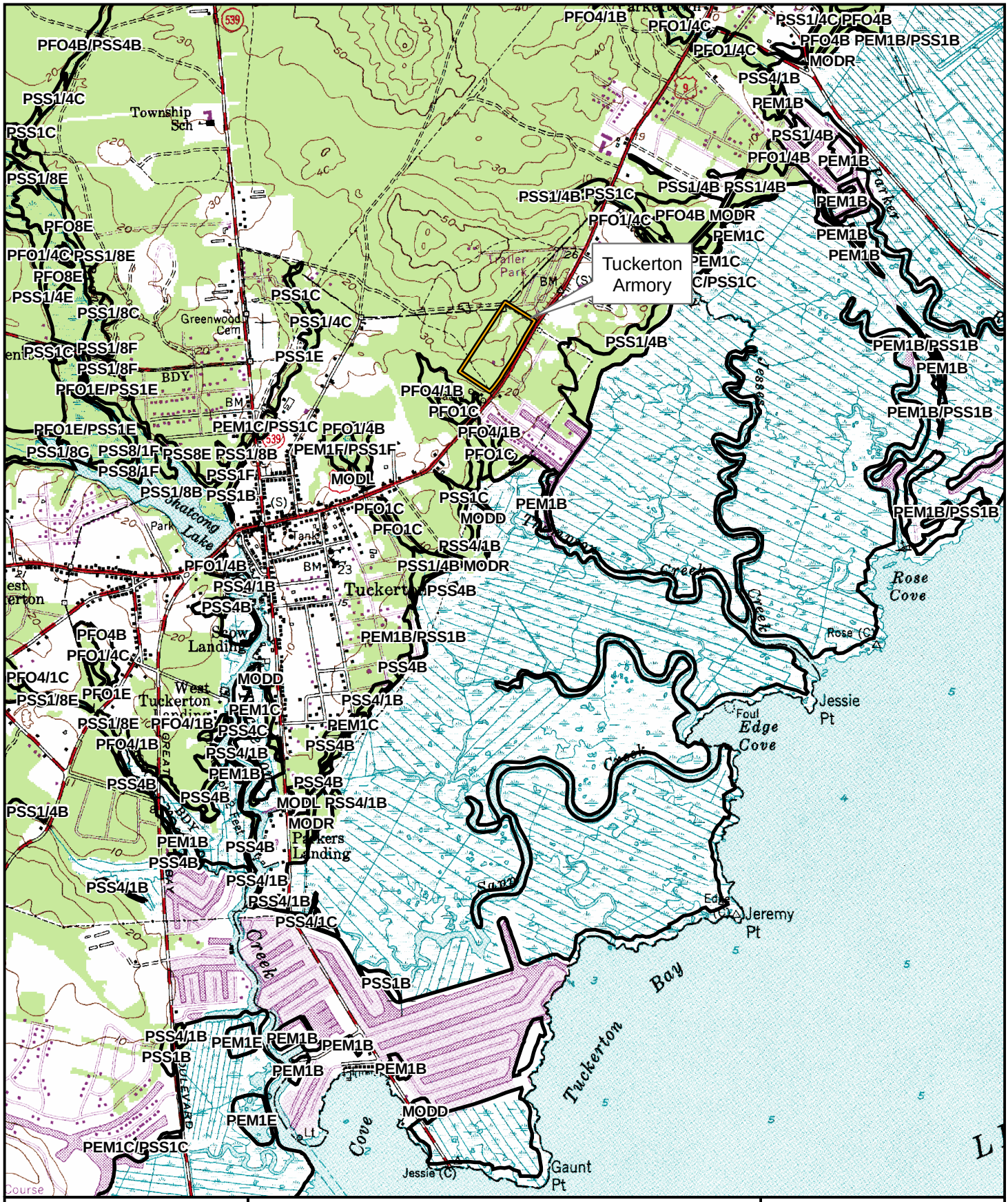




***Legend***

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 540726.707874 Feet
Northing: 283066.930037 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Tuckerton Armory
Tuckerton Borough,
Ocean Co., NJ

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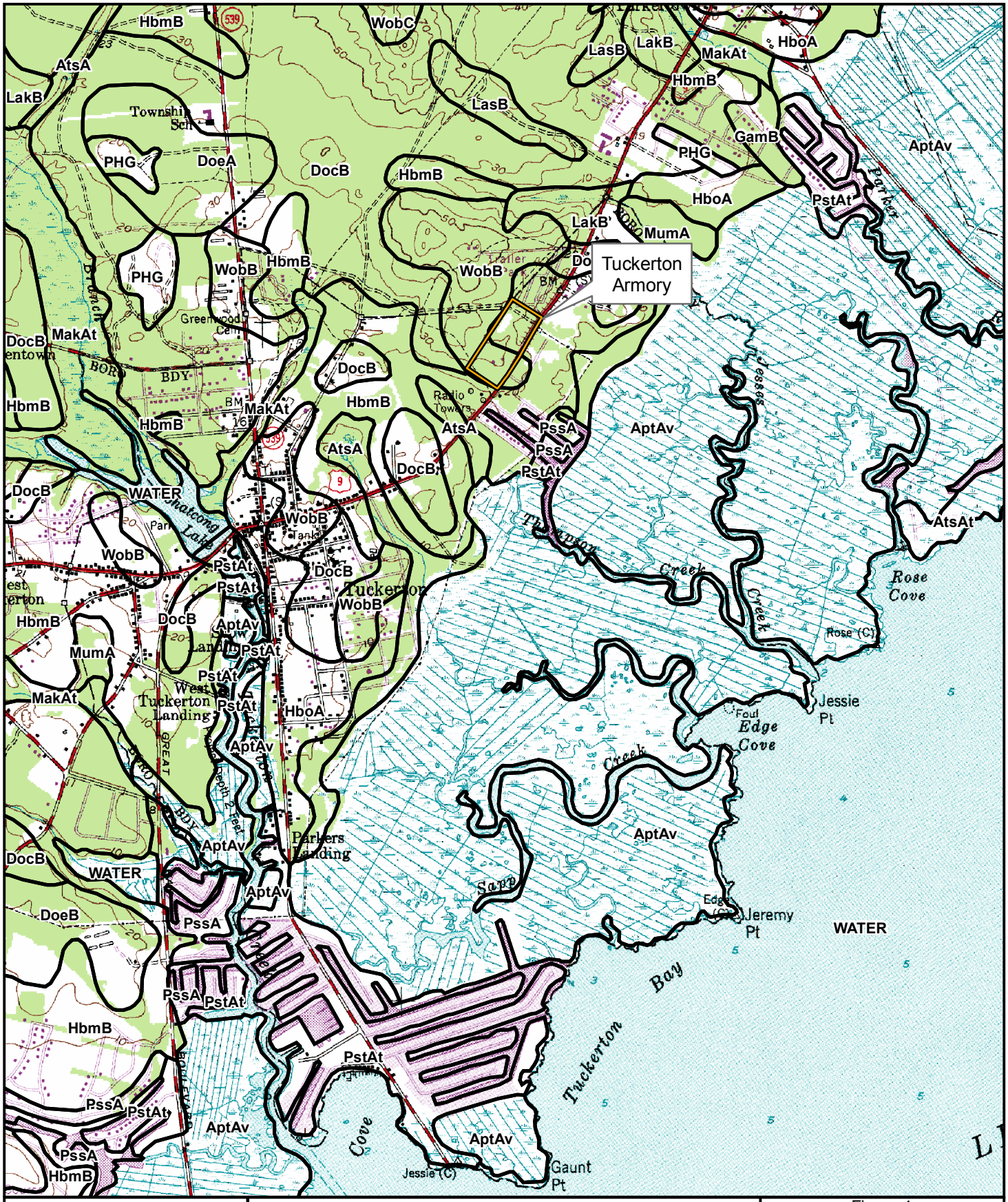




**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 540726.707874 Feet
Northing: 283066.930037 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Tuckerton Armory
Tuckerton Borough,
Ocean Co., NJ

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***Legend***

Soil Boring

Property Boundary

Wetland Flag

Photo Point

NJ State Plane Coordinates:
Easting: 540726.707874 Feet
Northing: 283066.930037 Feet

1:2,086

Figure 5
Wetlands Location Map
Tuckerton Armory
Tuckerton Borough,
Ocean Co., NJ

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Plymouth Meeting, PA 19462

# 25.0 VINELAND ARMORY FMS

This section of the report presents the results of the wetlands delineation for the Vineland Armory FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 25.1 Site Location

The Vineland Armory FMS installation is an approximately 44.55-acre parcel designated as Block 962, Lot 1 in Vineland City, Cumberland County, New Jersey (**Figure 1**). It is located on the southbound side (west side) of State Route 47, to the east of State Route 55. The NJ State Plane Coordinates for the site are East 338283.220070 feet and North 224853.387343 feet. The site is located in the Outer Coastal Plain physiographic section of New Jersey, in the Maurice River watershed of Watershed Management Area 17 (WMA 17; Maurice, Salem, and Cohansey).

The site is a rectangle-shaped parcel bound to the north and west by undeveloped land, to the east by Route 47, and to the south by commercial properties. The surrounding land use is mixed rural and commercial. The main developed portion of the installation (i.e. building, parking lot, and other structures) is in the central and eastern portions of the site; whereas the naturalized areas are generally in the northern, western, and southern portions of the site. A description of these areas is presented in Section 25.2.

## 25.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 25.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 80 and 90 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is an unnamed impoundment located approximately 1,000 feet to the northeast; the nearest mapped watercourse is Parvin Branch. At its closest point, Parvin Branch is located approximately 3,500 feet to the north of the site. Net drainage on the site is to northwest, towards Parvin Branch.

### 25.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetland communities to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped wetland is a palustrine, open water, unconsolidated bottom (POW/U) community located approximately

1,500 feet to the northeast of the site. This wetland is depicted on the NWI map as an isolated community.

### 25.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site area indicates the presence of a very small herbaceous wetland community in the north-western corner of the site (**Figure 3B**). Additionally, an off-site, relatively larger herbaceous wetland community is mapped along the northern site boundary. Neither of these communities is depicted on the NWI map.

### 25.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Pits, sand and gravel (PHG) – Mapped to occur as an irregular-shaped area in the central and southern portions of the site.
- Fort Mott loamy sand, 0 to 5 percent slopes (DoeB) – Mapped to occur as an irregular-shaped area in the eastern and southwest portions of the site.
- Downer loamy sand, 5 to 10 percent slopes (DocC) – Mapped to occur in the northwest portion of the site.
- Evesboro sand, 0 to 5 percent slopes (EveB) – Mapped to occur as small portions in the southwest corners of the site.
- Evesboro sand, 5 to 10 percent slopes (EveC) – Mapped to occur along a portion of the northern site boundary.
- Evesboro sand, 10 to 15 percent slopes (EveD) – Mapped to occur as a narrow fringe along the northwest site boundary.

### 25.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential for a state-listed herptile species to be present or suitable habitat for this species to be present on the site. The results of a Phase I survey of the site did not document the presence of this species nor suitable habitat for this species.

## 25.3 Results of the Field Assessment

As of September 2005, the Vineland Armory FMS installation was composed of the following four distinct community types: roadside depressional wetland, mixed woodland, mowed lawn, and developed land. The roadside depressional wetland is designated as Wetland Series A (**Figure 5**). No other wetland areas were identified on the site or within 150 feet of the site boundaries. Each of the four community types is described below.

A very small roadside depression is located near the north-western corner portion of the site. This crescent-shaped area appears to be the result of excavation during historic road-building activities. The plant community in this wetland is dominated by grass-leaved goldenrod

(*Euthamia graminifolia*, FAC), soft rush (*Juncus effusus*, FACW+), dock-leaf smartweed (*Polygonum lapathifolium*, FACW+), lady's thumb (*Polygonum persicaria*, FACW), and bristly dewberry (*Rubus hispidus*, FACW). A representative soil boring collected from the approximate center of this community exhibited an upper, five-inch, surface horizon of dark grayish-brown (10YR 4/2) medium to coarse loamy sand, underlain by a lower, three-inch layer of brown (10YR 4/3) coarse loamy sand. These horizons were underlain by an upper subsoil of strong brown (10YR 5/8) coarse sand.

A mid-stage, mixed woodland community characterizes the majority of the site area. This community is vegetated with a mixed assemblage of black oak (*Quercus velutina*, NI), white oak (*Quercus alba*, FACU), sassafras (*Sassafras albidum*, FACU-), pitch pine (*Pinus rigida*, FACU), eastern red cedar (*Juniperus virginiana*, FACU), red maple (*Acer rubrum*, FAC), black gum (*Nyssa sylvatica*, FAC), and black cherry (*Prunus serotina*, FACU) in the canopy and sapling layers. Abundant understory species include black huckleberry (*Gaylussacia baccata*, FACU), low blueberry (*Vaccinium angustifolium*, NL), wisteria (*Wisteria* sp., NA), scrub oak (*Quercus ilicifolia*, NL), common greenbrier (*Smilax rotundifolia*, FAC), red raspberry (*Rubus idaeus*, FAC-), and Virginia creeper (*Parthenocissus quinquefolia*, FACU).

The mowed lawn and developed land communities occupy the central and eastern portions of the site area. Drainage from these areas is generally to the east, towards Route 47. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional roadside species.

## 25.4 Conclusion

The results of the wetlands delineation conducted for the Vineland Armory FMS installation reveal the presence of a very small isolated wetland in the northwest corner of the site. This wetland is designated as Wetland Series A as depicted on **Figure 5**. It is anticipated to be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot freshwater wetlands transition area as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the wetland does not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). This conclusion is further supported by the findings of the April 2007 Rare Species Survey Report.

The wetland also does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetland that has 50 percent or more of the area within 50 feet of the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## Vineland Armory FMS

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**Legend**

- Installation Area
- Limited Access
- Highway
- Major
- Local
- Minor
- Ramp
- Other

1:50,000

Figure 1
Site Location Map
Vineland Armory/FMS
Vineland City,
Cumberland Co., NJ

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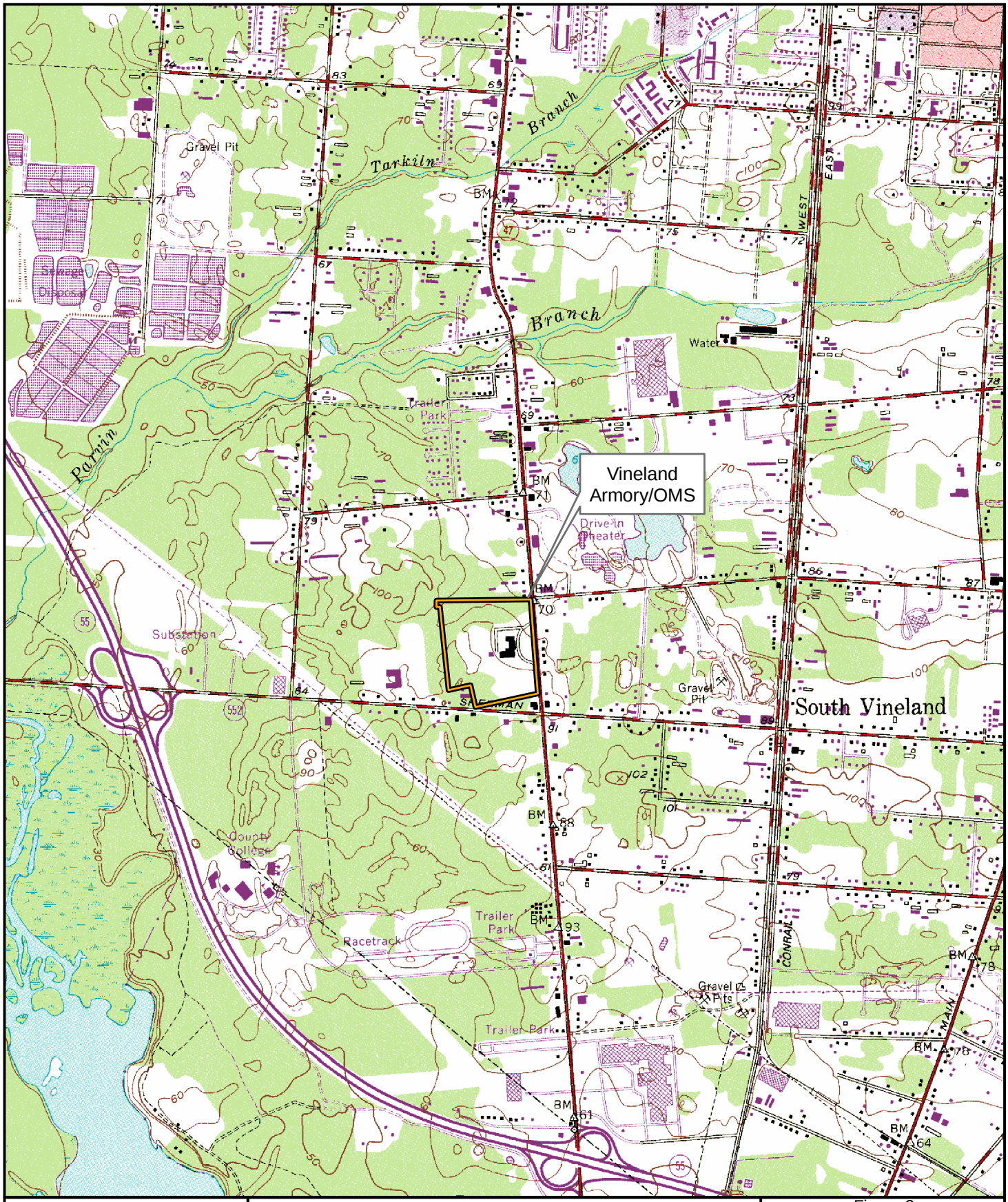
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 338283.220070 Feet
Northing: 224853.387343 Feet

1:24,000

Figure 2
USGS Topographic Map
Vineland Armory/OMS
Vineland City,
Cumberland Co., NJ

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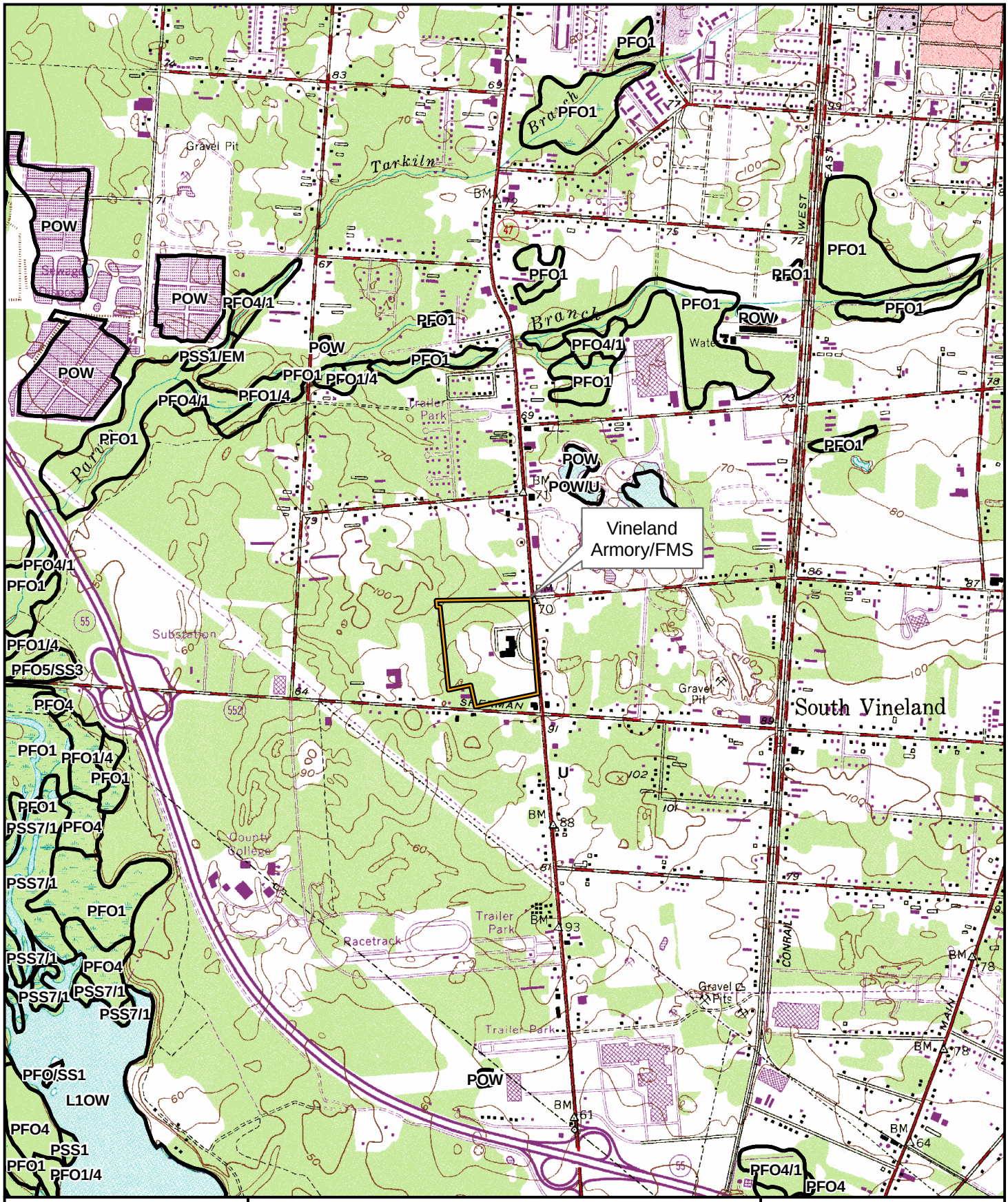




***Legend***

NWI Wetland

Installation Area

NJ State Plane Coordinates:
Easting: 338283.220070 Feet
Northing: 224853.387343 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Vineland Armory/FMS
Vineland City,
Cumberland Co., NJ

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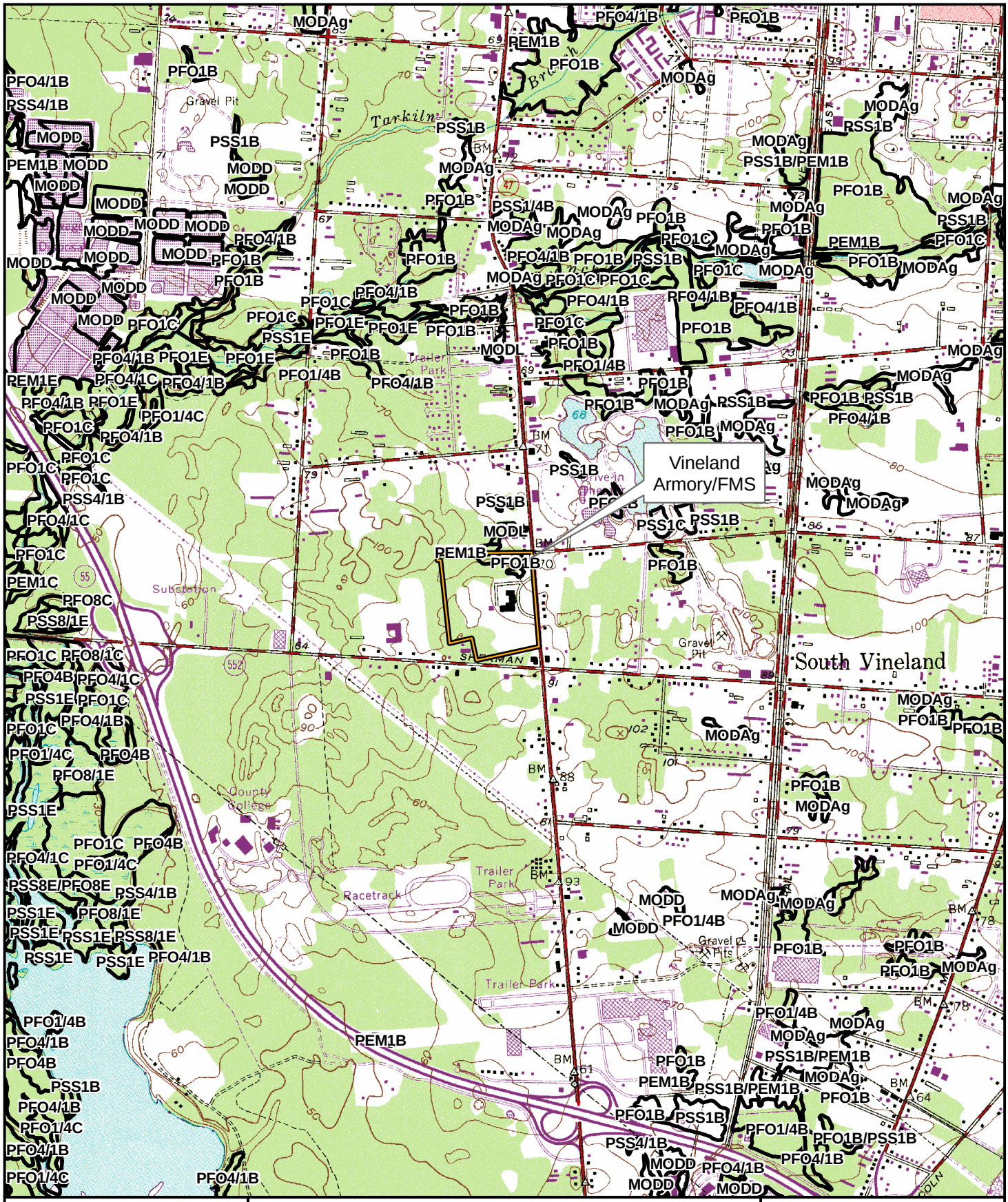
Plymouth Meeting, PA 19462


Vineland Armory/FMS
South Vineland
Tarkiln Brook
Gravel Pit
Substation
Trailer Park
Racetrack
County College
Drive-In
SHERMAN
LINCOLN
PEM1B
PFO1B
PFO4/1B
PSS1B
PSS1B/PEM1B
MODAg
MODD
PFO1/4B
PFO4B
PFO1C
PFO4/1C
PFO1E
PFO1/4C
PFO4/1B
PFO1/4B
PFO8/1E
PFO8C
PFO8/1C
PSS1E
PSS4/1B
PSS8/1E
PSS8E/PFO8E
PSS1C
PSS4/1C
PSS4/1E
PSS1E/PSS1E
PSS1E/PSS8/1E
RSS1E
PSS1E/PFO4/1B
PFO1B/PSS1B
MODL
PEM1E
PFO1C/PFO1E
PFO1E/PFO1E
PFO1C/PFO1C
PFO1C/PFO1B
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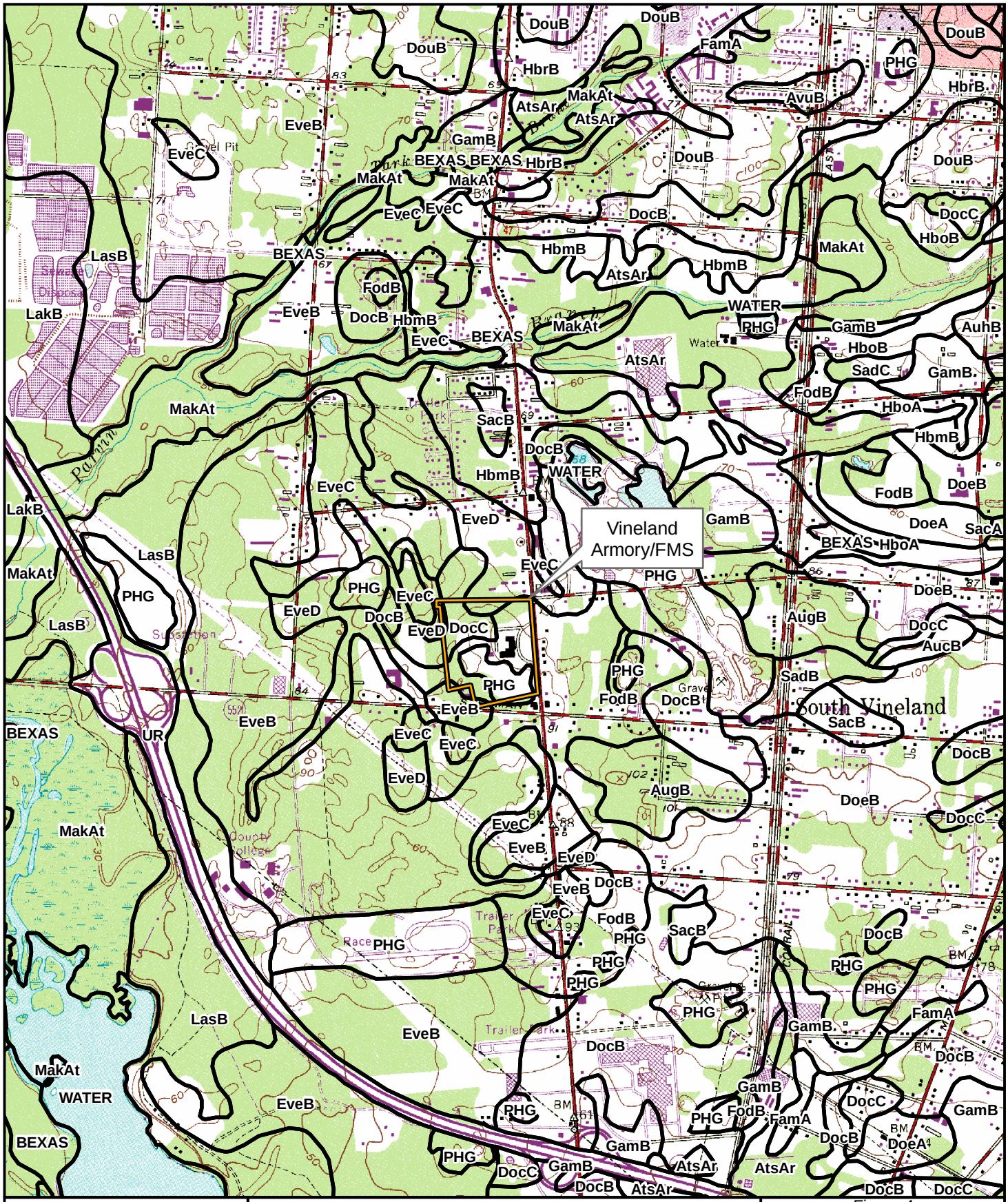
PFO1B






***Legend***

USDA Soils

Installation Area

NJ State Plane Coordinates:
Easting: 338283.220070 Feet
Northing: 224853.387343 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
Vineland Armory/FMS
Vineland City,
Cumberland Co., NJ

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***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 338283.220070 Feet
Northing: 224853.387343 Feet

1:2,641

Figure 5
Wetlands Location Map
Vineland Armory/FMS
Vineland City,
Cumberland Co., NJ

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# 26.0 WEST ORANGE ARMORY FMS/CSMS

This section of the report presents the results of the wetlands delineation for the West Orange Armory FMS/CSMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 26.1 Site Location

The West Orange Armory FMS/ CSMS installation is an approximately 53.03-acre parcel designated as Block 171, Lots 1, 3 and 4 in West Orange Township, Essex County, New Jersey (**Figure 1**) It is located on the southbound side of Pleasant Valley Way, south of its intersection with Mountain Avenue. The NJ State Plane Coordinates for the site are East 553216.645705 feet and North 710195.214716 feet. The site is located in the Piedmont physiographic section of New Jersey, in the Upper Passaic River watershed of Watershed Management Area 6 (WMA 6; Upper Passaic, Whippany, and Rockaway).

The site is an irregular-shaped parcel bound to the north by an active construction site for the Kessler Institute, to the west by undeveloped land, to the south by a Township road, and to the east by Pleasant Valley Way. The surrounding land use is mixed residential, rural, and institutional. The main developed portion of the site is the eastern half of the site, whereas the naturalized areas occupy the western half. A description of these areas is presented in Section 26.2.

## 26.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, the USDA NRCS soil survey data for the site area, and the April 2007 Rare Species Survey Report. The results of this review are presented below.

### 26.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 400 and 500 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is the Rahway River. At its closest point, the Rahway River is located approximately 500 feet to the southeast of the site; however, net drainage on the site is to the west, towards Bear Brook, a tributary to the Rahway River.

### 26.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates pockets of palustrine, forested, broad-leaved, deciduous, saturated wetlands (PFO1B) along the western property boundary (**Figure 3A**). This community is coincident with Bear Brook.

### 26.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data for the site area indicates the presence of a small area of deciduous wooded wetlands in the south-western portion of the site (**Figure 3B**). These wetlands are coincident with portions of the PFO1B community depicted on the NWI map.

### 26.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Boonton loam, 0 to 8 percent slopes, extremely stony (BogBc) – Mapped to occur in the northeast portion of the site.
- Boonton loam, 8 to 15 percents slopes, extremely stony (BogCc) – Mapped to occur as a linear band through the central portion of the site.
- Boonton loam, 15 to 35 percent slopes, extremely stony (BogDc) – Mapped to occur in the western portion of the site.
- Boonton – Urban land complex, 0 to 8 percent slopes (BouB) – Mapped to occur along a portion of the southwest site boundary.
- Haledon silt loam, 0 to 8 percent slopes, extremely stony (HanBc) – Mapped to occur as a finger extending into the site from the western site boundary.
- Urban land – Boonton substratum, 0 to 8 percent slopes (URBONB) – Mapped to occur in the eastern portion of the site.
- Urban land – Dunellen substratum, 0 to 8 percent slopes (URDUNB) – Mapped to occur in the northeast corner of the site.
- Dunellen sandy loam, 3 to 8 percent slopes (DunB) – Mapped to occur in the southeast corner of the site.

None of the above soil types is listed by the USDA as a hydric soil (USDA 1995).

### 26.2.5 Rare Species Survey

The results of the April 2007 Rare Species Survey Report indicate the potential presence of a state-listed herptile species or suitable habitat for this species to be present on the site. The results of a Phase I survey of the site did not document the presence of this species or suitable habitat for this species on the site.

## 26.3 Results of the Field Assessment

As of September 2005, the West Orange Armory FMS / CSMS installation was composed of the following six distinct community types: open water, forested deciduous wetland, emergent wetland, deciduous woodland, mowed lawn, and developed land. The open water, forested deciduous wetland, and emergent wetland communities are designated as Wetland Series A and B (**Figure 5**). Each of the six community types are described below.

A stream is located in the western portion of the site (i.e. the rear of the property), with a channel that meanders in and out of the property boundaries. The channel morphology ranges from very narrow (approximately one foot wide) drainage pathways to broad floodplain areas without clear bed and banks. The up-gradient end of this open water community is located near the south-western corner of the site, abutting the rear yards of private residential properties. At this end, the stream is more accurately described as a stormwater erosional feature. This erosional feature develops more characteristic stream-like features as the channel progresses down-gradient, to the north. The rear of the property is a valley landform, roughly oriented in an east to west direction; therefore, this stream flows northward into a low-lying area that also receives drainage from uphill areas to the north. At the time of the site visit, the up-gradient portions of the stream were dry, whereas the down-gradient portions typically exhibited one to two inches of standing water or very slow-moving water. The wetland boundaries associated with this stream ranged from the top-of-bank to slightly wider areas that included adjacent wetland communities, described below.

Small, narrow fringes of forested deciduous wetland are located along several segments of the stream community. This community has a mixed assemblage of typical wetland and upland vegetation such as sugar maple (*Acer saccharum*, FACU-), ironwood (*Carpinus caroliniana*, FAC), red oak (*Quercus rubra*, FACU-), American elm (*Ulmus americana*, FACW-), witch hazel (*Hamamelis virginiana*, FAC-), grape (*Vitis* sp., NA), poison ivy (*Toxicodendron radicans*, FAC), Japanese honeysuckle (*Lonicera japonica*, FAC-), common greenbrier (*Smilax rotundifolia*, FAC), and Japanese stilt grass (*Microstegium vimineum*, FAC). Additionally, an emergent marsh is located at the bottom of the valley that receives drainage from this stream and elevated areas to the north. This emergent marsh is dominated by Japanese stiltgrass (FAC), woolgrass (*Scirpus cyperinus*, FACW+), soft rush (*Juncus effusus*, FACW+), lurid sedge (*Carex lurida*, OBL). A representative soil boring collected from these fringe communities typically exhibits a single, deep horizon of grayish-brown (10YR 5/2) silt loam with distinct pale brown (10YR 6/3) mottles at a frequency of approximately 20 percent. The open water community and associated fringes of forested deciduous wetland and emergent wetland are collectively designated as Wetland Series B.

Another emergent wetland is located in the northern portion of the site, near the property boundary. This wetland is situated at a high elevation, at the end of a historic road cut. This community is surrounded by deciduous woodland, and is dominated by grass-leaved goldenrod (*Euthamia graminifolia*, FAC), meadowsweet (*Spiraea latifolia*, FAC+), and halberd-leaved tearthumb (*Polygonum arifolium*, OBL). A representative soil boring collected from this community typically exhibits a single, deep horizon of dark brown (7.5YR 3/4) silt loam, which is suspected to be young fill material. This community was designated as Wetland Series A.

Deciduous woodland is the dominant community type on this site. This community is dominated by sugar maple (FACU-), American beech (*Fagus grandifolia*, FACU), red oak (FACU-), tulip poplar (*Liriodendron tulipifera*, FACU), white ash (*Fraxinus americana*, FACU), black cherry (*Prunus serotina*, FACU), and sassafras (*Sassafras albidum*, FACU-) in the canopy and sapling layers. Also abundant, but not dominant, are black birch (*Betula lenta*, FACU), white oak (*Quercus alba*, FACU), and shagbark hickory (*Carya ovata*, FACU-). Well-developed or distinct shrub and ground layers were not apparent at the time of the site visit, likely the result of over-browsing by deer. Nevertheless, some species noted are poison ivy (FAC), white snakeroot (*Ageratina altissima*, FACU-), Japanese barberry (*Berberis thunbergii*, FACU), Asiatic bittersweet (*Celastrus orbiculatus*, NL), multiflora rose (*Rosa multiflora*, FACU), Allegheny

blackberry (*Rubus allegheniensis*, FACU-), and wine raspberry (*Rubus phoenicolasius*, FACU-). There are numerous low-lying road ruts throughout this community that do not exhibit wetland characteristics. These ruts were determined not to be wetlands.

The mowed lawn and developed land communities generally occupy the eastern portions of the site area, on the east side of the north-south ridge. Net drainage from these areas is therefore to the east, towards Pleasant Valley Road. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional, roadside species.

## 26.4 Conclusion

The results of the wetlands delineation conducted for the West Orange Armory FMS/CSMS installation reveal the presence of two wetland areas in the western portion of the site as depicted on **Figure 5**. The much larger Wetland Series B is associated with a stream and adjacent forested deciduous wetlands that extend into off-site areas. The relatively smaller Wetland Series A is an isolated, emergent wetland community situated at a high elevation on the site, sustained by perched ground water. It is anticipated that both wetland areas will be classified by the NJDEP as intermediate-resource value wetlands as per Subchapter 2 of N.J.A.C. 7:7A, thus possessing a 50-foot freshwater wetlands transition area (i.e. buffer). This conclusion was reached because the wetlands do not meet the criteria for either exceptional resource value wetlands or ordinary resource value wetlands, and thus by default will be designated by the NJDEP as intermediate resource value wetlands per N.J.A.C. 7:7A-2.4. The wetlands do not meet the criteria for exceptional resource value wetlands because they do not discharge into a FW1 or FW2 trout production water or their tributaries; are not a present habitat for threatened or endangered species; and are not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b). This conclusion is further supported by the findings of the April 2007 Rare Species Survey Report.

These wetlands also do not meet the criteria for ordinary resource value wetlands because they are not isolated wetlands that have 50 percent or more of the area within 50 feet of the wetland boundaries that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; drainage ditches, swales, or detention facilities as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## West Orange Armory FMS/CSMS

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**Legend**

| | |
|---|---|
| Installation Area | Local |
| Limited Access | Minor |
| Highway | Ramp |
| Major | Other |

1:50,000

Figure 1
Site Location Map
West Orange Armory FMS/CSMS
West Orange Twp.,
Essex Co., NJ

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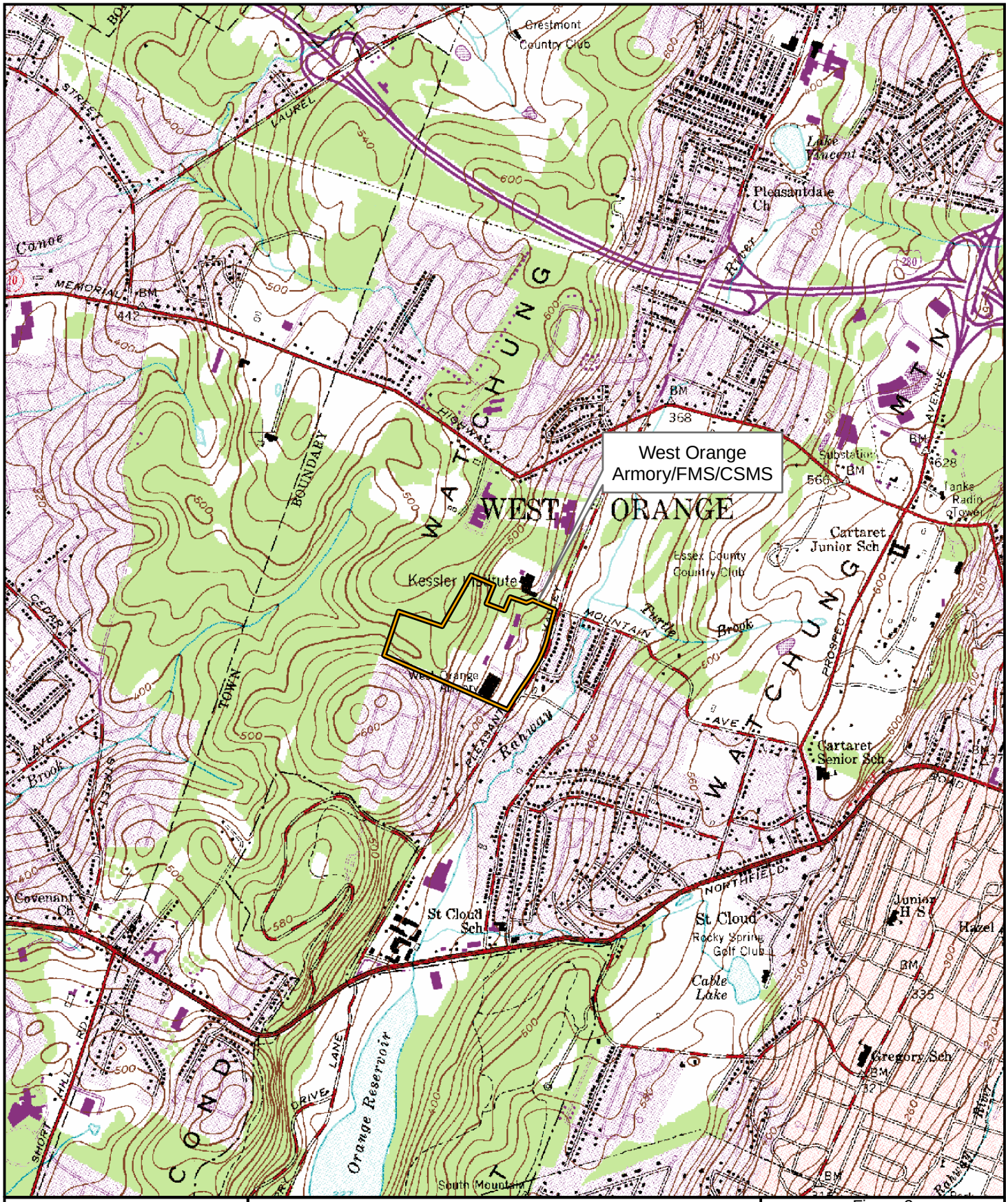
Plymouth Meeting, PA 19462






***Legend***

Installation Area

NJ State Plane Coordinates:
Easting: 553216.645705 Feet
Northing: 710195.214716 Feet

1:24,000

Figure 2
USGS Topographic Map
West Orange Armory FMS/CSMS
West Orange Twp.,
Essex Co., NJ

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Plymouth Meeting, PA 19462






***Legend***

Installation Area

NWI Wetland

NJ State Plane Coordinates:
Easting: 553216.645705 Feet
Northing: 710195.214716 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
West Orange
Armory/FMS/CSMS

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**Legend**

Installation Area

NJDEP Wetland

NJ State Plane Coordinates:
Easting: 553216.645705 Feet
Northing: 710195.214716 Feet

* See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
West Orange
Armory/FMS/CSMS

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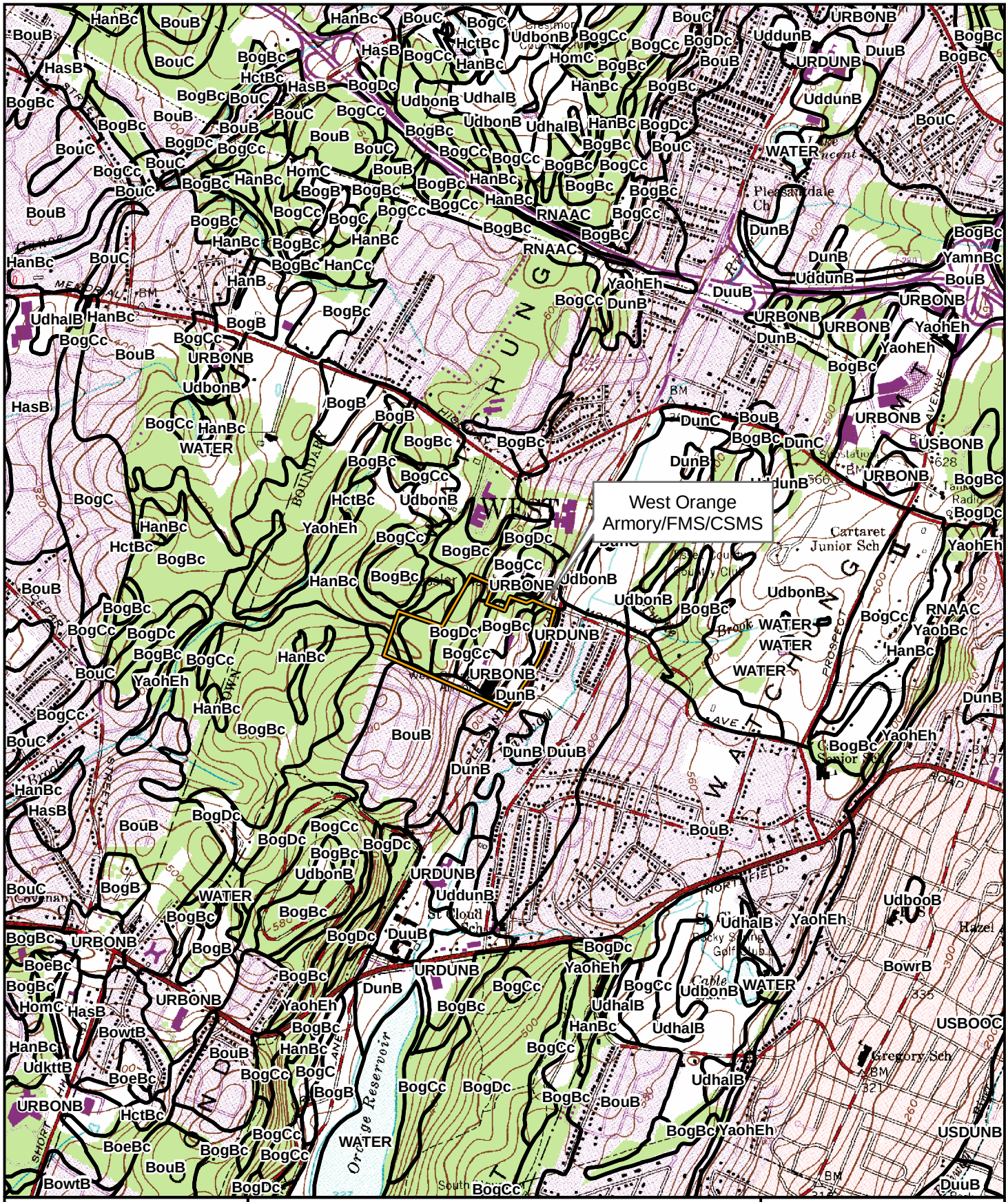




**Legend**

Installation Area

USDA Soils

NJ State Plane Coordinates:
Easting: 553216.645705 Feet
Northing: 710195.214716 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
West Orange Armory FMS/CSMS
West Orange Twp.,
Essex Co., NJ

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***Legend***

Soil Boring

Wetland Flag

Wetland Boundary

50' Wetland Buffer

Property Boundary

Photo Point

NJ State Plane Coordinates:
Easting: 553216.645705 Feet
Northing: 710195.214716 Feet

1:4,336

Figure 5
Wetlands Location Map
West Orange Armory FMS/CSMS
West Orange Twp.,
Essex Co., NJ

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# 27.0 WEST TRENTON AASF/FMS

This section of the report presents the results of the wetlands delineation for the West Trenton AASF/FMS installation. A description of the property location is presented first, followed by the results of a desk-top delineation, concluding with the results of the field delineation. The field delineation results detail the vegetation, soil, and hydrology observed on the site.

## 27.1 Site Location

The West Trenton AASF/FMS installation is a 120.2-acre parcel designated as Block 373, Lot 9 in Ewing Township, Mercer County, New Jersey (**Figure 1**). It is located on the southwest corner of Scotch Road and Upper Ferry Road. The NJ State Plane Coordinates for the site are East 406341.112046 feet and North 525712.665420 feet. The site is located in the Piedmont physiographic section of New Jersey, in the Assunpink Creek watershed of Watershed Management Area 11 (WMA 11; Central Delaware).

The site is an irregular-shaped parcel, bound to the north, south, and west by private roads within the Trenton-Mercer County Airport, and to the east by Scotch Road and Upper Ferry Road. The surrounding land use is commercial and government. The majority of the site is developed with the exception of a small area in the northeast. A description of these areas is presented in Section 27.2.

## 27.2 Results of the Desk-top Delineation

A desk-top review of available resources was conducted prior to the field investigation of the site. This desk-top delineation included the review of the USGS topographic quadrangle(s) for the site area, the USFWS NWI map(s) for the site area, the NJDEP freshwater wetlands GIS data for the site area, and the USDA NRCS soil survey data for the site area. The results of this review are presented below.

### 27.2.1 USGS Topographic Quadrangle

A review of the USGS topographic quadrangle for the site indicates that the site is situated between 160 and 180 feet above mean sea level (MSL) (**Figure 2**). The nearest mapped open water feature is an unnamed tributary to the West Branch of the Shabakunk Creek. At its closest point, the unnamed tributary is located approximately 300 feet to the northeast of the site. Net drainage on the site is to the east, towards the unnamed tributary.

### 27.2.2 National Wetlands Inventory

A review of the USFWS NWI map for the site area indicates no wetlands to be mapped on or immediately adjacent to the property (**Figure 3A**). The nearest mapped wetland is a palustrine, forested, broad-leaved, deciduous wetland (PFO1) located approximately 1,200 feet to the east of the site. This PFO1 wetland is associated with the riparian and floodplain areas for the West Branch of the Shabakunk Creek.

### 27.2.3 NJDEP Freshwater Wetlands

A review of the NJDEP freshwater wetlands GIS data indicates the presence of a linear area of herbaceous wetlands in the northeast corner of the site (**Figure 3B**). This community is not depicted on the NWI map.

### 27.2.4 USDA Soils

A review of the USDA soils GIS data indicates the site to be underlain by the following soil types (**Figure 4**):

- Cut and fill land, rock substratum (UdbB) – Mapped to occur in the northwest and western portions of the site.
- Quakertown silt loam, 0 to 6 percent slopes (QukB) – Mapped to occur in the central and eastern portions of the site.

Neither of these soil types is listed by the USDA as a hydric soil (USDA 1995).

## 27.3 Results of the Field Assessment

As of October 2005, the West Trenton AASF/FMS installation was composed of the following five distinct community types: open water, riparian forested deciduous wetland, riparian deciduous woodland, mowed lawn, and developed land. The open water, riparian forested deciduous wetland, and emergent marsh communities were identified as wetland and designated as Wetland Series A, B, and C (**Figure 5**). Each of these six community types are described below.

The open water community is a man-made drainage channel located along the northeast property boundary. This channel is oriented in a northwest to southeast direction and flows to the southeast. At its upgradient end, this channel originates at a culvert, is approximately 15 feet wide, and contains approximately six to eight inches of clear, slow-flowing water. The channel broadens to a diffuse marshy area at its approximate midpoint, and then converges into a single, discrete channel, flowing beneath an on-site earthen road crossing via twin culverts. The channel continues south-eastward through a culvert beneath Scotch Road. At its downgradient end, the channel is 10 to 12 feet wide and contains approximately four to six inches of clear, slow-flowing water. Wetland and upland vegetated riparian strips surround both sides of the channel, described below.

An early-stage, fringe of forested deciduous wetland is situated along both sides of the open water community. This riparian community varies in width and is vegetated with species such as red maple (*Acer rubrum*, FAC), silver maple (*Acer saccharinum*, FACW), black gum (*Nyssa sylvatica*, FAC), black willow (*Salix nigra*, FACW+), American elm (*Ulmus americana*, FACW-) in the canopy and sapling layers; spicebush (*Lindera benzoin*, FACW-), southern arrowwood (*Viburnum dentatum*, FAC), multiflora rose (*Rosa multiflora*, FACU), and silky dogwood (*Cornus amomum*, FACW) in the shrub layer; Japanese honeysuckle (*Lonicera japonica*, FAC-) and poison ivy (*Toxicodendron radicans*, FAC) in the vine layer; and jumpseed (*Tovara virginiana*, FAC) in the ground layer. A representative soil boring collected from this community typically exhibits a two-inch fibric layer, underlain by a single, depositional horizon of gray (10YR 5/1)

medium sandy loam. The open water community and the riparian forested deciduous wetland community are designated as Wetland Series A, B, and C. In order to account for potential freshwater wetland transition areas on the property, delineation of this community continued to off-site areas to the north.

The outer fringe of the riparian community is deciduous woodland. This community occupies the relatively higher elevations alongside the open water community and is dominated by black walnut (*Juglans nigra*, FACU), white ash (*Fraxinus americana*, FACU), black cherry (*Prunus serotina*, FACU), multiflora rose (FACU), autumn olive (*Elaeagnus umbellata*, NL), Asiatic bittersweet (*Celastrus orbiculatus*, NL), Allegheny blackberry (*Rubus allegheniensis*, FACU-), red raspberry (*Rubus idaeus*, FAC-), and Japanese stiltgrass (*Microstegium vimineum*, FAC). Mowed lawn and mowed naturalized vegetation (i.e. Japanese stiltgrass) characterizes the vegetation community around the riparian strip, and one particular low-lying area was investigated further for potential wetland characteristics. This stiltgrass-dominated knoll is located near the north-eastern property boundary. A soil boring collected from this area revealed a very dark grayish-brown (10YR 3/2) surface horizon of silt loam, underlain by an upper subsoil of light olive-brown (2.5Y 5/3) silt loam. This soil was not considered to be hydric, and therefore, the grassy knoll was not identified as wetland.

The mowed lawn and developed land communities occupy the majority of the site, with the exception of the north-eastern portion, described above. Net drainage from these communities is to the southeast, towards Scotch Road. The mowed lawn community is dominated by a mix of typical lawn grasses such as bluegrass (*Poa* sp., NA), rye (*Lolium* sp., NA), and fescue (*Festuca* sp., NA), intermixed with common herbaceous weed species. Vegetation within the developed land community is limited to landscaped plantings and occasional occurrences of relatively common, early-successional, roadside species.

## 27.4 Conclusion

The results of the wetlands delineation conducted for the West Trenton AASF/FMS installation reveal the presence of a wetland system along the east/northeast portion of the site. This wetland system comprises a drainage channel and adjacent forested wetland areas. These wetland areas were designated as Wetland Series A, B, and C, as depicted of **Figure 5**.

It is anticipated that the upgradient portion of Wetland Series B and all of Wetland Series A will be considered by the NJDEP to meet the definition of a ditch at N.J.A.C. 7:7A-1.4, thus classified as an ordinary-resource value wetland with no associated freshwater wetlands transition area (i.e. buffer). It is anticipated that the off-site Wetland Series C will be considered by the NJDEP to meet the definition of a State open water at N.J.A.C. 7:7A-1.4, thus possessing no freshwater wetlands transition area.

In contrast it is anticipated that the adjacent forested wetland portion of Wetland Series B will be classified by the NJDEP as an intermediate-resource value wetland, thus possessing a 50-foot freshwater wetlands transition area as per Subchapter 2 of N.J.A.C. 7:7A. This conclusion was reached because the wetland does not meet the criteria for either an exceptional resource value wetland or an ordinary resource value wetland, and thus by default will be designated by the NJDEP as an intermediate resource value wetland per N.J.A.C. 7:7A-2.4. The wetland does not meet the criteria for an exceptional resource value wetland because it does not discharge into a FW1 or FW2 trout production water or their tributaries; is not a present habitat for threatened or

endangered species; and is not a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat (N.J.A.C. 7:7A-2.4(b).

The wetland also does not meet the criteria for an ordinary resource value wetland because it is not an isolated wetland that has 50 percent or more of the area within 50 feet of the wetland boundary that is lawn, maintained landscaping, impervious surface, active railroad right-of-way, or graveled or stoned parking/storage areas and roads, any and all of which must have been legally in existence at that location prior to July 1, 1988; a drainage ditch, a swale, or a detention facility as defined at N.J.A.C. 7:7A-1.4 and N.J.A.C. 7:7A-2.4(d).

The determinations of the wetland boundaries, their classifications, and their respective associated transition areas, are subject to review by the NJDEP. As such, the above finding should not be considered final until approval from the NJDEP.

# FIGURES

## West Trenton AASF/FMS

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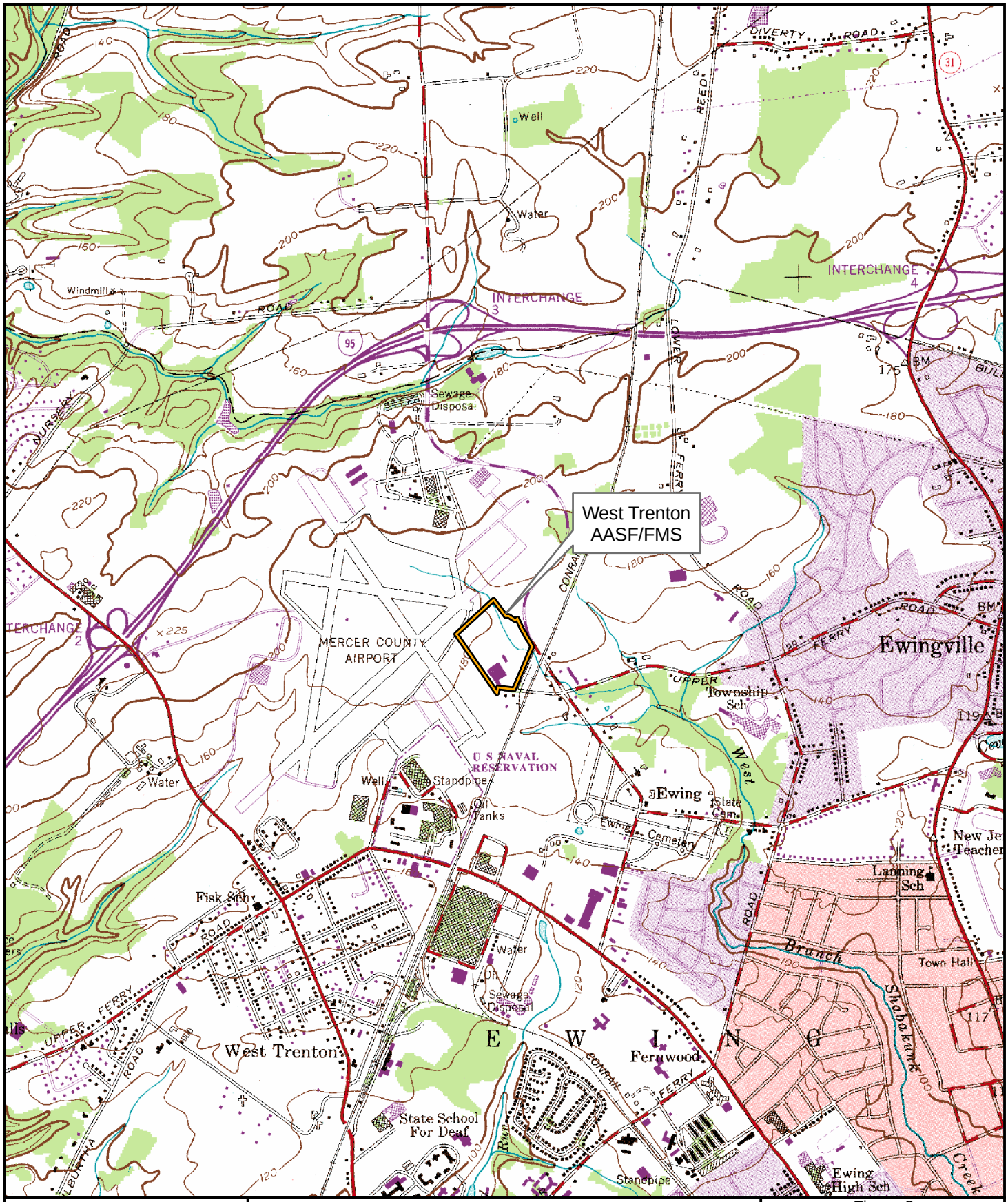
**Legend**

| | |
|---|---|
| Installation Area | Local |
| Limited Access | Minor |
| Highway | Ramp |
| Major | Other |

1:50,000

Figure 1
Site Location Map
West Trenton AASF/FMS
Ewing Twp.,
Mercer Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

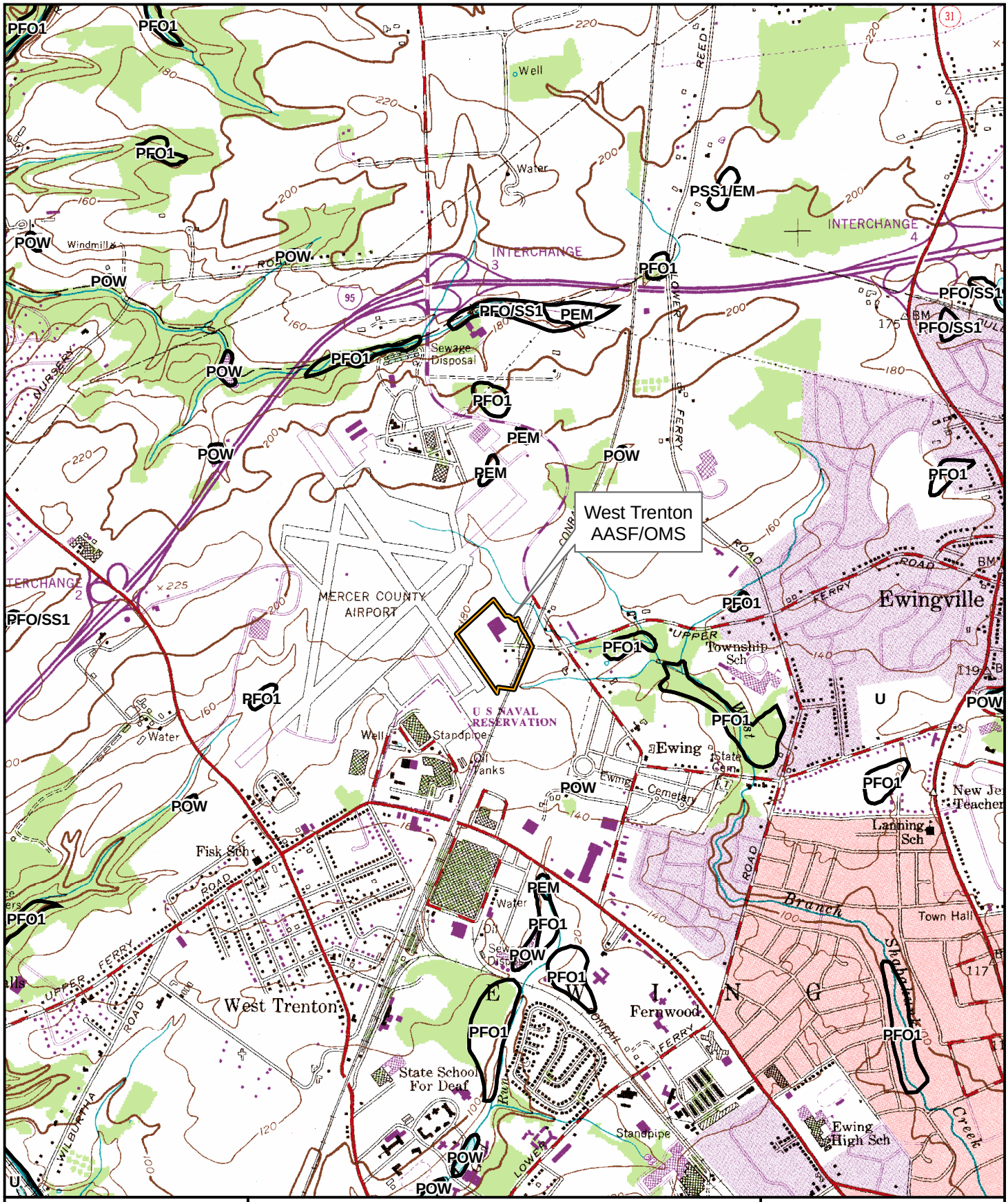
Installation Area

NJ State Plane Coordinates:
Easting: 406341.112046 Feet
Northing: 525712.665420 Feet

1:24,000

Figure 2
USGS Topographic Map
West Trenton AASF/FMS
Ewing Twp.,
Mercer Co., NJ

amec
EARTH & ENVIRONMENTAL, INC.
One Plymouth Meeting, Suite 850
Plymouth Meeting, PA 19462






***Legend***

NWI Wetland

Installation Area

NJ State Plane Coordinates:
Easting: 406341.112046 Feet
Northing: 525712.665420 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3a
USFWS NWI
Wetlands Inventory Map
Trenton Mercer Aviation Armory
Ewing Twp.,
Mercer Co., NJ

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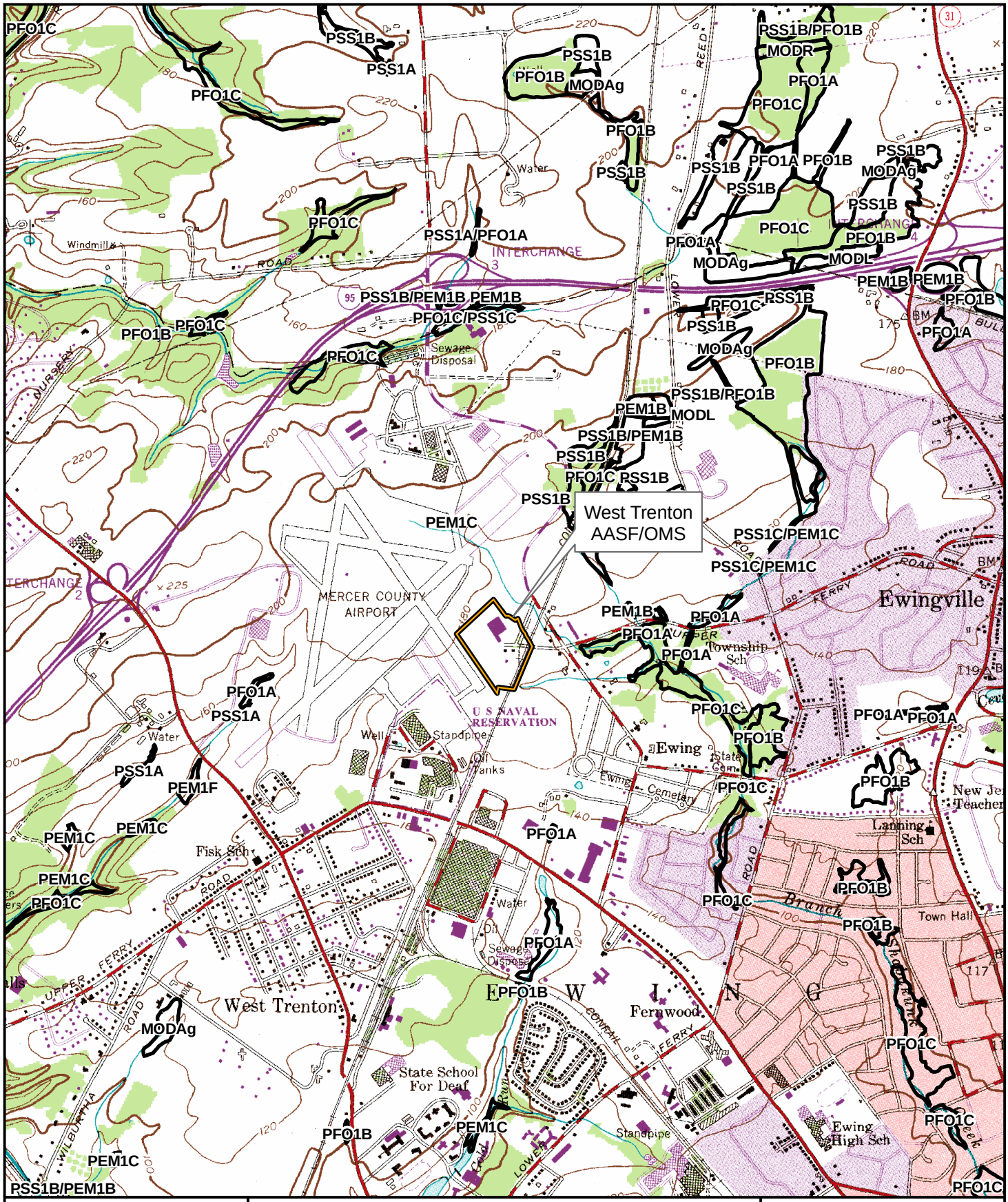
Plymouth Meeting, PA 19462






***Legend***

NJDEP Wetland

Installation Area

NJ State Plane Coordinates:
Easting: 406341.112046 Feet
Northing: 525712.665420 Feet

*See report text for wetland descriptions.

1:24,000

Figure 3b
NJDEP Wetlands
Wetlands Inventory Map
Trenton Mercer Aviation Armory
Ewing Twp.,
Mercer Co., NJ

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Plymouth Meeting, PA 19462






***Legend***

USDA Soils

Installation Area

NJ State Plane Coordinates:
Easting: 406341.112046 Feet
Northing: 525712.665420 Feet

* See report text for soil descriptions.

1:24,000

Figure 4
USDA Soils Map
West Trenton AASF/FMS
Ewing Twp.,
Mercer Co., NJ

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***Legend***

- Soil Boring
- Wetland Flag
- Wetland Boundary
- 50' Wetland Buffer
- Property Boundary
- Photo Point

NJ State Plane Coordinates:
Easting: 406341.112046 Feet
Northing: 525712.665420 Feet

1:2,062

Figure 5
Wetlands Location Map
West Trenton AASF/FMS
Ewing Twp.,
Mercer Co., NJ

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Plymouth Meeting, PA 19462

# 28.0 DELINEATION SUMMARY AND MANAGEMENT RECOMMENDATIONS

This section of the report presents a summary of the wetland delineation findings and a management summary for each facility. Planning-level cost estimates are also provided for the management recommendations. The table below summarizes the wetlands found on each facility, their respective transition areas/buffers, and the state or federal agency that holds regulatory authority over the facility's wetlands.

| Installation Name | Wetland Series | Transition Area/Buffer Width (feet) | Wetland Acreage (on-site) | Transition Area/Buffer Acreage (on-site) | Regulatory Agency |
|---|---|---|---|---|---|
| Bordentown Armory/FMS | A | 50 | 0.00 | 0.30 | NJDEP |
| Bordentown CSMS A | A | 0 | 0.13 | NA | NJDEP |
| | B/C | 0 | 0.02 | NA | |
| Bridgeton Armory | A | 0 and 50 | 1.03 | 2.70 | NJDEP |
| | B/E | 50 | 1.82 | 2.80 | |
| | C | 50 | 0.00 | 0.00 | |
| | D | 0 | 0.02 | NA | |
| | F | 50 | 0.00 | 0.00 | |
| Cape May Armory FMS | A | 150 | 10.79 | 6.40 | NJDEP |
| Cherry Hill Armory FMS | A | 0 and 50 | 0.00 | 0.00 | NJDEP |
| | B | 0 | 0.00 | NA | |
| Dover Armory FMS | A | 50 | 3.82 | 2.30 | NJDEP |
| | B | 50 | 0.16 | 0.60 | |
| Flemington Armory | A | 50 | 0.18 | 0.60 | NJDEP |
| | B | 0 | 0.00 | NA | |
| | C | 0 | 0.01 | NA | |
| | D | 0 and 50 | 1.21 | 1.90 | |
| | E | 0 | 0.00 | NA | |
| | F | 0 | 0.02 | NA | |
| Fort Dix, 3200 | A | 300 | 0.00 | 7.10 | NJ Pinelands Commission |
| | B | 300 | 1.31 | | |
| | C | 300 | 0.31 | 5.60 | |
| | D | 300 | 0.60 | 9.10 | |
| | E | 300 | 0.00 | 3.60 | |
| | F | 300 | 0.00 | O* Included with A/B | |
| Fort Dix, UTES | A | 300 | 0.17 | 5.20 | NJ Pinelands Commission |
| | B | 300 | 0.02 | 5.20 | |

| | | | | | |
|---|---|---|---|---|---|
| Franklin Armory | A | 0 | 0.04 | NA | NJDEP |
| | B | 150 | 2.08 | 4.30 | |
| | C/D | 0 and 150 | 0.23 | 2.60 | |
| Hackettstown Armory | A | 0 | 0.05 | NA | NJDEP |
| | B | 50 | 0.00 | 0.00 | |
| | C | 50 | 0.10 | 0.40 | |
| Hammonton Armory | A/B | 150 | 4.42 | 2.60 | NJDEP |
| Lawrenceville Complex | A | 0 and 50 | 0.16 | 1.30 | NJDEP |
| | B | 50 | 0.05 | 0.50 | |
| | C | 50 | 0.15 | 0.50 | |
| | D | 50 | 0.32 | 0.95 | |
| Morristown Armory FMS | A | 150 | 3.59 | 7.00 | NJDEP |
| | B | 0 | 0.02 | NA | |
| | C/D | 0 and 150 | 1.22 | 3.60 | |
| Newton Armory | A | 50 | 1.07 | 1.30 | NJDEP |
| Picatinny FMS | NA | NA | 0.00 | NA | NJDEP |
| Pitman Armory | A | 0 and 50 | 0.31 | 0.72 | NJDEP |
| Princeton Warehouse | A | 0 and 50 | 1.63 | 3.20 | NJDEP |
| Sea Girt NGTC | A | 0 | 0.03 | NA | NJDEP US Army Corps |
| | C | 50 | 3.17 | 4.00 | |
| Somerset Armory FMS | A | 50 | 0.00 | 0.00 | NJDEP |
| Toms River Armory FMS | A | 50 | 8.91 | 2.10 | NJDEP |
| | B | 50 | 0.07 | 0.50 | |
| | C | 50 | 0.80 | 0.50 | |
| Tuckerton Armory | NA | NA | 0.00 | NA | NJDEP |
| Vineland Armory FMS | A | 50 | 0.04 | 0.40 | NJDEP |
| West Orange Armory FMS/CSMS | A | 50 | 0.17 | 0.60 | NJDEP |
| | B | 50 | 2.22 | 2.00 | |
| West Trenton AASF/FMS | A | 0 | 0.05 | NA | NJDEP |
| | B | 0 and 50 | 0.51 | 1.50 | |
| | C | 0 | 0.00 | NA | |

In the above table, some wetland series are noted to have both 0-foot transition areas and 50- or 150-foot transition areas. In these instances, the wetland series include areas that are anticipated to be defined by the NJDEP per N.J.A.C. 7:7A-1.4 as State Open Waters or ordinary resource value wetlands, thus possessing no transition area. However, these same wetland series may also contain areas that are anticipated to be defined by the NJDEP as either

intermediate resource value wetlands, possessing a 50-foot transition area, or exceptional resource value wetlands, possessing a 150-foot transition area.

The above table also indicates that most of the installations' wetlands will be regulated by the NJDEP, with only the two Fort Dix installations (3200 and UTES) regulated by the NJ Pinelands Commission. The NJ Pinelands Commission regulates to a 300-foot wetland transition area. However, the Sea Girt NGTC installation will likely be regulated jointly by the NJDEP and the U.S. Army Corps of Engineers (USACOE) because of its proximity to tidal waters. It should also be noted that verification of the wetland boundaries at the Sea Girt installation would likely be conducted only by the NJDEP, and that the USACOE and the NJDEP would have a joint role in permitting any activities that would encroach wetlands, or wetlands and transition areas, respectively.

The sections below present management recommendations for each of the 25 installations, and these recommendations are also summarized in a table at the end of the individual sections. As indicated earlier, planning-level cost estimates are also provided for the management recommendations. These cost estimates were developed through a variety of methods including (1) prior project experience, (2) on-line quote requests, (3) consultation with local New Jersey contractors and vendors, and (4) pricing of materials at commercial retail facilities. This broad-scale approach resulted in a wide range of cost estimates. With the exception of one installation, the Bridgeton Armory, all of the cost estimates pertain to materials and supplies for educational signage. These materials and supplies include custom-lettered signs, sign posts, and mounting hardware. It is anticipated that the assembly and installation of these signs would be easily accomplished by the NJARNG without the assistance of an outside contractor/vendor. In contrast, a cost estimate for the full installation of chain-link fencing at the Bridgeton Armory by an outside contractor/vendor is provided since this is a relatively specialized task.

Purchasing materials and supplies (i.e., sign posts and mounting hardware) at commercial retail hardware stores represented the low end of the price range, and ordering materials and supplies to be shipped to the job site represented the high end of the price range. Custom-lettered signs are obviously not available at retail stores. Additionally, materials and supplies ordered in large quantities (e.g., for all 25 installations) will be significantly lower in price than if ordered on a per installation basis.

## 28.1 Bordentown Armory/FMS – Management Recommendations

The wetlands associated with the Bordentown Armory are located entirely off-site, to the north of the property. The anticipated 50-foot transition area for these wetlands extends into the site and into pre-existing development (i.e. mowed lawn and parking lot). Because of the proximity of these wetlands to mowed areas and the parking lot, there is a potential for these wetlands to be inadvertently encroached. The potential for these encroachments to result in adverse effects to the off-site wetlands is increased due to the moderately steep slope that separates the installation property from the off-site wetlands. Encroachments that may result in erosion of the soil surface would rapidly cause sedimentation into the off-site wetland.

The western portion of the installation contains intermittent pockets of deciduous woodland that are currently mesic. This portion of the installation should be re-examined in the future (e.g. 8 to 10 years) to determine if continued stormwater runoff from the installation has resulted in this system to develop into a wetland.

Based on the above analysis, the following is recommended for the Bordentown Armory/FMS installation:

- Educational signage pertaining to the subject of wetlands protection should be erected on the northern installation boundary, along the edge of the parking lot. A suggested spacing interval for this signage is ~100 feet apart which would consist of approximately two to three signs for this installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $120 to $330.

- Re-examination of the woodland pockets in the western portion of the installation within 8 to 10 years to determine if wetland conditions have developed over time.

## 28.2 Bordentown CSMS A – Management Recommendations

The wetlands associated with the Bordentown CSMS are associated with an intermittent stream that bisects the property. This stream is anticipated to be defined as a State Open Water by the NJDEP and thus possesses no transition area. The majority of the stream currently possesses an adequate vegetated riparian zone and any narrowing of this zone should be avoided. Narrowing of this riparian zone would include the removal of trees and shrubs that line the stream and the replacement of mowed lawn or meadow areas with impervious surfaces. However, avoiding vegetation removal within the riparian zone does not include the removal of any invasive plant species. Any invasive plant species removal activities in the riparian zone should include a management plan for either revegetation with native or desirable species, or monitoring for natural revegetation.

There is a potential for inadvertent encroachment into the stream from the road that currently bisects the stream (i.e. separating Wetland Series A from Wetland Series B/C). This road is the main thoroughfare between the northern and southern halves of the installation. There is also a potential for inadvertent encroachment into the upper reach of the stream in the southeastern portion of the property (at the upstream end of Wetland Series B/C). This upper reach is a subtle linear undulation in the landscape, near a portion of the installation that is a maintained picnic area.

Based on the above analysis, the following is recommended for the Bordentown CSMS A installation:

- Educational signage pertaining to the subject of wetlands protection erected along the road that bisects the stream. One sign on each side of the road is recommended for this location. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $80 to $220.

- Enhancement or widening of the riparian corridor along the portion of the stream where it is crossed by the aforementioned road.

## 28.3 Bridgeton Armory – Management Recommendations

The wetland system on the Bridgeton Armory installation is large and varies from a short drainage swale to a braided network of stream channels within a forested deciduous wetland.

The smallest feature of this system is the aforementioned short drainage swale (Wetland Series D) which leads from the parking lot towards the larger wetland system to the south. The general shape of the whole wetland system is linear and bisects the site in a roughly northwest to southeast direction. With one exception, a wide forested riparian corridor is present on the southern side; the northern side is relatively more narrow. The southwestern side of the wetland system exhibits a very narrow riparian corridor which separates the wetland from an area that is currently being used for light industrial activities.

Based on the above analysis, the following is recommended for the Bridgeton Armory installation:

- The erection of exclusion fencing or some other form of a physical or visual barrier between the developed land area in the southern portion of the site and the wetland system. This barrier should include approximately three educational signs in order to explain the presence of wetlands in the area. The cost estimate for installation of the exclusion fencing which consists of 6-foot tall, 11-gauge chain-link fencing ranges from $11,000.00 to $15,500.00. The cost estimate for the signage (i.e., signs, sign posts, and mounting hardware) ranges from $120 to $330.

## 28.4 Cape May Armory FMS – Management Recommendations

The wetland system on the Cape May Armory FMS installation is located in the southern portion of the site. There is a potential for a number of state-listed animal species to be present on the site, the majority of which would utilize the wetland habitats on the site. Mowed lawn extends up to the wetland boundary; meaning, the mowed lawn composes the transition area for this wetland. The mowed lawn area (i.e. transition area) to the east of the installation boundary is associated with recreational and athletic fields, thus having the potential for high public use.

Based on the above analysis, the following is recommended for the Cape May Armory FMS installation:

- Educational signage pertaining to the subject of wetlands protection should be erected on the eastern side of the wetland, near the recreational and athletic fields. A suggested spacing interval for this signage is ~150 feet apart which would consist of approximately three signs for this installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $120 to $330.

- Whenever possible, decrease the use of any lawn chemicals (e.g. fertilizers, pesticides, etc.) within a 150-foot band around the wetland boundary. This practice is anticipated to reduce the amount of potential non-point source pollution into the wetland.

## 28.5 Cherry Hill Armory FMS – Management Recommendations

The wetland system associated with the Cherry Hill Armory FMS installation is largely coincident with shoreline of the Cooper River. A paved pedestrian walkway runs parallel to the shoreline, and hence parallel to the wetland boundary. The wetland boundary and pedestrian walkway themselves may meander in and outside of the installation boundaries. The riparian corridor in the western portion of the wetland consists of mowed lawn and mature trees. The riparian

corridor in the eastern portion of the wetland consists of mowed lawn, buildings, and a paved parking area, one corner of which extends very close to the wetland boundary.

Based on the above analysis, the following is recommended for the Cherry Hill Armory FMS installation:

- Educational signage pertaining to the subject of wetlands and open water protection should be erected along the wetland boundary (i.e. shoreline of the Cooper River). This signage should be placed as close to the wetland boundary as possible while still remaining on the installation property. A suggested spacing interval for this signage is ~300 apart which would consist of approximately eight signs for this installation. One of these signs should be placed at the end of the paved parking area that abuts the wetland boundary in the eastern portion of the installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $320 to $880.

- Although the wetlands are anticipated to be designated by the NJDEP as a State Open Water, thus having no transition area, whenever possible, the use of any lawn chemicals (e.g. fertilizers, pesticides, etc.) should be decreased within a 50-foot band around the wetland boundary. This practice is anticipated to reduce the amount of potential non-point source pollution into the Copper River.

## 28.6 Dover Armory FMS – Management Recommendations

The wetland system on the Dover Armory FMS installation is largely coincident with the undeveloped portions of the site. Developed land, consisting of paved parking areas, a vehicle yard, and installation buildings, abut the wetland's southern boundary. Residential areas to the east of the installation and industrial warehouses to the northwest/west also abut portions of the wetland boundary.

Based on the above analysis, the following is recommended for the Dover Armory FMS installation:

- Educational signage pertaining to the subject of wetlands protection should be erected at the western and eastern ends of the wetland boundary; signage in the middle portion of the wetland is not considered to be necessary. One or two signs should be installed at the western end of the installation between the parking lot and the wetland boundary. One or two signs should be installed to flank the sides of the wetland, which is somewhat linear in shape at this end. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $80 to $220.

## 28.7 Flemington Armory – Management Recommendations

The wetland system on the Flemington Armory installation is a complex that ranges from narrow stormwater drainage ditches on the front lawn of the site, to extensive forested deciduous wetlands that extend to off-site areas. Although this wetland system generally surrounds the developed portion of the site, inadvertent encroachment into wetlands from the parking areas or other portions of the installation are not considered to be likely. This is because of existing

chain-link fencing around portions of the installation, coupled with the relatively higher elevation of the wetland areas in relation to the parking lots.

Based on the above analysis, the following is recommended for the Flemington Armory installation:

- Whenever possible, decrease the use of any lawn chemicals (e.g. fertilizers, pesticides, etc.) on the front mowed area of the installation. This practice is anticipated to reduce the amount of potential non-point source pollution into the extensive forested wetlands to the west.

## 28.8 Fort Dix 3200 – Management Recommendations

The wetland system on the Fort Dix 3200 installation includes a variety of wetland types including man-made stormwater drainage controls, forested wetlands, and disturbed wetlands. The surrounding uplands are also mixed and include mowed lawn, a ball-field, naturalized areas, paved parking areas, etc. Although the installation is a mosaic of differing wetland and upland types, inadvertent encroachment into wetland areas is not anticipated at this installation. This is because the wetlands that are within close proximity to the parking areas are clearly obvious to be stormwater control features on the property. Furthermore, the naturalized wetland areas already possess an adequate forested or scrub/shrub riparian buffer.

Based on the above analysis, no management recommendations are provided for the Fort Dix 3200 installation, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A.

## 28.9 Fort Dix UTES – Management Recommendations

The wetland system on the Fort Dix UTES installation comprises two very small wetland areas separated by a sand road. The smaller of the two, Wetland Series B, is an extremely small roadside depression that is vegetated with emergent wetland vegetation. However small this area is, it is suspected to serve as a minor recharge zone for Wetland Series A located downgradient and across the road. Wetland Series A is a depressional wetland within a relatively larger wooded upland stand, thus possessing an adequate vegetated buffer.

Based on the above analysis, the following is recommended for the Fort Dix UTES installation:

- Educational signage pertaining to the subject of wetlands protection should be erected on either side of the sand road that separates Wetland Series A and B. One sign for each side of the road is recommended. Educational signage along other portions of Wetland Series A is not considered to be necessary since there is an adequate wooded buffer. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $80 to $220.

## 28.10 Franklin Armory – Management Recommendations

The wetland system on the Franklin Armory installation includes areas anticipated to be defined by the NJDEP as State Open Waters, thus possessing no transition area, as well as exceptional

resource-value wetlands that will possess a 150-foot buffer. The exceptional resource-value designation is anticipated to be a result of the presence of the state-threatened wood turtle and suitable habitat for a number of state-listed wildlife species. The resulting 150-foot transition area will extend well into the mowed lawn areas of the installation.

Based on the above analysis, the following is recommended for the Franklin Armory installation:

- Educational signage pertaining to the subject of wetlands protection should be erected along the 150-foot transition area boundary. A suggested spacing interval for this signage is ~300 apart which would consist of approximately six signs for this installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $240 to $660.

- Whenever possible, decrease the use of any lawn chemicals (e.g. fertilizers, pesticides, etc.) on the mowed lawn areas towards the rear of the installation. This practice is anticipated to reduce the amount of potential non-point source pollution into the extensive forested wetlands to the west and north.

## 28.11 Hackettstown Armory – Management Recommendations

The wetland system on the Hackettstown Armory installation includes two small depressional wetlands along the site's western boundary. There are additional off-site wetland areas to the west of the installation, which are anticipated to be designated as an intermediate resource-value wetland, thus the resulting 50-foot buffer would not extend into the installation. The two small depressional on-site wetlands are located in the rear portion of the installation which is fairly inaccessible. These wetlands also abut railroad tracks that are also fairly remote.

Based on the above analysis, no management recommendations are provided for the Hackettstown Armory, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A.

## 28.12 Hammonton Armory – Management Recommendations

The wetland system on the Hammonton Armory installation is coincident with the wooded portion of the site. Mowed lawn extends from the developed portion of the installation (northwest portion of the site) right up to the wetlands boundary (i.e. tree-line). This forested wetland also exhibits suitable habitat for the state-endangered and federally-threatened plant, swamp pink. Undeveloped land borders the wetland on the installation's northeastern and southwestern sides; however, light industrial land use abuts the wetland boundary on the wetland's southeastern boundary.

Based on the above analysis, the following is recommended for the Hammonton Armory installation:

- Educational signage pertaining to the subject of wetlands protection should be erected along the anticipated 150-foot transition area boundary associated with the northwestern side of the wetland, within the mowed lawn portion of the installation. A suggested spacing interval for this signage is ~300 apart which would consist of approximately six

signs for this installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $240 to $660.

- Whenever possible, decrease the use of any lawn chemicals (e.g. fertilizers, pesticides, etc.) on the mowed lawn areas towards the rear of the installation. This practice is anticipated to reduce the amount of potential non-point source pollution into the extensive forested wetlands to the west and north.

## 28.13 Lawrenceville Complex – Management Recommendations

With the exception of the constructed wetland along the property frontage, the wetland system on the Lawrenceville Complex installation is generally located along the rear property boundary. These wetlands range from areas anticipated to be designated as State Open Water, thus having no transition area, to areas anticipated to be designated as an intermediate resource-value wetland, thus possessing a 50-foot transition area. These wetlands also abut the rear yards of numerous surrounding residential properties. The use of the rear wooded portion of the installation by surrounding residents was evident during the wetland delineation activities.

Based on the above analysis, the following is recommended for the Lawrenceville Complex installation:

- Educational signage pertaining to the subject of wetlands protection should be erected along segments of the south/southeastern property boundary associated with Wetland Series A. Approximately six signs are recommended for this area. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $240 to $660.

## 28.14 Morristown Armory FMS – Management Recommendations

The wetland system on the Morristown Armory FMS installation is located on opposite ends of the property (east and west) with the developed portion of the site situated in between. A substantial vegetated buffer exists for the majority of both wetlands with the exception of the upgradient end of Wetland Series A. The upgradient end of this series abuts the western parking lot for the installation building.

Based on the above analysis, the following is recommended for the Morristown Armory FMS installation:

- Educational signage pertaining to the subject of wetlands protection should be erected at the upgradient end of Wetland Series A, between the wetland and the parking lot. Two to three signs are recommended for this area. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $120 to $330.

## 28.15 Newton Armory FMS – Management Recommendations

The wetland system on the Newton Armory installation is a single, large depressional emergent wetland located in the east/southeastern portion of the property. A vegetated buffer is located around the majority of the wetland's perimeter.

Based on the above analysis, no management recommendations are provided for the Newton Armory, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A.

## 28.16 Picatinny FMS – Management Recommendations

The results of the wetlands delineation revealed that no wetlands or transition areas are present on the Picatinny FMS installation; therefore no management recommendations are applicable for this site.

## 28.17 Pitman Armory – Management Recommendations

The wetland system on the Pitman Armory installation consists of a linear drainage that originates within the property boundaries and bisects the site in an east-west direction, with drainage off-site to the east. The upgradient end of this linear system is anticipated to be designated as a State Open Water, whereas the remainder of the system is anticipated to be designated as an intermediate resource-value wetland, thus possessing a 50-foot transition area. With the exception of the upgradient end of the wetland, a substantial vegetated buffer exists around this system; the upgradient end of the wetland system abuts a paved parking lot.

Based on the above analysis, the following is recommended for the Pitman Armory installation:

- Educational signage pertaining to the subject of wetlands protection should be erected at the upgradient end of Wetland Series A, between the wetland and the parking lot. Approximately three signs are recommended for this area. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $120 to $330.

## 28.18 Princeton Warehouse – Management Recommendations

The wetland system on the Princeton Warehouse installation is a forested wetland with a highly sinuous boundary that occupies the northern, western, and approximately half of the southern undeveloped portions of the property. The anticipated 50-foot transition area for these wetlands is roughly coincident with the tree-line that surrounds the paved parking lot to the rear of the installation, and the rear portion of the driveway. With the exception of the parking lot, substantial wooded buffers exist around the majority of the wetland.

Based on the above analysis, the following is recommended for the Princeton Warehouse installation:

- Educational signage pertaining to the subject of wetlands protection should be erected along the perimeter of the parking lot and the rear portion of the driveway. A suggested spacing interval for this signage is ~100 apart which would consist of approximately eight signs for this installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $320 to $880.

## 28.19 Sea Girt NGTC – Management Recommendations

The wetland system on the Sea Girt NGTC installation includes both a waterfront, tidally-influenced open water and an isolated, freshwater emergent wetland. The waterfront areas are

the bulk-headed shoreline of Stockton Lake and the Atlantic coast beachfront. Inadvertent encroachment into these areas is not anticipated. The isolated, freshwater emergent wetland already contains educational signage along its perimeter.

Based on the above analysis, no management recommendations are provided for the Sea Girt NGTC installation, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A and the Coastal Zone Management Act Rules at N.J.A.C. 7:7E.

## 28.20 Somerset Armory FMS – Management Recommendations

The results of the wetlands delineation revealed that no wetlands are present on the Somerset Armory FMS installation; however, the transition area associated with an off-site wetland to the east of the property may abut the eastern installation boundary. A substantial wooded buffer is present around this off-site wetland, and a vegetated berm along the eastern installation boundary separates the site from the wetland. Inadvertent encroachment into the off-site wetland or its transition area is not considered to be a likely occurrence.

Based on the above analysis, no management recommendations are provided for the Somerset Armory installation, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A.

## 28.21 Toms River Armory FMS – Management Recommendations

The wetland system on the Toms River Armory FMS installation ranges is a mixed forested wetland associated with a stream corridor that occupies the western portion of the property. The upstream portion of this wetland complex is coincident with the installation's northwest boundary. It is anticipated that these wetlands will be designated as an intermediate resource-value wetland, thus possessing a 50-foot transition area. The resulting transition area in the upstream portion of this wetland complex extends into the parking lot and equipment yard for this installation, some portions of which are already fenced.

Based on the above analysis, the following is recommended for the Toms River Armory FMS installation:

- Educational signage pertaining to the subject of wetlands protection should be erected along the perimeter of the parking lot in the northwest portion of the installation. A suggested spacing interval for this signage is ~150 apart which would consist of approximately four signs for this installation. The cost estimate for this signage (i.e., signs, sign posts, and mounting hardware) ranges from $160 to $440.

## 28.22 Tuckerton Armory – Management Recommendations

The results of the wetlands delineation revealed that no wetlands or transition areas are present on the Tuckerton Armory installation; therefore no management recommendations are applicable for this site.

## 28.23 Vineland Armory FMS – Management Recommendations

The wetland system on the Vineland Armory FMS installation is a very small isolated wetland in the northwest corner of the site. Substantial forested areas surround this wetland, as such, inadvertent encroachment into this wetland is not considered to be likely.

Based on the above analysis, no management recommendations are provided for the Vineland Armory FMS installation, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A.

## 28.24 West Orange Armory FMS/CSMS – Management Recommendations

The wetland system on the West Orange FMS/CSMS installation includes a large forested wetland and stream complex in the western portion of the property, and a small, isolated perched wetland, also located in the western portion of the property. Both of these wetland areas are surrounded by substantial wooded areas and are a considerable distance from the developed portions of the installation. Inadvertent encroachment into these wetlands is not anticipated.

Based on the above analysis, no management recommendations are provided for the Vineland Armory FMS installation, other than compliance with the NJ Freshwater Wetland Act Rules at N.J.A.C. 7:7A.

## 28.25 West Trenton AASF/FMS – Management Recommendations

The wetland system on the West Trenton AASF/FMS installation is a straight, headwater drainage that originates along the eastern site boundary and drains southeastward, developing into a relatively more sinuous stream channel then extending off-site. A forested riparian corridor is present along the entire reach of the stream, although it is widest in the mid-section of this stream. The headwater and downstream ends are anticipated to be designated as a State Open Water, thus possessing no transition area. Mowed lawn surrounds most of the stream.

Based on the above analysis, the following is recommended for the West Trenton AASF/FMS installation:

- Whenever possible, decrease the use of any lawn chemicals (e.g. fertilizers, pesticides, etc.) around the stream. This practice is anticipated to reduce the amount of potential non-point source pollution into the wetland.

## 28.26 Management Summary

The table below summarizes the management recommendations developed for each of the installations.

| Installation Name | Management Recommendations |
|---|---|
| Bordentown Armory/FMS | Educational signage along parking lot.<br>Re-examination (i.e. spot checks) of site. |
| Bordentown CSMS A | Educational signage along road crossing.<br>Enhancement or widening of riparian corridor by road crossing. |
| Bridgeton Armory | Educational signage along southwestern wetland boundary.<br>Exclusion fencing along southwestern wetland boundary. |
| Cape May Armory FMS | Educational signage on eastern side of wetland.<br>If applicable, reduction in lawn chemical use. |
| Cherry Hill Armory FMS | Educational signage along pedestrian walkway for Cooper River.<br>If applicable, reduction in lawn chemical use. |
| Dover Armory FMS | Educational signage along the western and eastern ends of the wetland. |
| Flemington Armory | If applicable, reduction in lawn chemical use. |
| Fort Dix 3200 | No management recommendations necessary. |
| Fort Dix UTES | Educational signage along road crossing. |
| Franklin Armory | Educational signage along the transition area boundary.<br>If applicable, reduction in lawn chemical use. |
| Hackettstown Armory | No management recommendations necessary. |
| Hammonton Armory | Educational signage along the transition area boundary in the northwestern portion of the wetland.<br>If applicable, reduction in lawn chemical use. |
| Lawrenceville Complex | Educational signage along the south/southeastern installation boundary. |
| Morristown Armory FMS | Educational signage at the upgradient end of Wetland Series A, between the wetland and parking lot. |
| Newton Armory | No management recommendations necessary. |
| Picatinny FMS | No management recommendations necessary. |

| Installation Name | Management Recommendations |
|---|---|
| Pitman Armory | Educational signage at the upgradient end of Wetland Series A, between the wetland and parking lot. |
| Princeton Warehouse | Educational signage along the perimeter of the parking lot and the rear portion of the driveway. |
| Sea Girt NGTC | No management recommendations necessary. |
| Somerset Armory FMS | No management recommendations necessary. |
| Toms River Armory FMS | Educational signage along the perimeter of the northwest parking lot. |
| Tuckerton Armory | No management recommendations necessary. |
| Vineland Armory | No management recommendations necessary. |
| West Orange Armory FMS/CSMS | No management recommendations necessary. |
| West Trenton AASF/FMS | If applicable, reduction in lawn chemical use. |

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# APPENDIX A

# Site Photographs

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# Bordentown Armory / OMS

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Photo 1: Property frontage (eastern site boundary) along U.S. Route 206, viewed from the south, facing north.



Photo 2: Southern site boundary, viewed from Route 206, facing west (site is on the right side of photo).



Photo 3: Up-gradient (southern) edge of the off-site forested deciduous wetland (Series A), viewed from the site parking lot, facing west.



Photo 4: Alternate view of the up-gradient (southern) edge of the off-site forested deciduous wetland (Series A), viewed from northeastern site boundary, facing west. Wetland Series A is to the right side of the photo.



Photo 5: Typical view of the off-site forested deciduous wetland (Wetland Series A).



Photo 6: Alternate view of the off-site forested deciduous wetland (Wetland Series A).

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# Bordentown CSMS A

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Photo 1: Wetland Series A, viewed from the north, facing southwest.



Photo 2: Up-gradient end of Wetland Series A, viewed from the north, facing southwest.



Photo 3: South side of Wetland Series A, viewed from the north, facing west.




Photo 4: Road crossing that separates Wetland Series A from Wetland Series B/C, viewed from the north, facing south/southeast. Wetland Series A is to the right side of the photo; Wetland Series B/C is to the left side.



Photo 5: Wetland Series B/C (forested linear community around drainage channel), viewed from the south, facing northeast.



Photo 6: Upland area located up-gradient of Wetland Series B/C, viewed from the north, facing east/southeast.

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# Bridgeton Armory

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Photo 1: Stream channel, down-gradient of Wetland Flags B111 and B112, facing upstream (east).



Photo 2: Culvert located at the down-gradient end of Wetland Series B/E, facing west.



Photo 3: Off-site Wetland Series F, viewed from the road, facing west.



Photo 4: North side of Wetland Series B/E (right side of photo), bordering an agricultural field, facing east/southeast.



Photo 5: Wetland Series D, viewed from property driveway, facing south.



Photo 6: Typical view of Wetland Series A, viewed from the northern side of the stream channel, facing west



Photo 7: Northern edge of Wetland Series B/E by open field area adjacent to the parking lot, facing west.



Photo 8: Eastern property boundary, facing south. Site is to the right of photo. Wetland areas in this photo are coincident with the wooded areas.



Photo 9: Roadside drainage ditch associated with Wetland Series A, facing north.



Photo 10: Headwall at the up-gradient end of Wetland Series A, facing east. The off-site Wetland Series F is situated on the opposite side of the headwall, across the road.



Photo 11: Wetland Series F, facing east.



Photo 12: Typical view of the upland woods community.

# Cape May Armory OMS

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Photo 1: Typical view of forested deciduous wetland community designated as Wetland Series A.



Photo 2: Alternate view of forested deciduous wetland community portion of Wetland Series A.



Photo 3: Typical view of mixed late-stage scrub/shrub community and early-stage forested deciduous wetland community portion of Wetland Series A.



Photo 4: Alternate view of mixed late-stage scrub/shrub community and early-stage forested deciduous wetland community portion of Wetland Series A.



Photo 5: Zoomed-out view of Wetland Series A, viewed from the north, facing south. The Garden State Parkway is to the right side of the photo, and the wetlands are coincident with the wooded areas.



Photo 6: Alternate zoomed-out view of Wetland Series A, viewed from the north, facing southeast. The wetlands are coincident with the wooded areas.

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# Cherry Hill Armory OMS

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Photo 1: Typical view of Wetland Series A (left side of photo), viewed from the northeast, facing west.



Photo 2: Approximate midpoint of Wetland Series A, viewed from northeast side, facing west.



Photo 3: Off-site Wetland Series B (center of photo), viewed from the east, facing west. Wetland Series A is outside of the photo, to the left.



Photo 4: Off-site, eastern portion of Wetland Series A, viewed from the west, facing east.

# Dover Armory OMS

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Photo 1: Typical view of Wetland Series A near Wetland Flag A100, facing east (into the wetland).



Photo 2: Off-site, northeastern portion of Wetland Series A, near Wetland Flag A109, facing southeast.



Photo 3: Typical view of the upland woods community in the northern “flag” portion of the site.



Photo 4: Alternate view of Wetland Series A, near Wetland Flag A89, facing east.



Photo 5: Drainage channel (dry) located along the site boundary/up-gradient edge of Wetland Series A. The site is to the left side of the photo, the wetlands interior is to the right.



Photo 6: Typical view of Wetland Series B.

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# Flemington Armory

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Photo 1: Wetland Series D (wooded portion), along State Route 12, facing east.



Photo 2: Alternate view of Wetland series D (wooded portion), facing southwest.



Photo 3: Wetland Series D (wooded area) in the southern portion of the site, facing south.



Photo 4: General view of Wetland Series A, C, and D (on right side of photo), facing southeast towards State Route 12.



Photo 5: Wetland Series A and B (right side of photo) along State Route 12, facing east.



Photo 6: Typical view of upland deciduous woods community in the southern portion of the site.



Photo 7: Southern site boundary, facing northeast.

# Fort Dix 3200 Area

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Photo 1: Eastern site boundary (Florida Avenue), facing north (site is on the left side of photo).



Photo 2: Northern site boundary (Administration Street), facing east (site is on the right side of photo).



Photo 3: Northern site boundary (Administration Street), facing west (site is on the left side of photo).



Photo 4: Technology Drive, which bisects the western portion of the site. The view is facing north and a portion of Wetland Series D is within the wooded area on the left side of the photo.



Photo 5: The ballfield portion of the site, facing southwest from Florida Avenue.



Photo 6: Alternate view of the ballfield portion of the site, facing northwest from Florida Avenue.



Photo 7: Wetland Data Point 1, within the northern portion of the off-site Wetland Series A.



Photo 8: Alternate view of the northern portion of the off-site Wetland Series A.



Photo 9: Central portion of the off-site Wetland Series A near Wetland Flag A108.



Photo 10: Alternate view of the central portion of the off-site Wetland Series A, near Wetland Flag A110.



Photo 11: Wetland Data Point 2, located in the southern portion of the off-site Wetland Series A.



Photo 12: Alternate view of the southern portion of the off-site Wetland Series A.



Photo 13: Drainage channel within the off-site Wetland Series A, facing east (downstream).



Photo 14: Downgradient (eastern) portion of drainage channel shown in Photo 13 near Wetland Flag A127.



Photo 15: Pipe culvert linking the off-site Wetland Series A and the on-site Wetland Series B, beneath Florida Avenue. The view is from Wetland Series A, facing west.



Photo 16: Alternate view of the pipe culvert, viewed from Wetland Series B, facing northeast.



Photo 17: Wetland Series B near Wetland Flag B109.



Photo 18: Upgradient end of Wetland Series B at pipe culvert for State Route 68.



Photo 19: Wetland Series B by Wetland Flag B127.



Photo 20: Wetland Data Point 3, within Wetland Series B.



Photo 21: Florida Avenue which separates the off-site Wetland Series A from the on-site Wetland Series B, viewed from the north, facing south. Wetland Series A is on the left side of the photo; Wetland Series B is on the right.



Photo 22: Northwestern (upgradient) end of Wetland Series C, facing east.



Photo 23: Eastern (downgradient) end of Wetland Series C, viewed from Florida Avenue, facing west.



Photo 24: Wetland Series C by Wetland Flag C114.



Photo 25: Downgradient end of Wetland Series C, near Wetland Flag C100. A concrete outfall structure is visible in the photo.



Photo 26: Upgradient end of Wetland Series D.



Photo 27: Wetland Series D near Wetland Flag D115.



Photo 28: Stormwater outlet in Wetland Series D by Wetland Flag D121.



Photo 29: Wetland Data Point 4 in Wetland Series D.



Photo 30: Wetland Series E.



Photo 31: Lowest elevation within the off-site Wetland Series F, coincident with a New Hanover Township ROW.



Photo 32: Off-site Wetland Series F near Wetland Flag F107.



Photo 33: Wetland Data Point 5 within the off-site Wetland Series F.

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# Fort Dix UTES

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Photo 1: Off-site fire break and road, located to the north and northeast of the site.



Photo 2: Typical view of off-site, upland, mixed woods community located to the northeast of the site.



Photo 3: Typical view of off-site, upland, mixed woods community located to the north/northwest of the site.



Photo 4: General view of open area located in the central/south-central portion of the site.



Photo 5: Very small roadside depression designated as Wetland Series B.



Photo 6: Close-up view of Wetland Series A.



Photo 7: Zoomed-out view of Wetland Series A (to the left side of the photo).



Photo 8: Typical view of scrub/shrub upland community in the southern portion of the site.

# Franklin Armory

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Photo 1: Wetland Series B near Wetland Flag B100, facing south.



Photo 2: Typical view of Wetland Series A.



Photo 3: Down-gradient end of Wetland Series B, near Wetland Flag B141, facing north.



Photo 4: Typical view of Wetland Series C (State open water), facing southeast.

# Hackettstown Armory

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Photo 1: Wetland Series A (left side of photo), viewed from the north, facing southwest.



Photo 2: Typical view of Wetland Series B, facing northeast.



Photo 3: Typical view of Wetland Series C, facing southwest.



Photo 4: Typical view of upland woods to the northeast of the Wetland Series A.

# Hammonton Armory

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Photo 1: Southeastern corner of Wetland Series A, viewed from an upland finger.



Photo 2: Typical view of the southern portion of Wetland Series A.



Photo 3: Alternate view of Wetland Series A.



Photo 4: Down-gradient end of Wetland Series A, at culvert.



Photo 5: Eastern/northeastern portion of Wetland Series A.



Photo 6: Zoomed-out view of Wetland Series A (wooded area in photo).

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# Lawrenceville Complex

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Photo 1: Northern edge of forested deciduous woodland that contains Wetland Series A, viewed from near the western site boundary, facing east. The wetlands are located within the woodland's interior.



Photo 2: One example of various depressional areas within Wetland Series A.



Photo 3: Typical view of stream channel (part of Wetland Series A) along the southern site boundary. The main part of the site is to the right of the photo; the backyards of residential properties are to the left side of the photo.



Photo 4: One example of various drainage pathways within Wetland Series A.



Photo 5: Typical view of upland deciduous woods to the north of Wetland Series A.



Photo 6: Typical view of Wetland Series B, facing west.



Photo 7: Typical view of Wetland Series C.



Photo 8: Zoomed-out view of Wetland Series D, viewed from the southwest, facing northeast.



Photo 9: Zoomed-out view of Wetland Series D, viewed from the southeast, facing northwest.



Photo 10: Emergent vegetation portion of Wetland Series D.



Photo 11: Outlet culvert for Wetland Series D.

# Morristown Armory OMS

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Photo 1: Down-gradient end of Wetland Series A, along the northwestern property corner, facing north.



Photo 2: Typical view of the interior of Wetland Series A.



Photo 3: Zoomed-out view of the up-gradient edge (eastern edge) of Wetland Series A, shown as the wooded area behind the parking lot.



Photo 4: Up-gradient end of Wetland Series A, originating at pipe.



Photo 5: Typical view of upland deciduous woods community in the southern portion of the site.



Photo 6: Wetland Series B, viewed from the south (up-gradient), facing north



Photo 7: Emergent portion of Wetland Series C/D.



Photo 8: Forested portion of Wetland Series C/D, near the northeastern property corner.

# Newton Armory

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Photo 1: General view of the developed land area of the Newton site; Wetland Series A is located in a depressional area behind the treeline.



Photo 2: View of Wetland Series A through wooded portion of slope.



Photo 3: Typical view of Wetland Series A.



Photo 4: Alternate view of Wetland Series A.

# Picatinny FMS/AASF

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Photo 1: Site frontage (southwestern property boundary). The site is to the right side of the photo.



Photo 2: Open field area in the southwest corner of the site, facing northeast.



Photo 3: Alternate view of open field area in the southwest portion of the site, but farther into the property interior (northward). The community transitions to a mid-stage scrub/shrub community.



Photo 4: Northwestern site boundary.



Photo 5: Northern site boundary.



Photo 6: Southeastern site boundary.

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# Pitman Armory

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Photo 1: Northern edge of wooded area that contains Wetland Series A, viewed from the parking lot, facing southeast.



Photo 2: Up-gradient end of stream channel within Wetland Series A.



Photo 3: Partially-obscured headwall situated between the wood's edge and the parking area.



Photo 4: Stream channel within Wetland Series A.



Photo 5: Pipe at down-gradient end of Wetland Series A.



Photo 6: Floodplain community on the northern side of the stream channel within Wetland Series A.

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# Princeton Warehouse

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Photo 1: Eastern (down-gradient) side of Wetland Series A, along road and property frontage.



Photo 2: Typical view of upland woods community in the southern portion of the site.



Photo 3: Emergent portion of Wetland Series A, viewed from the wetland interior, facing northeast (towards the parking lot and driveway).



Photo 4: Typical view of Wetland Series A in the northern portion of the site.



Photo 5: Upland pocket in the northern portion of the site.

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# Sea Girt NGTC

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Photo 1: Zoomed-out view of the up-gradient end of Wetland Series A (situated within the wooded area).



Photo 2: View of Wetland Series A near Wetland Flag A88. The wetlands are to the left side of the photo.



Photo 3: Wetland Series A near Wetland Flag A101, facing northwest (up-gradient).



Photo 4: Wetland Series A near Wetland Flag A101, facing southeast (down-gradient).



Photo 5: A fringe of *Spartina alterniflora* salt marsh located near the southern end of Wetland Series A.



Photo 6: The down-gradient end of Wetland Series A (central and left side of photo), viewed from the south, facing west/northwest.



Photo 7: Area of low elevation determined to be non-wetland.



Photo 8: Zoomed-out view of Wetland Series C.

# Somerset Armory OMS

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Photo 1: Zoomed-out view of wooded area in the southeastern portion of the site, determined to be non-wetland, viewed from the north, facing southwest.



Photo 2: Zoomed-out view of the off-site Wetland Series A (wooded area on the left side of photo), viewed from the northeastern site boundary, facing southeast.



Photo 3: Close-up view of the off-site Wetland Series A.



Photo 4: Typical view of upland wooded community in the northwest portion of the site.

# Toms River Armory OMS

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Photo 1: Up-gradient end (northern end) of Wetland Series A.



Photo 2: Typical view of Wetland Series B, viewed from the south, facing north.



Photo 3: Typical view of upland wooded community, north of sand road that bisects the site.



Photo 4: Typical view of the sand road that bisects the site.



Photo 5: Typical view of mixed forested wetland community within Wetland Series A.



Photo 6: Sand road that separates Wetland Series A and C, viewed from the north, facing south.



Photo 7: Zoomed-out view of Wetland Series C, viewed from the north, facing south/southeast.

# Tuckerton Armory

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Photo 1: Typical view of the northeastern site boundary (site is on the left side of the photo). Mobile home development is to the right side of the photo.



Photo 2: Typical view of the northwestern site boundary (site is on the left side of the photo).



Photo 3: Typical view of upland woods community in the northern portion of the site.



Photo 4: Typical view of upland woods in the southwestern portion of the site.



Photo 5: Typical view of the upland woods community in the southwestern portion of the site.



Photo 6: Sand road area in the southwestern portion of the site.



Photo 7: Southwestern property line (site is the wooded area on the right side of the photo).

# Vineland Armory OMS

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Photo 1: Wetland Series A, viewed from the southwest, facing northeast.



Photo 2: Sand road in the northwestern portion of the site, facing east.



Photo 3: Typical view of the upland woods community that dominates the site.



Photo 4: Alternate view of the upland woods community that dominates the site.



Photo 5: Sand road and upland woods community in the western portion of the site.



Photo 6: Sand road and upland woods community in the southern portion of the site.

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# West Orange Armory OMS/CSMS

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Photo 1: Northeastern site boundary, viewed from the adjacent Kessler Development site, facing into the site (southwest).



Photo 2: Typical view of upland woods in the northeastern portion of the site.



Photo 3: Typical view of Wetland Series A.



Photo 4: Wetland Series B near the northwestern site boundary



Photo 5: Alternate view of Wetland Series B.



Photo 6: Stream channel within the western portion of Wetland Series B



Photo 7: Up-gradient end of Wetland Series B.



Photo 8: Typical view of upland woods community in the southeastern portion of the site.

# West Trenton AASF/OMS

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Photo 1: Stream channel within Wetland Series A.



Photo 2: Alternate view of stream channel within Wetland Series A.



Photo 3: Interior of Wetland Series B.



Photo 4: Alternate view of the interior of Wetland Series B.



Photo 5: Zoomed-out view of Wetland Series B.



Photo 6: Typical view of the off-site Wetland Series C.

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# APPENDIX B

# List of Plant Species Observed on the Site

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# Bordentown Armory / OMS

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Bordenton Armory installation, located in the City of Bordentown, Burlington County, New Jersey. The site inspection occurred on September 8, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| *Acer saccharinum* | Silver maple** | FACW |
| Asteraceae (Aster Family) | | |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod* | FAC |
| Betulaceae (Birch Family) | | |
| *Betula nigra* | River birch** | FACW |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle* | FAC- |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum** | FAC |
| Fabaceae (Bean/Pea Family) | | |
| *Robinia pseudo-acacia* | Black locust* | FACU- |
| Fagacaea (Oak Family) | | |
| *Quercus palustris* | Pin oak** | FACW |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Liquidambar styraciflua* | Sweetgum** | FAC |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush** | FACW+ |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier* | FAC |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| *Fraxinus pennsylvanicum* | Green ash** | FACW |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry** | FACU |
| *Rubus flagellaris* | Prickly dewberry** | NL |
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven | FACU- |
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss | NL |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper* | FACU |

# Bordentown CSMS A

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Bordentown CSMS installation, located in the City of Bordentown, Burlington County, New Jersey. The site inspection occurred on September 9, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple* | FAC |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| *Rhus typhina* | Staghorn sumac | NL |
| Araceae (Arum Family) | | |
| *Arisaema triphyllum* ssp. *triphyllum* | Jack-in-the-Pulpit | NL |
| Asteraceae (Aster Family) | | |
| *Eupatorium perfoliatum* | Boneset | FACW+ |
| *Solidago* sp. | Goldenrod* | NA |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Lonicera tatarica* | Tartarian honeysuckle** | FACU |
| *Viburnum dentatum* | Southern arrowwood | FAC |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum | FAC |
| Cyperaceae (Sedge Family) | | |
| *Carex lurida* | Lurid sedge** | OBL |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive* | NL |
| Fagaceae (Beech Family) | | |
| *Fagus grandifolia* | American beech | FACU |
| *Quercus palustris* | Pin oak | FACW |
| *Quercus rubra* | Red oak | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel | FAC- |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush** | FACW+ |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier | FAC |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife** | FACW+ |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar | FACU |
| Oleaceae (Olive Family) | | |
| *Fraxinus pennsylvanicum* | Green ash | FACW |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed* | FACU+ |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain** | NL |
| Poaceae (Grass Family) | | |
| *Bromus tectorum* | Downy brome* | NL |
| *Digitaria sanguinalis* | Crabgrass** | FACU- |
| *Festuca* sp. | Fescue** | NA |
| *Lolium* sp. | Rye | NA |
| *Phragmites australis* | Common reed | FACW |
| *Poa* sp. | Bluegrass* | NA |
| *Setaria* sp. | Bristly foxtail** | NL |
| *Triodia flava* | Purple-top* | NL |
| Rosaceae (Rose Family) | | |
| *Prunus avium* | Sweet cherry | NL |
| *Prunus serotina* | Black cherry | FACU |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| *Rubus flagellaris* | Prickly dewberry | NL |
| Typhaceae (Cat-tail Family) | | |
| *Typha latifolia* | Common cattail | OBL |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |

# Bridgeton Armory

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22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Bridgeton installation, located in Bridgeton, Cumberland County, New Jersey. The site inspection occurred on September 15 and 16, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Araceae (Arum Family) | | |
| *Symplocarpus foetidus* | Skunk cabbage | OBL |
| Asteraceae (Aster Family) | | |
| *Ambrosia artemisiifolia* | Common ragweed** | FACU |
| *Ambrosia trifida* | Great ragweed | FAC |
| *Artemisia vulgaris* | Common mugwort** | NL |
| *Eupatorium perfoliatum* | Boneset | FACW+ |
| *Eupatorium* sp. | Snakeroot/boneset** | NA |
| *Solidago* sp. | Goldenrod** | NA |
| Balsaminaceae (Touch-me-not Family) | | |
| *Impatiens capensis* | Jewelweed** | FACW |
| *Impatiens pallida* | Pale touch-me-not* | FACW |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Lonicera tatarica* | Tartarian honeysuckle | FACU |
| *Viburnum dentatum* | Southern arrowwood | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet* | NL |
| Commelinaceae (Spiderwort Family) | | |
| *Commelina communis* | Asiatic dayflower | FAC- |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum** | FAC |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Fabaceae (Bean/Pea Family) | | |
| *Lespedeza* sp. | Bush clover | NA |
| *Robinia pseudo-acacia* | Black locust | FACU- |
| Juglandaceae (Walnut Family) | | |
| *Carya glabra* | Pignut hickory** | FACU- |
| *Juglans nigra* | Black walnut** | FACU |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras** | FACU- |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife | FACW+ |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| *Fraxinus pennsylvanicum* | Green ash** | FACW |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed** | FACU+ |
| Poaceae (Grass Family) | | |
| *Phragmites australis* | Common reed | FACW |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed | FACW+ |
| *Polygonum persicaria* | Lady's thumb | FACW |
| *Rumex crispus* | Curly dock | FACU |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry | FACU |
| *Rosa multiflora* | Rosa multiflora | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| *Rubus flagellaris* | Prickly dewberry | NL |
| *Rubus hispidus* | Bristly dewberry | FACW |
| *Rubus idaeus* | Red raspberry** | FAC- |
| Salicaceae (Willow Family) | | |
| *Salix nigra* | Black willow | FACW+ |
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven | FACU- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm | FACW- |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle** | FACW+ |
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet | NA |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape | NA |

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# Cape May Armory OMS

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Cape May installation, located in Cape May, Cape May County, New Jersey. The site inspection occurred on October 18, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| *Rhus copallina* | Winged sumac* | NI |
| Aquifoliaceae (Holly Family) | | |
| *Ilex opaca* | American holly | FACU+ |
| Asteraceae (Aster Family) | | |
| *Baccharis halimifolia* | Groundsel tree** | FACW |
| *Eupatorium* sp. | Snakeroot/boneset** | NA |
| *Hieracium* sp. | Hawkweed | NA |
| *Solidago* sp. | Goldenrod** | NA |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood** | FAC |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum** | FAC |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar* | FACU |
| Ericaceae (Heath Family) | | |
| *Vaccinium corymbosum* | Highbush blueberry** | FACW- |
| Fagaceae (Beech Family) | | |
| *Quercus ilicifolia* | Scrub oak | NL |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Liquidambar styraciflua* | Sweetgum** | FAC |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras | FACU- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Poaceae (Grass Family) | | |
| *Phragmites australis* | Common reed** | FACW |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed | FACW+ |
| Rosaceae (Rose Family) | | |
| *Rubus flagellaris* | Prickly dewberry* | NL |
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss | NL |
| Vitaceae (Grape Family) | | |
| *Vitis* sp. | Grape* | NA |

# Cherry Hill Armory OMS

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Cherry Hill installation, located in Cherry Hill, Camden County, New Jersey. The site inspection occurred on October 11 and 12, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer negundo* | Box elder* | FAC+ |
| *Acer platanoides* | Norway maple | NL |
| *Acer rubrum* | Red maple** | FAC |
| Amaranthaceae (Amaranth Family) | | |
| *Amaranthus* sp. | Pigweed | NA |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Aquifoliaceae (Holly Family) | | |
| *Ilex opaca* | American holly | FACU+ |
| Araliaceae (Ginseng Family) | | |
| *Hedera helix* | English ivy | NL |
| Asteraceae (Aster Family) | | |
| *Ageratina altissima* | White snakeroot** | FACU- |
| *Artemisia vulgaris* | Common mugwort | NL |
| *Aster vimineus* | Small White Aster** | FAC |
| *Bidens frondosa* | Swamp beggar-ticks** | FACW |
| *Solidago* sp. | Goldenrod** | NA |
| Betulaceae (Birch Family) | | |
| *Betula nigra* | River birch | FACW |
| Bignoniaceae (Trumpet Creeper Family) | | |
| *Catalpa bignonioides* | Common catalpa | NL |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Sambucus canadensis* | Common elder | FACW- |
| *Viburnum dentatum* | Southern arrowwood | FAC |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood | FACW |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Cyperaceae (Sedge Family) | | |
| *Carex lurida* | Lurid sedge | OBL |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive | NL |
| Fabaceae (Bean/Pea Family) | | |
| *Robinia pseudo-acacia* | Black locust | FACU- |
| *Wisteria sp.* | Wisteria | NA |
| Fagaceae (Beech Family) | | |
| *Quercus palustris* | Pin oak* | FACW |
| *Quercus rubra* | Red oak* | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel | FAC- |
| *Liquidambar styraciflua* | Sweetgum** | FAC |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush | FACW+ |
| Lamiaceae (Mint Family) | | |
| *Glecoma hederacea* | Ground ivy | FACU |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier | FAC |
| *Veratrum viride* | False hellebore | FACW+ |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife | FACW+ |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar* | FACU |
| Menispermaceae (Moonseed Family) | | |
| *Menispermum canadense* | Canada moonseed | NI |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry** | NL |
| Nymphaeaceae (Water Lily Family) | | |
| *Nuphar luteum* | Spatterdock** | OBL |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash | FACU |
| *Fraxinus pennsylvanicum* | Green ash** | FACW |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain** | NL |
| Poaceae (Grass Family) | | |
| *Festuca* sp. | Fescue** | NA |
| *Lolium* sp. | Rye** | NA |
| *Microstegium vimineum* | Japanese Stiltgrass** | FAC |
| *Panicum clandestinum* | Deer-tongue grass | FAC+ |
| *Poa* sp. | Bluegrass** | NA |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed | FACW+ |
| *Polygonum persicaria* | Lady thumb** | FACW |
| *Rumex crispus* | Curly dock | FACU |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry | FACU |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| Salicaceae (Willow Family) | | |
| *Salix nigra* | Black willow | FACW+ |
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven** | FACU- |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm | FACW- |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| *Urtica dioica* | Stinging nettle | FACU |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet** | NA |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |
| *Vitis* sp. | Grape** | NA |

# Dover Armory OMS

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Dover installation, located in Dover, Morris County, New Jersey. The site inspection occurred on October 3, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| *Acer saccharinum* | Silver maple | FACW |
| *Acer saccharum* | Sugar maple** | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Asteraceae (Aster Family) | | |
| *Ageratina altissima* | White snakeroot** | FACU- |
| *Aster vimineus* | Small White Aster** | FAC |
| *Centaurea maculosa* | Spotted knapweed | NL |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| *Solidago* sp. | Goldenrod** | NA |
| Balsaminaceae (Touch-me-not Family) | | |
| *Impatiens capensis* | Jewelweed* | FACW |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry* | FACU |
| Betulaceae (Birch Family) | | |
| *Betula nigra* | River birch | FACW |
| *Betula populifolia* | Gray birch* | FAC |
| *Carpinus caroliniana* | Ironwood** | FAC |
| Bignoniaceae (Trumpet Creeper Family) | | |
| *Catalpa bignonioides* | Common catalpa | NL |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard** | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood* | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet* | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Clethraceae (White Alder Family) | | |
| *Clethra alnifolia* | Coast pepperbush** | FAC+ |
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood** | FACW |
| Cyperaceae (Sedge Family) | | |
| *Carex pensylvanica* | Sedge | NL |
| *Carex stricta* | Tussock sedge** | OBL |
| *Cyperus esculentus* | Yellow-nut sedge (Chufa) | FACW |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive | NL |
| Ericaceae (Heath Family) | | |
| *Vaccinium corymbosum* | Highbush blueberry | FACW- |
| Fagaceae (Beech Family) | | |
| *Fagus grandifolia* | American beech* | FACU |
| *Quercus alba* | White oak** | FACU |
| *Quercus bicolor* | Swamp white oak | FACW+ |
| *Quercus palustris* | Pin oak** | FACW |
| *Quercus rubra* | Red oak** | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel** | FAC- |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush* | FACW+ |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier | FAC |
| Lycopodiaceae (Clubmoss Family) | | |
| *Lycopodium obscurum* | Flat-branched ground-pine | FACU |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Platanaceae (Plane-tree Family) | | |
| *Platanus occidentalis* | American sycamore | FACW- |
| Poaceae (Grass Family) | | |
| *Microstegium vimineum* | Japanese Stiltgrass** | FAC |
| *Phragmites australis* | Common reed | FACW |
| Polemoniaceae (Phlox Family) | | |
| *Phlox* sp. | Phlox | NA |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum cuspidatum* | Japanese knotweed* | FACU- |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Matteuccia struthiopteris* | Ostrich fern | FACW |
| *Onoclea sensibilis* | Sensitive fern* | FACW |
| *Thelypteris noveboracensis* | New York fern | FAC |
| Rosaceae (Rose Family) | | |
| *Amelanchier* sp. | Shadbush | NA |
| *Crataegus* sp. | Hawthorn | NA |
| *Prunus avium* | Sweet cherry | NL |
| *Prunus serotina* | Black cherry** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm** | FACW- |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle* | FACW+ |
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet | NA |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |
| *Vitis* sp. | Grape** | NA |

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# Flemington Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Flemington installation, located in Flemington, Hunterdon County, New Jersey. The site inspection occurred on September 30, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Alismataceae (Water Plantain Family) | | |
| *Sagittaria latifolia* | Common arrowhead | OBL |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Apocynaceae (Dogbane Family) | | |
| *Apocynum androsaemifolium* | Spreading dogbane | NL |
| Araceae (Arum Family) | | |
| *Arisaema triphyllum* ssp. *triphyllum* | Jack-in-the-Pulpit | NL |
| Asteraceae (Aster Family) | | |
| *Achillea millefolium* | Yarrow | FACU |
| *Artemisia vulgaris* | Common mugwort | NL |
| *Aster vimineus* | Small white aster* | FAC |
| *Bidens* sp. | Beggar ticks | NA |
| *Cirsium* sp. | Thistle | NA |
| *Centaurea maculosa* | Spotted knapweed | NL |
| *Cichorium intybus* | Chicory | NI |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod* | FAC |
| *Solidago* sp. | Goldenrod** | NA |
| *Taraxacum officinale* | Common dandelion | FACU- |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry** | FACU |
| Betulaceae (Birch Family) | | |
| *Betula populifolia* | Gray birch | FAC |
| *Carpinus caroliniana* | Ironwood** | FAC |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood** | FAC |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood** | FACW |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Cyperaceae (Sedge Family) | | |
| *Carex lurida* | Lurid sedge* | OBL |
| *Carex stipata* | Stalk-grain sedge | OBL |
| *Scirpus cyperinus* | Wool grass | FACW+ |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive* | NL |
| Equisetaceae (Horsetail Family) | | |
| *Equisetum arvense* | Field horsetail | FAC |
| Ericaceae (Heath Family) | | |
| *Vaccinium corymbosum* | Highbush blueberry | FACW- |
| Fabaceae (Bean/Pea Family) | | |
| *Trifolium pratense* | Red clover | FACU- |
| *Trifolium repens* | White clover | FACU- |
| Fagaceae (Beech Family) | | |
| *Quercus alba* | White oak* | FACU |
| *Quercus palustris* | Pin oak* | FACW |
| *Quercus rubra* | Red oak** | FACU- |
| *Quercus velutina* | Black oak* | NI |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel** | FAC- |
| Juglandaceae (Walnut Family) | | |
| *Carya ovata* | Shagbark hickory** | FACU- |
| *Juglans nigra* | Black walnut** | FACU |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush* | FACW+ |
| *Juncus tenuis* | Path rush | FAC- |
| Lamiaceae (Mint Family) | | |
| *Lycopus virginicus* | Bugleweed* | OBL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |
| *Sassafras albidum* | Sassafras** | FACU- |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar | FACU |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| Oxalidaceae (Wood-sorrel Family) | | |
| *Oxalis europaea* | Yellow wood sorrel | NL |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain | NL |
| *Plantago major* | Common plantain | FACU |
| Poaceae (Grass Family) | | |
| *Andropogon virginicus* | Broomsedge | FACU |
| *Festuca arundinacea* | Tall fescue (Kentucky fescue) | FACU |
| *Festuca* sp. | Fescue | NA |
| *Hystrix patula* | Bottlebrush grass | NL |
| *Lolium* sp. | Rye | NA |
| Microstegium vimineum | Japanese Stiltgrass** | FAC |
| *Panicum clandestinum* | Deer-tongue grass* | FAC+ |
| *Phalaris arundinaceae* | Reed canary grass | FACW+ |
| *Phragmites australis* | Common reed** | FACW |
| *Poa* sp. | Bluegrass | NA |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| *Setaria* sp. | Bristly foxtail | NL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed | FACW+ |
| *Polygonum persicaria* | Lady's thumb* | FACW |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Onoclea sensibilis* | Sensitive fern | FACW |
| Rosaceae (Rose Family) | | |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus hispidus* | Bristly dewberry* | FACW |
| *Rubus idaeus* | Red raspberry** | FAC- |
| *Spiraea latifolia* | Meadow-sweet | FAC+ |
| Salicaceae (Willow Family) | | |
| *Populus tremula* | Quaking aspen | FACU |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss* | NL |
| Typhaceae (Cat-tail Family) | | |
| *Typha latifolia* | Common cattail* | OBL |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm** | FACW- |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape | NA |

# Fort Dix 3200 Area

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during field surveys at the Fort Dix 3200 Area Site, located at the Fort Dix Military Reservation, Burlington County, New Jersey. Wetland indicator classification nomenclature follows USFWS (1988 & 1996), and where applicable in parentheses, the NJ Pinelands-specific wetland indicators per *New Jersey Pinelands Commission Manual for Identifying and Delineating Pinelands Area Wetlands, A Pinelands Supplement to the Federal Manual* (R.A. Zampella, January 1991). In addition, NA = not applicable, NI = no indicator, NL = not listed, ** = dominant on the site, and * = abundant on the site. The field surveys were conducted on October 25 & 26, 2006.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple ** | FAC |
| *Acer saccharum* | Sugar maple ** | FACU- |
| Agavaceae (Agave Family) | | |
| *Yucca flaccida* (*Y. filamentosa*) | Yucca | NL |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy | FAC |
| Apocynaceae (Dogbane Family) | | |
| *Apocynum androsaemifolium* | Spreading dogbane * | NL |
| Aquifoliaceae (Holly Family) | | |
| *Ilex opaca* | American holly | FACU+ (FAC) |
| Araliaceae (Ginseng Family) | | |
| *Hedera helix* | English ivy | NL |
| Asteraceae (Aster Family) | | |
| *Ageratina atltissima* | White snakeroot ** | FACU- |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod ** | FAC |
| Berberidaceae (Barberry Family) | | |
| *Berberis thumbergii* | Japanese barberry | FACU |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle ** | FAC- |
| *Lonicera morrowii* | Morrow's honeysuckle * | FACU |
| *Viburnum dentatum* | Southern arrowwood | FAC |
| *Viburnum plicatum* | Japanese snowball | NI |
| Cornaceae (Dogwood Family) | | |
| *Cornus florida* | Flowering dogwood ** | FACU- |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar ** | FACU |
| Cyperaceae (Sedge Family) | | |
| *Carex pensylvanica* | Sedge | NL |
| *Carex stricta* | Tussock sedge ** | OBL |
| *Scirpus cyperinus* | Woolgrass | FACW+ |
| Ericaceae (Health Family) | | |
| *Chimaphila maculata* | Striped wintergreen | NL |
| Fabaceae (Bean/ Pea Family) | | |
| *Lespedeza* sp. | Bush clover | NA |
| *Robinia pseudo-acacia* | Black locust ** | FACU- |
| Fagaceae (Beech Family) | | |
| *Quercus velutina* | Black oak ** | NI |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Liquidambar styraciflua* | Sweetgum ** | FAC |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush ** | FACW+ |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush | FACW- |
| *Sassafras albidum* | Sassafras | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax glauca* | Glaucous greenbrier | FACU |
| *Smilax rotundifolia* | Common greenbrier | FAC (FACW-) |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Oleaceae (Olive Family) | | |
| *Fraxinus pennsylvanicum* | Green ash ** | FACW |
| Pinaceae (Pine Family) | | |
| *Pinus strobus* | Eastern white pine ** | FACU |
| Poaceae (Grass Family) | | |
| *Microstegium vimineum* | Japanese stiltgrass ** | FAC |
| *Panicum clandestinum* | Deer-tongue grass ** | FAC+ |
| *Panicum virgatum* | Switchgrass | FAC |
| *Schizachyrium scoparium* | Little bluestem ** | FACU- |
| *Setaria glauca* | Yellow foxtail ** | NL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Dock-leaf smartweed ** | FACW+ |
| *Polygonum persicaria* | Lady thumb ** | FACW |
| *Rumex crispus* | Curly dock | FACU |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry * | FACU |
| *Rosa multiflora* | Multiflora rose ** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry | FACU- |
| *Rubus idaeus* | Red raspberry ** | FAC- |
| *Rubus phoenicolasius* | Wine raspberry * | FACU- |
| Salicaceae (Willow Family) | | |
| *Salix nigra* | Black willow ** | FACW+ |
| Typhaceae (Cattail Family) | | |
| *Typha latifolia* | Common cattail ** | OBL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm | FACW- |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape ** | NA |

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# Fort Dix UTES

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the Fort Dix UTES installation, located at Fort Dix, Ocean County, New Jersey. The site inspection occurred on October 27, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996) and, where applicable in parentheses, the NJ Pinelands- specific wetland indicators per *New Jersey Pinelands Commission Manual for Identifying and Delineating Pinelands Area Wetlands, A Pinelands Supplement to the Federal Manual* (R.A. Zampella, January 1991). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Asteraceae (Aster Family) | | |
| *Eupatorium* sp. | Snakeroot/boneset* | NA |
| *Vernonia noveboracensis* | New York ironweed | FACW+ |
| Betulaceae (Birch Family) | | |
| *Betula populifolia* | Gray birch | FAC (FACW) |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum** | FAC (FACW) |
| Cyperaceae (Sedge Family) | | |
| *Cladium mariscoides* | Twig rush (Smooth sawgrass) | OBL |
| *Scirpus cyperinus* | Wool grass | FACW+ |
| Ericaceae (Heath Family) | | |
| *Gaylussacia baccata* | Black huckleberry** | FACU (FAC-) |
| *Gaylussacia dumosa* | Dwarf huckleberry | FAC (FACW+) |
| *Kalmia latifolia* | Mountain laurel** | FACU |
| *Vaccinium corymbosum* | Highbush blueberry** | FACW- (FACW+) |
| Fagaceae (Beech Family) | | |
| *Quercus dentata* | Chestnut oak* | NL |
| *Quercus ilicifolia* | Scrub oak** | NL |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife | FACW+ |
| Myricaceae (Bayberry Family) | | |
| *Comptonia peregrina* | Sweetfern | NL |
| Pinaceae (Pine Family) | | |
| *Pinus rigida* | Pitch pine** | FACU (FAC) |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Poaceae (Grass Family) | | |
| *Schizachyrium scoparium* | Little bluestem* | FACU- |
| Typhaceae (Cat-tail Family) | | |
| *Typha latifolia* | Common cattail | OBL |

# Franklin Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Franklin installation, located in the Township of Franklin, Sussex County, New Jersey. The site inspection occurred on September 29, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer negundo* | Box elder** | FAC+ |
| *Acer saccharum* | Sugar maple** | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Asteraceae (Aster Family) | | |
| *Aster vimineus* | Small White Aster* | FAC |
| *Bidens frondosa* | Beggar-ticks | FACW |
| *Eupatorium* sp. | Snakeroot/boneset | NA |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| Balsaminaceae (Touch-me-not Family) | | |
| *Impatiens capensis* | Jewelweed** | FACW |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry** | FACU |
| Betulaceae (Birch Family) | | |
| *Carpinus caroliniana* | Ironwood* | FAC |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard* | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Lonicera morrowii* | Morrow's honeysuckle** | FACU |
| *Viburnum acerifolium* | Maple-leaf viburnum | NL |
| *Viburnum dentatum* | Southern arrowwood** | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet | NL |
| Cornaceae (Dogwood Family) | | |
| *Cornus foemina* | Stiff dogwood** | FAC |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Cyperaceae (Sedge Family) | | |
| *Carex pensylvanica* | Sedge | NL |
| *Carex stricta* | Tussock sedge** | OBL |
| Fagaceae (Beech Family) | | |
| *Quercus alba* | White oak | FACU |
| *Quercus rubra* | Red oak** | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel** | FAC- |
| Juglandaceae (Walnut Family) | | |
| *Carya ovata* | Shagbark hickory | FACU- |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife | FACW+ |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash | FACU |
| *Fraxinus pennsylvanicum* | Green ash | FACW |
| Platanaceae (Plane-tree Family) | | |
| *Platanus occidentalis* | American sycamore | FACW- |
| Poaceae (Grass Family) | | |
| *Lolium* sp. | Rye | NA |
| *Microstegium vimineum* | Japanese Stiltgrass | FAC |
| *Phragmites australis* | Common reed* | FACW |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed** | FACW+ |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Matteuccia struthiopteris* | Ostrich fern | FACW |
| *Onoclea sensibilis* | Sensitive fern | FACW |
| *Polystichum acrostichoides* | Christmas fern | FACU- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Rosaceae (Rose Family) | | |
| *Amelanchier* sp. | Shadbush | NA |
| *Rosa multiflora* | Multiflora rose* | FACU |
| *Rubus allegheniensis* | Allegheny blackberry | FACU- |
| *Rubus idaeus* | Red raspberry | FAC- |
| *Rubus phoenicolasius* | Wine raspberry | FACU- |
| Tiliaceae (Linden Family) | | |
| *Tilia americana* | American basswood | FACU |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm* | FACW- |
| *Ulmus rubra* | Slippery elm | FAC |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape | NA |

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# Hackettstown Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey National Guard's Hackettstown installation, located in Hackettstown, Warren County, New Jersey. The site inspection occurred on October 6, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Asteraceae (Aster Family) | | |
| *Ageratina altissima* | White snakeroot | FACU- |
| *Chrysanthemum leucanthemum* | Oxeye daisy | NL |
| *Cirsium arvense* | Canada thistle | FACU |
| *Erigeron strigosus* | Lesser daisy fleabane (syn. Whitetop) | FACU+ |
| *Solidago* sp. | Goldenrod | NA |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry | FACU |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet** | NL |
| Cornaceae (Dogwood Family) | | |
| *Cornus florida* | Flowering dogwood** | FACU- |
| *Cornus foemina* | Stiff dogwood** | FAC |
| *Nyssa sylvatica* | Black gum** | FAC |
| Cyperaceae (Sedge Family) | | |
| *Carex stricta* | Tussock sedge** | OBL |
| Ericaceae (Heath Family) | | |
| *Chimaphila maculata* | Striped wintergreen | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Fagaceae (Beech Family) | | |
| *Fagus grandifolia* | American beech | FACU |
| *Quercus rubra* | Red oak | FACU- |
| Juglandaceae (Walnut Family) | | |
| *Carya ovata* | Shagbark hickory | FACU- |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |
| *Sassafras albidum* | Sassafras | FACU- |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| Oxalidaceae (Wood-sorrel Family) | | |
| *Oxalis europaea* | Yellow wood sorrel | NL |
| Pinaceae (Pine Family) | | |
| *Pinus strobus* | Eastern white pine** | FACU |
| Poaceae (Grass Family) | | |
| *Microstegium vimineum* | Japanese Stiltgrass** | FAC |
| *Secale cereale* | Rye | NL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum persicaria* | Lady's thumb* | FACW |
| *Tovara virginiana* | Jumpseed | FAC |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Polystichum acrostichoides* | Christmas fern | FACU- |
| Rosaceae (Rose Family) | | |
| *Amelanchier* sp. | Shadbush | NA |
| *Potentilla simplex* | Common cinquefoil | NL |
| *Prunus serotina* | Black cherry | FACU |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| *Rubus flagellaris* | Prickly dewberry | NL |
| *Rubus idaeus* | Red raspberry** | FAC- |
| *Rubus phoenicolasius* | Wine raspberry | FACU- |
| Scrophulariaceae (Figwort Family) | | |
| *Verbascum thapsus* | Common mullein | NL |
| Solanaceae (Nightshade Family) | | |
| *Solanum dulcamara* | Bittersweet nightshade | FAC- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet | NA |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |
| *Vitis* sp. | Grape** | NA |

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# Hammonton Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Hammonton installation, located in Hammonton, Atlantic County, New Jersey. The site inspection occurred on October 14, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996) and, where applicable in parentheses, the NJ Pinelands- specific wetland indicators per *New Jersey Pinelands Commission Manual for Identifying and Delineating Pinelands Area Wetlands, A Pinelands Supplement to the Federal Manual* (R.A. Zampella, January 1991). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Betulaceae (Birch Family) | | |
| *Alnus rugosa* | Speckled alder | FACW+ |
| *Betula populifolia* | Gray birch | FAC |
| Bignoniaceae (Trumpet Creeper Family) | | |
| *Catalpa bignonioides* | Common catalpa | NL |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet* | NL |
| Clethraceae (White Alder Family) | | |
| *Clethra alnifolia* | Coast pepperbush** | FAC+ |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum** | FAC |
| Cupressaceae (Cypress Family) | | |
| *Chamaecyparis thyoides* | Atlantic white cedar** | OBL |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Ericaceae (Heath Family) | | |
| *Vaccinium angustifolium* Syn. *V. pallidum; V. vacillans* | Low blueberry; lowbush blueberry | NL |
| *Vaccinium corymbosum* | Highbush blueberry* | FACW- |
| Fagaceae (Beech Family) | | |
| *Quercus bicolor* | Swamp white oak* | FACW+ |
| *Quercus velutina* | Black oak** | NI |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar | FACU |
| *Magnolia virginiana* | Sweet bay | FACW+ |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |
| Pinaceae (Pine Family) | | |
| *Pinus rigida* | Pitch pine | FACU |
| Poaceae (Grass Family) | | |
| *Phragmites australis* | Common reed** | FACW |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum cuspidatum* | Japanese knotweed | FACU- |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Asplenium Trichomanes* | Maidenhair fern | NL |
| *Matteuccia struthiopteris* | Ostrich fern* | FACW |
| *Onoclea sensibilis* | Sensitive fern | FACW |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry** | FACU |
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven | FACU- |
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss | NL |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |

# Lawrenceville Complex

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Lawrenceville installation, located in Lawrenceville, Mercer County, New Jersey. The site inspection occurred on September 6, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| *Acer saccharum* | Sugar maple** | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| *Rhus copallina* | Winged sumac | NI |
| Apocynaceae (Dogbane Family) | | |
| *Apocynum androsaemifolium* | Spreading dogbane | NL |
| Araceae (Arum Family) | | |
| *Peltandra virginica* | Arrow arum | OBL |
| *Symplocarpus foetidus* | Skunk cabbage | OBL |
| Asclepiadaceae (Milkweed Family) | | |
| *Asclepias syriaca* | Common milkweed | FACU |
| Asteraceae (Aster Family) | | |
| *Achillea millefolium* | Yarrow | FACU |
| *Ambrosia artemisiifolia* | Common ragweed | FACU |
| *Artemisia vulgaris* | Common mugwort | NL |
| *Solidago* sp. | Goldenrod* | NA |
| *Vernonia noveboracensis* | New York ironweed | FACW+ |
| Balsaminaceae (Touch-me-not Family) | | |
| *Impatiens capensis* | Jewelweed | FACW |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry | FACU |
| Betulaceae (Birch Family) | | |
| *Carpinus caroliniana* | Ironwood | FAC |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood** | FAC |
| *Viburnum acerifolium* | Maple-leaf viburnum | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet | NL |
| Commelinaceae (Spiderwort Family) | | |
| *Commelina communis* | Asiatic dayflower | FAC- |
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood** | FACW |
| Cyperaceae (Sedge Family) | | |
| *Carex lurida* | Lurid sedge | OBL |
| *Carex pensylvanica* | Sedge | NL |
| *Scirpus cyperinus* | Wool grass | FACW+ |
| Ericaceae (Heath Family) | | |
| *Vaccinium corymbosum* | Highbush blueberry | FACW- |
| Fabaceae (Bean/Pea Family) | | |
| *Robinia pseudo-acacia* | Black locust** | FACU- |
| Fagaceae (Beech Family) | | |
| *Fagus grandifolia* | American beech** | FACU |
| *Quercus alba* | White oak | FACU |
| *Quercus dentata* | Chestnut oak | NL |
| *Quercus palustris* | Pin oak | FACW |
| *Quercus rubra* | Red oak** | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Liquidambar styraciflua* | Sweetgum* | FAC |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush | FACW+ |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |
| Liliaceae (Lily Family) | | |
| *Smilacina racemosa* | False Solomon's Seal | FACU- |
| *Smilax rotundifolia* | Common greenbrier | FAC |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar | FACU |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| *Fraxinus pennsylvanicum* | Green ash | FACW |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Poaceae (Grass Family) | | |
| *Microstegium vimineum* | Japanese Stiltgrass** | FAC |
| *Panicum clandestinum* | Deer-tongue grass | FAC+ |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum arifolium* | Halberd-leaved tearthumb** | OBL |
| *Polygonum cuspidatum* | Japanese knotweed | FACU- |
| *Polygonum persicaria* | Lady's thumb | FACW |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Onoclea sensibilis* | Sensitive fern | FACW |
| *Thelypteris noveboracensis* | New York fern | FAC |
| Rosaceae (Rose Family) | | |
| *Crataegus* sp. | Hawthorn | NA |
| *Prunus serotina* | Black cherry** | FACU |
| *Pyrus* sp. | Crabapple | NA |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry* | FACU- |
| *Rubus phoenicolasius* | Wine raspberry | FACU- |
| Tiliaceae (Linden Family) | | |
| *Tilia americana* | American basswood | FACU |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus rubra* | Slippery elm | FAC |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |
| *Vitis aestivalis* | Summer grape** | FACU |

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# Morristown Armory OMS

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Morristown installation, located in Morristown, Morris County, New Jersey. The site inspection occurred on September 19 and 20, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer platanoides* | Norway maple | NL |
| *Acer saccharum* | Sugar maple** | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Araceae (Arum Family) | | |
| *Symplocarpus foetidus* | Skunk cabbage | OBL |
| *Acorus calamus* | Sweet flag** | OBL |
| Asclepiadaceae (Milkweed Family) | | |
| *Asclepias syriaca* | Common milkweed | FACU |
| Asteraceae (Aster Family) | | |
| *Ageratina altissima* | White snakeroot** | FACU- |
| *Bidens frondosa* | Beggar-ticks | FACW |
| *Cichorium intybus* | Chicory | NI |
| *Cirsium arvense* | Canada thistle | FACU |
| *Solidago* sp. | Goldenrod | NA |
| Balsaminaceae (Touch-me-not Family) | | |
| *Impatiens capensis* | Jewelweed | FACW |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry | FACU |
| Cornaceae (Dogwood Family) | | |
| *Cornus florida* | Flowering dogwood | FACU- |
| Cyperaceae (Sedge Family) | | |
| *Carex stricta* | Tussock sedge* | OBL |
| *Cladium mariscoides* | Twig rush (Smooth sawgrass) | OBL |
| *Cyperus esculentus* | Yellow-nut sedge (Chufa) | FACW |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Fabaceae (Bean/Pea Family) | | |
| *Robinia pseudo-acacia* | Black locust* | FACU- |
| Fagaceae (Beech Family) | | |
| *Quercus palustris* | Pin oak | FACW |
| *Quercus rubra* | Red oak | FACU- |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush | FACW+ |
| *Juncus tenuis* | Path rush | FAC- |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush | FACW- |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar | FACU |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash | FACU |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Platanaceae (Plane-tree Family) | | |
| *Platanus occidentalis* | American sycamore | FACW- |
| Poaceae (Grass Family) | | |
| *Eulalia viminea* | Eulalia** | FAC |
| *Panicum clandestinum* | Deer-tongue grass | FAC+ |
| *Setaria* sp. | Bristly foxtail | NL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum arifolium* | Halberd-leaved tearthumb** | OBL |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed** | FACW+ |
| *Polygonum persicaria* | Lady's thumb | FACW |
| *Rumex crispus* | Curly dock | FACU |
| Rosaceae (Rose Family) | | |
| *Prunus avium* | Sweet cherry | NL |
| *Prunus serotina* | Black cherry** | FACU |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus phoenicolasius* | Wine raspberry** | FACU- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven | FACU- |
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss** | NL |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm* | FACW- |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet | NA |
| Vitaceae (Grape Family) | | |
| *Vitis* sp. | Grape** | NA |

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# Newton Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Newton installation, located in Newton, Sussex County, New Jersey. The site inspection occurred on October 5, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer negundo* | Box elder | FAC+ |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy | FAC |
| Asclepiadaceae (Milkweed Family) | | |
| *Asclepias syriaca* | Common milkweed | FACU |
| Asteraceae (Aster Family) | | |
| *Aster vimineus* | Small White Aster | FAC |
| *Aster* sp. | Aster | NA |
| *Bidens* sp. | Beggar ticks | NA |
| *Cichorium intybus* | Chicory | NI |
| *Cirsium arvense* | Canada thistle | FACU |
| *Eupatorium* sp. | Snakeroot/boneset | NA |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| *Solidago* sp. | Goldenrod | NA |
| Bignoniaceae (Trumpet Creeper Family) | | |
| *Catalpa bignonioides* | Common catalpa | NL |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle | FAC- |
| *Lonicera tatarica* | Tartarian honeysuckle | FACU |
| *Viburnum recognitum* | Northern arrowwood | FACW- |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet | NL |
| Convolvulaceae (Morning-glory Family) | | |
| *Convolvulus* sp. | Bindweed | NA |
| Cornaceae (Dogwood Family) | | |
| *Cornus foemina* | Stiff dogwood | FAC |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Cyperaceae (Sedge Family) | | |
| *Carex stipata* | Stalk-grain sedge** | OBL |
| *Carex vulpinoidea* | Fox sedge | OBL |
| *Cyperus* sp. | Sedge | NA |
| *Scirpus cyperinus* | Wool grass** | FACW+ |
| Dipsacaceae (Teasel Family) | | |
| *Dipsacus sylvestris* | Teasel | FACU- |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive | NL |
| Euphorbiaceae (Spurge Family) | | |
| *Euphorbia esula* | Leafy spurge | NL |
| Fagaceae (Beech Family) | | |
| *Quercus palustris* | Pin oak | FACW |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel | FAC- |
| Hypericaceae (St. Johnswort Family) | | |
| *Hypericum* sp. | St. John's-wort | NA |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush** | FACW+ |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash | FACU |
| *Fraxinus pennsylvanicum* | Green ash | FACW |
| Oxalidaceae (Wood-sorrel Family) | | |
| *Oxalis europaea* | Yellow wood sorrel | NL |
| Pinaceae (Pine Family) | | |
| *Pinus strobus* | Eastern white pine | FACU |
| Poaceae (Grass Family) | | |
| *Dactylis glomerata* | Orchard grass | FACU |
| *Microstegium vimineum* | Japanese Stiltgrass | FAC |
| *Phalaris arundinaceae* | Reed canary grass** | FACW+ |
| *Phragmites australis* | Common reed | FACW |
| *Phleum pratense* | Timothy | FACU |
| *Poa* sp. | Bluegrass | NA |
| *Setaria* sp. | Bristly foxtail | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed | FACW+ |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry | FACU |
| *Rosa multiflora* | Multiflora rose | FACU |
| Rubiaceae (Madder Family) | | |
| *Galium* sp. | Bedstraw | NA |
| Scrophulariaceae (Figwort Family) | | |
| *Linaria vulgaris* | Butter-and-eggs | NL |
| *Verbascum thapsus* | Common mullein | NL |
| Solanaceae (Nightshade Family) | | |
| *Solanum carolinense* | Horse nettle | UPL |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape | NA |

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# Picatinny FMS/AASF

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Picatinny installation, located at the Picatinny Arsenal, Morris County, New Jersey. The site inspection occurred on September 21, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, and NL = Not listed.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Anacardiaceae (Cashew Family) | | |
| *Rhus copallina* | Winged sumac | NI |
| *Rhus typhina* | Staghorn sumac** | NL |
| Asclepiadaceae (Milkweed Family) | | |
| *Asclepias syriaca* | Common milkweed | FACU |
| Asteraceae (Aster Family) | | |
| *Aster vimineus* | Small White Aster | FAC |
| *Bidens* sp. | Beggar ticks* | NA |
| *Centaurea maculosa* | Spotted knapweed | NL |
| *Hieracium* sp. | Hawkweed | NA |
| *Solidago* sp. | Goldenrod** | NA |
| Betulaceae (Birch Family) | | |
| *Betula lenta* | Black birch* | FACU |
| *Betula populifolia* | Gray birch** | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet | NL |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive** | NL |
| Fabaceae (Bean/Pea Family) | | |
| *Lespedeza* sp. | Bush clover** | NA |
| *Trifolium pratense* | Red clover | FACU- |
| Fagaceae (Beech Family) | | |
| *Quercus ilicifolia* | Scrub oak | NL |
| Myricaceae (Bayberry Family) | | |
| *Comptonia peregrina* | Sweetfern | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Oxalidaceae (Wood-sorrel Family) | | |
| *Oxalis europaea* | Yellow wood sorrel | NL |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain | NL |
| Poaceae (Grass Family) | | |
| *Bromus tectorum* | Downy brome** | NL |
| *Panicum clandestinum* | Deer-tongue grass | FAC+ |
| *Schizachyrium scoparium* | Little bluestem** | FACU- |
| *Setaria* sp. | Bristly foxtail | NL |
| *Triodia flava* | Purple-top | NL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum cuspidatum* | Japanese knotweed | FACU- |
| *Polygonum lapathifolium* | Pale smartweed; dock-leaf smartweed** | FACW+ |
| *Rumex crispus* | Curly dock | FACU |
| Rosaceae (Rose Family) | | |
| *Rosa multiflora* | Multiflora rose | FACU |
| *Rubus allegheniensis* | Allegheny blackberry* | FACU- |
| *Rubus flagellaris* | Prickly dewberry** | NL |
| Salicaceae (Willow Family) | | |
| *Populus tremula* | Quaking aspen** | FACU |
| Scrophulariaceae (Figwort Family) | | |
| *Linaria vulgaris* | Butter-and-eggs | NL |
| *Verbascum thapsus* | Common mullein | NL |
| Solanaceae (Nightshade Family) | | |
| *Solanum carolinense* | Horse nettle | UPL |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot* | NL |
| Vitaceae (Grape Family) | | |
| *Vitis* sp. | Grape | NA |

# Pitman Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey National Guard's Pitman installation, located in Pitman, Gloucester County, New Jersey. The site inspection occurred on October 28, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer negundo* | Box elder | FAC+ |
| *Acer rubrum* | Red maple** | FAC |
| *Acer saccharinum* | Silver maple | FACW |
| *Acer saccharum* | Sugar maple | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| *Rhus copallina* | Winged sumac | NI |
| Aquifoliaceae (Holly Family) | | |
| *Ilex opaca* | American holly | FACU+ |
| Asclepiadaceae (Milkweed Family) | | |
| *Asclepias syriaca* | Common milkweed | FACU |
| Asteraceae (Aster Family) | | |
| *Eupatorium* sp. | Snakeroot/boneset** | NA |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood** | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet** | NL |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum* | FAC |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Ericaceae (Heath Family) | | |
| *Gaylussacia baccata* | Black huckleberry | FACU |
| *Kalmia latifolia* | Mountain laurel | FACU |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Fagaceae (Beech Family) | | |
| *Quercus alba* | White oak | FACU |
| *Quercus palustris* | Pin oak* | FACW |
| *Quercus rubra* | Red oak* | FACU- |
| Juglandaceae (Walnut Family) | | |
| *Carya ovata* | Shagbark hickory* | FACU- |
| *Juglans nigra* | Black walnut** | FACU |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras* | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Pinaceae (Pine Family) | | |
| *Pinus strobus* | Eastern white pine | FACU |
| Poaceae (Grass Family) | | |
| *Panicum* sp. | Grass | NA |
| *Schizachyrium scoparium* | Little bluestem* | FACU- |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum arifolium* | Halberd-leaved tearthumb | OBL |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Onoclea sensibilis* | Sensitive fern | FACW |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry** | FACU |
| *Rosa multiflora* | Multiflora rose* | FACU |
| *Rubus allegheniensis* | Allegheny blackberry* | FACU- |
| *Rubus flagellaris* | Prickly dewberry** | NL |
| *Rubus phoenicolasius* | Wine raspberry** | FACU- |
| Scrophulariaceae (Figwort Family) | | |
| *Paulownia tomentosa (imperialis)* | Princess-tree | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm* | FACW- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Vitaceae (Grape Family) | | |
| *Vitis* sp. | Grape | NA |

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# Princeton Warehouse

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22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Princeton installation, located in Princeton, Mercer County, New Jersey. The site inspection occurred on October 4, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, and NL = Not listed.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer negundo* | Box elder** | FAC+ |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Asteraceae (Aster Family) | | |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Lonicera tatarica* | Tartarian honeysuckle** | FACU |
| *Viburnum dentatum* | Southern arrowwood | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet** | NL |
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood** | FACW |
| Cyperaceae (Sedge Family) | | |
| *Carex crinita* | Fringed sedge | OBL |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive | NL |
| Fagaceae (Beech Family) | | |
| *Quercus rubra* | Red oak** | FACU- |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush* | FACW+ |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier* | FAC |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife | FACW+ |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash | FACU |
| *Fraxinus pennsylvanicum* | Green ash** | FACW |
| Pinaceae (Pine Family) | | |
| *Pinus strobes* | Eastern white pine** | FACU |
| Poaceae (Grass Family) | | |
| *Microstegium vimineum* | Japanese stiltgrass** | FAC |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed** | FACW+ |
| *Polygonum persicaria* | Lady's thumb | FACW |
| *Tovara virginiana* | Jumpseed** | FAC |
| Rosaceae (Rose Family) | | |
| *Pyrus* sp. | Crabapple | NA |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| *Rubus idaeus* | Red raspberry | FAC- |
| *Rubus phoenicolasius* | Wine raspberry** | FACU- |
| Salicaceae (Willow Family) | | |
| *Salix nigra* | Black willow | FACW+ |
| Typhaceae (Cat-tail Family) | | |
| *Typha latifolia* | Common cattail | OBL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm** | FACW- |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle** | FACW+ |
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet | NA |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape** | NA |

# Sea Girt NGTC

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Sea Girt installation, located in the Borough of Sea Girt, Monmouth County, New Jersey. The site inspection occurred on August 30, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer negundo* | Box elder | FAC+ |
| *Acer platanoides* | Norway maple | NL |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| *Rhus copallina* | Winged sumac* | NI |
| Asclepiadaceae (Milkweed Family) | | |
| *Asclepias syriaca* | Common milkweed | FACU |
| Asteraceae (Aster Family) | | |
| *Achillea millefolium* | Yarrow | FACU |
| *Ambrosia artemisiifolia* | Common ragweed | FACU |
| *Artemisia vulgaris* | Common mugwort | NL |
| *Baccharis halimifolia* | Groundsel tree* | FACW |
| *Centaurea maculosa* | Spotted knapweed | NL |
| *Hieracium* sp. | Hawkweed | NA |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| *Solidago sempervirens* | Seaside goldenrod | FACW |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle | FAC- |
| *Viburnum dentatum* | Southern arrowwood | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet** | NL |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum | FAC |
| Cyperaceae (Sedge Family) | | |
| *Cladium mariscoides* | Twig rush (Smooth sawgrass)** | OBL |
| *Eleocharis* sp. | Spike rush** | NA |
| *Scirpus cyperinus* | Wool grass | FACW+ |
| *Scirpus pungens* | Chair-maker's rush (Three-square) | FACW+ |
| *Cyperus esculentus* | Yellow-nut sedge (Chufa)** | FACW |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Fabaceae (Bean/Pea Family) | | |
| *Lotus corniculatus* | Bird's-foot trefoil | FACU- |
| *Robinia pseudo-acacia* | Black locust | FACU- |
| *Trifolium repens* | White clover | FACU- |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush** | FACW+ |
| *Juncus tenuis* | Path rush** | FAC- |
| Lythraceae (Loosestrife Family) | | |
| *Lythrum salicaria* | Purple loosestrife | FACW+ |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |
| Onagraceae (Evening Primrose Family)\ | | |
| *Oenothera biennis* | Common evening primrose | FACU- |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain | NL |
| Poaceae (Grass Family) | | |
| *Panicum virgatum* | Switchgrass** | FAC |
| *Phalaris arundinaceae* | Reed canary grass | FACW+ |
| *Phragmites australis* | Common reed** | FACW |
| *Setaria* sp. | Bristly foxtail | NL |
| *Sorghum halepense* | Johnson Grass | FACU |
| *Spartina alterniflora* | Saltmarsh cordgrass** | OBL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum cuspidatum* | Japanese knotweed* | FACU- |
| *Polygonum lapathifolium* | Pale smartweed; dock-leaf smartweed | FACW+ |
| *Polygonum pensylvanicum* | Pinkweed | FACW |
| *Rumex crispus* | Curly dock | FACU |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry* | FACU |
| *Rosa multiflora* | Multiflora rose | FACU |
| *Rubus hispidus* | Bristly dewberry | FACW |
| Salicaceae (Willow Family) | | |
| *Populus deltoides* | Eastern cottonwood | FAC |
| *Salix nigra* | Black willow | FACW+ |
| Scrophulariaceae (Figwort Family) | | |
| *Verbascum thapsus* | Common mullein | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |
| *Vitis* sp. | Grape* | NA |

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# Somerset Armory OMS

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22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Somerset installation, located in Somerset, Somerset County, New Jersey. The site inspection occurred on October 7, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer platanoides* | Norway maple** | NL |
| *Acer rubrum* | Red maple | FAC |
| *Acer saccharinum* | Silver maple | FACW |
| *Acer saccharum* | Sugar maple** | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| *Rhus copallina* | Winged sumac | NI |
| *Rhus typhina* | Staghorn sumac | NL |
| Asteraceae (Aster Family) | | |
| *Centaurea maculosa* | Spotted knapweed | NL |
| *Eupatorium* sp. | Snakeroot/boneset | NA |
| *Solidago* sp. | Goldenrod | NA |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood | FAC |
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood | FACW |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Fabaceae (Bean/Pea Family) | | |
| *Robinia pseudo-acacia* | Black locust** | FACU- |
| Fagaceae (Beech Family) | | |
| *Quercus palustris* | Pin oak** | FACW |
| *Quercus rubra* | Red oak** | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Liquidambar styraciflua* | Sweetgum* | FAC |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Juglandaceae (Walnut Family) | | |
| *Juglans nigra* | Black walnut | FACU |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush | FACW+ |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras** | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar** | FACU |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain | NL |
| Poaceae (Grass Family) | | |
| *Panicum clandestinum* | Deer-tongue grass | FAC+ |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry** | FACU |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| *Rubus flagellaris* | Prickly dewberry | NL |
| *Rubus occidentalis* | Black raspberry | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm | FACW- |
| Violaceae (Violet Family) | | |
| *Viola* sp. | Violet** | NA |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Vitis* sp. | Grape** | NA |

# Toms River Armory OMS

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Toms River installation, located in Toms River, Ocean County, New Jersey. The site inspection occurred on September 1, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple** | FAC |
| Asteraceae (Aster Family) | | |
| *Achillea millefolium* | Yarrow | FACU |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod | FAC |
| Betulaceae (Birch Family) | | |
| *Betula populifolia* | Gray birch | FAC (FACW) |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera tatarica* | Tartarian honeysuckle | FACU |
| Clethraceae (White Alder Family) | | |
| *Clethra alnifolia* | Coast pepperbush** | FAC+ (FACW-) |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum** | FAC (FACW) |
| Cupressaceae (Cypress Family) | | |
| *Chamaecyparis thyoides* | Atlantic white cedar** | OBL |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Cyperaceae (Sedge Family) | | |
| *Carex pensylvanica* | Sedge | NL |
| *Carex stricta* | Tussock sedge** | OBL |
| *Cladium mariscoides* | Twig rush (Smooth sawgrass) | OBL |
| *Scirpus cyperinus* | Wool grass | FACW+ |
| Droseraceae (Sundew Family) | | |
| *Drosera intermedia* | Spatulate-leaved sundew** | OBL |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive** | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Ericaceae (Heath Family) | | |
| *Gaylussacia baccata* | Black huckleberry** | FACU (FAC-) |
| *Vaccinium corymbosum* | Highbush blueberry | FACW- (FACW+) |
| Fabaceae (Bean/Pea Family) | | |
| *Robinia pseudo-acacia* | Black locust | FACU- |
| Fagaceae (Beech Family) | | |
| *Quercus alba* | White oak* | FACU |
| *Quercus ilicifolia* | Scrub oak* | NL |
| *Quercus palustris* | Pin oak | FACW |
| *Quercus rubra* | Red oak* | FACU- |
| *Quercus stellata (similis)* | Post oak** | NL |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush | FACW+ |
| *Juncus tenuis* | Path rush | FAC- |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras** | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier | FAC (FACW-) |
| Melastomaceae (Melastome Family) | | |
| *Rhexia virginica* | Meadow beauty | OBL |
| Pinaceae (Pine Family) | | |
| *Pinus rigida* | Pitch pine* | FACU (FAC) |
| *Pinus virginiana* | Virginia pine | NL |
| Poaceae (Grass Family) | | |
| *Andropogon virginicus* var. *abbreviatus* Syn. *Andropogon glomeratus* | Broomsedge; bushy beardgrass | FACW+ |
| *Bromus sp.* | Brome | *NA* |
| *Echinochloa crusgalli*. | Barnyard grass | FACU |
| *Leersia oryzoides* | Rice-cut grass | OBL |
| *Panicum clandestinum* | Deer-tongue grass* | FAC+ |
| *Panicum virgatum* | Switchgrass** | FAC |
| *Phragmites australis* | Common reed** | FACW |
| *Poa* sp. | Bluegrass | NA |
| *Setaria* sp. | Bristly foxtail | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry | FACU |
| *Rubus allegheniensis* | Allegheny blackberry | FACU- |
| *Rubus hispidus* | Bristly dewberry* | FACW |
| Salicaceae (Willow Family) | | |
| *Salix nigra* | Black willow | FACW+ |
| Scrophulariaceae (Figwort Family) | | |
| *Verbascum thapsus* | Common mullein | NL |
| Sphagnaceae (Sphagnum Family) | | |
| *Sphagnum* sp. | Sphagnum moss** | NL |

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# Tuckerton Armory

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey National Guard's Tuckerton installation, located in Tuckerton, Ocean County, New Jersey. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy** | FAC |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Ericaceae (Heath Family) | | |
| *Gaylussacia baccata* | Black huckleberry** | FACU |
| *Gaylussacia dumosa* | Dwarf huckleberry** | FAC |
| *Kalmia latifolia* | Mountain laurel | FACU |
| *Vaccinium angustifolium* Syn. *V. pallidum; V. vacillans* | Low blueberry; lowbush blueberry* | NL |
| Fabaceae (Bean/Pea Family) | | |
| *Wisteria sp.* | Wisteria | NA |
| Fagaceae (Beech Family) | | |
| *Quercus alba* | White oak* | FACU |
| *Quercus dentata* | Chestnut oak** | NL |
| *Quercus rubra* | Red oak* | FACU- |
| *Quercus velutina* | Black oak* | NI |
| Liliaceae (Lily Family) | | |
| *Smilax glauca* | Glaucous greenbrier (Catbrier)** | FACU |
| Pinaceae (Pine Family) | | |
| *Pinus rigida* | Pitch pine** | FACU |
| *Pinus virginiana* | Virginia pine* | NL |
| Poaceae (Grass Family) | | |
| *Panicum virgatum* | Switchgrass | FAC |
| *Schizachyrium scoparium* | Little bluestem | FACU- |

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# Vineland Armory OMS

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's Vineland installation, located in the City of Vineland, Cumberland County, New Jersey. The site inspection occurred on September 13, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, and NL = Not listed.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer rubrum* | Red maple | FAC |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy* | FAC |
| Aquifoliaceae (Holly Family) | | |
| *Ilex opaca* | American holly | FACU+ |
| Asteraceae (Aster Family) | | |
| *Bidens* sp. | Beggar ticks** | NA |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera morrowii* | Morrow's honeysuckle | FACU |
| Cornaceae (Dogwood Family) | | |
| *Nyssa sylvatica* | Black gum | FAC |
| Cupressaceae (Cypress Family) | | |
| *Juniperus virginiana* | Eastern red cedar | FACU |
| Cyperaceae (Sedge Family) | | |
| *Carex pensylvanica* | Sedge | NL |
| *Carex* sp. | Sedge | NA |
| *Cladium mariscoides* | Twig rush (Smooth sawgrass) | OBL |
| Ericaceae (Heath Family) | | |
| *Gaylussacia baccata* | Black huckleberry** | FACU |
| *Vaccinium angustifolium* Syn. *V. pallidum; V. vacillans* | Low blueberry; lowbush blueberry* | NL |
| Fabaceae (Bean/Pea Family) | | |
| *Albizia julibrissin* | Silk-tree | NL |
| *Lespedeza* sp. | Bush clover | NA |
| *Wisteria sp.* | Wisteria** | NA |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Fagaceae (Beech Family) | | |
| *Quercus alba* | White oak* | FACU |
| *Quercus ilicifolia* | Scrub oak | NL |
| *Quercus marilandica* | Blackjack oak | NL |
| *Quercus velutina* | Black oak** | NI |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush** | FACW+ |
| *Juncus tenuis* | Path rush | FAC- |
| Lamiaceae (Mint Family) | | |
| *Lycopus virginicus* | Bugleweed | OBL |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras** | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax glauca* | Glaucous greenbrier (Catbrier) | FACU |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Moraceae (Mulberry Family) | | |
| *Morus alba* | White mulberry | NL |
| Myricaceae (Bayberry Family) | | |
| *Comptonia peregrina* | Sweetfern | NL |
| Oxalidaceae (Wood-sorrel Family) | | |
| *Oxalis europaea* | Yellow wood sorrel | NL |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed* | FACU+ |
| Pinaceae (Pine Family) | | |
| *Pinus rigida* | Pitch pine* | FACU |
| Poaceae (Grass Family) | | |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum lapathifolium* | Willow-weed; dock-leaf smartweed** | FACW+ |
| *Polygonum persicaria* | Lady's thumb** | FACW |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Pteridium aquilinum* | Bracken fern | FACU |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry* | FACU |
| *Rosa multiflora* | Multiflora rose | FACU |
| *Rubus hispidus* | Bristly dewberry** | FACW |
| *Rubus idaeus* | Red raspberry** | FAC- |
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven | FACU- |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Urticaceae (Nettle Family) | | |
| *Urtica dioica* | Stinging nettle** | FACU |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper** | FACU |
| *Vitis* sp. | Grape | NA |

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# West Orange Armory OMS/CSMS

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey Army National Guard's West Orange installation, located in West Orange, Essex County, New Jersey. The site inspection occurred on September 22 and 23, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, and NL = Not listed.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer saccharum* | Sugar maple** | FACU- |
| Anacardiaceae (Cashew Family) | | |
| *Toxicodendron radicans* | Poison ivy* | FAC |
| Apocynaceae (Dogbane Family) | | |
| *Apocynum androsaemifolium* | Spreading dogbane | NL |
| Araceae (Arum Family) | | |
| *Symplocarpus foetidus* | Skunk cabbage | OBL |
| Asteraceae (Aster Family) | | |
| *Ageratina altissima* | White snakeroot** | FACU- |
| *Artemisia vulgaris* | Common mugwort | NL |
| *Aster vimineus* | Small White Aster | FAC |
| *Solidago (Euthamia) graminifolia* | Grass-leaved goldenrod** | FAC |
| *Solidago* sp. | Goldenrod* | NA |
| Balsaminaceae (Touch-me-not Family) | | |
| *Impatiens capensis* | Jewelweed | FACW |
| Berberidaceae (Barberry Family) | | |
| *Berberis thunbergii* | Japanese barberry* | FACU |
| Betulaceae (Birch Family) | | |
| *Betula lenta* | Black birch* | FACU |
| *Carpinus caroliniana* | Ironwood* | FAC |
| *Ostrya virginiana* | Hop hornbeam | FACU- |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet* | NL |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Cyperaceae (Sedge Family) | | |
| *Carex lurida* | Lurid sedge** | OBL |
| *Scirpus cyperinus* | Wool grass** | FACW+ |
| Fagaceae (Beech Family) | | |
| *Fagus grandifolia* | American beech** | FACU |
| *Quercus alba* | White oak* | FACU |
| *Quercus rubra* | Red oak** | FACU- |
| Hamamelidaceae (Witch Hazel Family) | | |
| *Hamamelis virginiana* | Witch hazel** | FAC- |
| Juglandaceae (Walnut Family) | | |
| *Carya ovata* | Shagbark hickory* | FACU- |
| Juncaceae (Rush Family) | | |
| *Juncus effusus* | Soft rush** | FACW+ |
| *Juncus tenuis* | Path rush | FAC- |
| Lauraceae (Laurel Family) | | |
| *Sassafras albidum* | Sassafras** | FACU- |
| Liliaceae (Lily Family) | | |
| *Smilax rotundifolia* | Common greenbrier** | FAC |
| Magnoliaceae (Magnolia Family) | | |
| *Liriodendron tulipifera* | Tulip poplar** | FACU |
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash** | FACU |
| Poaceae (Grass Family) | | |
| *Echinochloa crusgalli*. | Barnyard grass | FACU |
| *Microstegium vimineum* | Japanese Stiltgrass** | FAC |
| *Panicum clandestinum* | Deer-tongue grass | FAC+ |
| *Phragmites australis* | Common reed | FACW |
| *Setaria* sp. | Bristly foxtail | NL |
| Polygonaceae (Smartweed Family) | | |
| *Polygonum arifolium* | Halberd-leaved tearthumb** | OBL |
| *Polygonum cuspidatum* | Japanese knotweed | FACU- |
| *Polygonum persicaria* | Lady's thumb | FACW |
| Polypodiaceae (Polypody Family) – formerly Dennstaedtiaceae | | |
| *Polystichum acrostichoides* | Christmas fern | FACU- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry** | FACU |
| *Rosa multiflora* | Multiflora rose* | FACU |
| *Rubus allegheniensis* | Allegheny blackberry** | FACU- |
| *Rubus idaeus* | Red raspberry | FAC- |
| *Rubus phoenicolasius* | Wine raspberry** | FACU- |
| *Spiraea latifolia* | Meadow-sweet** | FAC+ |
| Simaroubaceae (Quassia Family) | | |
| *Ailanthus altissima* | Tree of heaven | FACU- |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm* | FACW- |
| Urticaceae (Nettle Family) | | |
| *Boehmeria cylindrica* | False nettle | FACW+ |
| Vitaceae (Grape Family) | | |
| *Vitis* sp. | Grape* | NA |

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# West Trenton AASF/OMS

Project No.: 3-2106-0114
22 October 2007

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## PLANT SPECIES LIST

The following is a list of plant species identified during site inspections at the New Jersey National Guard's West Trenton installation, located in West Trenton, Mercer County, New Jersey. The site inspection occurred on October 20, 2005. Wetland indicator classification nomenclature follows USFWS (1988 & 1996). In addition, NA= Not applicable, NI = No indicator, NL = Not listed, ** = dominant, and * = abundant.

| Scientific Name | Common Name | Classification |
|---|---|---|
| Aceraceae (Maple Family) | | |
| *Acer platanoides* | Norway maple | NL |
| *Acer rubrum* | Red maple** | FAC |
| *Acer saccharinum* | Silver maple* | FACW |
| Asteraceae (Aster Family) | | |
| *Erigeron strigosus* | Lesser daisy fleabane (syn. Whitetop) | FACU+ |
| *Eupatorium* sp. | Snakeroot/boneset** | NA |
| *Solidago* sp. | Goldenrod** | NA |
| Brassicaceae (Mustard Family) | | |
| *Alliaria officinalis* (syn. *A. petiolata*) | Garlic mustard | FACU- |
| Caprifoliaceae (Honeysuckle Family) | | |
| *Lonicera japonica* | Japanese honeysuckle** | FAC- |
| *Viburnum dentatum* | Southern arrowwood** | FAC |
| Celastraceae (Staff-tree Family) | | |
| *Celastrus orbiculatus* | Asiatic bittersweet* | NL |
| Cornaceae (Dogwood Family) | | |
| *Cornus amomum* | Silky dogwood** | FACW |
| *Nyssa sylvatica* | Black gum* | FAC (FACW) |
| Cyperaceae (Sedge Family) | | |
| *Carex pensylvanica* | Sedge | NL |
| Elaeagnaceae (Oleaster Family) | | |
| *Elaeagnus umbellata* | Autumn olive* | NL |
| Fabaceae (Bean/Pea Family) | | |
| *Coronilla varia* | Crown vetch* | NL |
| Juglandaceae (Walnut Family) | | |
| *Juglans nigra* | Black walnut* | FACU |
| Lauraceae (Laurel Family) | | |
| *Lindera benzoin* | Spicebush** | FACW- |

| Scientific Name | Common Name | Classification |
|---|---|---|
| Oleaceae (Olive Family) | | |
| *Fraxinus americana* | White ash* | FACU |
| Phytolaccaceae (Pokeweed Family) | | |
| *Phytolacca americana* | Common pokeweed | FACU+ |
| Plantaginaceae (Plantain Family) | | |
| *Plantago lanceolata* | English plantain | NL |
| Poaceae (Grass Family) | | |
| *Microstegium vimineum* | Japanese Stiltgrass** | FAC |
| *Schizachyrium scoparium* | Little bluestem | FACU- |
| Polygonaceae (Smartweed Family) | | |
| *Tovara virginiana* | Jumpseed** | FAC |
| Rosaceae (Rose Family) | | |
| *Prunus serotina* | Black cherry* | FACU |
| *Rosa multiflora* | Multiflora rose** | FACU |
| *Rubus allegheniensis* | Allegheny blackberry* | FACU- |
| *Rubus idaeus* | Red raspberry* | FAC- |
| Salicaceae (Willow Family) | | |
| *Salix nigra* | Black willow** | FACW+ |
| Umbelliferae (Parsley Family) | | |
| *Daucus carota* | Wild carrot | NL |
| Ulmaceae (Elm Family) | | |
| *Ulmus americana* | American elm* | FACW- |
| Vitaceae (Grape Family) | | |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |

# APPENDIX C

# Wetland Delineation Field Data Forms

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# Bordentown Armory / OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Bordentown Armory **Date:** 9/8/05
**County/State:** Burlington, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point within Wetland Series A, located down-gradient of line created by wetland flags A112 and A113.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Pin oak<br>Sweetgum<br>Red maple | *Quercus palustris*<br>*Liquidambar styraciflua*<br>*Acer rubrum* | FACW<br>FAC<br>FAC |
| Sapling | Sweetgum<br>Black gum | *Liquidambar styraciflua*<br>*Nyssa sylvatica* | FAC<br>FAC |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
____ **Inundation**
____ **Saturated in Upper 12"**
X **Water Marks**
____ **Drift Lines**
____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
____ **Oxidized Root Channels in Upper 12"**
X **Water-stained Leaves**
____ **Local Soil Survey Dat**
____ **FAC-Neutral Test**
____ **Dominance by OBL**
X **Other (explain)** – buttressed trunks

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-8 | 10YR 4/3 (brown) | NA | NA | Sandy loam with 40% pore linings and 20% faint to distinct soft dark masses. Slightly moist. |
| 8-12 (pan) | 2.5Y 4/2 (dark grayish-brown) | NA | NA | Clay loam with 50% pore linings. Slightly moist. |
| 12-14 (refusal) | 2.5Y 4/2 (dark grayish-brown) | 7.5YR 4/6 (strong brown) | 40% / prominent | Medium friable sandy loam with 30% small, round, quartzose pebbles. Slightly moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

**Site:** NJARNG Bordentown Armory **Date:** 9/8/05
**County/State:** Burlington, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point within Wetland Series A, located relatively deeper within wetland area than B1, down-gradient of wetland flags A109 and A110.

## VEGETATION

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Sweetgum<br>Red maple<br>Green ash | *Liquidambar styraciflua*<br>*Acer rubrum*<br>*Fraxinus pensylvanicum* | FAC<br>FAC<br>FACW |
| Sapling | Sweetgum | *Liquidambar styraciflua* | FAC |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Soft rush | *Juncus effusus* | FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- X **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Dat**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-8 | 10YR 4/3 (brown) | NA | NA | Sandy loam with 40% pore linings and 20% faint to distinct soft dark masses. Slightly moist. |
| 8-12 (pan) | 2.5Y 4/2 (dark grayish-brown) | NA | NA | Clay loam with 50% pore linings. Slightly moist. |
| 12-14 (refusal) | 2.5Y 4/2 (dark grayish-brown) | 7.5YR 4/6 (strong brown) | 40% / prominent | Medium friable sandy loam with 30% small, round, quartzose pebbles. Slightly moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

**Site:** NJARNG Bordentown Armory **Date:** 9/8/05
**County/State:** Burlington, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point collected from a low-lying area initially suspected of exhibiting wetland characteristics.

**VEGETATION**

**Community Type:** Forested deciduous woodland.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Silver maple<br>Black cherry<br>White ash | *Acer saccharinum*<br>*Prunus serotina*<br>*Fraxinus americana* | FACW<br>FACU<br>FACU |
| Sapling | White ash | *Fraxinus americana* | FACU |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Bristly dewberry | *Rubus flagellaris* | NL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 20

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)** – buttressed trunks

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-19 (refusal) | 7.5YR 3/4 (dark brown) | NA | NA | Friable medium to fine sandy loam. |
| | | | | |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes** _____ **No** **X**
**Wetland Hydrology Present?** **Yes** _____ **No** **X**
**Hydric Soils Present?** **Yes** _____ **No** **X**

**Is the Sampling Point Within a Wetland?** **Yes** _____ **No** **X**

# Bordentown CSMS A

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Bordentown CSMS **Date:** 9/9/05
**County/State:** Burlington, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point located up-gradient of line created by wetland flags A117 and A118.

**VEGETATION**

**Community Type:** Mowed upland field
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Crabgrass<br>Fescue | *Digitaria sanguinalis*<br>*Festuca* sp. | FACU-<br>NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-15 | 2.5Y 4/3 (olive-brown) grading to 10YR 5/6 (yellowish-brown) | NA | NA | Friable silt loam. |
| 15-24+ | 10YR 5/3 (brown) | 10YR 5/6 (yellowish-brown) | 30% / distinct | Silt loam. |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

**Site:** NJARNG Bordentown CSMS **Date:** 9/9/05
**County/State:** Burlington, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point located at the up-gradient end of Wetland Series A, but down-gradient of line created by wetland flags A119 and A120.

## VEGETATION

**Community Type:** Vegetated swale
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Purple loosestrife<br>Lurid sedge<br>Soft rush | *Lythrum salicaria*<br>*Carex lurida*<br>*Juncus effusus* | FACW+<br>OBL<br>FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- ____ **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- X **Other (explain)** – drainage swale

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 (refusal) | 2.5Y 5/2 (grayish-brown) | NA | NA | Silt loam with 30% pore linings. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Bordentown CSMS **Date:** 9/9/05
**County/State:** Burlington, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point located up-gradient of Wetland Series A.

**VEGETATION**

**Community Type:** Mowed upland field
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Crabgrass<br>Fescue | *Digitaria sanguinalis*<br>*Festuca* sp. | FACU-<br>NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12"**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12"**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-15 | 2.5Y 4/3 (olive-brown) grading to 10YR 5/6 (yellowish-brown) | NA | NA | Friable silt loam. |
| 15-24+ | 10YR 5/3 (brown) | 10YR 5/6 (yellowish-brown) | 30% / distinct | Silt loam. |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

**Site:** NJARNG Bordentown CSMS **Date:** 9/9/05
**County/State:** Burlington, NJ **Data Point:** B4
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point, located at the non-wetland end of Wetland Series B/C.

**VEGETATION**

**Community Type:** Upgradient end of drainage swale
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** NA

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)** – buttressed trunks

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-3 | 2.5Y 3/3 (dark olive-brown) | NA | NA | Friable sandy loam |
| 3-5 | 10YR 6/6 (brownish-yellow) | NA | NA | Friable sandy loam |
| 5-12 (refusal) | 50% 10YR 8/1 (white) and 50% 7.5YR 5/6 (strong brown) | NA | NA | Excessively-drained, friable sandy loam |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

# Bridgeton Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Bridgeton **Date:** 9/15/05
**County/State:** Cumberland, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point on northern side of channel within Wetland Series A, down-gradient of the line created by wetland flags A169 and A 170.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Green ash<br>Pignut hickory | *Acer rubrum*<br>*Fraxinus pensylvanicum*<br>*Carya glabra* | FAC<br>FACW<br>FACU- |
| Sapling | NA | *NA* | NA |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Japanese honeysuckle | *Lonicera japonica* | FAC |
| Ground | Jewelweed | *Impatiens capensis* | FACW |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 66

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** 1”
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
__X__ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
__X__ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 | 10YR 4/2 (dark grayish-brown) | NA | NA | Loamy silt. Slightly moist. |
| 12-26+ | 10YR 4/2 (dark grayish-brown) | NA | NA | Sandy loam with 40% pore linings. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Bridgeton **Date:** 9/15/05
**County/State:** Cumberland, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point representative of Wetland Series B/E.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | NA | *NA* | NA |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Japanese honeysuckle | *Lonicera japonica* | FAC |
| Ground | Poison ivy | *Toxicodendron radicans* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 75

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-14 | 10YR 4/2 (dark grayish-brown) | NA | NA | Silt loam with 5% pore linings. |
| 14-20+ | 10YR 4/2 (dark grayish-brown) to 10YR 4/1 (dark gray) | NA | NA | Loam with 50% pore linings. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

# Cape May Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Cape May **Date:** 10/18/05
**County/State:** Cape May, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Groundsel tree | *Baccharis halimifolia* | FACW |
| Vine | Poison ivy | *Toxicodendron radicans* | FAC |
| Ground | Japanese honeysuckle | *Lonicera japonica* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-6 | 10YR 3/3 (dark brown) | NA | NA | Loamy medium sand; moist. |
| 6-12 | 10YR 5/3 (brown) | NA | NA | Loamy coarse to medium sand; moist to very moist. |
| 12-22+ | 10YR 5/4 (yellowish-brown) | NA | NA | Medium sand; very moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| _____ | **Histosol** | _____ | **Concretions** |
| _____ | **Histic Epipedon** | _____ | **High Organic Content in Surface Layer in Sandy Soils** |
| _____ | **Sulfidic Odor** | _____ | **Organic Streaking in Sandy Soils** |
| _____ | **Aquic Moisture Regime** | _____ | **Listed on Local Hydric Soils List** |
| _____ | **Reducing Conditions** | _____ | **Listed on National Hydric Soils List** |
| _____ | **Gleyed or Low-Chroma Colors** | _____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | _____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | _____ |
| **Hydric Soils Present?** | **Yes** | _____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | _____ |

**Site:** NJARNG Cape May **Date:** 10/18/05
**County/State:** Cape May, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point for Wetland Series A, located down-gradient of the line created by Wetland Flags A99 and A100.

## VEGETATION

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Black gum | *Nyssa sylvatica* | FAC |
| Sapling | Black gum | *Nyssa sylvatica* | FAC |
| Shrub | Highbush blueberry | *Vaccinium corymbosum* | FACW- |
| Vine | Japanese honeysuckle | *Lonicera japonica* | FAC |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-4 | 10YR 3/2 (very dark grayish-brown) | NA | NA | Loamy medium sand; moist. |
| 4-10 | 10YR 5/2 (grayish-brown) | NA | NA | Loamy coarse to medium sand; moist to very moist. |
| 10-20+ | 10YR 5/3 (brown) | NA | NA | Medium sand; very moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | X | **No** | |
| **Wetland Hydrology Present?** | **Yes** | X | **No** | |
| **Hydric Soils Present?** | **Yes** | | **No** | X |
| **Is the Sampling Point Within a Wetland?** | **Yes** | X | **No** | |

**Site:** NJARNG Cape May **Date:** 10/18/05
**County/State:** Cape May, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point for Wetland Series A, located down-gradient of Wetland Flag A124.

## VEGETATION

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| | Sweetgum | *Liquidambar styraciflua* | FAC |
| Shrub | Southern arrowwood | *Viburnum dentatum* | FAC |
| Vine | Poison ivy | *Toxicodendron radicans* | FAC |
| | Common greenbrier | *Smilax rotundifolia* | FAC |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-4 | 10YR 3/2 (very dark grayish-brown) | NA | NA | Loamy medium sand; moist. |
| 4-10 | 10YR 5/2 (grayish-brown) | NA | NA | Loamy coarse to medium sand; moist to very moist. |
| 10-20+ | 10YR 5/3 (brown) | NA | NA | Medium sand; very moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| ____ | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | ____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# Cherry Hill Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Cherry Hill **Date:** 10/12/05
**County/State:** Camden, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point in the eastern portion of Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous riparian corridor
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Green ash | *Fraxinus pensylvanicum* | FACW |
| Sapling | Green ash | *Fraxinus pensylvanicum* | FACW |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Allegheny blackberry | *Rubus allegheniensis* | FACU- |
| Ground | Violet | *Viola* sp. | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 40

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** <1”
**Depth to Free Water in Pit:** 6”
**Depth to Saturated Soil:** 6”

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- X **Other (explain)** Proximity to stream

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-16 (refusal) | 10YR 3/2 (very dark grayish-brown) | NA | NA | Medium sandy loam with 30-40% pore linings; very moist to saturated at 6". |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **No** |
| **Wetland Hydrology Present?** | **Yes X** | **No** |
| **Hydric Soils Present?** | **Yes X** | **No** |
| **Is the Sampling Point Within a Wetland?** | **Yes X** | **No** |

**Site:** NJARNG Cherry Hill **Date:** 10/12/05
**County/State:** Camden, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series B, located down-gradient of the line created by Wetland Flags B101 and B102.

## VEGETATION

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Swamp beggar-ticks<br>Japanese Stiltgrass | *Bidens frondosa*<br>*Microstegium vimineum* | FACW<br>FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- ____ **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- **X** **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- **X** **Other (explain)** Proximity to drainage channel

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-6 | 10YR 3/2 (very dark grayish-brown) | NA | NA | Coarse to medium sandy loam with 20% pore linings; very moist. |
| 6-12 (refusal) | 10YR 4/2 (dark grayish-brown) | NA | NA | Coarse to medium sandy loam with 20% pore linings; very moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Cherry Hill **Date:** 10/12/05
**County/State:** Camden, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point in a topographically low area within the landscaped and mowed lawn area of the site.

**VEGETATION**

**Community Type:** Landscaped and mowed lawn
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Sweetgum<br>Green ash | *Liquidambar styraciflua*<br>*Fraxinus pensylvanicum* | FAC<br>FACW |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Lawn grasses<br>Violet | *NA*<br>*Viola* sp. | NA<br>NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** NA

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- _____ **Inundation**
- _____ **Saturated in Upper 12”**
- _____ **Water Marks**
- _____ **Drift Lines**
- _____ **Sediment Deposits**
- _____ **Drainage Patterns in Wetlands**
- _____ **Oxidized Root Channels in Upper 12”**
- _____ **Water-stained Leaves**
- _____ **Local Soil Survey Data**
- _____ **FAC-Neutral Test**
- _____ **Dominance by OBL**
- _____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-3 | 20YR 4/2 (dark grayish-brown) | NA | NA | Medium sandy loam; moist. |
| 3-20+ | 2.5Y 3/3 (dark olive-brown) | NA | NA | Coarse to medium sandy loam with 5% round quartzose pebbles. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| _____ | **Histosol** | _____ | **Concretions** |
| _____ | **Histic Epipedon** | _____ | **High Organic Content in Surface Layer in Sandy Soils** |
| _____ | **Sulfidic Odor** | _____ | **Organic Streaking in Sandy Soils** |
| _____ | **Aquic Moisture Regime** | _____ | **Listed on Local Hydric Soils List** |
| _____ | **Reducing Conditions** | _____ | **Listed on National Hydric Soils List** |
| _____ | **Gleyed or Low-Chroma Colors** | _____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | _____ | **No** | **X** |
| **Wetland Hydrology Present?** | **Yes** | _____ | **No** | **X** |
| **Hydric Soils Present?** | **Yes** | _____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | _____ | **No** | **X** |

**Site:** NJARNG Cherry Hill **Date:** 10/12/05
**County/State:** Camden, NJ **Data Point:** B4
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point in a topographically low area within the landscaped and mowed lawn area of the site.

**VEGETATION**

**Community Type:** Landscaped and mowed lawn
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Sweetgum<br>Red maple | *Liquidambar styraciflua*<br>*Acer rubrum* | FAC<br>FAC |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Lawn grasses<br>English plantain | *NA*<br>*Plantago lanceolata* | NA<br>NL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** NA

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-3 | 20YR 4/2 (dark grayish-brown) | NA | NA | Medium sandy loam; moist. |
| 3-20+ | 2.5Y 3/3 (dark olive-brown) | NA | NA | Coarse to medium sandy loam with 5% round quartzose pebbles. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| _____ | **Histosol** | _____ | **Concretions** |
| _____ | **Histic Epipedon** | _____ | **High Organic Content in Surface Layer in Sandy Soils** |
| _____ | **Sulfidic Odor** | _____ | **Organic Streaking in Sandy Soils** |
| _____ | **Aquic Moisture Regime** | _____ | **Listed on Local Hydric Soils List** |
| _____ | **Reducing Conditions** | _____ | **Listed on National Hydric Soils List** |
| _____ | **Gleyed or Low-Chroma Colors** | _____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | _____ | **No** | **X** |
| **Wetland Hydrology Present?** | **Yes** | _____ | **No** | **X** |
| **Hydric Soils Present?** | **Yes** | _____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | _____ | **No** | **X** |

# Dover Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Dover **Date:** 10/3/05
**County/State:** Sussex, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Early to mid-stage forested deciduous wetland.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Pin oak | *Acer rubrum*<br>*Quercus palustris* | FAC<br>FACW |
| Sapling | Red maple<br>Pin oak | *Acer rubrum*<br>*Quercus palustris* | FAC<br>FACW |
| Shrub | Southern arrowwood<br>Spicebush | *Viburnum dentatum*<br>*Lindera benzoin* | FAC<br>FACW- |
| Vine | Virginia creeper | *Parthenocissus quinquefolia* | FACU |
| Ground | Tussock sedge | *Carex stricta* | OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 88

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- X **Other (explain)** Shallow rooting

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-6 | 10YR 5/2 (grayish-brown) | NA | NA | Loamy silt with 10% pore linings; dry and friable. |
| 6-12 (refusal) | 7.5YR 7/1 (light gray) | NA | NA | Loamy silt with 10% pore linings; dry and friable. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Dover **Date:** 10/3/05
**County/State:** Sussex, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point located down-gradient of the line created by Wetland Flags A89 to A90.

## VEGETATION

**Community Type:** Early to mid-stage forested deciduous wetland.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Spicebush | *Lindera benzoin* | FACW- |
| Vine | NA | *NA* | NA |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**

| | |
|---|---|
| ____ | **Inundation** |
| ____ | **Saturated in Upper 12”** |
| ____ | **Water Marks** |
| ____ | **Drift Lines** |
| ____ | **Sediment Deposits** |
| X | **Drainage Patterns in Wetlands** |
| ____ | **Oxidized Root Channels in Upper 12”** |
| X | **Water-stained Leaves** |
| ____ | **Local Soil Survey Data** |
| ____ | **FAC-Neutral Test** |
| ____ | **Dominance by OBL** |
| X | **Other (explain)** Shallow rooting and multiple stem morphology in red maple. |

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-11 (refusal) | 10YR 5/2 (grayish-brown) | NA | NA | Loamy silt with 10% pore linings; dry and friable. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Dover **Date:** 10/3/05
**County/State:** Sussex, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series B.

## VEGETATION

**Community Type:** Mid-stage forested deciduous wetland.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Coast pepperbush | *Clethra alnifolia* | FAC+ |
| Vine | NA | *NA* | NA |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- X **Other (explain)** Shallow rooting

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-20+ | 10YR 2/1 (black) | NA | NA | Loam; moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| X | Histosol | | Concretions |
| | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

# Flemington Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Flemington **Date:** 9/30/05
**County/State:** Hunterdon, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series D.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Ironwood<br>American elm | *Carpinus caroliniana*<br>*Ulmus americana* | FAC<br>FACW- |
| Shrub | Multiflora rose<br>Spicebush | *Rosa multiflora*<br>*Lindera benzoin* | FACU<br>FACW- |
| Vine | NA | *NA* | NA |
| Ground | Japanese Stiltgrass | *Microstegium vimineum* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 83

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
X **Other (explain)** Shallow rooting of trees

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-1 | 10YR 4/2 (dark grayish-brown) | NA | NA | Loamy silt; 30% pore linings; dry. |
| 1-11 | 10YR 5/2 (grayish-brown) | NA | NA | Loamy silt; 20% pore linings; dry. |
| 11-18+ | 10YR 5/2 (grayish-brown) | NA | NA | Platy silty clay loam; 10% pore linings; 20% soft dark masses; dry. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Flemington **Date:** 9/30/05
**County/State:** Hunterdon, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Spicebush | *Lindera benzoin* | FACW- |
| Vine | NA | *NA* | NA |
| Ground | Japanese honeysuckle | *Lonicera japonica* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- X **Other (explain)** Shallow rooting of trees

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 | 10YR 4/2 (dark grayish-brown) | NA | NA | Loamy silt; 30% pore linings; moist. |
| 12-20+ | 10YR 5/2 (grayish-brown) | NA | NA | Loamy silt; 10% pore linings; moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# Fort Dix 3200 Area

Project No.: 3-2106-0114
22 October 2007

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**Wetland Delineation Data Form**

**Site:** Ft. Dix 3200 Area
**Muni/County/State:** Ft. Dix, Burlington Co., NJ
**Block & Lot:** NA

**Date:** 10/25/06
**Data Point:** WDP-1
**Investigator:** P. Perhamus

**Data Point Location and Position in Landscape:** Representative data point for Wetland Series A occurring on areas mapped as Holmdel soil.

## VEGETATION

**Community Type:** Disturbed, early- to mid-stage, mixed forested wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Sweetgum | *Liquidambar styraciflua* | FAC |
| Sapling | Sweetgum<br>Eastern white pine | *Liquidambar styraciflua*<br>*Pinus strobus* | FAC<br>FACU |
| Shrub & Vine | Multiflora rose | *Rosa multiflora* | FACU |
| Ground | Japanese stiltgrass<br>Grape<br>Lady thumb | *Microstegium vimineum*<br>*Vitis* sp.<br>*Polygonum persicaria* | FAC<br>NA<br>FACW |

**Percent of dominant species that are OBL, FACW, or FAC, excluding FAC- (of known USFWS classifications only, meaning excluding "NA"):** ~67

**Remarks:**

## HYDROLOGY

| **Recorded Data (Describe in Remarks):** | **Field Indicators:** |
|---|---|
| **Stream, Lake or Tide Gauge**<br>**Aerial Photographs**<br>**Other**<br><br>**Depth of Surface Water:** NA<br>**Depth to Free Water in Pit:** NA<br>**Depth to Saturated Soil:** NA | **____ Inundation**<br>**____ Saturated in Upper 12"**<br>**____ Water Marks**<br>**____ Drift Lines**<br>**____ Sediment Deposits**<br>**__X__ Drainage Patterns in Wetlands**<br>**____ Oxidized Root Channels in Upper 12"**<br>**__X__ Water-stained Leaves**<br>**____ Local Soil Survey Data**<br>**____ FAC-Neutral Test**<br>**____ Dominance by OBL**<br>**____ Buttressed trunks**<br>**____ Multiple-stemmed trees (usually red maple)**<br>**__X__ Low topographic elevation**<br>**____ Proximity to open water**<br>**____ Shallow rooting of trees**<br>**__X__ Other (explain)** Association with stormwater outfall pipe; road ruts contained pockets of standing water. |

**Remarks:**

**Wetland Delineation Data Form**

**SOIL**

**Soil Series:** Holmdel fine sandy loam, 0-2% slopes
**State Hydric:** Yes __**X**___ No _____
**Taxonomy:** Fine-loamy, mixed, active, mesic Aquic Hapludults

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-4 | 10YR 3/2 Very dark grayish-brown | NA | NA | Medium to fine sandy loam; slightly moist; 2% pore linings. |
| 4-18 | 2.5Y 3/2 Very dark grayish-brown | 2.5Y 4/4 Olive brown | 5%; distinct | Medium to fine sandy loam; slightly moist. |
| 18-21+ | 2.5Y 5/4 Light olive-brown | NA | NA | Medium to fine sandy loam; slightly moist. |
| | | | | |

**Hydric Soil Indicators:**

**____ Histosol**
**____ Histic Epipedon**
**____ Sulfidic Odor**
**____ Aquic Moisture Regime**
**____ Reducing Conditions**
**____ Gleyed or Low-Chroma Colors**
**____ Concretions**
**____ High Organic Content in Surface Layer in Sandy Soils**
**____ Organic Streaking in Sandy Soils**
**__X__ Listed on Local Hydric Soils List**
**____ Listed on National Hydric Soils List**
**____ Other (explain in Remarks)**

**Remarks:** This soil does not meet any of the current (Version 6.0) USDA Hydric Soil Field Indicators for loamy and clayey soils.

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes __X__** **No ____**
**Wetland Hydrology Present?** **Yes __X__** **No ____**
**Hydric Soils Present?** **Yes ____** **No __X__**

**Is the Sampling Point Within a Wetland?** **Yes __X__** **No ____**

**Remarks:** Although only 2 of the 3 standard wetland parameters were met, the area is designated as a wetland according to the NJ Pinelands Commission wetland delineation manual which utilizes the presence of a dominant hydrophytic vegetation community as a surrogate indicator for hydric soils.

**Wetland Delineation Data Form**

**Site:** Ft. Dix 3200 Area
**Muni/County/State:** Ft. Dix, Burlington Co., NJ
**Block & Lot:** NA

**Date:** 10/25/06
**Data Point:** WDP-2
**Investigator:** P. Perhamus

**Data Point Location and Position in Landscape:** Representative data point for Wetland Series A in areas mapped as Fluvaquents.

**VEGETATION**

**Community Type:** Scrub-shrub wetland within stream floodplain.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | Sweetgum | *Liquidambar styraciflua* | FAC |
| Shrub & Vine | Multiflora rose | *Rosa multiflora* | FACU |
| Ground | Japanese stiltgrass<br>Grape<br>White snakeroot | *Microstegium vimineum*<br>*Vitis* sp.<br>*Ageratina altissima* | FAC<br>NA<br>FACU- |

**Percent of dominant species that are OBL, FACW, or FAC, excluding FAC- (of known USFWS classifications only, meaning excluding "NA"):** 50

**Remarks:**

**HYDROLOGY**

| **Recorded Data (Describe in Remarks):** | **Field Indicators:** |
|---|---|
| **Stream, Lake or Tide Gauge**<br>**Aerial Photographs**<br>**Other**<br><br>**Depth of Surface Water:** NA<br>**Depth to Free Water in Pit:** NA<br>**Depth to Saturated Soil:** NA | **____ Inundation**<br>**____ Saturated in Upper 12"**<br>**____ Water Marks**<br>**____ Drift Lines**<br>**____ Sediment Deposits**<br>**__X__ Drainage Patterns in Wetlands**<br>**____ Oxidized Root Channels in Upper 12"**<br>**__X__ Water-stained Leaves**<br>**____ Local Soil Survey Data**<br>**____ FAC-Neutral Test**<br>**____ Dominance by OBL**<br>**____ Buttressed trunks**<br>**____ Multiple-stemmed trees (usually red maple)**<br>**____ Low topographic elevation**<br>**__X__ Proximity to open water**<br>**____ Shallow rooting of trees**<br>**____ Other (explain)** |

**Remarks:**

**Wetland Delineation Data Form**

**SOIL**

**Soil Series:** Fluvaquents, loamy, 0-3% slopes, frequently flooded
**State Hydric:** Yes __**X**___ No _____
**Taxonomy:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-6 | 10YR 4/2 Dark grayish-brown | 10YR 4/4 Dark yellowish-brown | 5% / faint | Medium to fine sandy loam; slightly moist. |
| 6-11 | 2.5YR 4/4 Reddish-brown | NA | NA | Medium loamy sand; moist to very moist. |
| 11-19+ | 2.5YR 4/4 Reddish-brown | 2.5Y 3/2 Very dark grayish-brown | 2% / distinct | Medium loamy sand; very moist. |
| | | | | |

**Hydric Soil Indicators:**

**____ Histosol**
**____ Histic Epipedon**
**____ Sulfidic Odor**
**____ Aquic Moisture Regime**
**____ Reducing Conditions**
**____ Gleyed or Low-Chroma Colors**
**____ Concretions**
**____ High Organic Content in Surface Layer in Sandy Soils**
**____ Organic Streaking in Sandy Soils**
**__X__ Listed on Local Hydric Soils List**
**____ Listed on National Hydric Soils List**
**____ Other (explain in Remarks)**

**Remarks:** This soil does not meet any of the current (Version 6.0) USDA Hydric Soil Field Indicators for loamy and clayey soils.

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes __X__** **No ____**
**Wetland Hydrology Present?** **Yes __X__** **No ____**
**Hydric Soils Present?** **Yes ____** **No __X__**

**Is the Sampling Point Within a Wetland?** **Yes __X__** **No ____**

**Remarks:** Although only 2 of the 3 standard wetland parameters were met, the area is designated as a wetland according to the NJ Pinelands Commission wetland delineation manual which utilizes the presence of a dominant hydrophytic vegetation community as a surrogate indicator for hydric soils.

**Wetland Delineation Data Form**

**Site:** Ft. Dix 3200 Area
**Muni/County/State:** Ft. Dix, Burlington Co., NJ
**Block & Lot:** NA

**Date:** 10/25/06
**Data Point:** WDP-3
**Investigator:** P. Perhamus

**Data Point Location and Position in Landscape:** Representative data point for Wetland Series B in areas mapped as Fluvaquents.

**VEGETATION**

**Community Type:** Scrub-shrub wetland within stream floodplain.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub & Vine | Multiflora rose | *Rosa multiflora* | FACU |
| Ground | Tussock sedge<br>Grass-leaved goldenrod | *Carex stricta*<br>*Euthamia graminifolia* | OBL<br>FAC |

**Percent of dominant species that are OBL, FACW, or FAC, excluding FAC- (of known USFWS classifications only, meaning excluding "NA"):** ~67

**Remarks:**

**HYDROLOGY**

| **Recorded Data (Describe in Remarks):** | **Field Indicators:** |
|---|---|
| **Stream, Lake or Tide Gauge**<br>**Aerial Photographs**<br>**Other**<br><br>**Depth of Surface Water:** NA<br>**Depth to Free Water in Pit:** NA<br>**Depth to Saturated Soil:** NA | **____ Inundation**<br>**____ Saturated in Upper 12"**<br>**____ Water Marks**<br>**____ Drift Lines**<br>**____ Sediment Deposits**<br>**__X__ Drainage Patterns in Wetlands**<br>**____ Oxidized Root Channels in Upper 12"**<br>**____ Water-stained Leaves**<br>**____ Local Soil Survey Data**<br>**____ FAC-Neutral Test**<br>**__X__ Dominance by OBL**<br>**____ Buttressed trunks**<br>**____ Multiple-stemmed trees (usually red maple)**<br>**____ Low topographic elevation**<br>**__X__ Proximity to open water**<br>**____ Shallow rooting of trees**<br>**____ Other (explain)** |

**Remarks:**

**Wetland Delineation Data Form**

**SOIL**

**Soil Series:** Fluvaquents, loamy, 0-3% slopes, frequently flooded
**State Hydric:** Yes __**X**___ No _____
**Taxonomy:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-6 | 10YR 3/1 Very dark gray | 10YR 4/4 Dark yellowish-brown | 1% / distinct | Silty clay loam; moist to very moist. |
| 6-20 | 10YR 4/4 Dark yellowish-brown | 10YR 4/1 Dark gray | 2% / faint | Clay loam; 5% iron concretions; moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

**____ Histosol**
**____ Histic Epipedon**
**____ Sulfidic Odor**
**____ Aquic Moisture Regime**
**__X__ Reducing Conditions**
**____ Gleyed or Low-Chroma Colors**
**____ Concretions**
**____ High Organic Content in Surface Layer in Sandy Soils**
**____ Organic Streaking in Sandy Soils**
**__X__ Listed on Local Hydric Soils List**
**____ Listed on National Hydric Soils List**
**__X__ Other (explain in Remarks)**

**Remarks:** This soil meets the criteria for USDA Hydric Soil Field Indicator F6 (Redox Dark Surface).

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes __X__** **No ____**
**Wetland Hydrology Present?** **Yes __X__** **No ____**
**Hydric Soils Present?** **Yes __X__** **No ____**

**Is the Sampling Point Within a Wetland?** **Yes __X__** **No ____**

**Remarks:**

**Wetland Delineation Data Form**

**Site:** Ft. Dix 3200 Area
**Muni/County/State:** Ft. Dix, Burlington Co., NJ
**Block & Lot:** NA

**Date:** 10/26/06
**Data Point:** WDP-4
**Investigator:** P. Perhamus

**Data Point Location and Position in Landscape:** Representative data point for Wetland Series D in an area mapped as Freehold loamy sand.

**VEGETATION**

**Community Type:** Mid-stage, forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub & Vine | Spicebush<br>Grape | *Lindera benzoin*<br>*Vitis* sp. | FACW-<br>NA |
| Ground | Japanese honeysuckle | *Lonicera japonica* | FAC- |

**Percent of dominant species that are OBL, FACW, or FAC, excluding FAC- (of known USFWS classifications only, meaning excluding "NA"):** 75

**Remarks:**

**HYDROLOGY**

| **Recorded Data (Describe in Remarks):** | **Field Indicators:** |
|---|---|
| **Stream, Lake or Tide Gauge**<br>**Aerial Photographs**<br>**Other**<br><br>**Depth of Surface Water:** NA<br>**Depth to Free Water in Pit:** NA<br>**Depth to Saturated Soil:** NA | **____ Inundation**<br>**____ Saturated in Upper 12"**<br>**____ Water Marks**<br>**____ Drift Lines**<br>**____ Sediment Deposits**<br>**__X__ Drainage Patterns in Wetlands**<br>**____ Oxidized Root Channels in Upper 12"**<br>**__X__ Water-stained Leaves**<br>**____ Local Soil Survey Data**<br>**____ FAC-Neutral Test**<br>**____ Dominance by OBL**<br>**____ Buttressed trunks**<br>**____ Multiple-stemmed trees (usually red maple)**<br>**____ Low topographic elevation**<br>**____ Proximity to open water**<br>**____ Shallow rooting of trees**<br>**__X__ Other (explain)** Within drainage channel for stormwater conveyance ditch |

**Remarks:**

**Wetland Delineation Data Form**

**SOIL**

**Soil Series:** Freehold loamy sand, 5-10% slopes
**State Hydric:** Yes _____ No __**X**___
**Taxonomy:** Fine-loamy, mixed, active, mesic Typic Hapludults

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-2 | 10YR 3/1 Very dark gray | NA | NA | Loam; moist. |
| 2-12 | 2.5Y 4/3 Olive brown | NA | NA | Medium to fine loamy sand; 2% pore linings; moist to very moist. |
| 12-20+ | 2.5Y 3/1 Very dark gray | NA | NA | Medium loamy sand; 10% pore linings; very moist. |
| | | | | |

**Hydric Soil Indicators:**

**____ Histosol**
**____ Histic Epipedon**
**____ Sulfidic Odor**
**____ Aquic Moisture Regime**
**____ Reducing Conditions**
**____ Gleyed or Low-Chroma Colors**
**____ Concretions**
**____ High Organic Content in Surface Layer in Sandy Soils**
**____ Organic Streaking in Sandy Soils**
**____ Listed on Local Hydric Soils List**
**____ Listed on National Hydric Soils List**
**____ Other (explain in Remarks)**

**Remarks:** This soil does not meet any of the current (Version 6.0) USDA Hydric Soil Field Indicators for loamy and clayey soils.

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes __X__** **No ____**
**Wetland Hydrology Present?** **Yes __X__** **No ____**
**Hydric Soils Present?** **Yes ____** **No __X__**

**Is the Sampling Point Within a Wetland?** **Yes __X__** **No ____**

**Remarks:** Although only 2 of the 3 standard wetland parameters were met, the area is designated as a wetland according to the NJ Pinelands Commission wetland delineation manual which utilizes the presence of a dominant hydrophytic vegetation community as a surrogate indicator for hydric soils.

**Wetland Delineation Data Form**

**Site:** Ft. Dix 3200 Area
**Muni/County/State:** Ft. Dix, Burlington Co., NJ
**Block & Lot:** NA

**Date:** 10/26/06
**Data Point:** WDP-5
**Investigator:** P. Perhamus

**Data Point Location and Position in Landscape:** Representative data point for Wetland Series F in areas mapped as Freehold series soils.

**VEGETATION**

**Community Type:** Mixed-stage, forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple<br>Sweetgum | *Acer rubrum*<br>*Liquidambar styraciflua* | FAC<br>FAC |
| Shrub & Vine | Grape | *Vitis* sp. | NA |
| Ground | Japanese stiltgrass | *Microstegium vimineum* | FAC |

**Percent of dominant species that are OBL, FACW, or FAC, excluding FAC- (of known USFWS classifications only, meaning excluding "NA"):** 100

**Remarks:**

**HYDROLOGY**

| **Recorded Data (Describe in Remarks):** | **Field Indicators:** |
|---|---|
| **Stream, Lake or Tide Gauge**<br>**Aerial Photographs**<br>**Other**<br><br>**Depth of Surface Water:** NA<br>**Depth to Free Water in Pit:** NA<br>**Depth to Saturated Soil:** NA | **____ Inundation**<br>**____ Saturated in Upper 12"**<br>**____ Water Marks**<br>**____ Drift Lines**<br>**____ Sediment Deposits**<br>**__X__ Drainage Patterns in Wetlands**<br>**____ Oxidized Root Channels in Upper 12"**<br>**__X__ Water-stained Leaves**<br>**____ Local Soil Survey Data**<br>**____ FAC-Neutral Test**<br>**____ Dominance by OBL**<br>**____ Buttressed trunks**<br>**____ Multiple-stemmed trees (usually red maple)**<br>**____ Low topographic elevation**<br>**____ Proximity to open water**<br>**____ Shallow rooting of trees**<br>**____ Other (explain)** |

**Remarks:**

**Wetland Delineation Data Form**

**SOIL**

**Soil Series:** Freehold fine sandy loam, 2-5% slopes
**State Hydric:** Yes _____ No __**X**___
**Taxonomy:** Fine-loamy, mixed, active, mesic Typic Hapludults

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-2 | 10YR 3/2 Very dark grayish-brown | NA | NA | Fine sandy loam; slightly moist. |
| 2-9 | 2.5Y 4/3 Olive brown | NA | NA | Fine loamy sand; slightly moist. |
| 9-24+ | 2.5Y 5/6 | NA | NA | Medium loamy sand; moist. |
| | | | | |

**Hydric Soil Indicators:**

**____ Histosol**
**____ Histic Epipedon**
**____ Sulfidic Odor**
**____ Aquic Moisture Regime**
**____ Reducing Conditions**
**____ Gleyed or Low-Chroma Colors**
**____ Concretions**
**____ High Organic Content in Surface Layer in Sandy Soils**
**____ Organic Streaking in Sandy Soils**
**____ Listed on Local Hydric Soils List**
**____ Listed on National Hydric Soils List**
**____ Other (explain in Remarks)**

**Remarks:** This soil does not meet any of the current (Version 6.0) USDA Hydric Soil Field Indicators for loamy and clayey soils.

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes __X__** **No ____**
**Wetland Hydrology Present?** **Yes __X__** **No ____**
**Hydric Soils Present?** **Yes ____** **No __X__**

**Is the Sampling Point Within a Wetland?** **Yes __X__** **No ____**

**Remarks:** Although only 2 of the 3 standard wetland parameters were met, the area is designated as a wetland according to the NJ Pinelands Commission wetland delineation manual which utilizes the presence of a dominant hydrophytic vegetation community as a surrogate indicator for hydric soils.

# Fort Dix UTES

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Ft. Dix UTES **Date:** 10/27/05
**County/State:** Ocean, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Highbush blueberry | *Vaccinium corymbosum* | FACW-(FACW+) |
| Vine | NA | *NA* | NA |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
X **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-10 | NA | NA | NA | Individual light-colored sand grains, coated with black organic matter; moist. |
| 10-20+ | 10YR 6/2 (light brownish-gray) | NA | NA | Medium sand; very moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| ____ | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | ____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# Franklin Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Franklin **Date:** 9/29/05
**County/State:** Sussex, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Japanese Stiltgrass<br>Jewelweed<br>Pale smartweed | *Microstegium vimineum*<br>*Impatiens capensis*<br>*Polygonum lapathifolium* | FAC<br>FACW<br>FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12"**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12"**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-1 | 10YR 2/1 (black) | NA | NA | Loam. |
| 1-10 (refusal) | 10YR 4/1 (dark gray) | NA | NA | Silt loam with 60% pore linings. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

# Hackettstown Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Hackettstown **Date:** 10/6/05
**County/State:** Warren, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | White ash | *Fraxinus americana* | FACU |
| Shrub | Stiff dogwood | *Cornus foemina* | FAC |
| Vine | Grape | *Vitis* sp. | NA |
| Ground | Tussock sedge | *Carex stricta* | OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 75

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
X **Dominance by OBL**
X **Other (explain)** Shallow rooting of trees

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-20 | 10YR 2/1 (black) | NA | NA | Mucky loam with 20% pore linings; very moist. |
| 20-26+ | 10YR 5/1 (gray) | NA | NA | Clay. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | Histosol | | Concretions |
| X | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| X | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

**Site:** NJARNG Hackettstown **Date:** 10/6/05
**County/State:** Warren, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series C.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Black gum | *Acer rubrum*<br>*Nyssa sylvatica* | FAC<br>FAC |
| Sapling | NA | *NA* | NA |
| Shrub | Spicebush | *Lindera benzoin* | FACW- |
| Vine | Poison ivy | *Toxicodendron radicans* | FAC |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12"**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12"**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
X **Other (explain)** Butressed tree trunks.

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 | 10YR 2/1 (black) | NA | NA | Mucky loam with 20% pore linings; very moist. |
| 12-18+ | 10YR 5/1 (gray) | NA | NA | Clay. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | Histosol | | Concretions |
| X | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| X | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

# Hammonton Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Hammonton **Date:** 10/14/05
**County/State:** Atlantic, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point within Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Black gum<br>Atlantic white cedar | *Acer rubrum*<br>*Nyssa sylvatica*<br>*Chamaecyparis thyoides* | FAC<br>FACW<br>OBL |
| Sapling | Red maple<br>Black gum | *Acer rubrum*<br>*Nyssa sylvatica* | FAC<br>FACW |
| Shrub | Coast pepperbush | *Clethra alnifolia* | FACW- |
| Vine | Common greenbrier | *Smilax rotundifolia* | FACW- |
| Ground | NA | NA | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
X **Water Marks**
_____ **Drift Lines**
X **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
X **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-1 | NA | NA | NA | Fibric layer |
| 1-15 | 2.5Y 2/1 (black) | NA | NA | Medium to fine sand; very moist. |
| 15-25+ | 10YR 6/2 (light brownish-gray) | NA | NA | Medium sand; very moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | Histosol | | Concretions |
| X | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

# Lawrenceville Complex

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Lawrenceville **Date:** 9/6/05
**County/State:** Mercer, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point representative of deciduous woods community situated up-gradient of Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | NA | *NA* | NA |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Japanese honeysuckle | *Lonicera japonica* | FAC- |
| Ground | Virginia creeper | *Parthenocissus quinquefolia* | FACU |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 25

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-24+ | 10YR 5/3 Brown grading to 10YR 6/6 Brownish-yellow | NA | NA | Silt with blocky structure |
| | | | | |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes** _____ **No** X
**Wetland Hydrology Present?** **Yes** _____ **No** X
**Hydric Soils Present?** **Yes** _____ **No** X

**Is the Sampling Point Within a Wetland?** **Yes** _____ **No** X

**Site:** NJARNG Lawrenceville **Date:** 9/6/05
**County/State:** Mercer, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point within linear depression located up-gradient of wetland flag A97.

**VEGETATION**

**Community Type:** Forested deciduous woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Sweetgum<br>Black cherry | *Acer rubrum*<br>*Liquidambar styraciflua*<br>*Prunus serotina* | FAC<br>FAC<br>FACU |
| Sapling | NA | *NA* | NA |
| Shrub | Maple-leaf viburnum | *Viburnum acerifolium* | NL |
| Vine | Poison ivy<br>Japanese honeysuckle | *Toxicodendron radicans*<br>*Lonicera japonica* | FAC<br>FAC- |
| Ground | Poison ivy | *Toxicodendron radicans* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 57

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-20+ | 10YR 5/3 Brown grading to 10YR 6/6 Brownish-yellow | NA | NA | Silt with blocky structure |
| | | | | |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** X | **No** _____ |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** X |
| **Hydric Soils Present?** | **Yes** _____ | **No** X |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** X |

**Site:** NJARNG Lawrenceville **Date:** 9/6/05
**County/State:** Mercer, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Upland data point representative of deciduous woods community situated up-gradient of wetland flag A107.

**VEGETATION**

**Community Type:** Forested deciduous woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Multiflora rose | *Rose multiflora* | FACU |
| Vine | Common greenbrier | *Smilax rotundifolia* | FAC |
| Ground | Poison ivy | *Toxicodendron radicans* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 80

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-14+ | 10YR 5/4 (yellowish-brown) grading to 10YR 4/4 (dark yellowish-brown) | 7.5YR 4/3 (brown) and 10YR 6/2 (light brownish-gray) | 30% distinct for both mottles | Friable silt to silt loam |
| | | | | |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | | **No** | **X** |
| **Hydric Soils Present?** | **Yes** | | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | | **No** | **X** |

**Site:** NJARNG Lawrenceville **Date:** 9/6/05
**County/State:** Mercer, NJ **Data Point:** B4
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point located down-gradient of wetland flag A107.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple | *Acer rubrum* | FAC |
| Sapling | Red maple | *Acer rubrum* | FAC |
| Shrub | Multiflora rose | *Rose multiflora* | FACU |
| Vine | Poison ivy | *Toxicodendron radicans* | FAC |
| Ground | Poison ivy | *Toxicodendron radicans* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 80

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Dat**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-20+ | 10YR 5/2 (grayish-brown) | 10YR 6/2 (light brownish-gray) | 20% / faint | Silt loam |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Lawrenceville **Date:** 9/6/05
**County/State:** Mercer, NJ **Data Point:** B5
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point located within approximate center of Wetland Series D.

**VEGETATION**

**Community Type:** Emergent wetland (marsh and wet meadow)
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | Silky dogwood | *Cornus amomum* | FACW |
| Vine | NA | *NA* | NA |
| Ground | Sensitive fern<br>Halberd-leaved tearthumb | *Onoclea sensibilis*<br>*Polygonum arifolium* | FACW<br>OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
X **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
X **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-20+ | 7.5YR 4/1 (dark gray) | 7.5YR 4/6 | 40% / distinct | Loamy clay w/ 60% pore linings and 5% small round quartzose pebbles. Moist to very moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Lawrenceville **Date:** 9/6/05
**County/State:** Mercer, NJ **Data Point:** B6
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point located within Wetland Series C, down-gradient of line created by wetland flags C101 and C102.

**VEGETATION**

**Community Type:** Swale
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Jewelweed | *Impatiens capensis* | FACW |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** 18"
**Depth to Saturated Soil:** 18"

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12"**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12"**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
**X** **Other (explain)** – regulated swale

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-7 | 7.5YR 2.5/2 (very dark brown) | NA | NA | Sandy loam. Very moist. |
| 7-20+ | 7.5YR 4/6 (strong brown) | 7.5YR 5/3 (brown) | 30% / distinct | Loamy sand. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| | **Gleyed or Low-Chroma Colors** | X | **Other (explain in Remarks)** |

**Remarks:** Although this soil lacks USDA field indicators of wetland hydrology, the area was delineated as a wetland because of its regulation under N.J.A.C. 7:7A as a drainage swale.

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | X | **No** | |
| **Wetland Hydrology Present?** | **Yes** | X | **No** | |
| **Hydric Soils Present?** | **Yes** | | **No** | X |
| **Is the Sampling Point Within a Wetland?** | **Yes** | X | **No** | |

# Morristown Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Morristown **Date:** 9/20/05
**County/State:** Morris, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point within an emergent vegetation portion of Wetland Series C/D.

## VEGETATION

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Sweet flag<br>Halberd-leaved tearthumb | *Acorus calamus*<br>*Polygonum arifolium* | OBL<br>OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-9 | 10YR 4/2 (dark grayish-brown) | NA | NA | Silt loam with 15% pore linings. Moist. |
| 9-13 | 10YR 4/3 (brown) | NA | NA | Silt loam with 30% pore linings. Moist. |
| 13-20+ | 10YR 7/2 (light gray) | 10YR 5/1 (gray) | 10% / distinct | Silt loam with 20% pore linings. Moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Morristown **Date:** 9/20/05
**County/State:** Morris, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point within an emergent vegetation portion of Wetland Series A.

## VEGETATION

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Tussock sedge<br>Halberd-leaved tearthumb<br>Japanese Stiltgrass<br>Sphagnum moss | *Carex stricta*<br>*Polygonum arifolium*<br>*Microstegium vimineum*<br>*Sphagnum* sp. | OBL<br>OBL<br>FAC<br>NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-16 | 10YR 4/1 (dark gray) | NA | NA | Silt loam. Very moist. |
| 16-20+ | 10YR 6/1 (gray) | Strong brown | 10% / prominent | Silty clay loam. Very moist. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | **Histosol** | | **Concretions** |
| | **Histic Epipedon** | | **High Organic Content in Surface Layer in Sandy Soils** |
| | **Sulfidic Odor** | | **Organic Streaking in Sandy Soils** |
| | **Aquic Moisture Regime** | | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

# Newton Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Newton **Date:** 10/5/05
**County/State:** Sussex, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Reed canary grass<br>Soft rush<br>Stalk-grain sedge | *Phalaris arundinaceae*<br>*Juncus effusus*<br>*Carex stipata* | FACW+<br>FACW+<br>OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12"**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
__X__ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12"**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
__X__ **Dominance by OBL**
__X__ **Other (explain)** Low topographic elevation.

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-15 (refusal) | 2.5Y 5/2 (grayish-brown) | NA | NA | Fine sandy loam with 40% pore linings; dry. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Newton **Date:** 10/5/05
**County/State:** Sussex, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Additional representative wetland data point for Wetland Series A.

**VEGETATION**

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Woolgrass<br>Grass-leaved goldenrod<br>Soft rush | *Scirpus cyperinus*<br>*Euthamia graminifolia*<br>*Juncus effusus* | FACW+<br>FAC<br>FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
__X__ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
__X__ **Other (explain)** Low topographic elevation.

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-14 (refusal) | 2.5Y 5/2 (grayish-brown) | NA | NA | Fine sandy loam with 30% pore linings; dry. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# Picatinny FMS/AASF

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Picatinny **Date:** 9/21/05
**County/State:** Sussex, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Low elevation within a mowed field.

**VEGETATION**

**Community Type:** Mowed upland field.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Little bluestem<br>Autumn olive (seedlings) | *Schizachyrium scoparium*<br>*Elaeagnus umbellata* | FACU-<br>NL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- _____ **Inundation**
- _____ **Saturated in Upper 12”**
- _____ **Water Marks**
- _____ **Drift Lines**
- _____ **Sediment Deposits**
- _____ **Drainage Patterns in Wetlands**
- _____ **Oxidized Root Channels in Upper 12”**
- _____ **Water-stained Leaves**
- _____ **Local Soil Survey Data**
- _____ **FAC-Neutral Test**
- _____ **Dominance by OBL**
- _____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-14 (refusal) | 10YR 4/6 (dark yellowish-brown) | NA | NA | Silt loam. Moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

**Site:** NJARNG Picatinny **Date:** 9/21/05
**County/State:** Sussex, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Low elevation along edge of paved parking lot.

**VEGETATION**

**Community Type:** Upland roadside community
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Pale smartweed<br>Little bluestem | *Polygonum lapathifolium*<br>*Schizachyrium scoparium* | FACW+<br>FACU- |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 50

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-15 (refusal) | 10YR 4/6 (dark yellowish-brown) | NA | NA | Silt loam. Moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| _____ | **Histosol** | _____ | **Concretions** |
| _____ | **Histic Epipedon** | _____ | **High Organic Content in Surface Layer in Sandy Soils** |
| _____ | **Sulfidic Odor** | _____ | **Organic Streaking in Sandy Soils** |
| _____ | **Aquic Moisture Regime** | _____ | **Listed on Local Hydric Soils List** |
| _____ | **Reducing Conditions** | _____ | **Listed on National Hydric Soils List** |
| _____ | **Gleyed or Low-Chroma Colors** | _____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

# Pitman Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Pitman **Date:** 10/28/05
**County/State:** Gloucester, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland point situated down-gradient of Wetland Flag A100.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Black walnut | *Acer rubrum*<br>*Juglans nigra* | FAC<br>FACU |
| Sapling | Black cherry | *Prunus serotina* | FACU |
| Shrub | NA | *NA* | NA |
| Vine | Japanese honeysuckle | *Lonicera japonica* | FAC |
| Ground | Sensitive fern | *Onoclea sensibilis* | FACW |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 60

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- X **Other (explain)** Shallow rooting of trees

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-5 | 10YR 3/3 (dark brown) | NA | NA | Silt loam; slightly moist. |
| 5-7 | 2.5Y 4/4 (olive brown) | NA | NA | Silt loam; slightly moist. |
| 7-15 | 2.5Y 4/4 (olive brown) | 7.5YR 4/6 (strong brown) | 3% / distinct | Silt loam; moist. |
| 15-21+ | 2.5Y 5/4 (reddish-brown) | 7.5YR 4/6 (strong brown) | 10% / distinct | Loam; moist. |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | _____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | _____ |
| **Hydric Soils Present?** | **Yes** | _____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | _____ |

# Princeton Warehouse

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Princeton **Date:** 10/4/05
**County/State:** Mercer, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for the emergent community within Wetland Series A.

## VEGETATION

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Japanese Stiltgrass | *Microstegium vimineum* | FAC |
| | False nettle | *Bohmeria cylindrica* | FACW+ |
| | Grass-leaved goldenrod | *Euthamia graminifolia* | FAC |
| | Poison ivy | *Toxicodendron radicans* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 (refusal) | 10YR 5/2 (grayish-brown) | NA | NA | Fine sandy loam with 20% pore linings; dry. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Princeton **Date:** 10/4/05
**County/State:** Mercer, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for the northern portion of Wetland Series A.

**VEGETATION**

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Green ash | *Fraxinus pensylvanicum* | FACW |
| Sapling | NA | *NA* | NA |
| Shrub | Tartarian honeysuckle | *Lonicera tartarica* | FACU |
| Vine | NA | *NA* | NA |
| Ground | Japanese honeysuckle | *Lonicera japonica* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 66

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
X **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-16 (refusal) | 10YR 5/2 (grayish-brown) | NA | NA | Fine sandy loam with 10% pore linings; dry. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# Sea Girt NGTC

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Sea Girt installation **Date:** 8/30/05
**County/State:** Monmouth, NJ **Data Point:** B1
**Investigator(s):** Perhamus

**Data Point Location and Position in Landscape:** Within the constructed wetland, delineated as Wetland Series C.

## VEGETATION

**Community Type:** Wet meadow
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Spike rush<br>Pinkweed<br>Dock-leaf smartweed | *Eleocharis* sp.<br>*Polygonum pensylvanicum*<br>*Polygonum lapathifolium* | OBL<br>FACW<br>FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Dat**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** _____ **Taxonomy (Subgroup):** _____
**Drainage Class:** _____ **Confirmed Mapped Type?:** _____

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-8 | 10YR 5/2 (grayish-brown) | NA | NA | Medium to fine sand; slightly moist. |
| 8-20 | 10YR 6/2 (light brownish-gray) | NA | NA | Medium to fine sand; slightly moist. |
| 20-28+ | 10YR 3/1 (very dark gray) | NA | NA | Medium to fine sand; moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| ____ | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Sea Girt installation **Date:** 8/30/05
**County/State:** Monmouth, NJ **Data Point:** B2
**Investigator(s):** Perhamus

**Data Point Location and Position in Landscape:** Additional boring within the constructed wetland, delineated as Wetland Series C.

## VEGETATION

**Community Type:** Wet meadow
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Twig rush<br>Dock-leaf smartweed | *Cladium mariscoides*<br>*Polygonum lapathifolium* | OBL<br>FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Dat**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** _____ **Taxonomy (Subgroup):** _____
**Drainage Class:** _____ **Confirmed Mapped Type?:** _____

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-4 | 10YR 3/2 (very dark grayish-brown) | NA | NA | Medium to fine sand; moist. |
| 4-20 | 10YR 4/3 (brown) | NA | NA | Medium to fine sand; 10% pore linings; moist. |
| 20-30+ | 10YR 4/6 (dark yellowish-brown) | 10YR 5/3 (brown) | 20% / distinct | Clay loam; moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| X | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| ____ | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | ____ | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# Somerset Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Somerset **Date:** 10/7/05
**County/State:** Somerset, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point in the northwest portion of the site.

**VEGETATION**

**Community Type:** Forested deciduous woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Black locust<br>Sugar maple | *Robinia pseudo-acacia*<br>*Acer saccharum* | FACU-<br>FACU- |
| Sapling | Sugar maple | *Acer saccharum* | FACU- |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Allegheny blackberry | *Rubus allegheniensis* | FACU- |
| Ground | Poison ivy | *Toxicodendron radicans* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 17

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- _____ **Inundation**
- _____ **Saturated in Upper 12”**
- _____ **Water Marks**
- _____ **Drift Lines**
- _____ **Sediment Deposits**
- _____ **Drainage Patterns in Wetlands**
- _____ **Oxidized Root Channels in Upper 12”**
- _____ **Water-stained Leaves**
- _____ **Local Soil Survey Data**
- _____ **FAC-Neutral Test**
- _____ **Dominance by OBL**
- _____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-16 (refusal) | 2.5YR 4.6 (red) | NA | NA | Coarse to medium sandy loam; slightly moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

**Site:** NJARNG Somerset **Date:** 10/7/05
**County/State:** Somerset, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point in the southern portion of the site.

**VEGETATION**

**Community Type:** Forested deciduous woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Black cherry | *Prunus serotina* | FACU |
| Sapling | Sassafras | *Sassafras albidum* | FACU- |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Allegheny blackberry | *Rubus allegheniensis* | FACU- |
| Ground | Violet | *Viola* sp. | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 (refusal) | 5YR 4/6 (yellowish-red) | NA | NA | Medium sandy loam; slightly moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

**Site:** NJARNG Somerset **Date:** 10/7/05
**County/State:** Somerset, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point in the eastern portion of the site.

**VEGETATION**

**Community Type:** Forested deciduous woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Black cherry<br>Black locust | *Prunus serotina*<br>*Robinia pseudo-acacia* | FACU<br>FACU- |
| Sapling | Black cherry<br>Black locust | *Prunus serotina*<br>*Robinia pseudo-acacia* | FACU<br>FACU- |
| Shrub | Multiflora rose | *Rosa multiflora* | FACU |
| Vine | Allegheny blackberry | *Rubus allegheniensis* | FACU- |
| Ground | Violet | *Viola* sp. | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-16 (refusal) | 2.5YR 4/6 (red) | NA | NA | Medium sandy loam; slightly moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes** _____ **No** **X**
**Wetland Hydrology Present?** **Yes** _____ **No** **X**
**Hydric Soils Present?** **Yes** _____ **No** **X**

**Is the Sampling Point Within a Wetland?** **Yes** _____ **No** **X**

# Toms River Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Toms River **Date:** 9/1/05
**County/State:** Ocean, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland point within C Series, down-gradient of line formed by wetland flags C102 and C013.

## VEGETATION

**Community Type:** Emergent wetland (marsh)
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Tussock sedge | *Carex stricta* | OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** 10”
**Depth to Saturated Soil:** 10”

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
X **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
X **Other (explain)** – dark ground surface

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-18 | 2.5Y 2.5/1 Black | NA | NA | Silt loam |
| 18-30+ | 2.5Y 5/2 Grayish-brown | NA | NA | Coarse sand |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | Histosol | | Concretions |
| X | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| X | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

**Site:** NJARNG Toms River **Date:** 9/1/05
**County/State:** Ocean, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland point within A Series, down-gradient of line formed by wetland flags A116 and A117.

## VEGETATION

**Community Type:** Mixed forested wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Red maple<br>Atlantic white cedar | *Acer rubrum*<br>*Chamaecyparis thyoides* | FAC<br>OBL |
| Sapling | Red maple<br>Black gum | *Acer rubrum*<br>*Nyssa sylvatica* | FAC<br>FAC |
| Shrub | Coast pepperbush | *Clethra alnifolia* | FAC+ |
| Vine | NA | *NA* | NA |
| Ground | Sphagnum moss | *Sphagnum* sp. | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** 5”
**Depth to Saturated Soil:** 5”

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Dat**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- X **Other (explain)** – shallow rooting

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-11 Floating root mat | 10YR 2/1 Black | NA | NA | Mucky silt loam |
| 11-30+ | Open water | NA | NA | NA |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | Histosol | | Concretions |
| X | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| X | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

**Site:** NJARNG Toms River **Date:** 9/1/05
**County/State:** Ocean, NJ **Data Point:** B3
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Within Wetland Series B, down-gradient of line created by wetland flags B110 and B100.

**VEGETATION**

**Community Type:** Forested deciduous drainage swale within forested deciduous woodland.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | Coast pepperbush<br>Black huckleberry | *Celthra alnifolia*<br>*Gaylussacia baccata* | FAC+<br>FACU |
| Vine | NA | *NA* | NA |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 50

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12"**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
X **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12"**
X **Water-stained Leaves**
_____ **Local Soil Survey Dat**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
X **Other (explain)** – drainage swale

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-16 | 10YR 3/1 Very dark gray | NA | NA | Silt loam (tight structure) |
| 16-35+ | 10YR 4/4 Dark yellowish brown | NA | NA | Medium sand with 7% small round quartzose pebbles. Moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| | Histosol | | Concretions |
| X | Histic Epipedon | | High Organic Content in Surface Layer in Sandy Soils |
| | Sulfidic Odor | | Organic Streaking in Sandy Soils |
| | Aquic Moisture Regime | | Listed on Local Hydric Soils List |
| X | Reducing Conditions | | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **No X** |
| **Wetland Hydrology Present?** | **Yes X** | **No** |
| **Hydric Soils Present?** | **Yes X** | **No** |
| **Is the Sampling Point Within a Wetland?** | **Yes X** | **No** |

# Tuckerton Armory

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Tuckerton **Date:** 10/17/05
**County/State:** Camden, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point at a low elevation within the woodland community in the northern portion of the site.

**VEGETATION**

**Community Type:** Forested mixed woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Chestnut oak<br>Pitch pine | *Quercus prinus*<br>*Pinus rigida* | NL<br>FACU |
| Sapling | Chestnut oak | *Quercus prinus* | NL |
| Shrub | Black huckleberry | *Gaylussacia baccata* | FACU |
| Vine | NA | NA | NA |
| Ground | NA | NA | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- _____ **Inundation**
- _____ **Saturated in Upper 12”**
- _____ **Water Marks**
- _____ **Drift Lines**
- _____ **Sediment Deposits**
- _____ **Drainage Patterns in Wetlands**
- _____ **Oxidized Root Channels in Upper 12”**
- _____ **Water-stained Leaves**
- _____ **Local Soil Survey Data**
- _____ **FAC-Neutral Test**
- _____ **Dominance by OBL**
- _____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-3 | NA | NA | NA | Fibric layer |
| 3-8 | 10YR 6/3 (pale brown) | NA | NA | Loamy medium sand; slightly moist. |
| 8-20 | 10YR 5/4 (yellowish-brown) | NA | NA | Loamy medium sand; slightly moist. |
| 20-25+ | 10YR 4/6 (dark yellowish-brown) | NA | NA | Loamy medium sand; slightly moist. |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** _____ | **No** **X** |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** **X** |
| **Hydric Soils Present?** | **Yes** _____ | **No** **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** **X** |

**Site:** NJARNG Tuckerton **Date:** 10/17/05
**County/State:** Camden, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point at a low elevation within the woodland community in the southwest portion of the site.

**VEGETATION**

**Community Type:** Forested evergreen woodland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Pitch pine | *Pinus rigida* | FACU |
| Sapling | Pitch pine | *Pinus rigida* | FACU |
| Shrub | Black huckleberry | *Gaylussacia baccata* | FACU |
| Vine | NA | NA | NA |
| Ground | NA | NA | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 0

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-4 | NA | NA | NA | Fibric layer |
| 4-10 | 10YR 6/3 (pale brown) | NA | NA | Loamy medium sand; slightly moist. |
| 10-18 | 10YR 5/4 (yellowish-brown) | NA | NA | Loamy medium sand; slightly moist. |
| 18-22+ | 10YR 4/6 (dark yellowish-brown) | NA | NA | Loamy medium sand; slightly moist. |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

**Hydrophytic Vegetation Present?** **Yes** _____ **No** **X**
**Wetland Hydrology Present?** **Yes** _____ **No** **X**
**Hydric Soils Present?** **Yes** _____ **No** **X**

**Is the Sampling Point Within a Wetland?** **Yes** _____ **No** **X**

# Vineland Armory OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG Vineland **Date:** 9/13/05
**County/State:** Cumberland, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point at approximate center of Wetland Series A.

## VEGETATION

**Community Type:** Roadside depression fringed by emergent wetland vegetation.
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Grass-leaved goldenrod<br>Lurid sedge | *Euthamia graminifolia*<br>*Carex lurida* | FAC<br>OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** <1”
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- ____ **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- **X** **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- **X** **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-5 | 10YR 4/2 (dark grayish-brown) | NA | NA | Medium to coarse loamy sand. Very moist. |
| 5-8 | 10YR 4/3 (brown) | NA | NA | Coarse loamy sand. Very moist. |
| 8-22+ | 10YR 5/8 (strong brown) | NA | NA | Coarse sand. Moist. |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| ____ | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

**Site:** NJARNG Bordentown CSMS **Date:** 9/9/05
**County/State:** Burlington, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point located at the up-gradient end of Wetland Series A, but down-gradient of line created by wetland flags A119 and A120.

## VEGETATION

**Community Type:** Vegetated swale
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Purple loosestrife<br>Lurid sedge<br>Soft rush | *Lythrum salicaria*<br>*Carex lurida*<br>*Juncus effusus* | FACW+<br>OBL<br>FACW+ |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- ____ **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- X **Other (explain)** – drainage swale

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 (refusal) | 2.5Y 5/2 (grayish-brown) | NA | NA | Silt loam with 30% pore linings. |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# West Orange Armory OMS/CSMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG West Orange **Date:** 9/23/05
**County/State:** Essex, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Wetland data point within approximate center of Wetland Series A.

**VEGETATION**

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Grass-leaved goldenrod<br>Meadowsweet<br>Halberd-leaved tearthumb | *Euthamia graminifolia*<br>*Spiraea latifolia*<br>*Polygonum arifolium* | FAC<br>FAC+<br>OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12"**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12"**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 (refusal) | 7.5YR 3/4 (dark brown) | NA | NA | Silt loam, possibly fill material. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

_____ **Histosol**
_____ **Histic Epipedon**
_____ **Sulfidic Odor**
_____ **Aquic Moisture Regime**
_____ **Reducing Conditions**
_____ **Gleyed or Low-Chroma Colors**
_____ **Concretions**
_____ **High Organic Content in Surface Layer in Sandy Soils**
_____ **Organic Streaking in Sandy Soils**
_____ **Listed on Local Hydric Soils List**
_____ **Listed on National Hydric Soils List**
_____ **Other (explain in Remarks)**

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | |
| **Hydric Soils Present?** | **Yes** | | **No** | **X** |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | |

**Site:** NJARNG West Orange **Date:** 9/23/05
**County/State:** Essex, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series B.

## VEGETATION

**Community Type:** Emergent wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Japanese Stiltgrass | *Microstegium vimineum* | FAC |
| | Woolgrass | *Scirpus cyperinus* | FACW+ |
| | Soft rush | *Juncus effuus* | FACW+ |
| | Lurid sedge | *Carex lurida* | OBL |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- ____ **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- X **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-12 (refusal) | 10YR 5/2 (grayish-brown) | 10YR 6/3 (pale brown) | 20% / distinct | Silt loam. Very moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | Histosol | ____ | Concretions |
| ____ | Histic Epipedon | ____ | High Organic Content in Surface Layer in Sandy Soils |
| ____ | Sulfidic Odor | ____ | Organic Streaking in Sandy Soils |
| ____ | Aquic Moisture Regime | ____ | Listed on Local Hydric Soils List |
| X | Reducing Conditions | ____ | Listed on National Hydric Soils List |
| X | Gleyed or Low-Chroma Colors | ____ | Other (explain in Remarks) |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# West Trenton AASF/OMS

Project No.: 3-2106-0114
22 October 2007

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**Site:** NJARNG West Trenton **Date:** 10/20/05
**County/State:** Cape May, NJ **Data Point:** B1
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative upland data point situated up-gradient of Wetland Series A.

**VEGETATION**

**Community Type:** Mowed field
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | NA | *NA* | NA |
| Sapling | NA | *NA* | NA |
| Shrub | NA | *NA* | NA |
| Vine | NA | *NA* | NA |
| Ground | Japanese Stiltgrass | *Microstegium vimineum* | FAC |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 100

**Remarks:**

**HYDROLOGY**

**Recorded Data (Describe in Remarks):**
**Stream, Lake or Tide Gauge**
**Aerial Photographs**
**Other**

**Depth of Surface Water:** NA
**Depth to Free Water in Pit:** NA
**Depth to Saturated Soil:** NA

**Field Indicators:**
_____ **Inundation**
_____ **Saturated in Upper 12”**
_____ **Water Marks**
_____ **Drift Lines**
_____ **Sediment Deposits**
_____ **Drainage Patterns in Wetlands**
_____ **Oxidized Root Channels in Upper 12”**
_____ **Water-stained Leaves**
_____ **Local Soil Survey Data**
_____ **FAC-Neutral Test**
_____ **Dominance by OBL**
_____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-7 | 10YR 3/2 (very dark grayish-brown) | NA | NA | Silt loam; moist. |
| 7-12 (refusal) | 2.5Y 5/3 (light olive-brown) | NA | NA | Silt loam; moist. |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | |
|---|---|
| _____ **Histosol** | _____ **Concretions** |
| _____ **Histic Epipedon** | _____ **High Organic Content in Surface Layer in Sandy Soils** |
| _____ **Sulfidic Odor** | _____ **Organic Streaking in Sandy Soils** |
| _____ **Aquic Moisture Regime** | _____ **Listed on Local Hydric Soils List** |
| _____ **Reducing Conditions** | _____ **Listed on National Hydric Soils List** |
| _____ **Gleyed or Low-Chroma Colors** | _____ **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | |
|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** X | **No** _____ |
| **Wetland Hydrology Present?** | **Yes** _____ | **No** X |
| **Hydric Soils Present?** | **Yes** _____ | **No** X |
| **Is the Sampling Point Within a Wetland?** | **Yes** _____ | **No** X |

**Site:** NJARNG West Trenton **Date:** 10/20/05
**County/State:** Cape May, NJ **Data Point:** B2
**Investigator(s):** Phil Perhamus

**Data Point Location and Position in Landscape:** Representative wetland data point for Wetland Series B.

## VEGETATION

**Community Type:** Forested deciduous wetland
**Dominant Plant Species:**

| Layer | Common Name | Scientific Name | Indicator |
|---|---|---|---|
| Canopy | Black willow | *Salix nigra* | FACW+ |
| Sapling | Black willow | *Salix nigra* | FACW+ |
| Shrub | Multiflora rose<br>Silky dogwood | *Rosa multiflora*<br>*Cornus amomum* | FACU<br>FACW |
| Vine | Poison ivy | *Toxicodendron radicans* | FAC |
| Ground | NA | *NA* | NA |

**Percent of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):** 80

**Remarks:**

## HYDROLOGY

**Recorded Data (Describe in Remarks):**
- **Stream, Lake or Tide Gauge**
- **Aerial Photographs**
- **Other**

**Depth of Surface Water:** <1”
**Depth to Free Water in Pit:** 1”
**Depth to Saturated Soil:** 1”

**Field Indicators:**
- ____ **Inundation**
- ____ **Saturated in Upper 12”**
- ____ **Water Marks**
- ____ **Drift Lines**
- ____ **Sediment Deposits**
- X **Drainage Patterns in Wetlands**
- ____ **Oxidized Root Channels in Upper 12”**
- X **Water-stained Leaves**
- ____ **Local Soil Survey Data**
- ____ **FAC-Neutral Test**
- ____ **Dominance by OBL**
- ____ **Other (explain)**

**Remarks:**

**SOIL**

**Mapping Unit Name:** NA **Taxonomy (Subgroup):** NA
**Drainage Class:** NA **Confirmed Mapped Type?:** NA

| Depth (in.) | Matrix Color(s) | Mottle Color(s) | Abundance/ Contrast | Texture, Concretions, Structure, etc. |
|---|---|---|---|---|
| 0-2 | NA | NA | NA | Fibric layer |
| 2-12 (refusal) | 10YR 5/1 (gray) | NA | NA | Medium sandy loam, saturated at 1". |
| | | | | |
| | | | | |

**Hydric Soil Indicators:**

| | | | |
|---|---|---|---|
| ____ | **Histosol** | ____ | **Concretions** |
| ____ | **Histic Epipedon** | ____ | **High Organic Content in Surface Layer in Sandy Soils** |
| ____ | **Sulfidic Odor** | ____ | **Organic Streaking in Sandy Soils** |
| ____ | **Aquic Moisture Regime** | ____ | **Listed on Local Hydric Soils List** |
| ____ | **Reducing Conditions** | ____ | **Listed on National Hydric Soils List** |
| X | **Gleyed or Low-Chroma Colors** | ____ | **Other (explain in Remarks)** |

**Remarks:**

**WETLAND DETERMINATION**

| | | | | |
|---|---|---|---|---|
| **Hydrophytic Vegetation Present?** | **Yes** | **X** | **No** | ____ |
| **Wetland Hydrology Present?** | **Yes** | **X** | **No** | ____ |
| **Hydric Soils Present?** | **Yes** | **X** | **No** | ____ |
| **Is the Sampling Point Within a Wetland?** | **Yes** | **X** | **No** | ____ |

# APPENDIX D

# Resumes of Personnel Involved with this Project

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# Charles R. Harman, P.W.S.

Senior Associate Ecologist

**Professional summary**

A terrestrial ecologist, Mr. Harman has 20 years of experience in the environmental consulting field. Mr. Harman specializes in natural resource related assessment and management activities, including ecological risk assessments, natural resource damage assessments, wetlands management and ecological restorations. He is responsible for the completion of ecological risk assessment projects and wetlands evaluations at hazardous waste sites and industrial facilities around the country. His duties include client and project management, supervision of junior staff, and technical completion of work assignments.

**Professional qualifications**

Qualified by NJDEP under N.J.A.C. 7:1E to certify Environmentally Sensitive Areas Protection Plans as an Ornithologist/Ecologist; 1998

Professional Wetland Scientist, Registration Number 249, Issued by Society of Wetland Scientists; 1995

Certificate of Completion; U.S. Army Corps of Engineers Wetlands Delineator Certification Training Program

**Education**

Southwest Texas State University, San Marcos, TX, M.A., Biology (GPA: 4.0 on a scale of 4.0), 1986

Texas A&M University, College Station, TX, B.S., Wildlife Ecology, 1977

**Continuing Education**

Law Seminars International, *Natural Resource Damages Litigation Workshop*, 2005

Hudson-Delaware Chapter SETAC Fall Workshop, *Tools for Improved Natural Resource Damage Assessment, Habitat Enhancement and Environmental Restoration*, 2005

Nicholas School of the Environment and Earth Sciences, Duke University, *Preparing and Documenting Environmental Impact Analyses*, 2005

Nicholas School of the Environment and Earth Sciences, Duke University, *New Advances in Ecological Risk Assessment*, 2004

Cook College Continuing Education, Rutgers Univ., *Natural Resource Damage Claims*, 2004

SETAC Short Course, *Natural Resource Damage Assessment Cooperative Efforts*, 2001

Cook College Continuing Education, Rutgers Univ., *Environmental and Ecological Risk Assessment*, 2001

Cook College Continuing Education, Rutgers Univ., *Threatened and Endangered Species of Northern New Jersey*, 2001

Cook College Continuing Education, Rutgers Univ., *Restoration of Native Woodlands*, 1999

American Society of Civil Engineers, *Design & Operation of Constructed Wetlands for Wastewater Treatment*, 1998

Cook College Continuing Education, Rutgers Univ., *Planning Hydrology for Wetlands Construction*, 1997

Cook College Continuing Education, Rutgers Univ., *Identification of Grasses, Sedges, and Rushes*, 1996

Cook College Continuing Education, Rutgers Univ., *Evaluation of Wetlands*; 1996

Cook College Continuing Education, Rutgers Univ*., Wetland Vegetation Identification*, 1995

Cook College Continuing Education, Rutgers Univ., *1987 ACOE Delineation Refresher Course*, 1995

Cook College Continuing Education, Rutgers Univ., *Hydric Soils*, 1994

Cook College Continuing Education, Rutgers Univ., *Hydrology of Wetlands*, 1994

Cook College Continuing Education, Rutgers Univ., *Wetland Construction Techniques*, 1994

Cook College Continuing Education, Rutgers Univ., *NJ Freshwater Wetlands Permits*, 1994

Cook College Continuing Education, Rutgers Univ., *Lake Management*, 1993

SETAC Short Course, Ecological Impact, Risk Assessments, & Cleanup Decisions at Hazardous Waste Sites, 1993

*Wetlands Mitigation and Restoration - Design, Installation and Evaluation Workshop*; 1993

Water Environment Federation/ATSDR, *Ecological Risk Assessment Seminar*, 1993

SETAC Short Course, *Ecological Risk Assessment*, 1992

Executive Enterprises, *Minimizing and Resolving Natural Resource Damage Claims*, 1992

Observer, *EPA Ecological Risk Assessment Guidelines Case Studies Workshop*; 1992

*OSHA 8-hour Hazardous Waste Operations Supervisors Training*; 1992

REWAI Learning Center, *Wetlands Delineation/Assessment Course*, 1990

Government Institutes, *CERCLA/NPL Seminar*, 1989

Government Institutes, *RCRA/Hazardous Waste Seminar*, 1989

Government Institutes, *Wetlands and Real Estate Development Seminar*, 1988

Government Institutes, *Impact of Environmental Law on Real Estate Transactions*, 1987

*OSHA 40-hour Health and Safety Training*; 1987

USDA Graduate School, *Wildlife Ecology Field Course*, 1982

## Memberships

Society of Environmental Toxicologists and Chemists

Hudson/Delaware Chapter of the Society of Environmental Toxicologists and Chemists

Chapter Vice-President - 1994

Chapter President – 1995
Interstate Technology Regulatory Council

Ecological Enhancements Team

Mitigation Wetlands Team

Constructed Wetlands Team

Small Arms Firing Range Team

Society for Ecological Restoration

Society of Wetlands Scientists

The Association of State Wetland Managers

**Special Activities**

2006: Lead Instructor. Ecologically Focused Remediation Strategies Short Course, 27th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Montreal, Quebec, Canada.

2006: Instructor. Constructed Wetlands in New Jersey, Lorman Education Services, Cherry Hill, NJ.

2004/2005: Instructor. Administration and Enforcement of Wetlands in New York Seminar, Lorman Education Services, Buffalo, NY

2003 – Present: Course Instructor. Ecological Risk Assessments at Hazardous Waste Sites, Cook College Continuing Education Course, Rutgers University.

**Location**

Somerset, New Jersey

**Summary of core skills**

Ecological Risk Assessment

Mr. Harman utilizes his expertise in vertebrate zoology and physiology, botany, and applied and systems ecology in the development of ecological risk assessments at CERCLA, RCRA, and other hazardous waste sites. He has been involved with ecological risk assessments at over 25 CERCLA sites and 3 RCRA corrective action sites. He has conducted biotic characterizations for hazardous waste sites located in freshwater wetlands and estuaries. He performed a detail vegetative analysis of a 1,300-acre RCRA Corrective Action site in support of an ecological risk assessment. Mr. Harman has conducted ecological risk assessments using a variety of USEPA headquarters, regional, program, and State methodologies. Mr. Harman has been involved at sites ranging in physical location from New England to the tropics and has focused on terrestrial, aquatic, and wetland systems.

Wetlands Management and Environmental Permitting

Mr. Harman has been actively involved in the design and construction of both mitigation wetlands and constructed wetlands for treatment purposes. He has designed and managed wetland restoration projects as part of remediation activities including red maple swamps, freshwater marshes and coastal emergent marshes. Mr. Harman has delineated wetlands using both the 1987 and 1989 manuals. He has designed and conducted detailed evaluations of the potential for ecological impacts to wetlands from the implementation of remedial actions, including pump and treat systems. He has evaluated wetlands and other ecological receptors at sites located in sensitive habitats, including the New Jersey Pinelands, the New Jersey Hackensack Meadowlands, coastal estuaries, and freshwater swamps and marshes. Mr. Harman has conducted threatened and endangered species surveys as part of biological characterizations, including surveys for swamp pink in New Jersey wetlands. Mr. Harman has

conducted wetland delineation projects in Connecticut, Delaware, Maine, Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, Puerto Rico, and Virginia.

As part of the wetland management process, Mr. Harman has developed wetland and other natural resource permits through both Federal and State agencies. Mr. Harman has obtained General Wetland Permits under the New Jersey Freshwater Wetlands Protection Act and has obtained Nationwide Wetland permits under the Clean Water Section 404 Program in New Jersey, New York, Pennsylvania, and Puerto Rico in advance of landfill construction activities and new building activities. Mr. Harman has obtained new stormwater permits under NJPDES programs for the construction of aircraft hangers and addressed state concerns at chemical plants for NPDES permit renewals. He has obtained stream encroachment permits, and permits under Coastal Zone Management Regulations for remedial construction activities. He oversaw the preparation of air permits for discharges from new building construction and has assisted in the preparation of RCRA Part B permit applications.

Natural Resource Damage Assessments
Mr. Harman is actively involved in many aspects of natural resource damage assessment, including the verification of injuries and lost services, and the development of detailed restoration plans.

Environmental Impact Assessment
Mr. Harman managed an environmental impact study to assess the potential for adverse ecological impacts to occur as a result of the siting and operation of a hazardous waste incinerator in a rural section of eastern Mississippi. The project included the detailed inventory of flora and fauna over a 2,000 acre project assessment area. As a case study, this assessment was published in *Hazardous Waste Incineration, Evaluating the Human Health and Environmental Risks* by Lewis Publishers. Mr. Harman served as senior reviewer on a project to develop a risk model to evaluate the potential for impacts resulting from the migration and introduction of invasive species into the Province of Alberta. Mr. Harman has participated in the preparation of several environmental assessments at military installations in southern New Jersey and in Massachusetts. His participation has included the delineation of wetlands, the evaluation of endangered species, the completion of plant inventories, and the identification of collected rodents.

## Employment history

Ecologist, AMEC Earth & Environmental (formerly Ogden Environmental & Energy Services), 2000 - Present

Ecologist, Ogden Environmental and Energy Services Co., Inc., 2000

Environmental Scientist, McLaren/Hart, Inc. (formerly Fred C. Hart Associates), 1990 – 2000

Environmental Scientist, Fred C. Hart Associates, Inc., 1987 – 1990

Instructor, Southwest Texas State University, 1986 – 1987

Officer, United States Navy, 1977 - 1981

## Detailed core skills or details by project

Mr. Harman has been involved in a number of projects, including:

**Ecological Risk Assessment, ExxonMobil, Former Lail Property, Paulsboro, NJ (Ongoing, $800,000, 2-7603-0003):** Project Director for remedial investigation/ecological risk assessment for PCB-contaminated freshwater tidal sediments located in Paulsboro, New Jersey, being completed for a major oil company. Responsible for overall technical approach to the project, quality oversight and client management. Project activities thus far have included: delineation of PCB-contaminated sediments material in tidal wetlands and mudflats through the collection of over 1000 surface water,

sediment, groundwater, vegetation, and biota samples. Objective of sampling is to determine uptake and potential impacts from PCBs to resident biota in freshwater tidal wetland. Completed fauna/flora survey and habitat characterization. Preparing Remedial Investigation Report and Ecological Risk Assessment for aquatic and terrestrial ecological receptors for submission to regulatory team consisting of NJDEP (lead agency), USFWS, Delaware River Basin Commission (DRBC), NOAA, and USACOE.

**Ecological Risk Assessment, ExxonMobil, Bayway Ecological Evaluation Support, Linden, NJ (Ongoing, $75,000, 1-7452-0000):** Managing the completion of the multi-tiered ecological assessment of a refinery located in Linden, New Jersey under New Jersey Department of Environmental Protection (NJDEP) protocols. Working for a major soil company, directing field and office efforts to evaluate potential impacts to natural resources on a 900-acre refinery site. Issues involved development of ecological screening methodologies and the preparation of work plans outlining their use. Supporting the client at project meetings with the NJDEP and providing strategic guidance on resolving technical issues with the State.

**Ecological Risk Assessment, ExxonMobil, KRGP Sediment Evaluation, Kingsville, TX (Ongoing, $70,000, 3-7672-0000):** Project manager for the completion of an ecological risk assessment for an ephemeral stream located in South Texas for a major oil company. Project has included the collection of surface water, sediment and surface soil samples that were analyzed for chromium and the completion of a Screening Level Ecological Risk Assessment under Texas ecological risk guidelines. Providing strategic and technical guidance to the client on the ecological ramifications of the chromium results in negotiations with the landowner.

**Ecological Risk Assessment, ExxonMobil, Charleston Ecological Assessment Support, Charleston, SC (Ongoing, $50,000, 2-7615-0000):** Conducting an ecological risk assessment for fuel oil terminal located in Charleston, South Carolina and formerly owned by a major oil company. Using data obtained by the onsite remedial investigation contractor, evaluating the potential for ecological risks to terrestrial and wetland receptors. Sensitive receptors also include a salt marsh bordering the property.

**Ecological Risk Assessment, Sauget Area 2 PRP Committee, Sauget Ecological Risk Assessment, Sauget, IL (Ongoing, $698,000, 1-7305-0000):** Project manager responsible for the planning and execution of a large-scale ecological risk assessment on behalf of a multi-company PRP group. Ecological risk assessment will include the evaluation of potential ecological impacts to aquatic resources within 12,000 feet long section of the Mississippi River and to terrestrial receptors in adjoining floodplain areas. Project began with the development of work plans in 2001. In 2002, terrestrial sampling (soil sampling, earthworm bioassay sampling, plant tissue collection and ecological description), and aquatic sampling (surface water and sediment sampling collection for chemical analysis and bioassay evaluation) was conducted. The Baseline Ecological Risk Assessment was submitted to the U.S. Environmental Protection Agency in 2003 and comments were addressed in 2004. Waiting on the completion of additional remedial investigation activities in order to incorporate that information in the BERA. Other project activities include long-range planning and budgeting, interaction with the PRP committee at meetings and conference calls, and negotiations with regulatory agencies.

**Ecological Risk Assessment, Geosciences, Inc, Rhodia Ecological Support, Charleston, SC (Ongoing, $18,000, 3-7887-0000):** Conducting an ecological risk assessment for a small environmental engineering firm at a Rhodia plant located in Charleston, South Carolina. Using data obtained by the onsite remedial investigation contractor, evaluating the potential for ecological risks to terrestrial and wetland receptors in large estuarine wetlands adjacent to the Site.

**Ecological Risk Assessment, U.S. Army Corps of Engineers, Philadelphia District, Gaunts Brook BEE, Fort Dix, NJ (Ongoing, $81,895, 7-2000-0002):** Under contract to the U.S. Army Corps of Engineers through Cape Environmental, responsible for the preparation of a Baseline Ecological

Evaluation of Gaunt's Brook downstream and off-site of the Hanover Lake remediation area. Preparation of the BEE included sediment, surface water and surface soil sampling, collection of benthic invertebrate samples, and detailed biological descriptions of the brook and the wetlands community through which it flows. The BEE will be used in discussions with the State of New Jersey regarding the potential for off-site adverse ecological risks to have arisen as a result of the deposition of lead contaminated soil Fort Dix property.

**Ecological and Human Health Risk Assessment, Connecticut Air National Guard, Orange Air Station, West Haven, CT (Ongoing, $50,000, 2-7622-0025):** Project manager for the completion of an ecological and human health risk assessment for this Air National Guard Station located in West Haven, CT.

**Sediment Assessment, U.S. Army Corps of Engineers, New York District, Gowanus Canal, Brooklyn, NY (Ongoing, $100,000, 5-7531-0000):** Under contract to the U.S. Army Corps of Engineers through David Miller Associates, providing ecological risk modeling support as part of an Habitat Evaluation Procedure assessment of the Gowanus Canal. The evaluation included the review of data collected by the Corps as well as the collection of surface and deep sediment samples within the Canal. The risk modeling will be used to assist the Corps in their New York Estuary restoration decision making process.

**Ecological Risk Assessment, GPU, Cape May MGP Support, Cape May, NJ (Ongoing, $45,000, 0-7358-0006):** Project manager for the completion of a Baseline Ecological Evaluation (BEE) under New Jersey's Technical Requirements for Site Remediation at a site located in Cape May, NJ. The BEE is used to quantitatively determine the potential for ecological impacts. The preparation of this BEE included the collection of surface sediment and surface soil samples from a tidal creek system in a coastal marsh.

**Forensic Environmental Liability Study, ExxonMobil, Olean Historical Research, Olean, NY (2006, $35,000, 6-7640-0000):** Project manager for research into the environmental conditions and history of a former refinery located in Olean, NY. The New York State Department of Environmental Conservation (NYSDEC) has identified the location as a hazardous waste site due to the results of a state sponsored remedial investigation. Working for a major oil company, responsible for managing research into all historic processes and practices of the former refinery. Working with the client to develop a strategy to address the NYSDEC concerns and plan for future environmental assessments.

**Forensic Environmental Liability Study, ExxonMobil, ExxonMobil – Rochester, Rochester, NY (2005, $51,000, 3-7672-0002):** Project manager for research into the environmental conditions and history of a former refinery located in Rochester, NY. The New York State Department of Environmental Conservation (NYSDEC) has identified the location as a hazardous waste site due to the results of a state sponsored remedial investigation. Working for a major oil company, responsible for managing research into all historic processes and practices of the former refinery. Responsible for preparing the report and managing the input from two AMEC offices into the submitted work product. Working with the client to develop a strategy to address the NYSDEC concerns and plan for future environmental assessments.

**Ecological Risk Assessment, Beazer East, Inc., Garwood Ecological Evaluation, Garwood, NJ (2005, $5,870, 4-7200-8700):** Project manager for the completion of a Baseline Ecological Evaluation (BEE) under New Jersey's Technical Requirements for Site Remediation at a site located in Garwood, NJ. The BEE is used to quantitatively determine the potential for ecological impacts.

**Ecological Risk Assessment, Dartco, Dartco BEE, North Branch, NJ (2005, $2,954, 3-7649-0000):** Project manager for the completion of a Baseline Ecological Evaluation (BEE) under New Jersey's Technical Requirements for Site Remediation at a site located in North Branch, NJ. The BEE is used to quantitatively determine the potential for ecological impacts.

**Ecological Risk Assessment, Applied Earth Solutions, Applied Earth Solution Eco Support, Bergenfield, NJ (2005, $1,966, 5-7400-0000):** Project manager for the completion of a Baseline Ecological Evaluation (BEE) under New Jersey's Technical Requirements for Site Remediation at a site located in Bergenfield, NJ. Client was a small environmental engineering firm. The BEE is used to quantitatively determine the potential for ecological impacts.

**Ecological Risk Assessment, Hatch Mott MacDonald, PVSC North Arlington Site, North Arlington, NJ (2004, $2,990, 3-7817-0000):** Working for a small environmental engineering firm, managed the completion of a Baseline Ecological Evaluation (BEE) under New Jersey's Technical Requirements for Site Remediation at a site located in North Arlington, NJ. The BEE is used to quantitatively determine the potential for ecological impacts.

**Ecological and Human Health Risk Assessment, Bethlehem Steel, Lackawanna Risk Assessment, Lackawanna, NY (2004, $400,000, 0-7377-0000):** Project director for the completion of the human health and ecological risk assessment for this abandoned steel mill facility located in Lackawanna, New York. The ecological activities include the completion of a draft ecological risk assessment submitted to USEPA Region II by another environmental consulting firm. To support the completion of the ecological risk assessment and to address comments made by the agency on the draft assessment, conducted supplemental surface water and sediment sampling, macroinvertebrate community assessment, surface soil sampling, wetlands delineation and description of terrestrial biological communities. Final comments were addressed and submitted in August 2004.

**Sediment Evaluation, General Motors, Technical Support to Redevelopment, Tarrytown, NY (2004, $236,000, 2-7636-0000, Phase 0007):** Task manager responsible for the planning and implementation of a sediment evaluation project for a former GM plant located in Tarrytown, NY. Responsibilities included the evaluation of historic sediment data from the site and the design of a comprehensive sediment sampling program to address data gaps. Additionally, oversaw the implementation of the sampling program and the presentation of the collected data.

**Sediment Evaluation, U.S. Army Corps of Engineers, New York District, Gowanus Canal and Bay Restoration, Brooklyn, NY (2004, $24,000, 2-7671-0037):** Under contract to the U.S. Army Corps of Engineers through NEA, completed an evaluation of sediment data collected from the Gowanus Canal. The evaluation included the review of data collected by the Corps and the development of a hierarchical evaluation process to focus future investigation and restoration on areas of greatest concern. In support of the Corps, attended one public meeting to outline the results of the project.

**Ecological Risk Assessment, Federal Pacific Electric, FPE Baseline Ecological Evaluation, Newark, NJ (2004, $4,590, 3-7854-0000):** Project manager for the completion of a Baseline Ecological Evaluation (BEE) under New Jersey's Technical Requirements for Site Remediation at a site located in Newark, NJ. The BEE is used to quantitatively determine the potential for ecological impacts.

**Ecological Risk Assessment, Kerramerican, Kerramerican, Inc, - Blue Hill Risk, Blue Hill ME (2003, $64,000, 1-7403-0000):** Managed the risk assessment activities (both ecological and human health) in support of a remedial investigation/feasibility study being conducted by the AMEC Mississauga, Ontario office. Conducted a screening level ecological risk assessment at a former zinc mine site in coastal Maine. Project included the detailed biological assessment of terrestrial, wetland and aquatic ecosystems along the two mile stretch of an upper order stream flowing past the mine site, the preparation of a WET functional evaluation of local wetlands, and the evaluation of surface water, sediment and biological samples.

**Sediment Evaluation, Pfister Chemical Site, Supplemental Sediment Evaluation, Ridgefield, NJ (2002, $102,600, 1-7308-0000):** Project manager for the evaluation of contaminated sediments located in Overpeck Creek adjacent to the site located in Ridgefield, NJ. The creek, located in the Hackensack

Meadowlands, was evaluated to determine the potential for ecological impacts and potential remediation/NRD costs associated with site-related constituents of concern.

**Ecological Risk Assessment, U.S Army, Fort Dix – ERA, Fort Dix Military Reservation, NJ (2001, $28,000, 1-7332-0000):** As part of the preparation of an Environmental Assessment for the restoration of a dam supporting Hanover Lake, conducted an screening-level ecological risk assessment on the impacts of the deposition of lead-contaminated soil in Gaunt's Brook leading from the lake. The ecological risk assessment included the collection of sediment samples for lead and various parameters such as AVS/SEM and the collection of benthic macroinvertebrates, as well as the analysis of historic surface water and sediment samples. Results of the assessment indicated the potential for ecological impacts to sediment organisms from exposure to lead.

**Wetlands Management, U.S. Army, Hanover Lake Wetlands Monitoring, Fort Dix Military Reservation, NJ (Ongoing, $36,000, 3-7913-0014):** Managing a project to monitor the progress of a wetlands mitigation project at the Hanover Lake remediation area. Responsibilities include field monitoring to measure planting success, preparation of progress reports and coordination of required corrective measures.

**Wetlands Management, Gamesa, Gamesa Schaffer Mountain Wind Farm, Somerset County, PA (Ongoing, $55,000, 0-7685-0000):** Task manager for the identification and delineation of wetland associated with projected access roads, transmission line corridors, and turbine locations at this planned wind farm located in Pennsylvania. Activities included reconnaissance visits to identify project wetland areas, coordination of wetland delineation activities, preparation of Jurisdictional Determination applications to the U.S. Corps of Engineers, and strategic planning with the client regarding approaches to wetlands permit and alignment of roads, corridors and turbines. Assisted with the field evaluation and preparation of the Critical Issues Report that identified preliminary environmental impediments to the planned wind farm.

**Wetlands Management, NedPower Mt. Storm Wind Farm, Grant County, WV (Ongoing, $20,000, 3-7962-0007):** Task manager for the identification and delineation of wetland associated with projected access roads, transmission line corridors, and turbine locations at this planned wind farm located in West Virginia. Activities included reconnaissance visits to identify project wetland areas, coordination of wetland delineation activities, preparation of Jurisdictional Determination applications to the U.S. Corps of Engineers, and strategic planning with the client regarding approaches to wetlands permit and alignment of roads, corridors and turbines.

**Wetlands Management, Act Engineers, Princeton Theological Seminary, Princeton, NJ (2006, $3,200, 6-7590-0000):** managed a project to delineate wetlands and submit a Letter of Interpretation to the NJDEP for a theological seminary.

**Wetlands Management, North Carolina National Guard, Camp Butner – Wetlands Assessment, Raleigh, NC (2004, $9,500, 2-7622-5066):** Provided peer-review support and technical guidance on project to delineate/identify all of the wetlands located on this 1,000 acre National Guard facility. Activities included site reconnaissance to identify wetland areas and provide guidance to technical staff on delineation techniques.

**Wetlands Management, Commonwealth of Pennsylvania, Jackson Ceramix Wetlands Delineation, Jefferson County, PA (2002, $17,000, 9-7038-007L, Phase 0304):** As part of a remedial investigation in Jefferson County, PA, delineated and evaluated the wetlands that are to be addressed in Operable Unit 2. Additionally, provided conceptual wetlands restoration design support to the Project Engineer.

**Wetlands Management, Honeywell, Inc., Honeywell Chrome 2002, Perth Amboy, NJ (2002, $35,000, 8-7001-0600):** As part of a remedial action being planned for a chromium residue site adjacent to Newark Bay, prepared a comprehensive wetlands permitting package for State freshwater

and coastal wetlands, State waterfront development, and Federal Nationwide Permit 26. Additional, supervised the preparation of a soil erosion and sediment control plan for the planned activities at the site.

**Wetlands Management, Sayreville Landfill III PRP Committee, Sayreville Wetlands Support, Sayreville, NJ (2002, $18,000, 0-7405-0000):** Project manager for the oversight of RD/RA activities, including the management of wetlands issues at an abandoned landfill that is almost entirely surrounded by wetlands. As part of the wetlands management process, delineated the wetlands around the 32-acre landfill, developed and obtained all state and Federal wetland permits, and prepared detailed wetland mitigation plans for compensatory mitigation as a result of landfill capping.

**Wetlands Management, U.S. Army, Wetlands Delineation and Mitigation, Fort Dix Military Reservation, NJ (2001, $20,000, 8-7007-0020, Phase 001):** Delineated wetlands at the Pemberton parcel as part of the preparation of an Environmental Assessments (EAs). Wetlands were delineated using the 1989 Interagency Manual. Detailed delineation reports were prepared as part of the EAs.

**Wetlands Management, U.S. Army, Wetlands Delineation and Mitigation, Fort Dix Military Reservation, NJ (2000, $20,000, 8-7007-0016, Phase 001):** Delineated wetlands at the Hanover Lake Dam restoration site as part of the preparation of an Environmental Assessments (EAs). Wetlands were delineated using the 1989 Interagency Manual. Detailed delineation reports were prepared as part of the EAs. Provided wetland mitigation design support as part of the excavation of contaminated stream sediments and wetland soils. Support included development of all associated NJDEP and Pineland permits and research into the presence of endangered species.

**Wetlands Management, U.S. Army, Wetlands Delineation, Wetlands Delienation, Fort Devens, MA (2000, $20,000, 8-7007-0013, Phase 0001):** Delineated wetlands as part of the preparation of an Environmental Assessments (EAs). Wetlands were delineated using the 1989 Interagency Manual. Detailed delineation reports were prepared as part of the EAs.

**NRD Defense Support, Soha & Lang, NRD Litigation Support, Tacoma, WA (2006, $91,500, 0-7412-0000:** Served as expert witness in the settlement of natural resource claims at the Commencement Bay CERCLA site in the state of Washington, between the City of Tacoma and its insurance carrier. The City was seeking to be reimbursed for NRD settlement costs from its insurance carrier, which feels the reimbursement is unwarranted due to prior knowledge of the action that led to the claim. In support of the carrier, reviewing site-related NRD documents, participated in depositions, and prepared trial presentation material.

**NRD Defense Support, Lucent, Lucent NRD, NJ (2005, $92,000, 3-7889-000):** Providing support to a corporate client seeking to resolve state natural resource damage claims under New Jersey regulations. Support includes evaluation of distribution of chemical contamination in surface water and sediments at 9 different locations in the State to determine the potential for an NRD claim. Future activities will include negotiations with the NJDEP over the potential claims and technical efforts to restore impacted resources.

**NRD Defense Support, Morris County Dump NPL Site, NRD Expert Witness Support:** While an employee of McLaren/Hart, served as an expert witness in defense of claims of injuries to natural resources made by the Department of Interior against National Gypsum. This case set precedence because it was the first time a Natural Resource Damage Claims case was argued in bankruptcy court. Following a review and critique of the government's case and oral arguments before the bankruptcy court by the government and the defense team, the judge decided that the trustee had not adequately proven damages to natural resources and issued a ruling favorable to the PRP.

**NRD Defense Support, Consolidated Edison Co., Arthur Kill Generating Plant Site, NRD Defense Support:** While an employee of McLaren/Hart, managed a project to provide NRD defense support to a power company in Staten Island, New York. The company released PCB-contaminated dielectric

fluid into the Arthur Kill from its generating station. Activities include the evaluation of potential impacts to natural resources from the spill and providing guidance to the client on defense strategies.

**NRD Defense Support, Robinson Silverman, NRD Defense Support:** While an employee of McLaren/Hart, managed a project that provided NRD consulting support to a law firm in New York City. The ultimate aim was to evaluate potential liabilities associated with the release of PCBs by a major industrial company into the New York Harbor and lower Hudson River, and to plan strategic defensive moves in anticipation of USEPA examination of the PCB issue.

**NRD Defense Support, Kirkpatrick and Lockhart, NRD Defense Support:** While an employee of McLaren/Hart, managed the preparation of an expert report in support of the legal defense of a steel company in Pittsburgh, PA that was sued by the USEPA for claimed violations of the Clean Water Act. Part of the suit claimed ecological impacts to natural resources located in the Allegheny and Kiskiminetas Rivers from discharges from four of the company's steel mills. Preparation of the report included interaction and coordination with the law firm and the steel mill, collection and evaluation of data, preparation of the draft document, and interaction with the expert witness to ensure technical accuracy. Report has been submitted to the Agency and is awaiting review.

**Ecological Restoration, General Electric, First ½ Mile Restoration, Pittsfield, MA (Ongoing, $108,000, 1-7318-0000):** Developed stream bank restoration plans in advance of the excavation of floodplain soil and sediments of the Housatonic River. Following excavation of the soils and sediments from the streambank, the area was graded, stabilized to prevent future erosion, and replanted to the extent necessary to restore the vegetative community to its pre-excavation habitat value. Additionally, providing monitoring support to determine whether the streambank restoration activities are successful.

**Ecological Restoration, JCP&L, Streambank Restoration:** While an employee of McLaren/Hart, managed the streambank restoration for a manufactured gas plant (MGP) site. The presence of the material required extensive excavations of soils along the bank of the Delaware-Raritan Canal. As a result of the excavations, extensive restoration to the banks and to exotic plant species existing at the Site was required. Responsibilities included the documentation of baseline vegetative conditions and the preparation of vegetative restoration plans. Extensive bio-restoration material was used to stabilize the canal slopes to allow for planted sugar maples and herbaceous vegetation to become established.

**Ecological Restoration, J&J Health Care Systems, Pond Restoration:** While an employee of McLaren/Hart, managed a project to restore the ecological and aesthetic balance of an 8,000 square foot pond. Restoration began with drainage of the pond followed by removal of the accumulated sediment. The bottom contour of the pond was restored to facilitate passage of new sediment through the pond. Riprap along the banks was restored to control erosion. To enhance water quality, a new aeration device was installed and banks of water lilies were built. At the completion of restoration activities, the pond was stocked with bluegill, yellow catfish, smallmouth bass, and fathead minnows.

**EIS Support, AES Sparrows Point LNG Project, FERC Third Party EIS, Sparrows Point, MD (Ongoing, $149,000, 7-6843-0000):** Part of the AMEC technical team assisted the AES Sparrows Point LNG, LLC and Mid-Atlantic Express LLC to perform third-party services to the Federal Energy Regulatory Commission (FERC) regarding the Sparrows Point Project. AMEC is the third-party consultant to FERC for the preparation of a National Environmental Policy Act (NEPA) compliant documents (the Draft Environmental Impact Statement [DEIS] and the Final EIS) for LNG facilities and related pipelines. Specific responsibilities include the review and assessment of the Resource Reports related to Water Resources and preparation of those particular segments of the EIS in accordance with the 2002 FERC Guidance Manual for Environmental Report Preparation.

**EIS Support, U.S. Army, Biological Assessment, Fort Dix Military Reservation, NJ (2001, $26,000, 1-7332-0005):** Prepared a biological assessment (BA) for the use of graphite containing smoke obscurants on four firing ranges on base. The BA evaluated the potential for short-term and long-term

effects to sensitive receptors from exposure to graphite and fog oil. The BA was prepared based on an evaluation of current literature on the use of the material, a scientific review of the sensitivities of wildlife and plants to the materials, and an estimation of potential exposure patterns.

**EIS Support, Monsanto/DowElanco, Preparation of Generic EIS:** While an employee of McLaren/Hart, wrote a Generic Environmental Impact Statement for the use of fluridone and glyphosate in the waters of the State of New York. The clients were seeking NYSDEC authorization for the use of their products in the state to control aquatic weeds and required a GEIS under 6 NYCRR Part 617 (SEQRA) to assist local applicators with needed permits. Activities to prepare the GEIS included collection and review of ecotoxicological data on the two chemicals, description of uses and potential ecological settings, identification of environmental impacts, and determination of mitigation measures and alternatives. Document was prepared and submitted to the NYSDEC on behalf of the clients. After responding to NYSDEC comments, attended three public hearings on the GEIS in support of the clients. Document was finally approved by the NYSDEC in 1995 and became the first GEIS accepted for aquatic herbicides since a Department generated GEIS was approved in 1981.

**EIS Support, Blue Circle Atlantic Cement Company, Ravena, NY:** While an employee of McLaren/Hart, under a Part 316 permit application to burn hazardous waste as a supplemental fuel, assisted the facility with the preparation of an EIS under the New York state SEQRA process. Responsibilities consisted of the identification of baseline ecological resources at the site, and using air-modeling support to project future emission and deposition rates, identified potential risks to ecological resources from the hypothetical burning of hazardous waste.

## Publications

Barnthouse, L., C. Harman, W. Landis, and L. Tannenbaum. 2006. Integrated Environmental Assessment and Management's Commitment to Scientific Discourse. Editorial, Integrated Environmental Assessment and Management, 2:3.

Interstate Technology Regulatory Council (ITRC). 2006. *Design of Ecological Land Re-use of Remediated Sites.* Ecological Enhancements Team, Participant and Contributing Author.

ITRC. 2005. G*uide for Characterization, Design, Construction and Monitoring Mitigation Wetlands.* Mitigation Wetlands Team, Participant and Contributing Author.

C.R. Harman, W.R. Alsop, and P.D. Anderson. 2004. Ecological Risk Assessment Applied to Energy Development. *in Encyclopedia of Energy*. *ed*. C.J. Cleveland. Elsevier Science, San Diego, CA.

ITRC. 2003. *Technical and Regulatory Guidance Document for Constructed Treatment Wetlands.* Constructed Wetlands Team, Participant and Contributing Author.

ITRC. 2003. *Characterization and Remediation of Soil at Closed Small Arms Firing Ranges*. Small Arms Firing Range Team, Participant and Contributing Author.

P.J. Sheehan, F.J. Dombrowski, M.J. Ungs, and C.R.Harman. 1999. Ecotoxicological Risk Assessment for Hazardous Waste Incineration: A Case Study. *in Hazardous Waste Incineration, Evaluating the Human Health and Environmental Risks*. *eds.* S.M.Roberts, C.M. Teaf, and J.A. Bean. Lewis Publishers, Boca Raton, Florida.

Sheehan, P.J., E. Algeo and C.R. Harman. 1993. Ecotoxicology and Economics. *McLaren/Hart Reporter*.

Harman, C. R., W. M. Romaine and C. P. D'Alleinne. 1993. Wetlands Management at CERCLA Sites, *Current and Future Priorities for Environmental Management*. NAEP 18th Annual Conference Proceedings. Raleigh, North Carolina: 113-124.

Harman, C. R. 1991. Environmental Liability Assessments of Former Gasoline Service Stations, *Proceedings of the Ninth Annual Hazardous Materials Management Conference/ International*. Atlantic City, New Jersey.

Harman, C. R. 1986. Effects of Rural Development on Avian Community Structure. Southwest Texas State Univ. Master's Thesis, 57 pp.

## Professional Presentations

Harman, C.R. and G.R. Biddinger. 2006. Using Ecological Enhancements to Manage Environmental Obligations: Conceptual Approaches and Implementation. Poster Presentation at the 27th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Montreal, Quebec, Canada.

Harman, C.R. 2004. A Baseline Ecological Risk Assessment Completed for a Site on a Mississippi River Floodplain. Platform Presentation at the 25th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Portland, Oregon.

Harman, C.R. 2004. Integration of Ecological Re-Use as a Component of Remediation at Hazardous Waste Sites. Platform Presentation at the 25th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Portland, Oregon.

Gneiding, L; C. Calhoun; P. Perhamus; and C. Harman. 2003. An Instream Aquatic Study of a Stream Receiving Treated Groundwater from a Landfill. Poster Presentation at the 24th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Austin, Texas.

Gneiding, L.; C. Calhoun; P. Perhamus; and C. Harman. 2003 Low Benthic Macroinvertebrate Numbers: Contamination or Habitat? Poster Presentation at the 24th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Austin, Texas.

Harman, C.R. 2003. Technical Approaches to Habitat Enhancement as Part of Remedial Actions. Wildlife Habitat Council on Using Ecological Enhancements at Region V Contaminated Sites. Merrillville, IN.

Harman, C.R., V. Gallo, and S. Posten. 2002. Biodegradation Of Chlorinated Hydrocarbons Discharged Through Ground Water Into a Wetlands. Platform Presentation at the 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah.

Gneiding, L., C. Calhoun, and C. Harman. 2002. The Effects of Channelization on Benthic Macroinvertebrate Populations Within a Contaminated Urban Stream. Poster Presentation at the 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah.

Gneiding, L., C. Calhoun, and C. Harman. 2002. A Terrestrial Ecological Risk Assessment Involving Ecologically Virgin Material. Poster Presentation at the 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah.

Gneiding, L., C. Calhoun, and C. Harman. 2002. Is There Ecological Risk Within a Man-Made Trench? Poster Presentation at the 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah.

Calhoun, C., L. Gneiding, and C. Harman. 2002. Ranking SWMU Remediation Using a Terrestrial Ecological Risk Assessment. Poster Presentation at the 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah.

Harman, C. and C. Calhoun. 2002. An Ecological Risk Assessment Using Multiple Lines of Evidence at a Mine Site in Maine. Poster Presentation at the 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah.

Harman, C.R. 2001. The Use of Constructed Wetlands to Manage Stormwater Runoff at Firing Ranges. Presentation at the ITRC Meeting, Falmouth, MA.

Harman, C.R. 2001. Ecological Risk Assessments: Concepts and Methodologies. Hudson/Delaware Chapter SETAC Annual Meeting Short Course, Lyndhurst, NJ.

Harman, C.R. and P.K. Perhamus. 1999. Evaluation of Potential Impacts to Wetland Systems from Groundwater Extraction Systems. Platform Presentation at the 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Philadelphia, Pennsylvania.

Baron, L, N.L. Bonnevie, and C.R. Harman. 1998. Application of Approaches for Evaluating the Bioavailability of Chemicals in Terrestrial and Aquatic Environments. Poster Presentation at the 19th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Charlotte, North Carolina.

Sigethy, S., L. Baron, C. Harman, and S. Venkatraman. 1997. Prediction of Metal Bioavailability to Plants using Soil Physico-Chemical Properties: An Approach to Improving Risk Estimates. Platform Presentation at the Society of Risk Analysis Conference, Washington, D.C.

Baron, L., S. Sigethy, C. Harman, and S. Venkatraman. 1997. Use of Soil Physico-Chemical Properties to Predict Metal Bioavailability and Ecological Risks in Terrestrial Environments. Platform Presentation at the 18th Annual Meeting of the Society of Environmental Toxicology and Chemistry, San Francisco, California.

Baron, L.A., S.D. Sigethy, and C.R. Harman. 1997. Ecological Risk Assessment of the Aquatic Community Adjacent to a Steel Manufacturing Facility. Platform Presentation at the at the ASTM Committee E-47 on Biological Effects and Environmental Fate Seventh Symposium on Environmental Toxicology and Risk, St. Louis, Missouri.

Harman, C.R. 1997. Wetlands and Ecological Risk Assessments: An Overview. Hudson/Delaware Chapter SETAC Annual Meeting Short Course, Prallsville, New Jersey.

Baron, L.A. and C. R. Harman. 1996. Screening Ecological Risk Assessment for the Aquatic Community at a Municipal Sewage Treatment Plant. Poster Presentation at the 17th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Washington, D.C..

Baron, L.A. and C. R. Harman. 1996. Evaluation of Chemical Constituents in Sediments Adjacent to a CERCLA Site. Poster Presentation at the 17th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Washington, D.C..

Harman, C.R., C.S. Crockett, C.P. D'Alleinne, P.S. Price, and K. Schild. 1995. Use of Monte-Carlo Analysis to Evaluate Multimedia Ecological Risks and Impacts. Platform Presentation at the Society of Risk Analysis Annual Conference, Honolulu, Hawaii.

Harman, C.R. 1995. Wetlands Restoration at Hazardous Waste Sites in Northern New Jersey. Poster Presentation at the 16th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Vancouver, British Columbia, Canada.

Harman, C.R. and W. Gilchrist. 1995. The Ecological Evaluation of Surface Water Outfalls at a Manufacturing Plant in New Jersey. Poster Presentation at the 16th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Vancouver, British Columbia, Canada.

Harman, C.R., F.G. Brockerhoff and C.P. D'Alleinne. 1995. Evaluation of Potential Ecological Impacts Associated with a POTW Located on Hempstead Bay, New York. Poster Presentation at the 16th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Vancouver, British Columbia, Canada.

Harman, C.R. 1995. Risk and Natural Resource Damage Assessments. Presentation at the 1995 Mid-America Safety, Health & Environmental Conference. Lake of the Ozarks, Missouri.

Harman, C.R. and C.P. D'Alleinne. 1994. Distribution of Mercury Residues in Domestic Chicken (*Gallus domesticus*) Samples Collected From a Hazardous Waste Site. Poster Presentation at the 15th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Denver, Colorado.

Harman, C.R. 1994. The Use of an Ecological Receptor Evaluation to Select a Remediation Strategy at a Hazardous Waste Site. Poster Presentation at the 15th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Denver, Colorado.

Harman, C.R. and T.J. Lusardi. 1994. Interrelationship of Sediments, Surface Water and Groundwater in a Connecticut Stream. Poster Presentation at the Ninth Annual Contaminated Soils Conference, University of Massachusetts, Amherst, Massachusetts.

Schmitt, L.M. and C.R. Harman. 1994. The Use of Air Modeling in a Predictive Ecological Risk Assessment for a Hazardous Waste Incinerator. Poster Presentation at the 87th Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio.

Harman, C.R. 1994. Designing a Good Ecological Sampling/Analysis Plan. Presentation at the New Jersey Water Pollution Control Association Tech Transfer Ecological Risk Assessment Seminar, Somerset, New Jersey.

Harman, C.R. 1994. The Use of Ecological Risk Assessments in Defining Remediation Approaches. Hudson/Delaware Chapter of the Society of Environmental Toxicology and Chemistry Annual Meeting, West Chester, Pennsylvania.

Harman, C. R., C.P. D'Alleinne, P.J. Sheehan, and F.J. Dombrowski. 1993. The Use of a Predictive Ecological Risk Assessment in Support of a Hazardous Waste Incinerator Siting Permit. Poster Presentation at the 14th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Houston, Texas.

Harman, C. R. 1993. A Review of the Natural Resource Damage Claims Case at the Asbestos Dump Superfund Site, Morris County, New Jersey. Poster Presentation at the 14th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Houston, Texas.

Romaine, W. M. and C. R. Harman. 1993. Utilization of Diversity and Biotic Indices in Defense of Natural Resource Damage Claims. Poster Presentation at the 14th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Houston, Texas.

Schmitt, L.M., C.R. Harman and C.P. D'Alleinne. 1993. The Consideration of Phytotoxicological Factors in Ecological Risk Assessments. Poster Presentation at the 14th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Houston, Texas.

Harman, C. R., W. M. Romaine and C. P. D'Alleinne. 1993. Wetlands Management at CERCLA Sites. Platform Presentation at the National Association of Environmental Professionals 18th Annual Conference, Raleigh, North Carolina.

Harman, C. R. and C. P. D'Alleinne. 1993. Trace Element Concentrations in Guinea Grass (*Panicum maximum*) Collected From a Hazardous Waste Site in Juncos, Puerto Rico. Poster Presentation at the ASTM Committee E-47 on Biological Effects and Environmental Fate Third Symposium on Environmental Toxicology and Risk Assessment, Atlanta, Georgia.

Harman, C. R. 1991. Environmental Liability Assessments of Former Gasoline Service Stations. Platform Presentation at the Ninth Annual Hazardous Materials Management Conference/International, Atlantic City, New Jersey.

## Corporate Presentations

Harman, C.R. 2002. Environmental Impact Statements/Ecological Risk Assessments. Air Force Mentor-Protege Training Program to Zambrana Engineering. St. Louis, MO.

Harman, C.R. 2001. Mitigation and Constructed Wetlands: Technical Approaches and Requirements. Air Force Mentor-Protege Training Program Technical Presentation to Zambrana Engineering. St. Louis, MO.

Harman, C.R. 2000. Using Risk Assessment to Manage Environmental Liabilities. Presentation at the 2000 Pennsylvania Environmental Conference, Harrisburg, Pennsylvania.

Harman, C.R. 2000. Natural Resource Damage Claims: The Next Big Thing? Presentation at the 2000 Prudential Roundtable Meeting, Boston, Massachusetts.

Harman, C.R. 1998. Principles of Natural Resource Damage and Ecological Restoration. Technical Presentation to Lucent Technologies Inc., Bell Laboratories, Murray Hill, New Jersey.

Harman, C.R. 1998. Ecological Assessments and NRD Evaluations Under the Tech Regs. Technical Presentation to Riker, Danzig, Sherer, Hyland & Perretti, Morristown, New Jersey.

Harman, C.R. 1997. Ecological Risk Assessments - What Are They & What Will They Mean To Your Company. Presentation at the Chemical Industry Council of New Jersey Spring Environmental/Regulatory Conference, New Brunswick, New Jersey.

Harman, C.R. and T.J. Iannuzzi. 1997. Ecological Risk Assessment: Applications and Advances. Technical Presentation to Merck & Co., Whitehouse Station, New Jersey.

Harman, C.R. 1997. Ecological Risk Assessment: Applications, Advantages and Advances. Technical Presentation to Hercules, Inc., Wilmington, Delaware.

Harman, C.R. 1996. Ecological Risk Assessments: Protocols and Procedures. Technical Presentation to the law firm of Sidley Austin, Washington, D.C.

Harman, C.R. 1996. Overview of the Natural Resource Damage Assessment Process. Technical Presentation to the law firm of Manko, Gold & Katcher, Philadelphia, Pennsylvania.

Harman, C. R. 1992. Ecological Risk Assessments, Concepts and Methodologies. Technical Presentation to the Superfund Response Group, Mobil Oil Corporation, Princeton, New Jersey.

Harman, C. R. 1992. Ecological Risk Assessments. Part of NJDEPE Proposed Cleanup Standards Seminar, Sponsored by McLaren/Hart Environmental Engineering Corporation and the law firm Herold and Haines, Warren, New Jersey.

Keenan, R. K. and C. R. Harman. 1992. Ecological Risk Assessment in the 1990's. Technical Presentation to the law firm of Sidley & Austin, New York, New York and Chicago, Illinois.

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# Phil Perhamus, P.W.S.

Senior Biologist

**Professional summary**
Mr. Perhamus is a biologist with seventeen years of experience in natural resources and the environmental sciences. He specializes in wetland studies, natural resources, impact assessments, and ecological risk assessment. His specific capabilities include wetlands delineation, wetlands permitting, habitat restoration, environmental impacts assessment, aquatic and terrestrial wildlife surveys, threatened and endangered (T&E) species surveys, environmental investigations, and stream assessments.

Mr. Perhamus has extensive experience working with numerous state and federal agencies, local municipal bodies, county agencies, private industry, conservation groups, and private landowners. His agency experience includes the New Jersey Department of Environmental Protection (NJDEP), the NJ Division of Fish and Game (DFW), the New Jersey Pinelands Commission (NJPC), the Pennsylvania Department of Environmental Protection (PADEP), the Pennsylvania Fish and Boat Commission (PAFBC), the Pennsylvania Department of Conservation and Natural Resources (PADCNR), the New York State Department of Environmental Conservation (NYSDEC), the Connecticut Department of Environmental Protection (CTDEP), the Maine Department of Inland Fisheries and Wildlife (MDIFW), the United States Army Corps of Engineers (USACOE), the United States Fish and Wildlife Service (USFWS); the United States Environmental Protection Agency (USEPA), the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), and the United States Coast Guard (USCG).

**Professional Qualifications**
Professional Wetland Scientist (PWS), Society of Wetland Scientists (SWS), Certification No. 1640 (April 7, 2006).

Commonwealth of Virginia, Licensed Professional Wetland Delineator, Department of Professional and Occupational Regulation, License No. 3402 000063 (July 17, 2006).

Certificate of Training. U.S. Army Corps of Engineers Wetland Delineator Training. (November 1998).

**Education**
Graduate Studies, Environmental Science. Rutgers University, New Brunswick, NJ. 1990-1994.

B.S., Ecology. Unity College, Unity, ME. 1990.

**Continuing Education and Professional Training**

Threatened and Endangered Species of Southern New Jersey (Field Course). Rutgers University, Cook College Office of Continuing Professional Education. North Brunswick, NJ. 2006.

Coastal Vegetation Identification. Rutgers University, Cook College of Continuing Professional Education. New Brunswick, NJ. 2005.

Wetlands Monitoring. Rutgers University, Cook College of Continuing Professional Education. New Brunswick, NJ. 2005

Stream Restoration. Rutgers University, Cook College Office of Continuing Professional Education. New Brunswick, NJ. 2004.

NJDEP Landscape Project Training. New Jersey Department of Environmental Protection, Endangered and Nongame Species Program, Trenton, NJ. 2004 and 2005.

Freshwater Wetlands Construction Techniques. Rutgers University, Cook College Office of Continuing Professional Education. New Brunswick, NJ. 2004

Hydrology of Wetlands. Rutgers University, Cook College Office of Continuing Professional Education. New Brunswick, NJ. 2004.

Watershed Management. United States Environmental Protection Agency (USEPA) On-line training course: http://www.epa.gov/watertain.

Stream Encroachment Permit Program. Rutgers University, Cook College Office of Continuing Professional Education. New Brunswick, NJ. 2003.

New Jersey Coastal Program Review. Rutgers University, Cook College Office of Continuing Education. Toms River, NJ. 2002.

Comprehensive Restoration of Aquatic Environments. National SETAC Workshop; Newark, NJ. 2001.

Limnology: Lake Evaluation and Management. HDC-SETAC Short Course; West Chester, PA. 2001.

Threatened and Endangered Species of Northern New Jersey. Rutgers University, Cook College Office of Continuing Professional Education. North Brunswick, NJ. 2001.

Threatened and Endangered Species of Southern New Jersey. Rutgers University, Cook College Office of Continuing Professional Education. North Brunswick, NJ. 2000.

Wetland Plants of New Jersey. HDC-SETAC Short Course; Stockton, NJ. 2000.

GPS Mapping of Watersheds. HDC-SETAC Short Course; Stockton, NJ. 2000.

NJ Freshwater Wetlands; Permits and Regulations. Rutgers University, Cook College Office of Continuing Professional Education. North Brunswick, NJ. 1999 and 2005.

Integrated Design of Constructed Wetlands. National SETAC Short Course; Charlotte, NC. 1998.

Basic Wetland Delineator Training. Institute for Wetland and Environmental Education and Research (IWEER). Mt. Laurel, NJ. 1998.

OSHA 10-Hour Construction Safety Training.

OSHA Site Health and Safety Coordinator Training. 29 CFR 1910.120(e)(4).

OSHA 40-Hour Health and Safety Training. 29 CFR 1910.120(e)(3).

**Memberships**
Society of Wetlands Scientists (SWS)
New York State Wetlands Forum (NYSWF)
Delaware River Invasive Plants Partnership (DRIPP)
Society of Environmental Toxicology and Chemistry, Hudson-Delaware Chapter (HDC-SETAC)
Pennsylvania Biodiversity Partnership (PABIODIV)

**Summary of core skills**

Natural Resources
Mr. Perhamus has conducted numerous and varied natural resource studies including surveys for periphyton, phytoplankton and zooplankton, aquatic and terrestrial vegetation, benthic macroinvertebrates, fish, herptiles, small and large mammals, and birds. He has also conducted numerous field surveys for federally-listed and state-listed plant and animal species, and their respective habitats. These species have included swamp pink (*Helonias bullata*), Knieskern's beaked rush (*Rhynchospora knieskernii*), sickle-leaved golden aster (*Chrysopsis falcata*), tall pawpaw (*Asimina triloba*), bog turtle (*Clemmys muhlenbergii*), wood turtle (*Clemmys insculpta*), Pine Barrens tree frog (*Hyla andersonii*), northern pine snake (*Pituophis melanoleucus melanoleucus*), and Indiana bat (*Myotis sodalis*).

Ecological Risk Assessment
Mr. Perhamus has conducted small and large scale empirical-based ecological risk assessments at CERCLA, RCRA, and State-lead sites nationwide. He worked closely with the U.S. Environmental Protection Agency/Environmental Response Team (U.S. EPA/ERT) for 8 years (1990 to 1998) under the Response Engineering and Analytical Contract (REAC) during the formulation of the 1997 Ecological Risk Assessment Guidance for Superfund (ERAGS) document. He was a contributing author to the U.S. EPA Representative Biological Sampling Document (Appendix B in ERAGS). He has conducted ecological risk assessments that have incorporated a multitude of techniques including extent and magnitude of contamination studies, biological assessments and surveys, wildlife community and population analyses, biological tissue collection, toxicity identification and evaluation (toxicity testing), laboratory phytotoxicity evaluation, X-ray fluorescence (XRF) screening of site matrices, and radiological surveys.

Environmental Impacts Assessment
Mr. Perhamus has conducted and prepared numerous Environmental Assessments (EA) and Environmental Impact Statements (EIS) for the Federal Communications Commission (FCC), PA Department of Environmental Protection, the U.S. Army Corps, various municipalities, and private landowners in New Jersey and Pennsylvania. He has also provided expert testimony in defence of

these assessments to municipal boards. These boards have included the South Brunswick, NJ Planning Board, the Bordentown Township Planning Board, and the Upper Mount Bethel Township, PA Zoning Board.

Wetlands Delineation, Permitting, Restoration and Monitoring
Mr. Perhamus has conducted numerous wetland delineations and assessments in a multitude of habitat types nationwide. He has developed regulatory permits under the programs of the NJDEP, PADEP, NYSDEC, CTDEP, the U.S. Army Corps, and the U.S. Coast Guard. He has developed both conceptual and construction-ready wetland restoration plans and has been intimately involved in the field implementation of these restorations and subsequent monitoring. He has experience presenting restoration projects to Federal and State level funding sources such as the U.S. Fish and Wildlife Service Partners in Wildlife Program, the NJ Wetlands Mitigation Council, the PA Growing Greener Grant program, and the PA Department of Conservation and Natural Resources.

**Employment history**
Senior Biologist, AMEC Earth & Environmental, Inc., Somerset, NJ, 2003-present
Senior Biologist, Princeton Hydro, LLC, Ringoes, NJ, 2000-2003
Senior Associate Environmental Scientist, McLaren/Hart, Inc., 1998-2000
Project Scientist, Roy F. Weston, Inc./REAC, Edison, NJ, 1990-1998
Wildlife Intern, The Nature Conservancy, Long Island Chapter, Shelter Island, NY, 1990
Vegetation Intern, The Massachusetts Audubon Society, Lincoln, MA, 1989
Research Intern, The Institute of Ecosystem Studies, Millbrook, NY, 1988.
Wildlife Intern, Maine Department of Inland Fisheries and Wildlife, Augusta, ME. 1987.

**Presentations / publications**
Contributing Author, Appendix D *in* ITRC. 2005. Characterization, Design, Construction, and Monitoring of Mitigation Wetlands. The Interstate Technology & Regulatory Council, Mitigation Wetlands Team.

**Perhamus, P.K.**, M. Watson, and W. Simmons. 2003. Landscape-scale Examination of an Eroding River in a Developed Watershed. SETAC 24th Annual Meeting; Austin, TX.

Gneiding, L.R., C.R. Calhoun, **P.K. Perhamus**, and C.R. Harman. 2003. Low Benthic Macroinvertebrate Numbers: Contaminant or Habitat? SETAC 24th Annual Meeting; Austin, TX.

Gneiding, L.R., C.R. Calhoun, **P.K. Perhamus**, and C.R. Harman. 2003. An Instream Aquatic Study of a Stream Receiving Treated Groundwater from a Landfill. SETAC 24th Annual Meeting; Austin, TX.

**Perhamus, P.** 2002. Assessment of the Manasquan River. Final Report for the Monmouth County Health Department, on behalf of the New Jersey Watershed Management Area 12 TMDL Committee.

Harman, C.R. and **P. Perhamus**. 1999. Evaluation of Potential Impacts to Wetland Systems from Groundwater Extraction Systems. SETAC 20th Annual Meeting; Philadelphia, PA.

Baron, L., **P. Perhamus-Kim**, C. Harman, N. Bonnevie. 1998. Applications for Approaches for Evaluating the Bioavailability of Metals in Terrestrial and Aquatic Environments. SETAC 19th Annual Meeting; Charlotte, NC.

**Kim, P.Y.**, P. Bovitz, B. VanDerveer, M. Donohue, K. Munney, and M. Sprenger. 1994. The Use of Chemical, Histopathological, and Toxicity Evaluations to Investigate a Wildlife Kill. SETAC 15th Annual Meeting; Denver, CO.

Henry, R.G., **P. Kim**, B. VanDerveer, and M. Sprenger. 1993. The Use of Water and Sediment Toxicity Evaluations and Biological Surveys to Establish Ecological Risk and Justify Remedial Activities at a Superfund Site. SETAC 14th Annual Meeting; Houston, TX.

Kracko, K., **P. Kim**, and M. Sprenger. 1992. An Ecological Assessment of Aquatic and Terrestrial Habitat Impacted by a Tannery. SETAC 13th Annual Meeting; Cincinnati, OH.

VanDerveer, W.D., M.D. Sprenger, D.A. Adams, and **P. Kim**. 1991. Evaluation of Field and Laboratory Methodologies for Use in Coastal Plain Riverine Site Monitoring Plans. SETAC 12th Annual Meeting; Seattle, WA.

**Details by project:**

***NATURAL RESOURCES / T&E SPECIES***

**Tinicum Township and The Tinicum Conservancy – The Giving Pond Phase 1 Baseline Natural Resource Inventory (NRI), Tinicum Twp., Bucks Co., PA:** Project Manager for a baseline Natural Resource Inventory (NRI) of a former sand and gravel quarry acquired by the PA Department of Conservation and Natural Resources (DCNR) Delaware Canal Park System for transformation into a State Park and Environmental Education Center. This project was co-managed with Forbes Environmental and Land Use Planning, and pulled together a large multi-disciplinary project team including various private and public sector volunteers at the local, state, and federal level. The study examined the physical and biological resources existing at the site, assessed the potential impacts for the proposed site transformation, and developed a conceptual habitat management plan.

**Monmouth County Board of Health – Manasquan River Assessment Project, Freehold and Howell Twps., Monmouth Co., NJ:** Project Manager for a Rosgen-based assessment of the upper Manasquan River and its associated watershed. Using the Rosgen stream classification methodology, the upper Manasquan River was examined for its severe erosion problems and subsequent elevated nutrient and fecal coliform levels and associated biological impairment. Problems stream segments were identified along the reach of the upper Manasquan, evaluated for their departure from stable conditions, and assessed for their stabilization and restoration potential. Current NJ Best Management Practices (BMPs) were evaluated for incorporation into concepts of Low-Impact Design (LID) and Sustainable Drainage Systems on local and regional scales in the watershed. The results of this study were presented in a public forum at a New Jersey Department of Environmental Protection (NJDEP) Stormwater Conference and posted on the Internet.

**Chesterfield Township – Crosswicks Creek NRI, Chesterfield Twp., Burlington Co., NJ:** Project Manager. Conducted a Natural Resource Inventory (NRI) for the Crosswicks Creek watershed within the boundaries of Chesterfield Township, NJ. This project involved the inventory of the physical and natural resources existing within the study area, and also the evaluation and feasibility for public access to the Crosswicks Creek. 2006.

**Tinicum Conservancy – Roaring Rocks/Swamp Creek Biodiversity Study, Tinicum Twp., Bucks Co., NJ:** Project Manager. Conducted a biological inventory of the aquatic components of the Roaring Rocks and Swamp Creek subwatersheds as part of a larger biodiversity study funded by the Commonwealth of Pennsylvania. This project involved fishery and benthic macroinvertebrate surveys.

**Shaffer Mountain Wind, LLC – Somerset Co., PA:** Conducted an Indiana bat (*Myotis sodalis*) habitat evaluation for a large-scale (10,000-acre) proposed 100+MW wind energy facility.

**CSX Transportation – Shorter Alabama Derailment Site, Shorter, Macon Co., AL:** Conducted a benthic macroinvertebrate and herptile survey at a train derailment site involving an acetone and methylene chloride spill and subsequent fire, for the purposes of assessing the impacts of the derailment upon the local aquatic system.

**CSX Transportation – Former Crosstie Chipping Facility Site, Brewton, Escambia Co., AL:** Conducted a benthic macroinvertebrate and herptile survey at a crosstie chipping facility formerly contaminated with PAHs and other organics for the purposes of assessing the impacts of the site operations upon the local aquatic system. 2006.

**Civalier Engineering & Surveying, Inc. – Gaughan Swamp Pink Project Site, Sewell Twp., Gloucester Co., NJ:** Conducted a field survey of an 8-acre property for the federally-listed plant species swamp pink (*Helonias bullata*). 2006.

**HMG Engineering, Ltd – Deleyer Property Site, Lower Mt. Bethel Twp., Northampton Co., PA:** Project Manager; conducted a Phase 1 bog turtle survey for a proposed agricultural development site.

**Tinicum Township – Tinicum Creek Sheephole Road Restoration, Tinicum Twp., Bucks Co., PA:** Under a PA Growing Greener Grant, conducted a Rosgen-based stream assessment for a degraded section of the Tinicum Creek.

**Howmet Industries Site, Rockaway Twp., Morris Co., NJ:** Conducted a fishery and benthic macroinvertebrate survey of a trout-production stream located adjacent to a metallurgical facility.

**Kin-Buc Landfill, Edison Twp., Middlesex Co., NJ:** Project Team Member for a small mammal survey (muskrat) investigation of the tidal estuarine marshes throughout the Kin-Buc Landfill area. Collected specimens were used to characterize the population and for tissue residue analysis of PCBs.

**Heleva Landfill Superfund Site, Lehigh Co., PA:** Conducted stream electroshocking and a benthic macroinvertebrate survey of Coplay Creek as part of a long-term monitoring program of the stream's aquatic resources.

**Sadat Associates – Chambers Bridge Road Site, Brick Twp., Ocean Co., NJ:** Conducted a wetlands delineation for the development of a proposed athletic facility. This project involved a habitat evaluation for the protected Pine Barren treefrog, (*Hyla andersonii*).

**GeoTrans, Inc. – Sparta Telecom Tower Site, Sparta, Sussex Co., NJ:** Performed a Phase 1 survey for bog turtle (*Clemmys muhlenbergii*) habitat within and around the proposed development footprint of a telecommunications tower.

**Gael Telecommunications – Woodmansie Site, Barnegat Twp., Ocean Co., NJ:** Conducted a field survey for the protected plant species, Knieskern's beaked-rush (*Rhynchospora knieskernii*) at a proposed telecommunications tower site.

**Sprint Telecommunications – Germania Site, Galloway Twp., Atlantic Co., NJ:** Conducted a field survey for the protected plant species, Knieskern's beaked-rush (*Rhynchospora knieskernii*) at a proposed telecommunications tower site.

**Fort Dix – LFSH, AAR, and LFBF Complex Site, Fort Dix, Plumsted Twp., Ocean Co., NJ:** Conducted a field survey for the State-threatened sickle-leaved golden aster (*Chrysopsis falcata*) at a proposed construction site within a military installation located within the NJ Pinelands Protection Area.

**Fort Dix – MOUT Complex Site, Fort Dix, Plumsted Twp., Ocean Co., NJ:** Conducted a field survey for the NJ State-threatened northern pine snake (*Pituophis melanoleucus melanoleucus*) and the sickle-leaved golden aster (*Chrysopsis falcata*) at a proposed construction site within a military installation located within the NJ Pinelands Protection Area.

**Cornell-Dubilier Site, Bound Brook, NJ:** Project Team Member for a large-scale fishery survey of the Bound Brook to determine human health and ecological risk potential from PCB-contaminated sediments. The results of this study, in conjunction with other ongoing studies, resulted in a temporary moratorium for fish consumption in the Bound Brook.

**National Lead Industries Superfund Site, Pedricktown, Salem Co., NJ:** Project Team Member for a small mammal community survey, gross necropsy, and tissue residue analysis for metals accumulation. Implemented an *in situ* earthworm bioaccumulation test using submerged growth chambers.

**Small Mammal Method Development Project, Franklin Twp., Somerset Co., NJ:** Implemented various small mammal collection techniques to augment a population and community database for the U.S. EPA Environmental Response Team (ERT). These techniques included the use of snap traps, Havahart traps, Sherman traps, Longworth traps, Victor mole traps, and pitfall traps.

**Tex Tin Superfund Site, Texas City, Galveston Co., TX:** Conducted a benthic macroinvertebrate survey of the estuarine habitats surrounding the facility.

**Marzone Pesticides Site, Tifton, Tift Co., GA:** Conducted a comprehensive wildlife survey of the aquatic and terrestrial habitats surrounding the site, including benthic macroinvertebrate, fish, amphibian, vegetation, terrestrial insect, and small mammal.

**Lemon Lane Landfill Site, Bloomington, Monroe Co., IN:** Conducted stream electroshocking in the waterways surrounding the site for a fishery survey and tissue residue analysis.

**Fox River Group – Lower Fox River Risk Assessment, WI:** Conducted a boat-mounted electroshocking survey for the collection of fish tissue samples for use in both ecological and human health risk assessments.

***WETLANDS RESTORATION AND MONITORING***

**Middletown Township Environmental Commission – McClees Creek Baseline Assessment Project, Middletown Twp., Monmouth Co., NJ:** Project Manager for a baseline assessment of a tidal salt marsh experiencing rapid encroachment by the invasive species, common reed (*Phragmites australis*). The assessment involved an evaluation of the existing and historical environmental conditions and hydraulic modelling to determine the cause of the wetland's disturbed condition, and to arrive at a sustainable remedy. The results of this assessment were used to develop a construction-ready restoration plan that was presented to the NJ Wetlands Mitigation Council, in cooperation with the U.S. Fish and Wildlife Service.

**CP Railway – Afton NY Stream Restoration, Village of Afton, Chenango Co., NY:** Prepared a streambank stabilization plan for rip-rap areas and moderately-steep riparian slopes of a rail construction and rehabilitation project.

**Chemical Leaman Tank Lines (CLTL) Superfund Site, City of Bridgeport, Gloucester Co., NJ:** Conducted long-term monitoring of an expansive red maple swamp to measure the effects of a large-scale pump-and-treat groundwater remediation system. The methodology and interim results of this project were presented in a platform session at the 1999 20th Annual SETAC Meeting in Philadelphia, PA.

**Ewan Property Superfund Site, Shamong Twp., Burlington Co., NJ:** Conducted long-term monitoring of a red maple - Atlantic white cedar swamp to measure the effects of a nearby pump-and-treat groundwater remediation system.

**Confidential Client – Vernal Habitat Enhancement Site, Tinicum Twp., Bucks Co., PA:** Constructed stone weirs within a seasonal stream to enhance amphibian breeding habitat by extending the water-holding period of existing vernal pools.

**Peruzzi Pontiac/GMC Truck – Peruzzi Property Site, Preston Twp., Wayne Co., NJ:** Conducted long-term restoration monitoring of three emergent wetlands constructed under a U.S. Army Corps permit.

**OENJ – Woodbridge Restoration Project, Woodbridge Twp., Middlesex Co., NJ:** Provided oversight and conducted planting activities at a tidal emergent marsh restoration site.

**Hopkins Farm, Upper Freehold Twp., Monmouth Co., NJ:** Project Team Member for a Swamp Pink survey and wetlands restoration monitoring.

**Sayreville Landfill III, Sayreville Borough, Middlesex Co., NJ:** Project Team Member for the development of a wetlands restoration plan of a tidal emergent marsh.

**Orleans Homebuilders – Buckingham Restoration, Buckingham Twp., Bucks Co., PA:** Project Team Member for the field implementation of a wetlands restoration effort.

**WRS – Pascale Property/Cooper Chemical Site, Warren Co., NJ:** Performed a landscaping inventory on a private estate containing buried unexploded ordnance (UXOs), and mapped the locations of key horticultural specimens using GPS.

**U.S. EPA – Zschiegner Property, Howell Twp., Monmouth Co., NJ:** Developed a conceptual wetlands restoration plan for a forested deciduous wetland system slated for remediation of chromium waste.

***WETLANDS DELINEATION AND PERMITTING (1989 MANUAL)***

**ExxonMobil Corporation – Former Lail Property Site, East Greenwich Twp. & Paulsboro Borough, Gloucester Co., NJ:** Prepared a Multiple Permit Application for the environmental remediation of a freshwater tidal marsh and embayment. These permits included a NJDEP Statewide General Permit No. 4; a NJDEP Waterfront Development Permit; a NJDEP Upland Waterfront Development Permit; a NJDEP 1970 Coastal Wetlands Act Permit, a NJDEP Coastal Area Facilities Review Act (CAFRA) Permit, a NJDEP Tidelands License; and a U.S. Army Corps of Engineers Nationwide Permit No. 38.

**Civalier Engineering & Surveying, Inc. – Goodwin Property Site, Franklin Twp., Gloucester Co., NJ:** Project Manager. Conducted a wetlands delineation and prepared an application for the NJDEP for approval of the proposed wetland boundaries. 2006.

**Civalier Engineering & Surveying, Inc. – Wilkins Property Site, Harrison Twp., Gloucester Co., NJ:** Project Manager. Conducted a wetlands delineation and prepared an application for the NJDEP for approval of the proposed wetland boundaries. 2006.

**Civalier Engineering & Surveying, Inc. – Mt. Calvary Apostolic Church Site, Winslow Twp., Camden Co., NJ:** Project Manager. Conducted a wetlands delineation and prepared a NJDEP Special Activity Waiver application for the redevelopment of a church property. 2006.

**Civalier Engineering & Surveying, Inc. – Congregation B'nai Tikvah Association Site, Washington Twp., Gloucester Co., NJ.** Project Manager. Conducted a wetlands delineation of a forested riparian corridor and prepared a NJDEP General Permit No. 11 (GP11) application for a stormwater outfall.

**Civalier Engineering & Surveying, Inc. – Marten Avenue Site, Mt. Laurel Twp., Burlington Co., NJ.** Conducted a wetlands delineation of a forested system and prepared an application to the NJDEP for approval of the proposed wetland boundaries. 2006.

**Civalier Engineering & Surveying, Inc. – Davidson Road Site, Woolwich Twp., Gloucester Co., NJ.** Conducted a wetlands delineation of a former agricultural property and prepared an application to the NJDEP for approval of the proposed wetland boundaries. 2006.

**Civalier Engineering & Surveying, Inc. – JM Land Site, Gloucester Twp., Camden Co., NJ:** Project Manager; conducted a wetlands delineation and permitting project (NJDEP Statewide General Permit No. 6) for a proposed residential development.

**Civalier Engineering & Surveying, Inc. – Signature Homes Site, South Harrison Twp., Gloucester Co., NJ:** Project Manager; conducted a wetlands presence/absence assessment for a proposed residential subdivision.

**Civalier Engineering & Surveying, Inc. – Mitchell Property Site, Voorhees Twp., Camden Co., NJ:** Project Manager; conducted a wetlands delineation for a freshwater wetlands transition area (i.e., wetland buffer) that encroached the site boundary.

**Civalier Engineering & Surveying, Inc. – Gaughan Property Site, Mantua Twp., Gloucester Co., NJ:** Project Manager; conducted a wetlands delineation and permitting project involving the application to the NJDEP for a Line-Verification LOI and a Transition Area Waiver (Averaging Plan) of a forested property proposed for commercial development into an automobile service garage.

**Civalier Engineering & Surveying, Inc. – Orchard Estates Site, Monroe Twp., Gloucester Co., NJ:** Project Manager for a wetlands delineation and application to the NJDEP for a Line-Verification LOI, a Freshwater Wetlands General Permit No. 6, a Freshwater Wetlands General Permit No. 11, and a Transition Area Waiver (Averaging Plan Option). This project site was located adjacent to a large swamp pink (*Helonias bullata*) population. Numerous meetings and discussions with regulatory bodies (NJDEP, U.S. Fish and Wildlife Service, Green Acres) were conducted to arrive at a development scenario acceptable to all parties.

**Civalier Engineering & Surveying, Inc. – Windsor Estates Site, South Harrison Twp., Gloucester Co., NJ:** Project Manager; conducted a wetlands delineation and permitting project for a proposed residential subdivision. This project involved the application to the NJDEP LURP for a Line-Verification LOI, Transition Area Waiver (Averaging Plan), General Permit No. 2 (GP2), General Permit No. 6 (GP6), and a General Permit No. 7 (GP7).

**Civalier Engineering & Surveying, Inc. – Saddlebrook Estates Site, Monroe Twp., Gloucester Co., NJ:** Conducted a wetlands delineation and developed applications to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI), a Freshwater Wetlands General Permit No. 6, and a Freshwater Wetlands Transition Area Waiver (Averaging Plan Option).

**Civalier Engineering & Surveying, Inc. – Warren Park Estates Site, Pennsville Twp., Salem Co., NJ:** Project Manager for an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI), a Freshwater Wetlands General Permit No. 6, and a Transition Area Waiver (Averaging Plan Option).

**Civalier Engineering & Surveying, Inc. – Harrison Twp. Site, Harrison Twp., Gloucester Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI).

**Civalier Engineering & Surveying, Inc. – Mt. Calvary Apostolic Church Site, Winslow Twp., Camden Co., NJ:** Project Manager for a wetlands delineation and the development of an application

to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) and a Transition Area Waiver (Special Activity Option). This project required on-site meetings with the NJDEP to resolve vernal habitat issues on the adjacent property.

**Civalier Engineering & Surveying, Inc. – Spino Property Site, Voorhees Twp., Camden Co., NJ:** Project Manager for a wetlands delineation and the development of an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI).

**Civalier Engineering & Surveying, Inc. – Winslow Twp. Site, Winslow Twp., Camden Co., NJ:** Project Manager for a wetlands delineation and the development of an application to the NJ Department of Environmental Protection (NJDEP) for a Presence/Absence Letter of Interpretation (P/A LOI).

**Civalier Engineering & Surveying, Inc. – Herskowitz Property Site, Woodbury Heights Borough, Gloucester Co., NJ:** Project Manager for a wetlands delineation and the development of an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) for the expansion of an existing commercial retail facility.

**Civalier Engineering & Surveying, Inc. – Sewell Auto Garage Site, Mantua Twp., Gloucester Co., NJ:** Project Manager for a wetlands delineation of a forested wetland complex proposed for commercial development.

**Civalier Engineering & Surveying, Inc. – Aboud Property Site, Deptford Twp., Gloucester Co., NJ:** Project Manager for a wetlands delineation of a forested deciduous wetland system proposed for a single-family residential dwelling.

**Civalier Engineering & Surveying, Inc. – Tarpy Drive Site, Deptford Twp., Gloucester Co., NJ:** Project Manager for a wetlands delineation of a forested tract proposed for residential development.

**Civalier Engineering & Surveying, Inc. – Ellsworth Property Site, Monroe Twp., Gloucester Co., NJ:** Project Manager for a wetlands delineation of a large agricultural and forested property situated in the NJ Pinelands Protection Area.

**NJ Army National Guard – Various Sites, State-wide:** Conducted wetlands delineations for the Bordentown Armory OMS (Burlington Co.), Bordentown CSMS (Burlington Co.), Bridgeton Armory (Salem Co.), Cape May Armory (Cape May Co.), Cherry Hill Armory (Camden Co.), Dover Armory (Morris Co.), Flemington Armory (Hunterdon Co.), Fort Dix UTES (Ocean Co.), Franklin Armory (Sussex Co.), Hackettstown Armory (Warren Co.), Hammonton Armory (Atlantic Co.), Lawrenceville Complex (Mercer Co.), Morristown Armory (Morris Co.), Newton Armory (Sussex Co.), Picatinny FMS/AASF (Morris Co.), Pitman Armory (Gloucester Co.), Princeton Armory (Mercer Co.), Sea Girt NGTC (Monmouth Co.), Somerset Armory (Somerset Co.), Toms River Armory (Ocean Co.), Tuckerton Armory (Ocean Co.), Vineland Armory (Cumberland Co.), West Orange Armory (Essex Co.), and West Trenton (Mercer Co.).

**ACT Engineers, Inc. – Princeton Theological Seminary Site, West Windsor Twp., Mercer Co., NJ.** Conducted a wetlands delineation and submitted an application to the NJDEP for approval of the proposed wetlands boundaries.

**GeoTrans, Inc. – Confidential Site, Hanover Twp., Morris Co., NJ:** Project Manager for a wetlands permitting project involving the application to the NJDEP for a General Permit No. 4 (GP4) for the remediation of contaminated wetland soils.

**AMEC Civil, LLC – Shark River Route 35 Bridge Site, Belmar Borough, Ocean Co., NJ:** Prepared a Multiple Permit Application (Waterfront Development, CAFRA, and Water Quality Certificate) for a proposed stone jetty in a previously sub-tidal area.

**Ogle Property Site, N. Brunswick Twp., Middlesex Co., NJ:** Project Manager for a wetlands delineation of a residential property for proposed home expansion.

**Princeton Junction Engineering – Marlton Woods Site, Evesham Twp., Burlington Co., NJ:** Conducted a wetlands delineation of a formerly drained agricultural parcel, developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI), and prepared an Environmental Impacts Assessment (EIA) for a proposed residential development.

**Princeton Junction Engineering – Gillespie Site, Hopewell Twp., Mercer Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Notice of Violation (NOV) site. This wetland system was severely disturbed with unauthorized excavation and fill, and required the use of heavy machinery to determine the extent of hydric soils. The delineation was conducted in the presence of a NJDEP Enforcement Officer.

**Princeton Junction Engineering – Gunther Property Site, Upper Freehold Twp., Monmouth Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) for a minor residential subdivision.

**Princeton Junction Engineering – Lauricella Property Site, Hopewell Twp., Mercer Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) for a minor subdivision.

**Princeton Junction Engineering – Perrine Property Site, Cranbury Twp., Middlesex Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) for the expansion of an existing commercial facility.

**Devine – Devine Property Site, Vernon Twp., Sussex Co., NJ:** Conducted a wetlands delineation in response to a Notice of Violation (NOV) issued by the NJ Department of Environmental Protection to a private landowner. On-site meetings with the landowner and the NJDEP Enforcement Officer resulted in a plan of action to resolve the NOV.

**Civil Dynamics, Inc. – Voorhees Sewer Project, Voorhees Twp., Warren Co., NJ:** Project Manager; conducted a wetlands delineation for a proposed sewer improvement project.

**Civil Dynamics, Inc. – Maskells Mills Dam, Lower Alloways Creek Twp., Atlantic Co., NJ:** Project Manager; conducted a wetlands delineation within a 300-foot envelope around a proposed dam rehabilitation site.

**Civil Dynamics, Inc. – Highland Lakes Beach Redevelopment Project Site, Vernon Twp., Sussex Co., NJ:** Project Manager; conducted a wetlands delineation and the development of an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI).

**Civil Dynamics, Inc. – Harrisonville Dam, Harrison Twp., Gloucester Co., NJ:** Project Manager; conducted a wetlands delineation within a 300-foot envelope around a proposed dam rehabilitation site.

**Hughes Environmental, Inc. – Linwood/MacDonald YMCA, Sandyston Twp., Sussex Co., NJ.** Conducted a wetlands delineation for a YMCA summer camp facility encompassing forested, scrub-shrub, emergent, and lacustrine wetland systems.

**CAP Inc., Montgomery Twp., Somerset Co., NJ:** Project Manager for a wetlands delineation and wildlife habitat survey of an expansive farm property/forested wetland system.

**Mountain Creek – Vernon Township Site, Vernon Twp., Sussex Co., NJ:** Project Team Member for the delineation of wetlands on the Vernon Valley – Great Gorge ski area property and the former Action Park amusement park. Developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) and Freshwater Wetlands General Permit No. 6.

**Bohler Engineering - Campus Drive Site, Parsippany – Troy Hills Twp., Morris Co., NJ.** Conducted a wetlands delineation and developed a Letter of Interpretation (LOI) application to the NJ Department of Environmental Protection (NJDEP).

**Metrologic Instruments – Gloucester Township Site, Gloucester Twp., Camden Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI).

**Elizabethtown Water Company – Raritan Township Site, Raritan Twp., Hunterdon Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI) for a proposed minor subdivision.

**Candullo Property, Millstone Twp., Monmouth Co., NJ:** Conducted a wetlands delineation of a forested wetland/upland complex identified as providing habitat for a protected species, the barred owl (*Strix varia*).

**Windsor Management – Hogback Road Site, Bordentown Twp., Burlington Co., NJ:** Developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI). This project included a field survey for two protected plant species, pale Indian plantain (*Cacalia atriplicifolia*) and tall pawpaw (*Asiminia triloba*), documented by the NJDEP to have the potential to occur on the site. No individuals of either species were found.

**Windsor Management – County Home Road Site, Pilesgrove Twp., Salem Co., NJ:** Conducted a wetlands delineation of an expansive forested wetland adjacent to a proposed residential subdivision. This project included a habitat survey for the protected bog turtle, *Clemmys muhlenbergii*).

**Windsor Management – Woolwich Township Site, Woolwich Twp., Gloucester Co., NJ:** Conducted a wetlands delineation of numerous agricultural properties proposed for a residential subdivision.

**Windsor Management – Mensch Property Site, Upper Deerfield Twp., Salem Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI).

**Zigga Homes – Brookhill Estates Site, Edison Twp., Middlesex Co., NJ:** Project Manager for a wetlands delineation and development of an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation (LOI).

**Zigga Homes – Amboy Avenue Site, Edison Twp., Middlesex Co., NJ:** Project Manager for a wetlands delineation and development of an application to the NJ Department of Environmental Protection (NJDEP) for a Presence/Absence Letter of Interpretation (PA LOI).

**Zaidi Homes – Old Bridge Township Site, Old Bridge Twp., Middlesex Co., NJ:** Conducted wetlands delineations of several private properties proposed for minor subdivision.

**Jomo – Jomo Property, Old Bridge Twp., Monmouth Co., NJ:** Conducted a cursory wetlands delineation to resolve outstanding land use and permitting issues for a private landowner.

**Cranbury Township Pump Station Project, Cranbury and South Brunswick Twps., Middlesex Co., NJ:** Developed a Freshwater Wetlands General Permit No. 2 from the NJ Department of Environmental Protection (NJDEP) for a linear utility development project.

**Pond & Spitz Homes – Cropwell Road Site, Cherry Hill Twp., Camden Co., NJ:** Conducted a wetlands delineation and developed an application to the NJ Department of Environmental Protection for a Freshwater Wetlands Statewide General Permit No. 6.

**Brennan Transportation – Rancocas Road Site, Burlington Twp., Burlington Co., NJ:** Conducted a wetlands delineation of a farm property proposed for a minor subdivision.

**Harowitz Property Site, Lawrence Twp., Mercer Co., NJ:** Project Manager for a wetlands delineation and the development of an application to the NJ Department of Environmental Protection (NJDEP) for a Line-Verification Letter of Interpretation.

**Versar Inc. – Ft. Monmouth Telecommunications Improvement Project, Boroughs of Eatontown, Oceanport, Shrewsbury, and Tinton Falls, Monmouth Co., NJ:** Project Manager and Field Team Leader for the development of a Multiple Permit and Federal Consistency Determination application to the NJ Department of Environmental Protection (NJDEP) for an Upland Waterfront Development Permit, Coastal Area Facilities Review Act (CAFRA) Permit, Coastal Wetlands Permit, Section 401 Water Quality Certificate, and a Freshwater Wetlands General Permit No. 2.

**Versar Inc. – Ft. Monmouth Nature Trails Project, Boroughs of Eatontown, Oceanport, Shrewsbury, and Tinton Falls, Monmouth Co., NJ:** Project Manager and Field Team Leader for the development of a Multiple Permit and Federal Consistency Determination application to the NJ Department of Environmental Protection (NJDEP) for a Waterfront Development Permit, Coastal Area Facilities Review Act (CAFRA) Permit, Coastal Wetlands Permit, Section 401 Water Quality Certificate, and a Freshwater Wetlands General Permit No. 17.

**East Freehold Sanitary Sewer System Project, Freehold Twp., Monmouth Co., NJ:** Conducted a wetlands delineation for a proposed water supply development project.

**Zion, Breen & Richardson Associates – Stabilization of Lock 1 / Path Development Project, (Delaware and Raritan Canal), Hamilton Twp., Mercer Co., NJ:** Developed a Multiple Permit Application to the NJ Department of Environmental Protection for a Waterfront Development Permit and Freshwater Wetlands Transition Area Waiver (Averaging Plan Option) for the restoration of Lock 1 of the Delaware and Raritan Canal. Also developed an application to the U.S. Coast Guard, and to the U.S. Army Corps Philadelphia District for all applicable Nationwide Permits (NWPs).

***WETLANDS DELINEATION AND PERMITTING (1987 MANUAL)***

**Shaffer Mountain Wind, LLC – Somerset Co., PA:** Conducted a large-scale (10,000-acre) wetlands delineation of a mountain complex for the siting of a proposed 100+MW wind energy facility (turbines, access roads, transmission lines, substation, and laydown areas). The evaluation also included T&E habitat surveys for the Indiana bat (*Myotis sodalis*).

**PA Army National Guard – Various Sites, State-wide:** Conducted wetlands delineations for the Cambridge Springs Site, McKean Co., South Mountain Site, Franklin, PA, the Graterford State Correctional Institution Site, Graterford, PA, and the Northeast Philadelphia Airport, Philadelphia Co. as part of the transformation of the 56th Brigade to a Stryker Brigade Combat Team (SBCT).

**NC Army National Guard – Camp Butner, Granville and Durham Cos., NC:** Provided technical support to a wetlands delineation and permitting project for the proposed development of a military range.

**Fort Pickett - Brunswick, Dinwiddie, and Nottoway Cos.; Blackstone, VA:** Conducted wetland delineations at various proposed construction locations throughout the installation as part of the transformation of the 56th Brigade to a Stryker Brigade Combat Team (SBCT).

**Shell Energy – NedPower Mt. Storm Project Site, West Virginia.** Conducted wetland delineations of a mountain ridge system for the siting of a proposed 100+MW wind energy facility. A Jurisdictional Determination (JD) was received for this delineation from the USACOE, Pittsburgh District.

**Valero Refinery, Wilmington, DE:** Conducted a wetlands delineation for the siting of a proposed dredge material handling facility for a petroleum refinery.

**Policelli Engineering, Inc. – Landis Property Site, Hamilton Twp., Monroe Co., PA:** Project Manager. Conducted a wetlands delineation of a forested system for the proposed development of a residential dwelling. 2006.

**Policelli Engineering, Inc. – Shoemaker Property Site, Upper Mt. Bethel Twp., Northampton Co., PA:** Project Manager; conducted a wetlands delineation for a proposed residential development.

**Policelli Engineering, Inc. – Martin Property Site, Hamilton Twp., Monroe Co., PA:** Project Manager; conducted a wetlands delineation for a proposed residential development.

**Policelli Engineering, Inc. – Woolverton Property Site, Washington Twp., Northampton Co., PA:** Project Manager; conducted a wetlands delineation for a proposed residential development.

**Policelli Engineering, Inc. – Creek Road Site, Upper Mt. Bethel, Northampton Co., PA:** Project Manager for a wetlands delineation of an agricultural property for proposed residential development.

**Policelli Engineering, Inc. – Delabole Estates Site, Pen Argyl Borough, Northampton Co., PA:** Project Manager for a wetlands delineation of a forested property for a proposed residential subdivision.

**Policelli Engineering, Inc. – Bickford Property Site, Upper Mt. Bethel Twp., Northampton Co., PA:** Project Manager for a wetlands delineation of a forested property for proposed residential development.

**Policelli Engineering, Inc. - Laurel Hill Subdivision Site, Upper Mt. Bethel Twp., Northampton Co., PA:** Project Manager for a presence/absence delineation for wetlands at a proposed residential subdivision site.

**Policelli Engineering, Inc. - Miller Property Site, Upper Mt. Bethel Twp., Northampton Co., PA:** Project Manager for a wetlands delineation on a residential lot for the siting of an on-site wastewater disposal system.

**HMG Engineering, Ltd. – Deleyer Property Site, Lower Mt. Bethel Twp., Northampton Co., PA:** Project Manger; conducted a wetlands delineation for a proposed agricultural development site.

**HMG Engineering, Ltd. – Confidential Site, Upper Mt. Bethel Twp., Northampton Co., PA:** Project Manager; conducted a wetlands delineation of a residential property in violation of the Clean Water Act.

**Currie Property Site, Stroud Twp., Monroe Co., PA:** Project Manager for a wetlands delineation of a forested property for a residential development.

**Robinson Property Site, Upper Mt. Bethel Twp., Northampton Co., PA:** Project Manager for a wetlands delineation of an agricultural property for a residential subdivision.

**CSX Transportation, Inc., Genesee River Dredging Project, City of Rochester, Monroe Co., NY:** Developed a Joint Permit between the Corps – Buffalo District and the NYSDEC Region 8 for the remediation (by dredging) of contaminated sediments from the Genesee River.

**Commonwealth Construction & Development, Inc. – Kimberton Ridge Site, East Vincent Twp., Chester Co., PA:** Conducted a wetlands delineation and developed an application to the U.S. Army Corps Philadelphia District for a Jurisdictional Determination (JD) of the proposed wetland boundaries.

**Brandywine Realty Trust – Newtown Office Commons Site, Newtown Twp., Bucks Co., PA:** Conducted a wetlands delineation and application for a Jurisdictional Determination (JD) from the U.S. Army Corps, Philadelphia District.

**Boucher & James – Datesman Property Site, Wrightstown Twp., Bucks Co., PA:** Conducted a wetlands delineation of a large farm property, a significant portion of which was to be designated as Township open space.

**Windsor Management – Failor Farm Site, Lower and Upper Allen Twps., Cumberland Co., PA:** Conducted a wetlands delineation of a farm property proposed for a residential subdivision.

**Windsor Management – Stark Farm Site, Southampton Twp., Cumberland Co., PA:** Conducted a wetlands delineation of a farm property proposed for a residential subdivision.

**Orleans Homebuilders – Byers Station Site, Upper Uwchlan Twp., Chester Co., PA:** Conducted a wetlands delineation of specific problem areas associated with road crossings for a proposed residential subdivision.

**Cornell Radiation Disposal Site (RDS)/Chemical Disposal Site (CDS), Lansing Twp., Tompkins Co., NY.** Project Team Member for the development of a U.S. Army Corps (Buffalo District) Pre-Discharge Notification (PDN) for proposed remedial activities.

**Richard Welch – Spring Oak Farm Site, Solebury Twp., Bucks Co., PA:** Developed a PA Department of Environmental Protection / U.S. Army Corps Joint Permit application for a channel crossing associated with a proposed minor subdivision.

**Orleans Homebuilders – Wiltshire Walk Project, Newtown Twp., Bucks Co., PA:** Developed a PA Department of Environmental Protection / U.S. Army Corps Joint Permit application for a stream enclosure and relocation of an existing road crossing.

**Richard Brown Associates – H&K Tool and Machine Company Site, Lower Southampton Twp., Bucks Co., PA:** Developed an application to the U.S. Army Corps Philadelphia District for a Jurisdictional Determination (JD) of a Notice of Violations (NOV) site. A cease-and-desist order was implemented, and the violations were resolved through the use of sediment and erosion controls.

**Mathurin Property Site, Penn Forest Twp., Carbon Co., PA:** Conducted a wetlands delineation of a residential lot previously designated as wetland. The results of the delineation indicated that the majority of the lot area was non-wetland and developable.

***WETLANDS DELINEATION AND PERMITTING (NJ PINELANDS COMMISSION)***

**Fort Dix – Tiger Base Well Site, Fort Dix Military Reservation, Ocean and Burlington Cos., NJ.** Conducted a wetlands delineation of a forested system for the proposed development of a potable well.

**Fort Dix – IR Settlement Well Site, Fort Dix Military Reservation, Ocean and Burlington Cos., NJ.** Conducted a wetlands presence/absence determination of a military training facility for the proposed development of a potable well.

**Fort Dix – ASP Potable Well Site, Fort Dix, Plumstead Twp., Ocean Co., NJ:** Conducted a wetlands delineation within a 300-foot envelope around a proposed potable well development footprint within the NJ Pinelands Protection Area.

**Fort Dix – Rock Crusher Potable Well Site, Fort Dix, Plumstead Twp., Ocean Co., NJ:** Conducted a wetlands presence/absence assessment within a 300-foot envelope around a proposed potable well development footprint within the NJ Pinelands Protection Area.

**Fort Dix – ARDC Potable Well Site, Fort Dix, Plumstead Twp., Ocean Co., NJ:** Conducted a wetlands delineation within a 300-foot envelope around a proposed potable well development footprint within the NJ Pinelands Protection Area.

**Fort Dix - MOUT Complex Site, Fort Dix, Plumsted Twp., Ocean Co., NJ:** Conducted a wetlands delineation in various NJ Pine Barrens habitats for a proposed military training facility.

**Civalier Engineering & Surveying, Inc. – Howard Brown Site, Monroe Twp., Gloucester Co., NJ:** Project Manager. Conducted a wetlands delineation and prepared an application to the NJ Pineland Commission for approval of the proposed wetland boundaries.

**Civil Dynamics Inc. – Lake Fred Dam Project Site., Galloway Twp., Atlantic Co., NJ:** Project Manager; conducted a wetlands delineation and provided on-call wetlands consulting support for a dam replacement project on the campus of the Richard Stockton College of New Jersey. This project was situated upgradient of known breeding habitat for the state-endangered Pine Barrens treefrog (*Hyla andersonii*). Civil Dynamics and AMEC demonstrated that the proposed dam replacement would not adversely impact this species.