Appendix A – Environmental Survey Reports

DEPARTMENT OF VETERANS AFFAIRS
CONSTRUCTION AND FACILITIES MANAGEMENT OFFICE
WASHINGTON DC

August 5, 2021

U.S. Fish & Wildlife Service
Attn: Ms. Jennifer Kagel
Pennsylvania Field Office
110 Radnor Rd., Suite 101
State College, PA 16801

Re: ***Phase 1 Bog Turtle Habitat Survey Report*** **(October 2020)**
Phase 2 Presence/Probable Absence Bog Turtle Survey Report **(June 2021) and**
Phase 1 Additional Project Area Bog Turtle Habitat Survey Report **(July 2021)**
Indiantown Gap National Cemetery Phase 5 Expansion Project
PNDI # 737860

Dear Ms. Kagel,

The U.S. Department of Veterans Affairs (VA), National Cemetery Administration (NCA) is currently preparing a Supplemental Environmental Assessment (SEA) in accordance with VA policy for compliance with the National Environmental Policy Act (NEPA). The SEA evaluates the potential impacts of the proposed Phase 5 expansion within the Indiantown Gap National Cemetery (IGNC). The proposed Phase 5 expansion area covers approximately 45 acres and is located east of the existing developed portion of the cemetery.

The IGNC is located in Annville, Lebanon County with approximate coordinates of 40.423871, -76.558388. Indiantown Gap National Cemetery is approximately 20-miles northeast of Harrisburg, in the Lebanon Valley of central-southern Pennsylvania.

Project Purpose

The purpose of the Phase 5 expansion is to extend the longevity of the Indiantown Gap National Cemetery and provide future generations of eligible Veterans and their families with long-term, reasonable access to burial benefits at a National Cemetery in the east central Pennsylvania region.

Surveys Completed To-Date

In 2020, VA began designing the alignment for the proposed 45-acre Phase 5 expansion area within a larger 120-acre area. Accordingly, VA performed a bog turtle habitat survey throughout this 120-acre area (120-Acre Project Area). The survey identified potential bog turtle habitat (PBTH). Subsequently, a Phase 2 Presence/Absence Survey (Phase 2) was completed and determined that no bog turtles were present within the 120-acre Project Area. No bog turtles were identified in the PBTH. The Phase 1 Bog Turtle Habitat Assessment (Phase 1) and Phase 2 Presence/Absence Survey (Phase 2) reports are included as Attachments 1 and 2, respectively, to this letter.

Subsequently, VA selected a design in early 2021. By July 2021, the design team proposed other minor surficial improvements (e.g. repaving) within the existing developed western portion of IGNC. Accordingly, a PBTH survey was performed in the western portion of the developed cemetery; the area of this survey is identified as the "Additional Project Area" in the attached report dated July 2021 (attachment 3). The survey determined that the Additional Project Area contained PBTH within 300 feet of where proposed improvements would occur. The proposed disturbance to areas within 300-feet of the identified PBTH would be limited to widening of existing paved walkways within the mowed and maintained cemetery grounds, installation of informational signage along existing roadways, and non-structural cosmetic maintenance of existing monuments and bridge structures. Additionally, VA notes there are no proposed direct impacts to wetlands or watercourses in the Additional Project Area.

However, due to the presence of PBTH, VA has elected to assume presence of bog turtles in these additional wetlands for the purposes of this Proposed Action and to employ avoidance measures during improvements to grounds located within 300 feet of the PBTH to ensure no adverse effects to bog turtles. These avoidance measures, for which we request USFWS concurrence, are as follows:

- To avoid adverse effects to bog turtles, all disturbance within 300-feet of the PBTH identified in the Additional Project Area on June 10, 2021, would be conducted during the bog turtle time-of year restriction period between October 01 and March 31, OR conducted under the supervision of a Recognized Qualified Bog Turtle Surveyor.
- Due to the currently mowed and maintained conditions adjacent to the PBTH wetlands and the limited disturbance required to complete the work proposed for the Additional Project Area, we find that installing bog turtle habitat exclusion fencing would result in additional unnecessary disturbance and extend the duration of work time needed to complete the maintenance and upgrades in the areas adjacent to the PBTH. As such, we request USFWS's additional concurrence with the recommendation of TES&P's Recognized Qualified Bog Turtle Surveyor that habitat exclusion measures should not be required if the work is conducted under the supervision of a Recognized Qualified Bog Turtle Surveyor. If additional unanticipated changes to the proposed improvements are encountered, the use of habitat exclusion measures would be utilized at the digression of the onsite Recognized Qualified Bog Turtle Surveyor and would be reported to the USFWS immediately.

A summary of the attached reports detailing and supporting the above findings is as follows:

1) ***Indiantown Gap National Cemetery Expansion Project Phase 1 Bog Turtle Habitat Survey Report (October 2020).*** Potential bog turtle habitat identified in wetland INC-W-002; Phase 2 Survey initiated.
2) ***Indiantown Gap National Cemetery Phase 5 Expansion Project, Phase 2 Bog Turtle Presence/Probable Absence Survey Report (June 2021).*** Phase 2 survey completed for wetland INC-W-002 and probable absence of bog turtles is assumed.
3) ***IGNC Phase 5 Expansion Project-Additional Project Area Phase 1 Bog Turtle Habitat Survey (July 2021).*** Habitat identified; wetland will be assumed to be occupied and approval of avoidance measures is requested.

Additionally, a signed copy of the final PNDI receipt #737860 is provided as an attachment following the attached survey reports.

VA is requesting your review of the attached bog turtle reports and concurrence with the avoidance measures described above and supported by the findings presented in the survey reports attached.

VA appreciates your time and attention to this request. Should you have any questions or concerns, please contact me at (202) 632-5529 or via email at Fernando.Fernandez@va.gov.

Sincerely,

FERNANDO L. FERNANDEZ 336237

Digitally signed by FERNANDO L. FERNANDEZ 336237
Date: 2021.08.12 10:21:05 -04'00'

Fernando Fernández, REM
Environmental Engineer
U.S. Department of Veterans Affairs
Construction and Facilities Management Office

CC: Emma Fernandes, Mabbett & Associates, Inc.
Bridger Thompson, Thompson Environmental Surveys & Permitting, LLC

Attachments:

1) *Indiantown Gap National Cemetery Expansion Project Phase 1 Bog Turtle Habitat Survey Report (October 2020)*
2) *Indiantown Gap National Cemetery Phase 5 Expansion Project, Phase 2 Bog Turtle Presence/Probable Absence Survey Report (June 2021)*
3) *IGNC Phase 5 Expansion Project-Additional Project Area Phase 1 Bog Turtle Habitat Survey (July 2021)*
4) *PNDI # 737860*

ATTACHMENT 1

Phase 1 Bog Turtle Habitat Survey Report

U.S. Department of Veterans Affairs

Proposed Phase 5 Cemetery Expansion at the Indiantown Gap National Cemetery Annville, Lebanon County, Pennsylvania

Phase 1 Bog Turtle Habitat Survey Report

Prepared for:

AE Works, Ltd.

Prepared by:

Mabbett & Associates, Inc.

Thompson Environmental Surveys & Permitting, LLC.

October 2020

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Appendices

1 Introduction

Mabbett & Associates, Inc. (Mabbett) and subcontractor Thompson Environmental Surveys & Permitting, LLC. (TES&P) recently conducted a Phase 1 Bog Turtle (*Glyptemys muhlenbergii*) Habitat Survey (Phase 1) at the Indiantown Gap National Cemetery for the proposed Phase 5 expansion (hereafter referred to as the Project). The Phase 1 survey was conducted to determine if the conditions of potential bog turtle habitat (PBTH) are present within the vicinity of the Project area. The information derived from this survey will be used for future project planning and design purposes. This report documents the methodology and results of the Phase 1 Bog Turtle Habitat Survey performed for the Project by TES&P in October, 2020.

2 Background

The Project is located within the United States Geological Survey (USGS) Indiantown Gap, PA 7.5-minute series topographical quadrangle (USGS, 2013). Land cover within the Project area consists of mowed maintained open areas, forest, wetlands, watercourses, and floodplain/riparian areas. Land uses in the vicinity of the Project consist of developed military training ranges and facilities, cemetery, transmission line right-of-way, and primary and secondary roadways. The Project area drains to north and east Aires Run which is located in Swatara Creek Watershed and the Lower Susquehanna River basin.

Federal law, specifically the Endangered Species Act (ESA) of 1973, mandates that all federal agencies undertaking projects that have an effect or have the potential to have an effect on threatened, endangered, or candidate species, be it through direct or indirect jurisdiction, such as a federal license or permit, must undergo Section 7 ESA Review. The Section 7 consultation process requires that federal agencies, or those entities seeking a federal license or permit, consider how their undertakings may affect endangered species and allow the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS), if applicable, the opportunity to comment on such undertakings. Additionally, any projects in Pennsylvania that are within the known range of bog turtles, a state threatened species, and may require a Pennsylvania Department of Environmental Protection (PADEP) Chapter 105 Individual Permit, or a General Permit (GP) 5, 6, 7, 8, 9 or 11, must comply with the bog turtle screening requirements of the PA State Programmatic General Permit (PASPGP), and are required to conduct a Phase 1 Bog Turtle Habitat Survey as part of the permit review process. The known range of the bog turtle in Pennsylvania includes: Adams, Berks, Bucks, Carbon, Chester, portions of Cumberland (Yellow Breeches Watershed), Delaware, portions of Dauphin (Conewago, and Spring Creek Watersheds), Franklin, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill (Swatara Creek Watershed), and York Counties (USFWS 2018; USACE, 2008).

The Project is within the known range of bog turtles in Pennsylvania. As such, a Phase 1 Bog Turtle Habitat Survey is required for any potential developments in or adjacent to the Project area.

3 Phase 1 Survey Methodology

On October 07 and 08, 2020, TES&P biologist, Bridger Thompson, a USFWS and Pennsylvania Fish and Boat Commission (PFBC) Recognized Qualified Bog Turtle Surveyor (RQBTS) conducted a Phase 1 survey for the above referenced Project to identify PBTH. PBTH is recognized by three criteria: suitable hydrology (including spring seeps, shallow surface water, persistently saturated soils, subsurface flow, and rivulets); suitable soils (including a bottom substrate of soft muck, a critical criterion) and; suitable vegetative structure (including dominant vegetation of low grasses and sedges, reed canary grass, cattail, rice cut grass, phragmites, or skunk cabbage, and possibly a scrub-shrub wetland component with a relatively open canopy).

Based on information provided by AE Works, Ltd., the Phase 1 Study Area (Study Area) was determined. The Study Area includes all wetlands identified within 300 feet of the proposed Project limits-of-disturbance. The approximately 216-acre Study Area is located adjacent to the Indiantown Gap National Cemetery, south of Biddle Drive and west of Indiantown Road in East Hanover and Union Townships, Lebanon County, Pennsylvania (**Figure 1 - Project Location Map**). Prior to conducting the onsite survey, TES&P conducted a desktop review for the Project and investigated current and historic aerial imagery of the Study Area. An aquatic resources delineation survey was conducted concurrently with the Phase 1 survey. During the onsite surveys TES&P identified eighteen (18) wetlands within the Study Area. Each resource was assessed in its entirety for the conditions required to be considered PBTH. If a wetland was determined to be PBTH, the Designated Survey Area (DSA) within the wetland was determined. DSA is defined as all areas of the wetland where soft muck-like soils are present. Information recorded during the Phase 1 survey for each wetland is presented on the USFWS Phase 1 Bog Turtle Habitat Survey Field Forms for the Northern Population Range (Revised April 2020), including dominant plant species, substrate characteristics, and hydrology (Attachment B). Representative habitat conditions within the wetlands were photographed and are included in the attached photo log (Attachment C).

4 Habitat Survey Results

During the on-site survey, TES&P investigated eighteen wetlands identified within the Study Area. The following is a brief description of the investigated resources and their potential to be considered bog turtle habitat.

Wetland (INC-W-001)

Wetland INC-W-001 is an approximately 0.14-acre palustrine emergent (PEM) wetland located in a topographic depression at the edge of the existing mowed maintained cemetery boundary. The wetland is situated at the discharge of a small seasonal ground water seep that is the origin of a downslope perennial channel. The primary source of hydrology to the wetland is the seasonal groundwater discharge and seasonally high ground water table. Surface water runoff from adjacent uplands also contributes to the wetland hydrology. The wetland vegetation is dominated Japanese stilt grass (*Microstegium vimineum*), clearweed (*Pilea pumila*), and fowl managrass (*Glyceria striata*). The substrate of the wetland contains silt loam underlain by clay loam material and was not mucky. The wetland is not dominated by species common to areas identified as PBTH and, it does not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition lacking an appropriate habitat structure wetland INC-W-001 is not considered PBTH. The location of the wetland is depicted on Page 5 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-002)

Wetland INC-W-002 is an approximately 0.52-acre PEM wetland located in a topographic depression at the toe of the fill slope of Biddle Drive. The wetland is situated at the discharge of multiple seasonal ground water seeps that contribute to a downslope perennial channel. The primary source of hydrology to the wetland is the persistent groundwater discharge, seasonal high ground water table, and a surface water runoff from adjacent uplands. The wetland vegetation is dominated by Japanese stilt grass, dark green bulrush (*Scirups atrovirens*), and cattail (*Typha latifolia*). The substrate of the wetland contained silt and silt loam underlain by clay loam and contained areas of mucky substrate measuring to depths of 3-to-10 inches associated with the persistent groundwater fed hydrology. The wetland contains species common to areas identified as PBTH and areas with the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. While portions of the wetland have been historically disturbed by road construction enough microhabitat conditions and vegetative structure remain to potentially support bog turtles. **Due to the presence of persistently ground water fed hydrology and mucky soil substrate and the presence of a vegetative structure containing microhabitat conditions wetland INC-W-002 is considered PBTH.** Approximately 0.12-acres of DSA was identified within the wetland. The location of the wetland and associated DSA is depicted on Page 1 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-003)

Wetland INC-W-003 is an approximately 0.01-acre PEM wetland located along the floodplain of a small intermittent watercourse that flows through a natural swale on a wooded hillslope. The primary source of hydrology to the wetland is the seasonal ground water flow within the watercourse and surface water runoff from adjacent uplands. The wetland vegetation is dominated by Japanese stilt grass, bulrush, and jewelweed (*Impatiens capensis*). The substrate of the wetland was saturated and contained silt loam but, was not mucky per association with persistent spring fed hydrology. The wetland did contain species common to areas identified as PBTH however, it did not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed by logging. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition of surrounding area wetland INC-W-003 is not considered PBTH. The location of the wetland is depicted on Page 3 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-004)

Wetland INC-W-004 is an approximately 0.02-acre PEM wetland located at the origin of a small intermittent watercourse that flows through a natural swale on a wooded hillslope. The primary source of hydrology to the wetland is the seasonal ground water discharge within the wetland and surface water runoff from adjacent uplands. The wetland vegetation is dominated by Japanese stilt grass, jewelweed, and sensitive fern (*Onoclea sensibilis*). The substrate of the wetland was not saturated and contained silt loam that was not mucky per association with persistent spring fed hydrology. The wetland did contain some species common to areas identified as PBTH however, it did not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed by logging. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition of surrounding area wetland INC-W-004 is not considered PBTH. The location of the wetland is depicted on Page 1 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-005)

Wetland INC-W-005 is an approximately 0.01-acre PEM resource located in the central portion of the Study Area. The wetland is situated in a topographic depression within a periodically maintained transmission right-of-way area adjacent to a wooded/shrubby hillslope. The primary source of wetland hydrology is provided by a seasonal groundwater discharge and surface water runoff collection within the right-of-way. The wetland vegetation is dominated by Japanese stiltgrass, sensitive fern, and ironweed (*Vernonia altissima*). The substrate of the wetland was not saturated and contained silt loam underlain by a clay loam that was not mucky per

association with persistent spring fed hydrology. The wetland did contain some species common to areas identified as PBTH however, it did not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed by right-of-way clearing and maintenance. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition of surrounding area wetland INC-W-006 is not considered PBTH. The location of the wetland is depicted on Page 1 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-006)

Wetland INC-W-006 is an approximately 0.04-acre PEM wetland located at the origin of a small intermittent watercourse that flows through a natural swale on a wooded hillslope. The primary source of hydrology to the wetland is the seasonal ground water discharge within the wetland and surface water runoff from adjacent uplands. The wetland vegetation is dominated by Japanese stilt grass, jewelweed, and arrowleaf tearthumb (*Persicaria sagittata*). The substrate of the wetland was saturated and contained silt loam underlain by a clay loam but, the substrate was not mucky per association with persistent spring fed hydrology. The wetland did contain some species common to areas identified as PBTH however, it did not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed by logging. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition of surrounding area wetland INC-W-006 is not considered PBTH. The location of the wetland is depicted on Page 2 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-007)

Wetland INC-W-007 is an approximately 0.10-acre PEM resource located in the southeast portion of the Study Area. This wetland is associated with the seasonal groundwater discharge from several intermittent channels that are loosely defined throughout a forested bottomland. The surrounding area contains thick scrub-shrub vegetation resulting from historic use of the area for military training activities and recent logging. The wetland vegetation is dominated by Japanese stilt grass, jewelweed, sensitive fern, and bulrush and the surrounding forested area contains ash species (*Fraxinus sp.)*, red maple (*Acer rubrum*), and spice bush (*Lindera benzoin*). The wetland contains some vegetation commonly observed in PBTH however, there is no mucky soil substrate. Due to the historic disturbances, lack of a mucky soil substrate, spring fed hydrology, and appropriate micro-habitat conditions, wetland INC-W-007 is not considered PBTH. The location of the wetland is depicted on Page 8 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-008)

Wetland INC-W-008 is an approximately 0.08-acre PEM resource located in the southwest portion of the Study Area. The wetland is located natural depressional topography within a drainage in a wooded shrubby lot. The wetland hydrology is associated with seasonal ground water discharge, seasonally high groundwater, and surface water runoff from upslope-maintained cemetery grounds. The wetland vegetation is dominated by arrowleaf tearthumb, jewelweed, Japanese stiltgrass, sensitive fern, and bulrush. The wetland substrate soft due to the persistently saturated conditions however, it is not mucky. The vegetative structure is not consistent with the conditions typically observed in PBTH and no subsurface flow or microhabitat conditions were observed. Due to the lack of a spring fed hydrology, mucky soil substrate, and appropriate vegetative and micro-habitat conditions, wetland INC-W-008 is not considered potential bog turtle habitat. The location of the wetland is depicted on Page 7 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-009)

Wetland INC-W-009 is an approximately 0.04-acre PEM resource located in the southwest portion of the Study Area. The wetland is located in an excavated swale that receives stormwater discharge form the upslope-maintained cemetery grounds. The wetland hydrology is associated with seasonal groundwater discharge, seasonally high groundwater table and surface water runoff that collects constructed swale. The wetland

vegetation is dominated by Japanese stiltgrass, cattail, bulrush, and willowherb (*Epilobium ciliatum*). The wetland substrate is saturated however, it is not mucky and the vegetative structure was not consistent with the conditions typically observed in PBTH. Due to disturbed wetland conditions and the lack of a spring fed hydrology, mucky soil substrate, and appropriate vegetative and micro-habitat conditions, wetland INC-W-009 is not considered potential bog turtle habitat. The location of the wetland is depicted on Page 7 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-010)

Wetland INC-W-010 is an approximately 0.01-acre PEM wetland located along the discharge of a small ephemeral watercourse flows through natural low topography on a wooded hillslope. The primary source of hydrology to the wetland is the surface water runoff from adjacent uplands. The wetland vegetation is dominated by Japanese stilt grass, jewelweed, willowherb, beggars tick (*Bidens frondosa).* The substrate of the wetland is not saturated and contained silt loam underlain by a clay loam that was not mucky per association with persistent spring fed hydrology. The wetland did contain some species common to areas identified as PBTH however, it did not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed by logging. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition of surrounding area wetland INC-W-010 is not considered PBTH. The location of the wetland is depicted on Page 5 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-011)

Wetland INC-W-011 is an approximately 0.02-acre PEM resource located in the central portion of the Study Area. The wetland is located in depressional topography downslope of a graded filled storage site. The primary source of wetland hydrology is the surface water runoff collection from the surrounding uplands and disturbed fill areas. The wetland is only vegetated on its fringes and could be more precisely classified as a vernal pool as it has evidence of an algal mat in the central non-vegetated concave areas. The fringe vegetation is dominated by Japanese stiltgrass, bulrush, and Pennsylvania smartweed (*Polygonum pensylvanicum*). The wetland substrate was not saturated and was primarily composed of silt deposited from erosion. The vegetative structure in the wetland was not consistent with the conditions typically observed in potential bog turtle habitat. Due to the lack of a mucky soil substrate, spring fed hydrology, and appropriate vegetative and micro-habitat conditions, wetland INC-W-011 is not considered PBTH. The location of the wetland is depicted on Page 5 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-012)

Wetland INC-W-012 is an approximately 0.20-acre PEM wetland located in a wooded shrubby lot at the edge of a mowed maintained cemetery boundary. The wetland is situated at the discharge of several small seasonal ground water seeps that create a heavily incised downslope intermittent channel. The primary source of hydrology to the wetland is the seasonal groundwater discharge and seasonal high ground water. Surface water runoff from adjacent uplands also contributes to the wetland hydrology. The wetland vegetation is dominated Japanese stilt grass and jewelweed. The substrate of the wetland was saturated and contains silt loam underlain by clay loams material that was not mucky. The wetland is not dominated by species common to areas identified as PBTH and, it does not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition lacking an appropriate habitat structure wetland INC-W-012 is not considered PBTH. The location of the wetland is depicted on Page 5 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-013)

Wetland INC-W-013 is an approximately 0.01-acre PEM wetland located at the origin of a small ephemeral watercourse flows through a natural swale on a wooded hillslope. The primary source of hydrology to the wetland is the surface water runoff from adjacent uplands. The wetland vegetation is dominated by Japanese

stilt grass, jewelweed, and sensitive fern. The substrate of the wetland was not saturated and contained silt loam underlain by a clay loam that was not mucky per association with persistent spring fed hydrology. The wetland did contain some species common to areas identified as PBTH however, it did not contain the appropriate habitat structure including surface flow in rivulets, subsurface flow, and micro habitat conditions. Additionally, the wetland is located in an area that has been historically disturbed by logging. Due to the lack of spring fed hydrology and mucky soil substrate, and the historically disturbed condition of surrounding area wetland INC-W-013 is not considered PBTH. The location of the wetland is depicted on Page 5 of Figure 2, additional wetland information is provided in Table 2.

Wetland (INC-W-014)

Wetland INC-W-014 is an approximately 0.02-acre PEM resource located in the northwest portion of the Study Area. This wetland is situated along the interface of a toe of slope and the floodplain of a small perennial watercourse. The wetland vegetation is dominated by Japanese stiltgrass, and spicebush (*Lindera benzoin*). The primary source of wetland hydrology is seasonal groundwater discharge at the toe of slope and surface water runoff collection from periodic flood flow. The wetland substrate was saturated and consists of a is a silt loam and sandy alluvial deposits. The wetland does not contain a mucky soil substrate or spring fed hydrology. The vegetative structure and micro habitat conditions are not consistent with the conditions typically associated with PBTH. Due to the lack of a spring fed hydrology and mucky soil substrate wetland INC-W-014 is not considered PBTH. The location of the wetland is depicted on Page 1 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-015)

Wetland INC-W-015 is an approximately 0.04-acre PEM resource located north-central portion of the Study Area. This wetland is situated along the interface of a toe of slope and the floodplain of a small intermittent watercourse within a disturbed transmission line right-of-way. The wetland vegetation is dominated by Japanese stiltgrass and cattail. The primary source of wetland hydrology is seasonal groundwater discharge at the toe of slope and surface water runoff collection from periodic flood flow. The wetland substrate is saturated and consists of a silt loam and sandy alluvial deposits. The wetland does not contain a mucky soil substrate or spring fed hydrology. The vegetative structure and micro habitat conditions are not consistent with the conditions typically associated with PBTH. Due to the lack of a spring fed hydrology and mucky soil substrate wetland INC-W-015 is not considered PBTH. The location of the wetland is depicted on Page 3 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-016)

Wetland INC-W-016 is an approximately 0.14-acre PEM resource located in the north-central portion of the Study Area. This wetland is situated on a low-lying floodplain bench along a small perennial watercourse. The primary source of wetland hydrology is the seasonally high groundwater table and periodic flooding from the perennial channel. The wetland substate was not saturated and consists of a silt loam. The wetland vegetation is dominated by Japanese stiltgrass and spice bush. The wetland does contain the vegetative structure and micro habitat conditions typically associated with PBTH and the wetland does not contain a mucky soil substrate or persistent spring fed hydrology. Due to the lack of a spring fed hydrology, mucky soil substrate, and appropriate vegetative structure and microhabitat conditions wetland INC-W-016 is not considered PBTH. The location of the wetland is depicted on Page 3 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-017)

Wetland INC-W-017 is an approximately 0.02-acre PEM resource located northeast portion of the Study Area. The wetland is situated at the interface between a toe of slope and a floodplain bench within a disturbed transmission line right-of-way. The primary source of wetland hydrology is seasonal toe of slope ground water discharge and seasonally high groundwater table. The wetland vegetation is dominated by Japanese stilt grass, cattail, and arrow leaved tearthumb. The wetland substrate is saturated and consists of a silt loam. The substrate is soft due to the persistent saturated conditions however no deep mucky areas were observed. The wetland does

contain the vegetative structure commonly associated with PBTH. However, the micro habitat conditions in the wetland are not consistent with the conditions typically observed in PBTH. Due to the lack of a mucky soil substrate, persistent spring fed hydrology, and appropriate and micro-habitat conditions, wetland INC-W-017 is not considered PBTH. The location of the wetland is depicted on Page 3 of Figure 2. Additional wetland information is provided in Table 2.

Wetland (INC-W-018)

Wetland INC-W-018 is an approximately 0.24-acre PEM resource located in the northwest extent of the Study Area. The wetland is situated in a periodically maintained roadside ditch along Biddle Drive. The primary source of wetland hydrology is associated with seasonal groundwater discharge that collects in the ditch at the toe of the fill slope for the road. Additional hydrology is provided by stormwater discharge from roadside culverts and surface water collection in the low-lying topography. The wetland vegetation is dominated by cattail Japanese stilt grass, cattail, sensitive fern, and arrowleaf tearthumb. The wetland does not contain a persistent spring fed hydrology or mucky soil substrate, and lacks the micro habitat conditions associated with PBTH. Due to the lack of a spring fed hydrology, mucky soil substrate, and lacking vegetative structure and micro habitat conditions, and the periodic and historic disturbances wetland INC-W-018 is not considered PBTH. The location of the wetland is depicted on Page 4 of Figure 2. Additional wetland information is provided in Table 2.

Table 2- Wetland Identification Table

Resource ID	Type (PEM/PFO/PSS)[1]	Latitude	Longitude	Approximate Wetland Acreage (ac.)	Potential Bog Turtle Habitat or Travel Corridor (Y / N / UK)[2]	Approx. Acreage of DSA (ac.)
INC-W-001	PEM	40.423065	-76.562842	0.14	N	N/A
INC-W-002	PEM	40.424842	-76.566119	0.52	Y	0.12
INC-W-003	PEM	40.424552	-76.565716	0.01	N	N/A
INC-W-004	PEM	40.424179	-76.565654	0.02	N	N/A
INC-W-005	PEM	40.424046	-76.565338	0.01	N	N/A
INC-W-006	PEM	40.425187	-76.560155	0.04	N	N/A
INC-W-007	PEM	40.420372	-76.557410	0.10	N	N/A
INC-W-008	PEM	40.419790	-76.561134	0.08	N	N/A
INC-W-009	PEM	40.419976	-76.561614	0.04	N	N/A
INC-W-010	PEM	40.420604	-76.559229	0.01	N	N/A
INC-W-011	PEM-Vernal	40.421766	-76.560199	0.02	N	N/A
INC-W-012	PEM	40.421950	-76.561219	0.20	N	N/A

Resource ID	Type (PEM/PFO/PSS)[1]	Latitude	Longitude	Approximate Wetland Acreage (ac.)	Potential Bog Turtle Habitat or Travel Corridor (Y / N / UK)[2]	Approx. Acreage of DSA (ac.)
INC-W-013	PEM	40.423140	-76.560306	0.01	N	N/A
INC-W-014	PEM	40.425439	-76.564939	0.04	N	N/A
INC-W-015	PEM	40.425980	-76.556861	0.04	N	N/A
INC-W-016	PEM	40.426610	-76.556800	0.14	N	N/A
INC-W-017	PEM	40.426539	-76.555554	0.02	N	N/A
INC-W-018	PEM	40.424629	-76.567777	0.24	N	N/A

1. PEM-PALUSTRINE EMERGENT, PFO-PALUSTRINE FORESTED PSS-PALUSTRINE SCRUB-SHRUB, PUB PALUSTRINE UNCONSOLIDATED BOTTOM.
2. Y-YES, N-NO, UK-UNKNOWN.

5 Summary

Eighteen (18) wetlands were investigated during the Phase 1 Bog Turtle Habitat Survey performed on October 07 and 08, 2020 for Mabbett and Associates, Inc. at the Indiantown Gap National Cemetery proposed Phase 5 Expansion Project. One wetland (INC-W-002) was determined to be potential bog turtle habitat. No additional resources within the Phase 1 bog turtle habitat survey study area were determined to be potential bog turtle habitat.

This report was prepared by:
Thompson Environmental Surveys & Permitting, LLC.

Bridger J. Thompson

Senior Biologist/Owner

6 References

Cowardin, L.M., Charter, V., Golet, F.C., LaRoe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States, Report No. FWS/OBL-97/31. United States Department of the Interior, Fish and Wildlife Service, Washington, District of Columbia.

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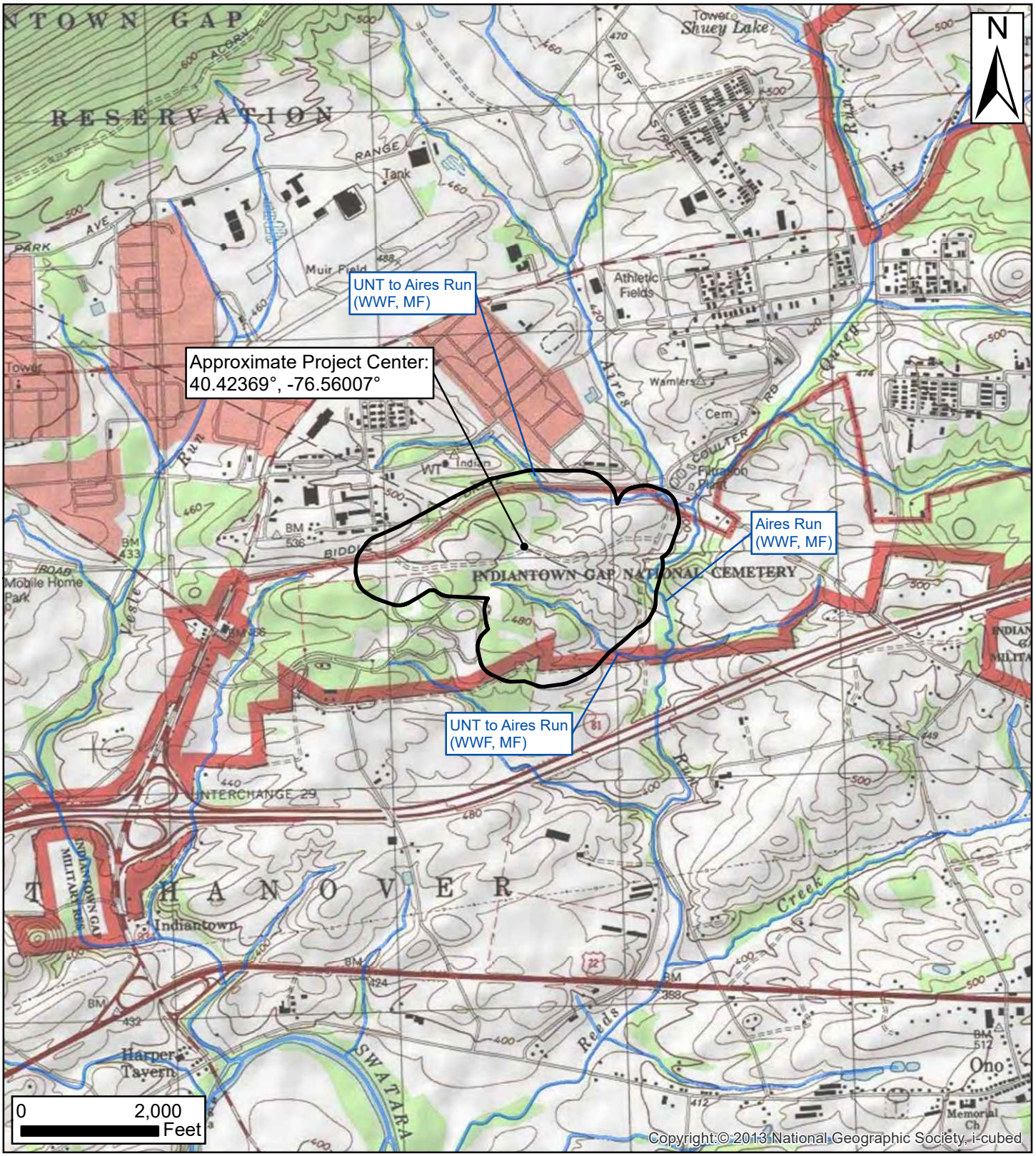
United State Geological Survey (USGS) 2013. Perkiomenville, and Milford Square, Pennsylvania 7.5-Minute Series Topographic Quadrangle Maps. Reston, Virginia.

Appendix A
Figures

INDIANTOWN GAP NATIONAL CEMETERY

Figure 1: Location Map



THOMPSON ENVIRONMENTAL Surveys & Permitting, LLC.

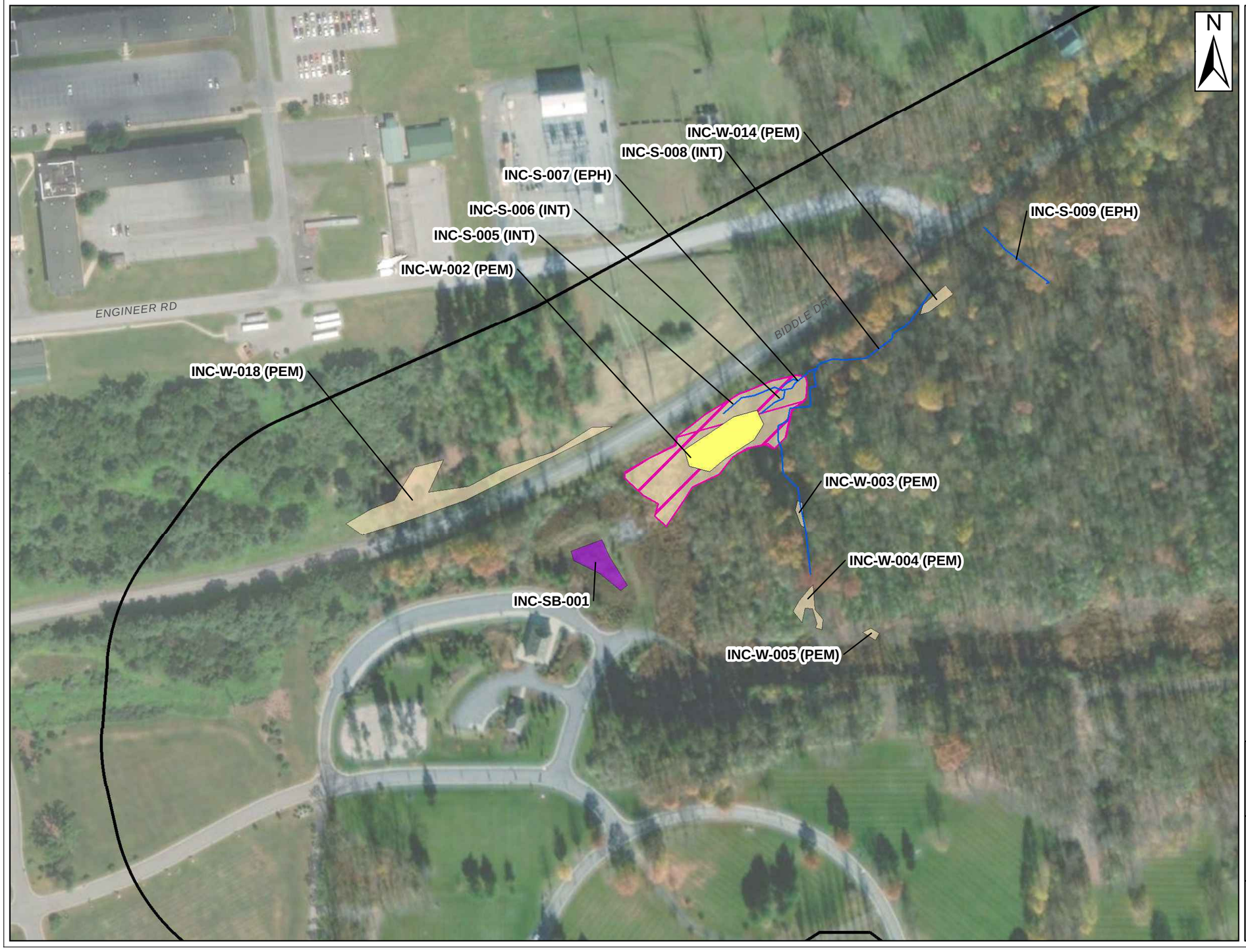
Date: 10/18/2020 | Created By: CMG

USGS 7.5' Quadrangle: Indiantown Gap
East Hanover and Union Townships
Lebanon County, Pennsylvania

Mabbett

INDIANTOWN GAP NATIONAL CEMETERY

Figure 2: Phase 1 Bog Turtle Habitat Survey

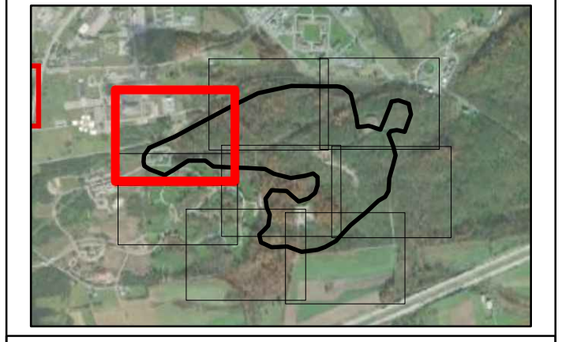


Legend

- Approximate Open End
- Approximate Watercourse
- Potential Bog Turtle Habitat
- Designated Survey Area
- Approximate Watercourse Area
- Stormwater Basin

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)
- PEM/Vernal Pool
- Study Area



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THOMPSON ENVIRONMENTAL
Surveys & Permitting, LLC.

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Created By: CMG

Date: 10/27/2020

INDIANTOWN GAP NATIONAL CEMETERY

Figure 2: Phase 1 Bog Turtle Habitat Survey

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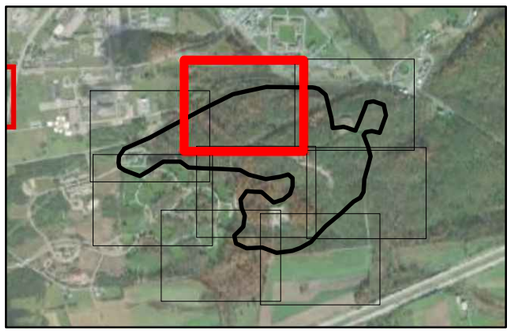

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Surveys & Permitting, LLC.

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Created By: CMG

Date: 10/27/2020

INDIANTOWN GAP NATIONAL CEMETERY

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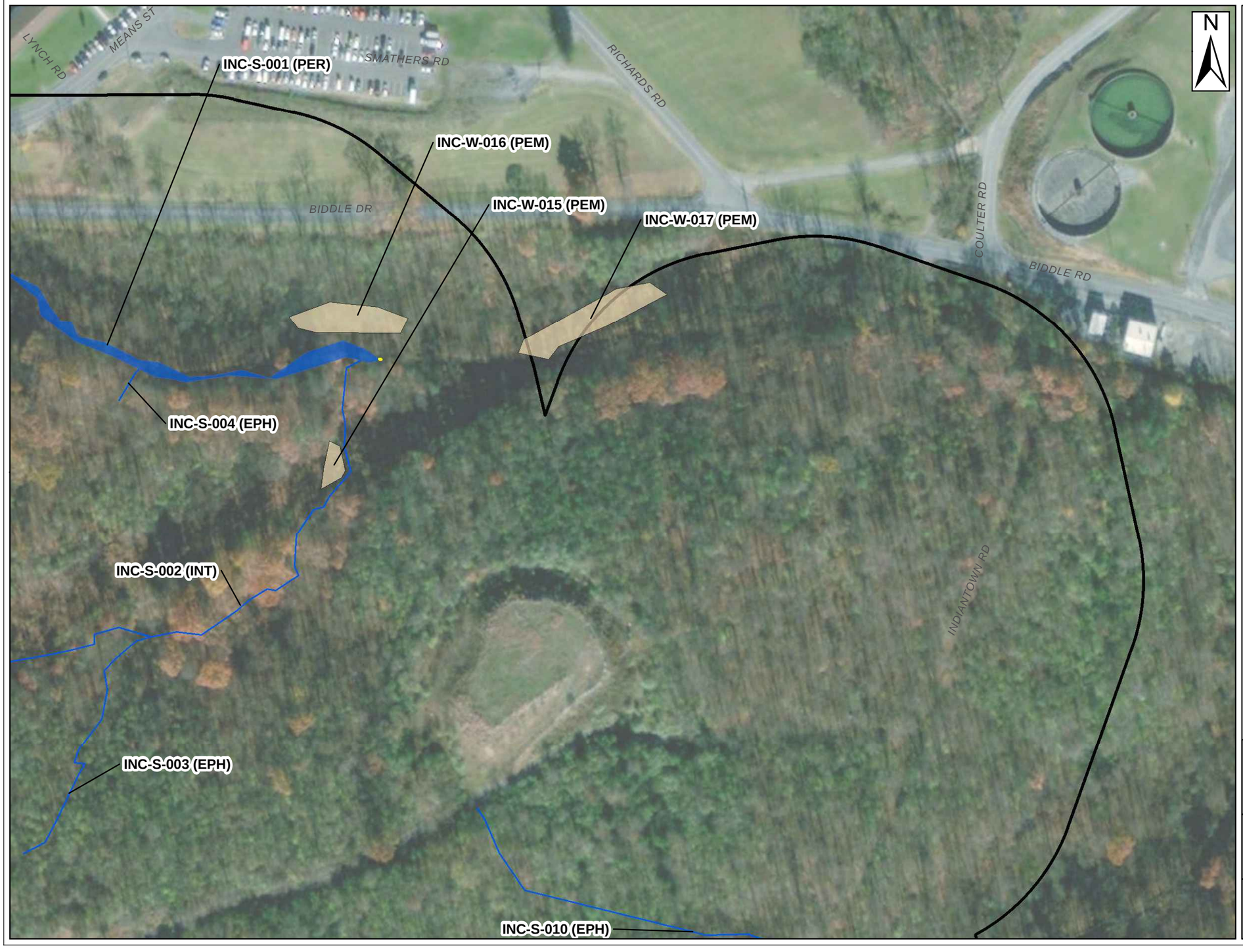

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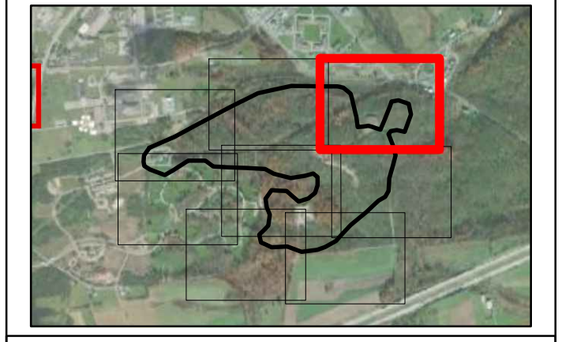

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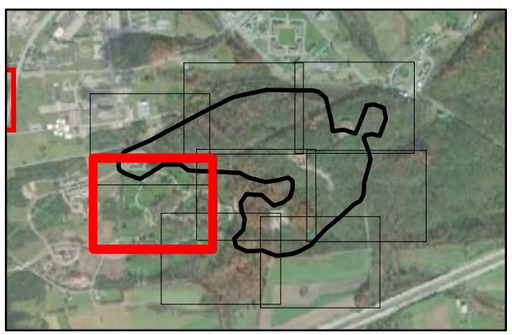

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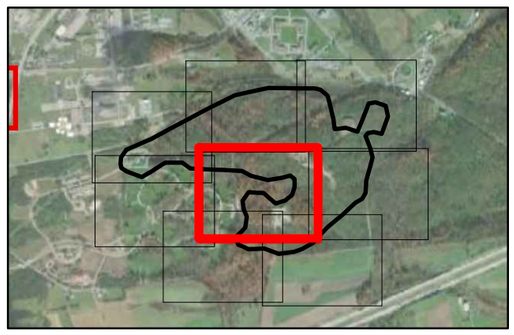

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Surveys & Permitting, LLC.

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Created By: CMG

Date: 10/27/2020

INDIANTOWN GAP NATIONAL CEMETERY

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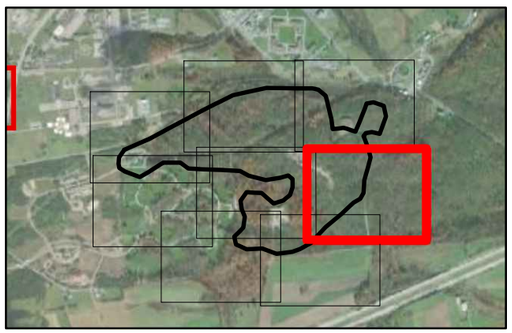

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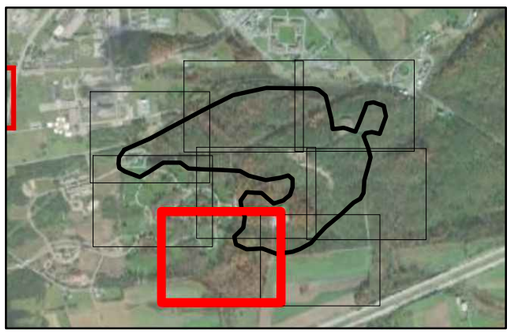

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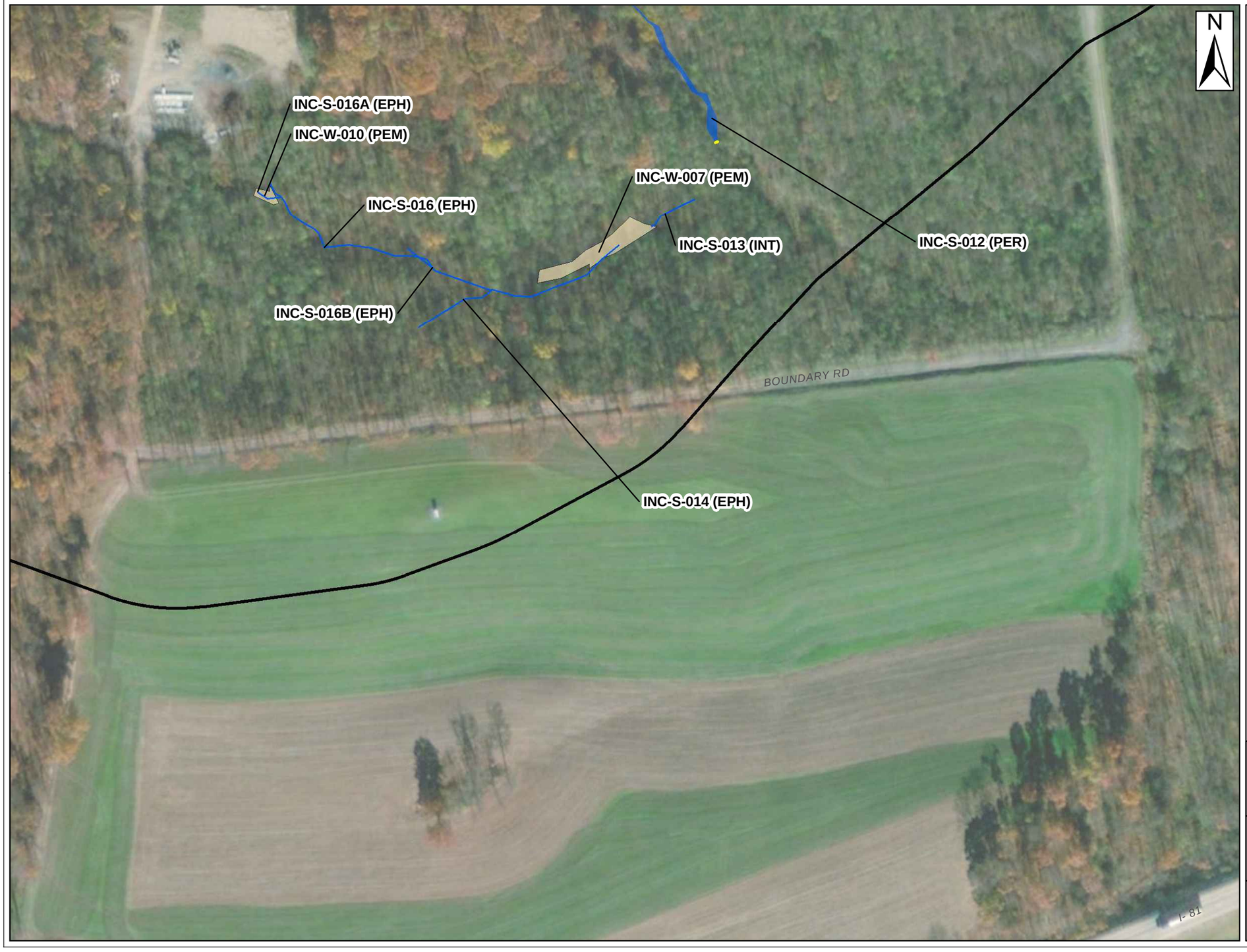
Figure 2: Phase 1 Bog Turtle Habitat Survey



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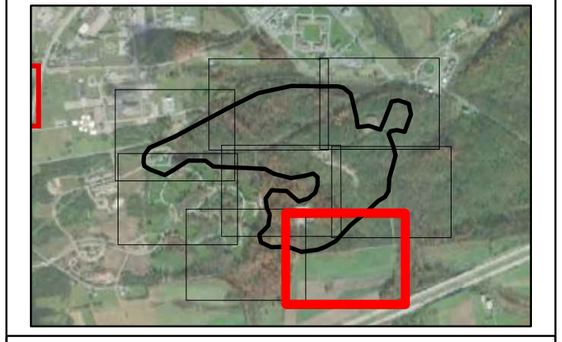

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Surveys & Permitting, LLC.

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Created By: CMG

Date: 10/27/2020

Appendix B

USFWS Phase 1 Bog Turtle Habitat Survey Field Forms for the Northern Population Range

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-001
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.423065, -76.562842 **Project Type** Expantion of Existing Site
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridget Thompson **Affiliation** Thompson Environmental
Other Assistants Present Emma Fernandes

Date/Condition

Date of Survey 10/07/20 **Time In** 0930 **Time Out** 1000 **Air Temp.** 60 (F) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.14 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes X No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-001

X Yes __ No Are there any signs of disturbance to *vegetation* (e.g., mowing, pasturing, burning)? If yes, describe:

Site has been logged

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season N/A

Soil types present*:

WeD- Weikert channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100 %	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calomus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (e.g., sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-001

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located in a logged wooded/shrubby lot adjacent to a maintained cemetery grounds. Wetland is associated w/ seasonal ground water discharge and surface runoff concentated in shallow depressions and channels.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
- X None of it – the entire wetland is within the property boundaries
- __ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? A phase 1 habitat survey identified PBTH w/in the Project area. Historic phase 1 surveys for this area have identified PBTH w/in the watershed

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not persistently spring fed.
No mucky substrate
No vegetative structure or micro-habitat conditions

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-002
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.424842, -76.566119 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover & Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present Emma Fernandes

Date/Condition

Date of Survey 10/07/20 **Time In** 10 15 **Time Out** 10 45 **Air Temp.** 40 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.57 acres, if known **# Wetlands w/In Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
X Rivulets (1 inches deep) X Subsurface Tunnel/Rivulets __ Tire Ruts (____inches deep)
X Small Puddles/Depressions (1 inches deep) XSaturated soils present? If yes, year-round? X Likely __ Unlikely__ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Portions of the wetland are impacted by historic road construction, wetland receives stormwater discharge from road side culvert and up slope cemetery grounds.

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 X11-20 X > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

No

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-002

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

CmB - Comly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: 0.12 - acre DSA

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	25%	4 in.	10 in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus spp.*	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix spp.*
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American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum spp.*	
Cattail *Typha spp.*	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicoria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum spp.*	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum spp.*	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-002

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located in depressional topography at toe slope that is the origin of multiple intermittent channels wetland abutts a fillslope for Biddle Drive.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
X None of it – the entire wetland is within the property boundaries
__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? This wetland is PBTH. Phase I surveys conducted at this location for historic projects have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? X Yes __ No If yes, which ones?
Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

X Yes __ No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure The **soils** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
__ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): The wetland is persistently spring/ground water derived, the wetland contains mucky substrate 4-10" in depth. The vegetative structure and micro-habitat conditions are consistent w/ PBTH.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-003
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.424552, -76.565714 **Project Type** Expanding existing facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present Emma Fernandes

Date/Condition

Date of Survey 10/07/2020 **Time In** 1045 **Time Out** 1100 **Air Temp.** 60 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.01 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-003

X Yes __ No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Historic Logging

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

CmB- Conly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-003

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
wetland is located in a natural gully w/in a wooded-shrubby lot. wetland is situated along a small incised intermittent drainage that provides seasonal hydrology.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
- X None of it – the entire wetland is within the property boundaries
- __ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? Phase I Survey identified PBTH w/in 1 wetland w/in the Project area PHI surveys conducted w/in proximity of this site for historic projects have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not persistently spring fed. No muck substrate present no vegetative structure or micro-habitat.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-004
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.424179, -76.565054 **Project Type** Expanding existing facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co.
Lead Surveyor Bridget Thompson **Affiliation** Thompson Environmental
Other Assistants Present Emma Fernandes

Date/Condition

Date of Survey 10/07/2020 **Time In** 1100 **Time Out** 1115 **Air Temp.** 60 (F°)/C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions

Wetland Info

Wetland Size 0.02 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse __ Trib/Stream __ Pond __ Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-004

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

CmB- Conly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-004

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a wooded-shrubby lot adjacent to a transmission line ROW. Wetland is associated w/ seasonal groundwater seep that discharges in a shallow depression.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? A Phase 1 survey for this project identified PBTH w/in the study area. Previous Phase 1 surveys in the area have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not persistently spring fed
wetland does not contain mucky substrate
wetland does not have micro-habitat conditions

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-005
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.424046, -76.565338 **Project Type** Expanding existing facility.
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present Emma Fernandes

Date/Condition

Date of Survey 10/07/2020 **Time In** 1115 **Time Out** 1130 **Air Temp.** 60 (F°)C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.01 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] X 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is w/in a constructed transmission line ROW.

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 X > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-005

X Yes __ No Are there any signs of disturbance to *vegetation* (e.g., mowing, pasturing, burning)? If yes, describe:
wetland is w/in a periodically maintained transmission line ROW.

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season
sprayed w/ herbicide, cutting woody veg.

Soil types present*:

CmB - Comly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus spp.*	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix spp.*
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus spp.*	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum spp.*	
Cattail *Typha spp.*	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum spp.*	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum spp.*	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-005

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a slight depression w/in a periodically maintained transmission line ROW. Wetland is associated w/ a small seasonal ground water discharge w/in the ROW.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey for this Project identified PBTH w/in the study area

PHI surveys for previous projects have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not persistently spring fed. wetland does not contain mucky substrate. Wetland does not have vegetative structure or micro-habitat cond.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger J Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-006
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.425187, -76.560155 **Project Type** Expanding existing facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co.
Lead Surveyor Bridget Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/07/2020 **Time In** 1230 **Time Out** 1245 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions

Wetland Info

Wetland Size 0.04 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-0016

X Yes __ No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Logging

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

BKD - Berks channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

Wetland Type/Vegetation

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Alder Spp. *Alnus spp.*	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix spp.*
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus spp.*	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum spp.*	
Cattail *Typha spp.*	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum spp.*	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum spp.*	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-006

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located at the origin/discharge point of a small intermittent channel downslope of the wetland the hydrology becomes channelized. Wetland is located in a natural gully in a wooded, shrubby lot.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey for this project identified PBTH w/in the study Area

PHI surveys for previous projects have identified PBTH w/in the watershed

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not persistently Spring fed. Wetland does not contain mucky substrate. Wetland does not contain micro-habitat conditions

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridget Thompson **Signature** Bridget Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-007
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.420372, -76.557410 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 0900 **Time Out** 0930 **Air Temp.** 60 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.10 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: ING W-007

X Yes __ No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Logging

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

WeD Weikert channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-007

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in natural gully in wooded-shrubby lot. Wetland is associated w/ the seasonal groundwater discharge w/in the gully and convergence of multiple ephemeral drainages that provide surface runoff.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey for this project has identified PBTTI w/in the project study area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? X Yes __ No If yes, which ones?

E. Box turtle

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not persistently spring fed. Wetland does not contain mucky substrate. Wetland does not contain micro-habitat conditions.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-008
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.419790, -76.501134 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 1030 **Time Out** 1045 **Air Temp.** 60 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (e.g., details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.08 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
X Small Puddles/Depressions (__/__ inches deep) XSaturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland has a culvert that provides hydrology from upslope cemetery grounds and a culvert that discharges hydrology under a small gravel maintenance road.

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-008

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

WeD - Wickwire channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-008

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located w/in a small topographic depression in a wooded-shrubby lot adjacent to maintained cemetery grounds. Wetland is associated w/ the headwater of a small intermittent drainage. Seasonal groundwater discharge and seasonally high water-table.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
- [X] None of it – the entire wetland is within the property boundaries
- [ ] Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
- [ ] None of it [ ] All of it [ ] Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? [X] Yes [ ] No [ ] Unk Habitat **off-site**? [ ] Yes [X] No [ ] Unk

If yes, how did you conclude this? Phase I survey for this project identified PBTH w/in the study area.

Species

Were any bog turtles observed? [ ] Yes [X] No If yes, how many?_____
Other herps observed? [ ] Yes [X] No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

- [ ] Yes [X] No [ ] Unsure The **hydrology** criterion for bog turtle habitat is met.
- [ ] Yes [X] No [ ] Unsure The **soils** criterion for bog turtle habitat is met.
- [ ] Yes [X] No [ ] Unsure The **vegetation** criterion for bog turtle habitat is met.
- [ ] Yes [X] No [ ] Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
- [ ] Yes [X] No [ ] Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
- [X] This wetland does **NOT** have potential bog turtle habitat. [ ] **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): The wetland is no sufficiently spring fed. The wetland substrate is soft and persistnty saturated but not mucky.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-009
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.419976, -76.561614 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 1045 **Time Out** 1100 **Air Temp.** 60 (F°)C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions

Wetland Info

Wetland Size 0.04 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is w/in a constructed swale that receives surface runoff from upslope maintained cemetery grounds

Estimate time period (in years) of disturbance*: __ ≤ 5 X 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-009

X Yes __ No Are there any signs of disturbance to *vegetation* (e.g., mowing, pasturing, burning)? If yes, describe:
Wetland is w/in a constructed swale

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:
WeD - Weikert channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100 %	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

Wetland Type/Vegetation

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Alder Spp. *Alnus spp.*	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix spp.*
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus spp.*	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum spp.*	
Cattail *Typha spp.*	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum spp.*	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum spp.*	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: NC-W-009

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located in a constructed swale at the edge of a maintained cemetary grounds wetland is associated w/ storm water discharge into the swale and excavation to the seasonal ground water level.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
- X None of it – the entire wetland is within the property boundaries
- __ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes X No __ Unk

If yes, how did you conclude this? Phase 1 survey for this project was identified PBTH w/in the study area.

Species

Were any bog turtles observed? __ Yes __ No If yes, how many?_____
Other herps observed? __ Yes __ No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not persistently spring fed wetland does not contain mucky substrate wetland does not have vegetative structure or micro-habitat

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-010
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.420604, -76.559229 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 1130 **Time Out** 1145 **Air Temp.** 70 (F°)C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions

Wetland Info

Wetland Size 0.01 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-010

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

WeD- Weikert channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	beggar's tick
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-010

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a wooded-shrubby lot at the head water of a small ephemeral drainage the drainage discharges from upslope maintained all areas to the depressional topo where the wetland developed.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes X No __ **Unk**

If yes, how did you conclude this? The Phase 1 survey conducted for this Project identified PBTH w/in the study area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not spring fed. wetland does not contain mucky substrate. wetland does not contain veg. structure or micro-hab. conditions.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridget Thompson **Signature** Bridget Thompson

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-011
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.421766, -76.560199 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 1200 **Time Out** 1215 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.02 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse __ Trib/Stream X Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
X Small Puddles/Depressions (X inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INCW-011

__Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WeD - Weikert Channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	10%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:	90%	None	N/A in.	N/A in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	bulrush
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-011

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is a vernal pool w/ vegetated fringe. Wetland receives surface runoff from upslope maintenance area and fill area.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
- X None of it – the entire wetland is within the property boundaries
- __ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes X No __ Unk

If yes, how did you conclude this? The Phase I survey for this Project identified PBTH w/in the study area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is a vernal pool.
No veg structure.
No micro-habitat conditions

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-012
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project.
Coordinates 40.421950, -76.561219 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 1230 **Time Out** 1300 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.20 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland receives surface run off from upslope maintained cemetery grounds

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-012

__ Yes X No Are there any signs of disturbance to ***vegetation*** (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

CmB - comly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb spp. *Polygonum* spp.	bulrush
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-012

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in wooded-shrubby lot down slope of maintained cemetery grounds wetland is associated w/ area of seasonal ground water discharge and surface runoff collection that becomes steeply incised INT channel.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

- X None of it – the entire wetland is within the property boundaries
- __ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes X No __ Unk

If yes, how did you conclude this? The Phase I survey for this Project identified PBTH w/in the study area

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is no persistently Spring fed. wetland does not contain mucky substrate wetland does not contain vegetative structure or micro-habitat conditions

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridge. Thompson **Signature** Bridget D Thompson

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609 3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-013
PNDI # (for PA): 719157

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.423140, -76.560306 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/08/202 **Time In** 1330 **Time Out** 1345 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.01 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-013

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: CmB- Comly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-013

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a slight depression along a small ephemeral drainage that conveys surface run off from upslope maintenance area. Wetland is located in wooded-shrubby lot.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes X No __ Unk

If yes, how did you conclude this? The Phase I survey for this Project identified PBTI w/in the study Area

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is no spring fed.

No mucky substrate

No vegetative structure or micro-habitat conditions.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-014
PNDI # (for PA): 7/9137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.425439, -76.564939 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridget Thompson **Affiliation** Thompson Environmental
Other Assistants Present Emma Fernandes

Date/Condition

Date of Survey 10/07/20 **Time In** 1145 **Time Out** 1200 **Air Temp.** 60 (F°C°)
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.04 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (_____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-014

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

BKD- Berks channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: NC-W-014

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located on floodplain bench at toe-of-slope wetland is associated w/ seasonal high groundwater and seasonal toe of slope groundwater discharge.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? ☒ Yes __ No __ Unk Habitat **off-site**? ☒ Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey conducted for this project identified PBTH w/in the study area. PHI surveys conducted for previous projects identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes ☒ No If yes, how many?_____

Other herps observed? __ Yes ☒ No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes ☒ No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes ☒ No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes ☒ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes ☒ No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes ☒ No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

☒ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is no persistently spring fed wetland does not contain mucky substrate. wetland does not have vegetative structure of micro hab. conditions.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridget Thompson **Signature** Bridget Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-015
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.425980, -76.554861 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates Inc.
County/Township/Municipality East Hanover + Union Twp. Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/07/2020 **Time In** 1315 **Time Out** 1330 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions

Wetland Info

Wetland Size 0.04 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] X 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-015

X Yes __ No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland is w/in a periodically maintained transmission line ROW.

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

BkD- Berks Channery silt loam 15 to 25 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

Wetland Type/Vegetation

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	(Tearthumb Spp. *Polygonum spp.*)	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	(Soft Rush or Common Rush *Juncus effusus*)	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	(Japanese Stiltgrass *Microstegium vimineum*)	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-015

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located on a flood plain bench and at the toe-of-slope w/in a periodically maintained transmission line ROW. The wetland is associated w/ seasonal ground water discharge at the toe-of-slope and seasonal high groundwater associated w/ the channel.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? The phase1 survey conducted for this project identified PBTH w/in the project study area. Previous PH I surveys have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not persistently spring fed wetland does not contain mucky substrate. wetland does not have vegetative structure or micro-habitat cond.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-016
PNDI # (for PA): 7191377

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.426610, -76.556800 **Project Type** Expanding Existin Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover / Union Twp Lebanon Co.
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/07/2020 **Time In** 1345 **Time Out** 1415 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.14 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:
None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-016

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: Ho - Holly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-016

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

wetland is located in and along floodplain of a small perennial watercourse wetland is associated w/ seasonal high water table and occational flooding from surface runoff and storm flow

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? The Phase I survey for this project identified PBTH w/in the project study area.

Phase I surveys for previous projects have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not persistently spring fed wetland does not contain mucky substrate wetland does not contain vegetative structure or micro-habitat conditions.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-017
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project
Coordinates 40.426539, -76.555554 **Project Type** Expanding Existing Facility
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover + Union Twp Lebanon Co
Lead Surveyor Bridge Thompson **Affiliation** Thompson Environmental
Other Assistants Present

Date/Condition

Date of Survey 10/07/2020 **Time In** 1400 **Time Out** 1430 **Air Temp.** 70 (F°) C°
Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown
Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)
Notes (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.02 acres, if known **# Wetlands w/in Project Area[2]** 18
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] X 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is located w/in a disturbed periodically maintained transmission line ROW

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 __ 11-20 X > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-017

X Yes __ No Are there any signs of disturbance to *vegetation* (e.g., mowing, pasturing, burning)? If yes, describe:
Wetland is w/in a periodically maintained transmission line ROW.

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season
Herbicid Spraying, periodic cutting woody vegetation

Soil types present*:

Ho - Holly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phaloris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (e.g., sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-017

Landscape Info

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

The wetland is located w/in a periodically maintained transmission line ROW. wetland is situated along floodplain and at toe-of-slope wetland is PSSO. w/ seasonal discharge at the toe-of-slope and contains soft saturated conditions but no mucky substrate.

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X Yes __ No __ Unk

If yes, how did you conclude this? The Phase I survey for this project identified PBTH w/in the Project study area.

Phase I surveys for previous projects have identified PBTH w/in the watershed.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): This wetland is close to being PBTH but lacks a persistent spring fed hydrology and deep mucky substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 10/07/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: NC-W-018
PNDI # (for PA): 719137

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project

Coordinates 40.424629, -76.567777 **Project Type** Expanding Existing Facility

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover + Union Twp Lebanon Co

Lead Surveyor Bridget Thompson **Affiliation** Thompson Environmental

Other Assistants Present

Date/Condition

Date of Survey 10/08/2020 **Time In** 1500 **Time Out** 1530 **Air Temp.** 70 (F°) C°

Last Precipitation __ < 24 hours __ 1-7 days X > 1 week __ unknown **Drought conditions?** __ Yes X No __ Unknown

Drought Index*[1] (Circle): none D0 (D1) D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map)

Notes (e.g., details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):
The region is experiencing very dry drought like conditions.

Wetland Info

Wetland Size 0.24 acres, if known **# Wetlands w/in Project Area[2]** 18

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is located w/in a constructed and periodically maintained roadside ditch.

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 X > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-018

X Yes __ No Are there any signs of disturbance to *vegetation* (e.g., mowing, pasturing, burning)? If yes, describe:

Periodically mowed / maintained roadside ditch.

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

CmB - Comly silt loam 3 to 8 percent slopes

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus spp.*	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix spp.*
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus spp.*	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum spp.*	bulrush
Cattail *Typha spp.*	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum spp.*	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum spp.*	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-018

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
The wetland is located on a slight hill slope that extends to a constructed roadside ditch

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
- X None of it – the entire wetland is within the property boundaries
- __ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? X **Yes** __ **No** __ **Unk**

If yes, how did you conclude this? The Phase I Survey for this project identified PBTH w/in the Project Study Area.
Phase I surveys for previous projects identified PBTH w/in the Watershed

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): This wetland is not persistently spring fed and does not contain any deep mucky substrate.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridge-Thompson **Signature** [signature]

Date 10/08/2020

Contact Information bthompson@thompsonesp.com 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Appendix C
Photo Log

Photograph:	**Date:**
1	10/08/20
Feature ID: Wetland INC W-001	
Direction: Northwest	
Description: View of wetland INC-W-001 showing vegetative conditions.	

Photograph:	**Date:**
2	10/08/20
Feature ID: Wetland INC-W-002	
Direction: Southwest	
Description: View of wetland INC-W-002 showing the vegetative structure.	

Photograph:	**Date:**
3	10/08/20

Feature ID:

Wetland INC-W-003

Direction:

East

Description:

View of the vegetative conditions in wetland INC-W-003 located wooded swale.

Photograph:	**Date:**
4	10/08/20

Feature ID:

Wetland INC-W-004

Direction:

South

Description:

View of the vegetative conditions in wetland INC-W-004.

Photograph:	**Date:**
5	10/08/20
Feature ID:	
Wetland INC-W-005	
Direction:	
North	
Description:	
View of the vegetative conditions in wetland INC-W-005.	

Photograph:	**Date:**
6	10/08/20
Feature ID:	
Wetland INC-W-006	
Direction:	
South	
Description:	
View of wetland INC-W-006 located in a wooded/shrubby lot at the origin of a small intermittent watercourse.	

Photograph: 7	**Date:** 10/08/20
Feature ID: Wetland INC-W-007	
Direction: West	
Description: View of the vegetative conditions in wetland INC-W-007.	

Photograph: 8	**Date:** 10/08/20
Feature ID: Wetland INC-W-008	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-008.	

Photograph:	**Date:**
9	10/08/20
Feature ID: Wetland INC-W-009	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-009.	

Photograph:	**Date:**
10	10/08/20
Feature ID: Wetland INC-W-010	
Direction: South	
Description: View of the vegetative conditions in wetland INC-W-010.	

Photograph: 11	**Date:** 10/08/20
Feature ID: Wetland INC-W-011	
Direction: North	
Description: View of wetland INC- W-011.	

Photograph: 12	**Date:** 10/08/20
Feature ID: Wetland INC-W-012	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-012.	

Photograph:	**Date:**
13	10/08/20
Feature ID: Wetland INC-W-013	
Direction: South	
Description: View of wetland INC-W-013.	

Photograph:	**Date:**
14	10/08/20
Feature ID: Wetland INC-W-014	
Direction: West	
Description: View of the vegetative conditions in wetland INC-W-014.	

Photograph: 15	**Date:** 10/08/20
Feature ID: Wetland INC-W-015	
Direction: East	
Description: View of the vegetative conditions in wetland INC-W-015.	

Photograph: 16	**Date:** 10/08/20
Feature ID: Wetland INC-W-016	
Direction: South	
Description: View of wetland INC-W-016.	

Photograph:	**Date:**
17	10/08/20
Feature ID: Wetland INC-W-017	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-017.	

Photograph:	**Date:**
18	10/08/20
Feature ID: Wetland INC-W-018	
Direction: East	
Description: View of the vegetative conditions in wetland INC-W-018.	

Appendix D
PNDI Receipt

1. PROJECT INFORMATION

Project Name: **Indiantown Gap National Cemetery**
Date of Review: **9/28/2020 11:42:33 AM**
Project Category: **Development, Additions/maintenance to existing development facilities**
Project Area: **130.95 acres**
County(s): **Lebanon**
Township/Municipality(s): **EAST HANOVER; UNION**
ZIP Code: **17003**
Quadrangle Name(s): **INDIANTOWN GAP**
Watersheds HUC 8: **Lower Susquehanna-Swatara**
Watersheds HUC 12: **Reeds Run-Swatara Creek**
Decimal Degrees: **40.423356, -76.560188**
Degrees Minutes Seconds: **40° 25' 24.819" N, 76° 33' 36.6756" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Potential Impact**	**MORE INFORMATION REQUIRED, See Agency Response**

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

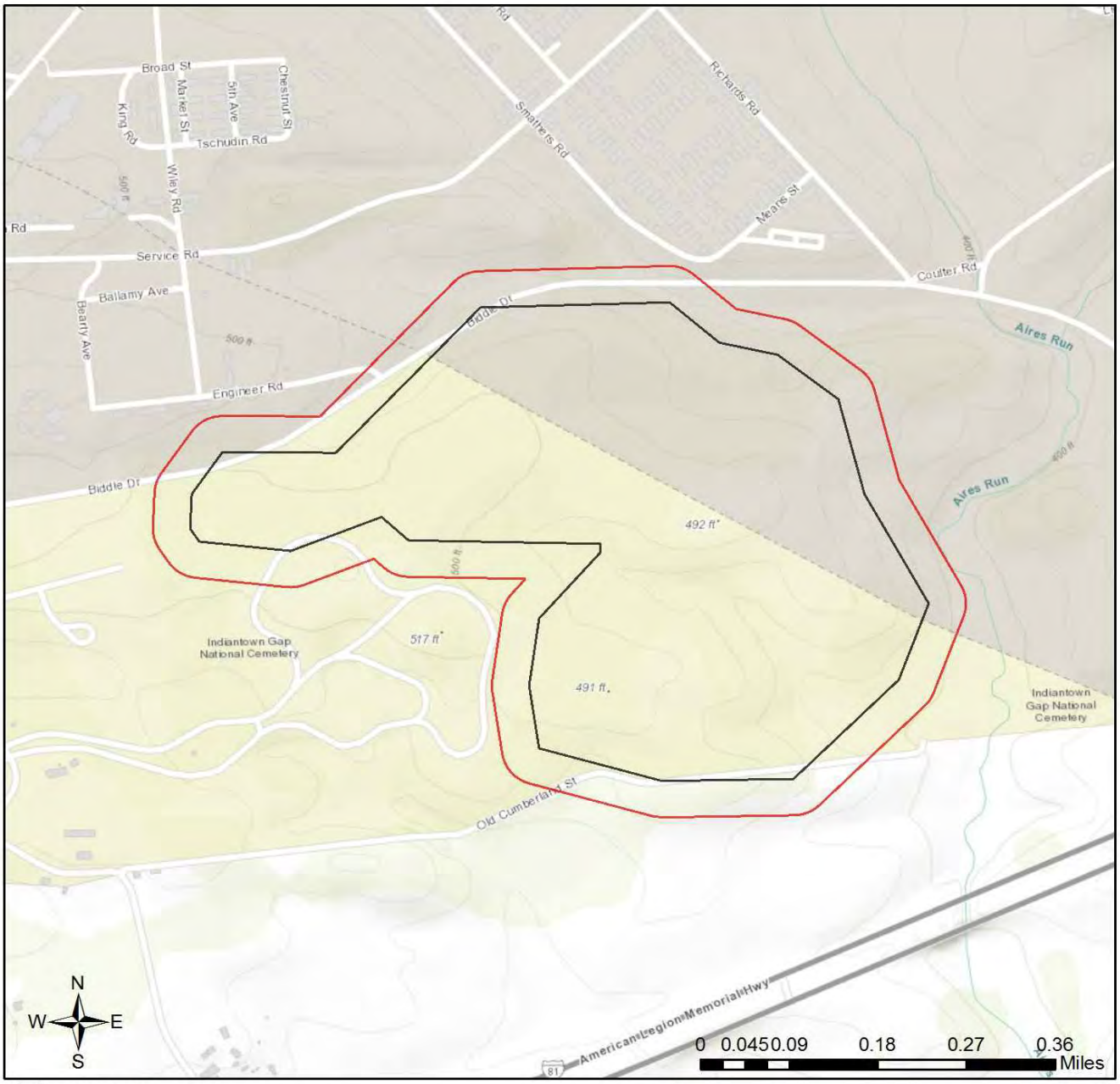
Indiantown Gap National Cemetery

Project Boundary

Buffered Project Boundary

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Indiantown Gap National Cemetery



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Which of the following closest describes the proposed project?
Your answer is: No groundwater extraction (e.g., water supply well, well for irrigation, groundwater pumping to facilitate mining, pump-and-treat operation) is proposed in order to implement or support this project.

Q2: Are there any perennial or intermittent waterways (rivers, streams, creeks, tributaries) in or near the project area, or on the land parcel?
Your answer is: Yes

Q3: Describe how wastewater (effluent) will be handled (select one). For the purpose of this question, wastewater/effluent does not include stormwater runoff. If the project involves solely the renewal or modification of an existing discharge permit (e.g., NPDES permit), select from options 3, 4, 5, or 6 below.
Your answer is: This project/activity (including construction, maintenance, and operation of the completed project) will not generate any wastewater/effluent; therefore, none will be discharged.

Q4: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: The project area (or land parcel) has not been investigated by someone qualified to identify and delineate wetlands, or it is currently unknown if the project or project activities will affect wetlands.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

Information Request: Conduct a Bog Turtle Habitat (Phase 1) Survey in accordance with USFWS Guidelines for Bog Turtle Surveys (April 2020). Evaluate all wetlands within 300 feet of the project area, which includes all areas that will be impacted by earth disturbance or project features (e.g., roads, structures, utility lines, lawns, detention basins, staging areas, etc.). IF THE PHASE 1 SURVEY IS DONE BY A QUALIFIED BOG TURTLE SURVEYOR (see https://www.fws.gov/northeast/pafo/endangered/surveys.html): 1) Send positive results to USFWS for concurrence, along with a project description documenting how impacts will be avoided. OR, conduct a Phase 2 survey and send Phase 1 and 2 results to USFWS for concurrence. 2) Send a courtesy copy of negative results to USFWS (label as "Negative Phase 1 Survey Results by Qualified Bog Turtle Surveyor: USFWS Courtesy Copy"). USFWS approval of negative results is not necessary when a qualified surveyor does the survey in full accordance with USFWS guidelines. IF THE PHASE 1 SURVEY IS NOT DONE BY A QUALIFIED SURVEYOR: Send ALL Phase 1 results to USFWS for concurrence, and if potential habitat is found, also send a project description documenting how impacts will be avoided. As a qualified bog turtle surveyor, I _____ (name) certify that I conducted a Phase 1 survey of all wetlands in and within 300 feet of the project area on _____(date) and determined that bog turtle habitat is absent.

_____ (Signature)

Avoidance Measure: Do not conduct this project/activity within 50 feet of any streams, rivers, creeks, or tributaries. This includes both perennial and intermittent waterways.

As the project proponent or applicant, I certify that I will implement the above Avoidance Measure:
_____(Signature)

SPECIAL NOTE: **If you agree to implement the above Avoidance Measure and if applicable, any Information Requests, no further coordination with this agency regarding threatened and endangered species and/or special concern species and resources is required.** If you are not able to comply with the Avoidance Measures, you are required to coordinate with this agency - please send project information to this agency for review (see "What to Send" section).

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).

Check-list of Minimum Materials to be submitted:

____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.

____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)

In addition to the materials listed above, USFWS REQUIRES the following

____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.

____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)

____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

ATTACHMENT 2

Phase 2 Bog Turtle Presence/Probable Absence Survey Report

Indiantown Gap National Cemetery Phase 5 Expansion Project

PHASE 2 BOG TURTLE PRESENCE/ PROBABLE ABSENCE SURVEY REPORT

PREPARED BY:

THOMPSON ENVIRONMENTAL SURVEYS & PERMITTING, LLC.

FOR:

MABBETT & ASSOCIATES, INC.,

June 2021

TABLE OF CONTENTS

FIGURES

APPENDICIES

SECTION 1 INTRODUCTION

1.1 INTRODUCTION

On November 4, 1997 under the provisions of the Endangered Species Act of 1973 the United States Fish and Wildlife Service (USFWS) listed the bog turtle (*Glyptemys muhlenbergii)*, as threatened. In Pennsylvania pursuant to Pennsylvania Code, Title 58, Chapter 75: Endangered Species the bog turtle is listed as endangered. Due to the bog turtles' federal and state protected status, any project in Pennsylvania that may potentially impact wetlands or waters in watersheds listed as known or likely occurrence of bog turtles will require a Phase 1 Bog Turtle Habitat Survey (Phase 1). The results of the Phase 1 habitat survey will determine if potential bog turtle habitat is in or within proximity to the proposed impacts for the project. If potential bog turtle habitat is identified and direct or indirect impacts are unavoidable a Phase 2 Presence/Probable Absence Bog Turtle Survey (Phase 2) is required to determine the presence or probable absence of bog turtles within the evaluated wetland. The time and duration of the Phase 2 surveys is dependent on the identified average of designated survey area (DSA) within the wetland. DSA can be defined as the portion of the wetland that contains the appropriate hydrology and soil substrate conditions to support bog turtles. In addition to a Phase 2 bog turtle survey, wetlands identified as potential bog turtle habitat that contain greater than 2 acres (ac) of DSA or wetlands that contain difficult survey conditions may require a Phase 3 Bog Turtle Trapping Survey (Phase 3) depending on USFWS and Pennsylvania Fish and Boat Commission (PFBC) review.

On October 7, 2021 Thompson Environmental Surveys & Permitting (TES&P) performed a Phase 1 bog turtle habitat survey for Mabbett & Associates, Inc (Mabbett) to support the proposed Phase 5 Indiantown Gap National Cemetery Expansion Project (Project). The results of this investigation revealed one wetland within the Project study area that met the criteria to be considered potential bog turtle habitat (PBTH). The results of the Phase 1 bog turtle habitat survey were reported to Mabbett in May 2021. While the proposed Project will require minimal land disturbances and no aquatic resource impacts are anticipated due to the limited timeframe available to conduct Phase 2 bog turtle surveys in the 2021 survey season Mabbett elected to conduct a Phase 2 bog turtle survey for this wetland prior to receiving concurrence on the Phase 1 survey results. TES&P's USFWS/PFBC Recognized Qualified Bog Turtle Surveyor (RQBTS) David Brotherton conducted the Phase 2 survey under the purview of his PFBC Type III, Scientific Collectors Permit (Permit Number 2021-03-0302), and associated Chapter 75.4 Special Permit for Collection of Threatened and Endangered Species. completed the Phase 2 bog turtle survey in April and May 2021. This report documents the results and conclusions of the Phase 2 bog turtle survey conducted for the Project.

1.2 PROJECT DESCRIPTION

The Project is located along the south side of Biddle Drive along the northern border of the Indiantown Gap National Cemetery in East Hanover and Union Townships, Lebanon County, Pennsylvania (Figure 1). The coordinates for the approximate Project center are 40.42484° and -76.56614°. The Project is located on the United States Geological Survey (USGS) Indiantown Gap, PA 7.5-minute topographical quadrangle (USGS, 2013). Land cover within the Project area consists of mowed maintained open areas, forest, wetlands, watercourses, and floodplain/riparian areas. Land uses in the vicinity of the Project consist of

developed military training ranges and facilities, cemetery, transmission line right-of-way, and secondary roadways. The Project drains south via an unnamed tributary (UNT) to Aires Run which is located within the Susquehanna River Basin.

SECTION 2 SURVEY METHODS

2.1 PHASE 2 SURVEY METHODOLOGY

This section discusses the methods used to complete the Phase 2 bog turtle survey described within this report. During the 2021 Phase 2 bog turtle survey season, TES&P biologists conducted Phase 2 bog turtle surveys in one wetland (Wetland INC-W-002) identified as PBTH within the Project area. A total of 0.12-acres of DSA were surveyed **(Figure 2)**. The Phase 2 bog turtle surveys in accordance with the USFWS *Guidelines for Bog Turtle Surveys* (Revised April 2020).

For wetlands designated as PBTH, TES&P biologists identified areas of DSA and estimated the approximate acreage. The Phase 2 survey consisted of four site visits to the identified PBTH wetlands with four to six person hours of survey effort conducted per acre of DSA. The Phase 2 survey was performed between April 15 and June 15 during days with suitable weather conditions and at least two survey visits were conducted in May.

Survey methods included random opportunistic sampling and a modified grid search. Initially, the entire DSA was quietly walked through and probed with hands and probing sticks, while visually searching for basking or foraging turtles. While conducting the walk through a visual assessment of the wetland was conducted to identify areas that appeared to contain the best habitat conditions, typically containing all three bog turtle habitat characteristics: spring fed hydrology with subsurface flow, tussock vegetative structure, and mucky soils. Following the initial walk-through, the areas of best habitat in the DSA were further investigated by lifting and looking under dead or loose vegetation covering the ground surface, muddling with hands in the muck and under vegetation while feeling for submerged turtles, and probing deep subsurface soil pipes with hands. A modified grid-like fashion and random opportunistic survey method ensured the entire DSA was thoroughly surveyed. Following a thorough search of the DSA, a final walk through of the entire DSA was again conducted to visually search for turtles that may have moved away from the areas where the intensive search was being conducted. During the final walk-through, vegetation was lifted and deep mucky areas were probed using a probing stick and hands.

The TES&P biologist recorded the date, number of survey crew members, total survey time and the current weather conditions including; air temperature (in the shade) at the start and end of the survey, precipitation and percent cloud cover. Additionally, all herptiles species and the number encountered during the surveys were recorded. Representative photos of the wetlands, DSA, and herptiles were taken and are located in **Appendix A**. While no bog turtles were encountered during the surveys, had they been, the turtles would have been processed on site following USFWS guidelines and immediately released in the exact location from where they were found and the Phase 2 survey would have concluded.

SECTION 3 WETLAND DESCRIPTIONS

3.1 WETLAND DESCRIPTIONS

Brief descriptions of the wetlands and DSAs investigated during the Phase 2 bog turtle survey are below including; wetland size, location within the landscape, surrounding land use, wetland conditions, and acreage of DSA. **Table 1** provides a summary of the wetland characteristics.

Wetland INC-W-002 (PEM)

Wetland INC-W-002 is an approximately 0.52-acre palustrine emergent (PEM) resource situated in a depression at a toe slope that is the origin of multiple intermittent channels. The wetland is located on the south side of Biddle Drive and along the northern border of Indiantown Gap National Cemetery and is within 300-feet of the proposed limits of disturbance for the proposed Phase 5 expansion. The primary source of wetland hydrology is provided by a seasonal ground water spring seeps and seasonally high groundwater table. Portions of the wetland receive hydrology from surface water runoff from a roadside culvert and stormwater discharge from the cemetery, located upslope from the wetland. The dominant vegetation in the wetland included sensitive fern (*Onoclea sensibilis*), broadleaf cattail (*Typha latifolia*), rice cutgrass (*Leersia oryzoides*), fox sedge (*Carex vulpinoidea*), jewelweed (*Impatiens capensis*), black willow (*Salix nigra)* and silky dogwood (*Cornus amomum*). The wetland soil substrate consists of silt loam with a mucky substrate that can be probed to depths of 4 to 10 inches. The wetland contains vegetative species common to bog turtle habitat and the vegetative structure and micro-habitat conditions are consistent with the conditions commonly observed in bog turtle habitat including rivulets and pockets of standing surface water. Due to the presence of mucky soil conditions, spring-fed hydrology, and a vegetative structure with micro-habitat conditions Wetland INC-W-002 is considered PBTH. Approximately 0.12-acre of DSA was identified in the wetland. The location of the wetland and respective DSA is depicted on Figure 2. A summary of the wetland characteristics is provided in Table 1.

Table 1- Wetland Identification Table

Wetland ID	Size (acres)	Total DSA (acres)	Wetland Types and Percentage[1]	Extent of Mucky soils (<3"deep)	DSA	Latitude / Longitude	Bog Turtles Found[2]
INC-W-002 (DSA 1)	0.52	0.12	PEM – 100%	PEM – 25%	1	40.424842°, -76.566119°	No

1. PEM-Palustrine emergent, PFO-Palustrine forested PSS-Palustrine scrub-shrub, PUB-Palustrine unconsolidated bottom.
2. Y-Yes, N-No, UK-unknown.

SECTION 4 RESULTS

4.1 PHASE 2 RESULTS

TES&P conducted the Phase 2 bog turtle surveys for Wetland INC-W-002 within a 0.12-acre area of DSA within the Project Area. A description of the survey results for the wetland are below. TES&P biologist identified common herpetological species during the Phase 2 survey. The photolog in **Appendix A** contains representative photographs of the species observed. **Table 2** provides a summary of the herpetofauna observed during the survey efforts. **Table 3** summarizes the dates of surveys, number of surveyors, survey effort, weather conditions, and species observed.

Wetland INC-W-002

The TES&P biologist conducted four Phase 2 surveys with a total of 34.44 survey hours per acre for the 0.12-acres of DSA in Wetland INC-W-002. Biologists encountered a few common herpetofauna while conducting the surveys; however, no bog turtles, or signs of bog turtle activity (tracks, shells, or nests) were observed within the identified DSAs during the 2021 survey efforts.

Table 2: Common and Scientific Names of Herpetofauna Observed during the Phase 2 Surveys

Common Name	Scientific Name
Green Frog	*Lithobates clamitans*
Northern Dusky Salamander	*Desmognathus fuscus*
Eastern Box Turtle	*Terrapene carolina*
Grey Treefrog	*Hyla versicolor*

Table 3: Phase 2 Bog Turtle Survey Results

Wetland Name	Survey Date	Time (Start - Stop)	Search-Effort (Hours)	Number of Surveyors	DSA Size (acres)	Total Hours of Search-Effort (per-acre) [1]	Weather Survey Start - Survey Stop Cloud Cover estimate	No. of Bog Turtles Found	Other Species observed
Wetland INC-W-002	4/28/2021	01:10 – 02:10	1.00	1	0.12	8.33	Start - 86° F with 15% cloud cover, wind 0 mph Stop - 86° F with 10% cloud cover, wind 0 mph	0	Green Frog (1) N. Dusky Salamander (1)
	5/04/2021	12:58 – 02:02	1.07	1		8.89	Start - 78° F with 20% cloud cover, wind 1 mph Stop - 85° F with 20% cloud cover, wind 1 mph	0	Green Frog (1) E. Box Turtle (3) Gray Treefrog (calling)
	5/12/2021	01:35 – 02:35	1.00	1		8.33	Start - 65° F with 10% cloud cover, wind 3 mph Stop - 67° F with 10% cloud cover, wind 1 mph	0	none
	05/19/2021	11:56 – 01:00	1.07	1		8.89	Start - 81° F with 0% cloud cover, wind 1 mph Stop - 82° F with 0% cloud cover, wind 0 mph	0	Green Frogs (2)

[1] Total Hours of Search Effort Per Acre = Search Effort x Number of Surveyors / DSA Size

SECTION 5 CONCLUSIONS

5.0 PROJECT RESULTS AND CONCLUSIONS

During the 2021 bog turtle survey season, TES&P conducted Phase 2 bog turtle surveys for Wetland INC-W-002 identified as PBTH for the Indiantown Gap National Cemetery Expansion Project. No bog turtles, or signs of bog turtle activity (tracks, shells, or nests) were identified during the 2021 survey efforts. Therefore, based on the Phase 2 bog turtle survey results, TES&P is confident that the probable absence of the species for the surveyed wetlands has been determined.

SECTION 6 REFERENCES

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U.S. Army Corps of Engineers (USACE). 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)*. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

U.S. Fish and Wildlife Service (USFWS). 2001. *Bog Turtle (Clemmys muhlenbergii), Northern Population Recovery Plan*. Hadley, Massachusetts.

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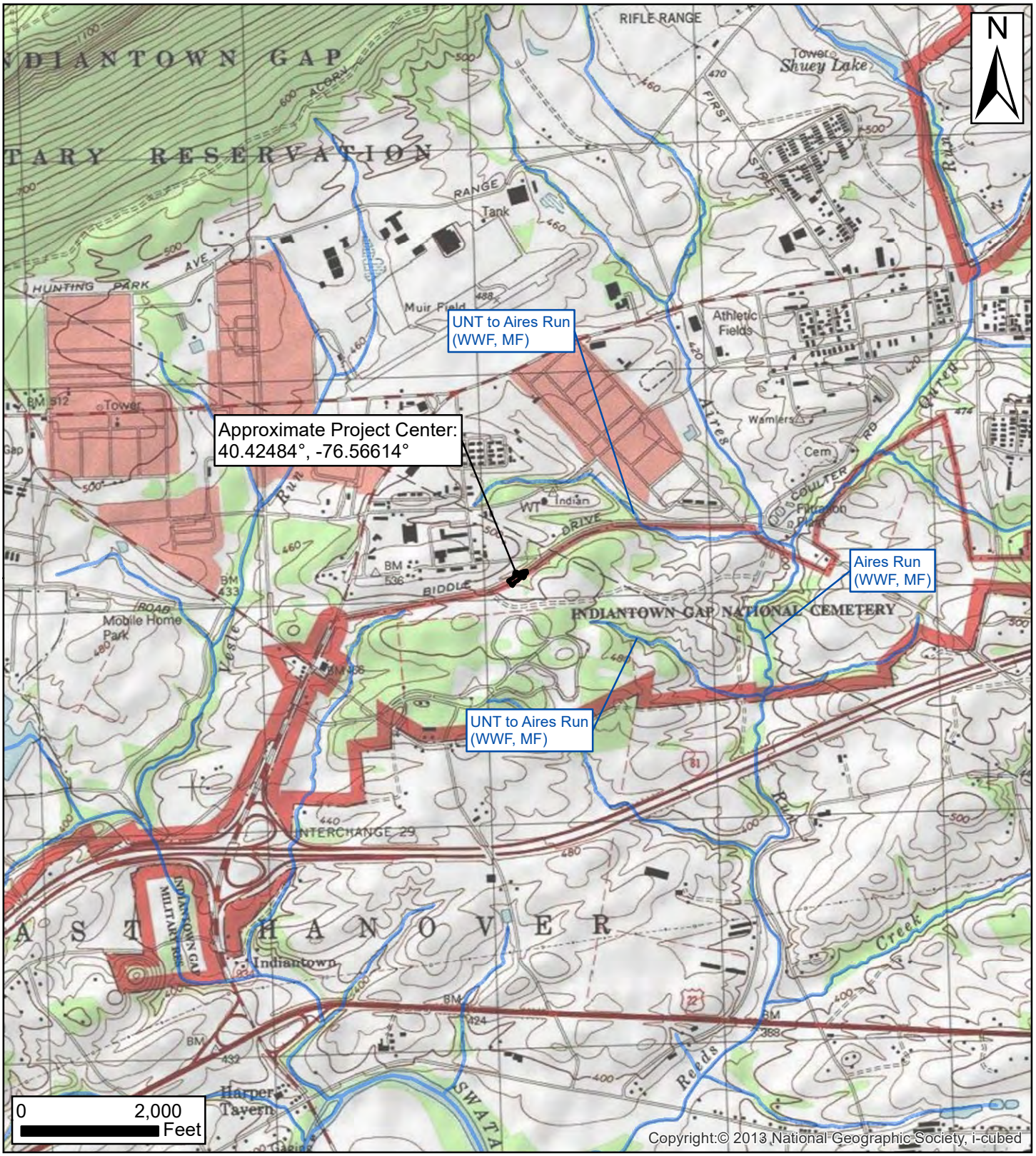
FIGURES

INDIANTOWN GAP NATIONAL CEMETERY

Figure 1: Location Map



THOMPSON ENVIRONMENTAL Surveys & Permitting, LLC.	**USGS 7.5' Quadrangle: Indiantown Gap** **East Hanover Township** **Lebanon County, Pennsylvania**	Mabbett
Date: 6/20/2021 | Created By: CMG		

INDIANTOWN GAP NATIONAL CEMETERY

Figure 2: Phase 2 Bog Turtle Presence Survey

Legend

- Approximate Watercourse
- Potential Bog Turtle Habitat
- Designated Survey Area

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)

Mabbett

TES&P
THOMPSON ENVIRONMENTAL
Surveys & Permitting, LLC.

0 20 40 Feet

Created By: CMG

Date: 6/20/2021

Appendix A

Photographic log

Photograph: 1	**Date:** 04/28/21
Feature ID: Wetland INC-W-002 (DSA)	
Direction: East	
Description: View of open emergent portion of Wetland INC-W-002 in DSA 1 with mucky substrates and several spring seeps on the 1st Phase 2 survey visit.	

Photograph: 2	**Date:** 04/28/21
Feature ID: Wetland INC-W-002 (DSA)	
Direction: West	
Description: View of open emergent area with muck and seeps in Wetland INC-W-002 (DSA 1) dominated by sensitive fern and rice cutgrass on the 1st Phase 2 survey visit.	

Photograph:	**Date:**
3	05/04/21

Feature ID:
Wetland INC-W-002 (DSA)

Direction:
East

Description:
View of open emergent area with muck and seeps in Wetland INC-W-002 (DSA 1) dominated by sensitive fern, rice cutgrass and soft rush on the 2nd Phase 2 survey visit.

Photograph:	**Date:**
4	05/12/21

Feature ID:
Wetland INC-W-002 (DSA)

Direction:
East

Description:
View of open emergent area with muck and seeps in Wetland INC-W-002 (DSA 1) dominated by sensitive fern, rice cutgrass and soft rush on the 3rd Phase 2 survey visit.

Photograph: 5	**Date:** 05/12/21
Feature ID: Wetland INC-W-002	
Direction: West	
Description: View of emergent area in the western portion of Wetland INC-W-002 (DSA) dominated by cattail, rice cutgrass and sensitive fern on the 3rd Phase 2 survey visit.	

Photograph: 6	**Date:** 05/19/21
Feature ID: Wetland INC-W-002 (DSA)	
Direction: East	
Description: View of emergent area with muck and seeps in Wetland INC-W-002 (DSA 1) dominated by sensitive fern, rice cutgrass and soft rush on the 4th Phase 2 survey visit.	

Photograph: 7	**Date:** 05/190/21
Feature ID: Wetland INC-W-002 (DSA)	
Direction: West	
Description: View of emergent area with mucky soils and seeps in Wetland INC-W-002 (DSA 1) dominated by sensitive fern and rice cutgrass on the 4th Phase 2 survey visit.	

Photograph: 8	**Date:** 05/04/21
Feature ID: Eastern Box Turtle (female)	
Direction: NA	
Description: Photo of Eastern Box Turtle found in the western portion of Wetland INC-W-002 during the surveys.	

Photograph:	**Date:**
8	05/04/21
Feature ID: Eastern Box Turtle (juvenile)	
Direction: NA	
Description: Photo of Eastern Box Turtle found in the western portion of Wetland INC-W-002 during the surveys.	

Photograph:	**Date:**
8	05/04/21
Feature ID: Eastern Box Turtle (male)	
Direction: NA	
Description: Photo of Eastern Box Turtle found in the western portion of Wetland INC-W-002 during the surveys.	

ATTACHMENT 3

Additional Project Area Phase 1 Bog Turtle Habitat Survey

THOMPSON ENVIRONMENTAL
Surveys & Permitting, LLC.

July 22, 2021

U.S. Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Rd #101,
State College, PA 16801

RE: (POSITIVE) Phase 1 Bog Turtle Habitat Survey Conducted by a Recognized Qualified Bog Turtle Surveyor
Indiantown Gap National Cemetery Phase 5 Expansion Project, Additional Project Areas
East Hanover Township, Lebanon County, Pennsylvania
PNDI # 737860

To Whom it May Concern:

Thompson Environmental Surveys & Permitting, LLC. (TES&P) recently conducted Phase 1 Bog Turtle (*Glyptemys muhlenbergii*) Habitat Surveys (Phase 1) for Mabbett & Associates, Inc. (Mabbett) on behalf of the U.S Department of Veterans Affairs (VA). The Phase 1 survey covered Additional Project Areas identified in June 2021 for the Indiantown Gap National Cemetery (IGNC) Phase 5 Expansion Project (Project). The purpose of the Project is to expand the existing cemetery to include additional burial sites and to upgrade and maintain existing cemetery walkways, monuments, and structures.

PROJECT BACKGROUND
The initial IGNC Project encompasses areas located east of the existing developed cemetery boundary in a non-developed portion of the IGNC Property (**Figure 1**).

Phase 1 Bog Turtle Habitat Assessment were completed for this initial Project Area in 2020. Phase 2 Presence/Absence Surveys (Phase 2) were completed for one wetland identified as potential bog turtle habitat in the 2021 Phase 2 bog turtle survey season. Reports were completed to document the results of these surveys and are included in a separate submission. However, due to recently proposed design refinements an Additional Project Area is required (**Figure 2**). This report discusses the results of Phase 1 surveys conducted for this Additional Project Area.

The Additional Project Area is located in East Hanover, Township, Lebanon County, Pennsylvania. The coordinates for the approximate Additional Project Area center are 40.42033° and -76.568297°. The Additional Project Area is located on the United States Geological Survey (USGS) Indiantown Gap, PA 7.5-minute topographical quadrangle (USGS, 2013). Land cover within proximity to the Additional Project Area consists of open land and small wooded lots. Land use in the vicinity of the Additional Project Area consists of developed and maintained cemetery grounds, visitor centers and monuments, and paved and maintained walkways and secondary roadways. The Additional Project Area drains east to an unnamed tributary (UNT) to Aires Run and west to an UNT to Indiantown Run both of which are located within the Swatara Creek watershed and Lower Susquehanna River Basin.

The Phase 1 bog turtle habitat survey described herein conforms to the survey methodology outlined in the United States Fish and Wildlife Service (USFWS) guidelines for conducting Phase 1 Bog Turtle Habitat Surveys pursuant to the Bog Turtle Recovery Plan (USFWS, 2001) and Guidelines for Bog Turtle Surveys (USFWS, Revised April 2020). This letter report discusses the results of the Phase 1 bog turtle habitat survey.

REGULATORY BACKGROUND

Federal law, specifically the Endangered Species Act (ESA) of 1973, mandates that all federal agencies undertaking projects that have an effect or have the potential to have an effect on threatened, endangered, or candidate species, be it through direct or indirect jurisdiction, such as a federal license or permit, must undergo Section 7 ESA Review. The Section 7 consultation process requires that federal agencies, or those entities seeking a federal license or permit, consider how their undertakings may affect endangered species and allow the USFWS or National Marine Fisheries Service (NMFS), if applicable, the opportunity to comment on such undertakings.

The PA Natural Diversity Inventory (PNDI) Environmental Review receipt (PNDI # 737860) for the Project was updated on July 9, 2021 to include the Additional Project Area. Based on the PNDI response receipt it was anticipated that there may be potential impacts to bog turtle a federally threatened and state endangered special. As, such a Phase 1 Bog Turtle habitat Survey was completed for the Project. No known impacts to threatened and endangered and/or special concerns species and resources under jurisdiction of the Pennsylvania Game Commission, PA Department of Conservation and Natural Resources, or Pennsylvania Fish and Boat Commission were identified, therefore no additional communication with those respective agencies is required. A copy of the PNDI receipt is provided as (**Attachment A)**.

SURVEY METHODOLOGY

On June 10, 2021 TES&P Biologist, Bridger Thompson, a USFWS and Pennsylvania Fish and Boat Commission (PFBC) Recognized Qualified Bog Turtle Surveyor (RQBTS) conducted Phase 1 bog turtle habitat surveys for the above referenced Additional Project Area to identify potential bog turtle habitat (PBTH). Bog turtle habitat is recognized by three criteria: suitable hydrology including spring seeps, shallow surface water, persistently saturated soils, subsurface flow, rivulets, suitable soils (including a bottom substrate of soft muck, a critical criterion), suitable vegetative structure (including dominant vegetation of low grasses and sedges, reed canary grass, cattail, rice cut grass, phragmites, or skunk cabbage), and possibly a scrub-shrub wetland component with a relatively open canopy. The Phase 1 bog turtle habitat survey included all wetlands identified by TES&P within the Phase 1 Study Areas for the Additional Project Area(**Figure 3**).

In June 2021 Mabbett provided TES&P with mapping depicting the boundaries of the Additional Project Area and proposed limits-of-disturbance (LOD) for the Additional Project Area. Prior to conducting an on-site Phase 1 survey, TES&P conducted a desktop review for the Additional Project Area and reviewed historic aerial imagery for the Project. During onsite inspection TES&P surveyed all area within 300-feet of the proposed LOD and Additional Project Area for wetland resources. All wetlands observed were assessed in their entirety for the conditions required to be considered PBTH. If a wetland was determined to be PBTH the Designated Survey Area (DSA) within the wetland was determined. DSA is defined as all areas of the wetland where soft muck-like soils are present. Information recorded for the habitat assessment for each wetland is presented on the USFWS Phase 1 Bog Turtle Habitat Survey Field Forms for the Northern Population Range (Revised April 2020), including dominant plant species, substrate characteristics, and hydrology (**Attachment B**). Representative conditions within Study Areas and the wetlands were photographed, and are included in the attached photo log (**Attachment C**).

HABITAT ASSESSMENT RESULTS

During on-site surveys, TES&P identified a total of nineteen wetlands within 300-feet of the proposed LOD for the Additional Project Area. For the purposes of this report the investigated wetlands are identified as (INC-W-021 through INC-W-039). The following is a brief description of the investigated resources and their potential to be considered bog turtle habitat.

Wetland INC-W-021

Wetland INC-W-021 is approximately 2.21-acre palustrine emergent (PEM) resource located in the southeast corner of the Additional Project Area. The wetland situated in a wooded shrubby gully that extends along the floodplain of Aires Run. The primary source of wetland hydrology is provided by seasonal groundwater discharge that originates along the toe-of-slope of the gully and a seasonal ground water connection to Aires Run. Additional hydrology is attributed to seasonal flood flow from Aires Run. The dominant vegetation in the wetland is composed of reed canary grass (*Phalaris arundinacea*) and Japanese stilt grass (*Microstegium vimineum).* The wetland contained pockets of soft saturated soil substrate associated with the seasonal groundwater discharge and small pockets of standing surface water. However, no mucky substrate was observed. The wetland contains vegetative species common to bog turtle habitat but lacks the vegetative structure and micro-habitat conditions to be considered potential bog turtle habitat. Due to the lack of mucky soil conditions, persistent spring-fed hydrology, and a vegetative structure with micro-habitat conditions, and the evidence of seasonal flooding Wetland INC-W-021 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-022

Wetland INC-W-022 is approximately 0.49-acre PEM resource located on the eastern edge of the Additional Project Area east of Indiantown Road. The wetland is situated in wooded shrubby area that follows the floodplain of Aires Run. The wetland extends along a small high flow channel of Aires Run that contains pockets of perched surface water from seasonal flooding. The primary source of wetland hydrology is provided by seasonal flood flow from Aires Run. The majority of the wetland is non-vegetated but is bordered by skunk cabbage (*Symplocarpus foetidus*), jewelweed (*Impatiens capensis*), and fringe sedge (*Carex crinita*). The wetland contained areas of soft soil substrate associated with the perched surface water and collected organic debris however, no mucky substrate was observed. The wetland micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due to the evidence of seasonal flooding, lack of mucky soil conditions, or a persistent spring-fed hydrology, and lack of a vegetative structure with micro-habitat conditions Wetland INC-W-022 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-023

Wetland INC-W-023 is approximately 0.03-acre PEM resource located in the southeast corner of the existing cemetery grounds. The wetland is situated in a man-made storm water swale in a mowed and maintained area of the cemetery. The primary source of wetland hydrology is provided by seasonal groundwater discharge that is conveyed to the swale by a concrete storm drain. The wetland vegetation is dominated by cattail (*Typha latifolia*). The wetland soil substrate contained soft areas associated with the seasonal groundwater hydrology however, no mucky deep substrate was observed. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due to the man-made conditions and the lack of mucky soil substrate, the lack of a persistent spring-fed hydrology, and lack of a vegetative structure with micro-habitat conditions Wetland INC-W-023 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-024
Wetland INC-W-024 is approximately 0.12-acre PEM resource located in the southeast portion of the Additional Project Area. The wetland is situated on the upstream side of a small bridge structure that crosses an intermittent drainage. The wetland originates from a seasonal hillslope groundwater seep within a wooded shrubby lot and extends to the floodplain of a small intermittent drainage feature. The surrounding landscape consists of mowed maintained cemetery grounds. The primary source of wetland hydrology is provided by the seasonal groundwater discharge that originates within the wooded lot and drains in a naturally depressional area towards the channel. The dominant vegetation in the wetland contained cattail, and jewelweed. The wetland soil substrate contained areas of soft soils associated with the seasonal groundwater hydrology and collected silt deposits and organic debris at the bridge abutment however, no deep mucky substrate was observed. The wetland contains vegetative species common to bog turtle habitat however, portions of the wetland have been disturbed by the bridge crossing and evidence suggests the wetland size has increased as a result of the disturbance. While the micro-habitat conditions are consistent with the conditions commonly observed in bog turtle habitat due to the evidence of historic disturbance, the lack of persistent mucky soil conditions, and the lack of a persistent spring-fed hydrology, Wetland INC-W-024 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-025
Wetland INC-W-025 is approximately 0.13-acre PEM resource located in the southeast portion of the Additional Project Area. The wetland is situated on the downstream side of a small bridge structure that crosses an intermittent drainage. The wetland originates from a persistent hillslope groundwater seep at the edge of the mowed maintained cemetery grounds and extends to the floodplain of a small intermittent drainage feature. The surrounding landscape consists of mowed maintained cemetery grounds. The primary source of wetland hydrology is provided by the persistent groundwater discharge that drains along a vegetated hillslope area towards the channel. The wetland vegetation is dominated by soft rush (*Juncus effusus*), sedges (*Carex sp.*), and jewelweed fringed by willow (*Salix sp.*) and silky dogwood (*Cornus amomum*). The wetland soil substrate contains soft areas associated with the persistent groundwater hydrology and mucky areas measuring to depth of six inches were observed. In addition to the mucky soils evidence suggests that the wetland contains sub-surface flows associated with the groundwater seeps. The wetland contains vegetative species common to bog turtle habitat and the wetland lacks the level of disturbance observed in the upstream areas. Additionally, the micro-habitat conditions are consistent with the conditions commonly observed in bog turtle habitat. **Due to the presence of a persistent groundwater hydrology with sub-surface flow, the presence of persistent mucky soil conditions, and microhabitat conditions Wetland INC-W-025 is considered PBTH.** Approximately 0.01-acre of DSA was identified. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-026
Wetland INC-W-026 is approximately 0.43-acre PEM resource located in the southeast portion of the Additional Project Area. The wetland is situated a wide flattened depressional area within a wooded/shrubby gully that conveys an intermittent drainage. The wetland originates from a persistent hillslope groundwater seeps at the edge of the mowed maintained cemetery grounds and extends to the floodplain of a small intermittent drainage feature. The surrounding landscape consists of mowed maintained cemetery grounds and the wooded/shrubby lot. The primary source of wetland hydrology is provided by the persistent groundwater discharge that drains along a vegetated hillslope area towards the channel and a piezometric water table connection with the intermittent channel. The wetland vegetation is dominated by cattail, sedges, and sweet flag (*Acorus calamus*) and is fringed by willow and silky dogwood. The wetland soil substrate contains soft areas associated with the persistent groundwater hydrology and

mucky areas measuring to depth of ten inches were observed. In addition to the mucky soils evidence suggests that the wetland contains sub-surface flows associated with the groundwater seeps and piezometric water table connection with the intermittent channel. The wetland contains vegetative species common to bog turtle habitat and the micro-habitat conditions are consistent with the conditions commonly observed in bog turtle habitat. **Due to the presence of a persistent groundwater hydrology with sub-surface flow and the persistent mucky soil conditions, and microhabitat conditions Wetland INC-W-026 is considered PBTH.** Approximately 0.10-acre of DSA was identified. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-027

Wetland INC-W-027 is approximately 0.10-acre PEM resource located in the central portion of the Additional Project Area. The wetland is situated on the downstream side of a small bridge structure that crosses an intermittent drainage. The wetland originates from seasonal hillslope groundwater seeps and extends to the floodplain of a small heavily eroded intermittent drainage feature. The surrounding landscape consists of mowed maintained cemetery grounds. The primary source of wetland hydrology is provided by the seasonal groundwater discharge that originates along the edge of the maintained areas and drains in a naturally depressional area towards the heavily eroded channel. The wetland vegetation is dominated by cattail and sweet flag fringed by willow and dogwood. The wetland soil substrate contained areas of soft soils associated with the saturated conditions however, no deep mucky substrate was observed. The wetland contains vegetative species common to bog turtle habitat however, the micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due to the lack of persistent mucky soil conditions, and the lack of a persistent spring-fed hydrology, Wetland INC-W-027 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-028

Wetland INC-W-028 is approximately 0.27-acre PEM resource located in the central portion of the Additional Project Area. The wetland is situated in a narrow swale that extends from the upstream side of a small bridge structure that crosses an intermittent drainage. The wetland originates at a persistent groundwater seep at the edge of the mowed maintained cemetery grounds and extends within the swale that conveys the small intermittent drainage feature. The surrounding landscape consists of mowed maintained cemetery grounds. The primary source of wetland hydrology is provided by the persistent groundwater discharge that drains along the swale. The wetland vegetation is dominated by cattail, sweet flag, soft rush, and sedges, with small pockets of willow and silky dogwood. The wetland soil substrate contains soft mucky areas associated with the persistent groundwater hydrology and mucky substrate measuring to depth of twelve inches was observed. In addition to the mucky soils evidence suggests that the wetland contains sub-surface flows associated with persistent groundwater seeps. The wetland contains vegetative species common to bog turtle habitat and the micro-habitat conditions are consistent with the conditions commonly observed in bog turtle habitat. **Due to the presence of a persistent groundwater hydrology with sub-surface flow and the persistent mucky soil conditions, and microhabitat conditions Wetland INC-W-028 is considered PBTH.** Approximately 0.10-acre of DSA was identified. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-029

Wetland INC-W-029 is approximately 0.25-acre PEM resource located in the central portion of the Additional Project Area. The wetland is situated in a wide depression between two small bridge structures that cross an intermittent drainage. The wetland is the downstream extent of wetland INC-W-028 and is also associated with the persistent groundwater seeps and intermittent drainage feature that is conveyed in the natural swale. The surrounding landscape consists of mowed maintained cemetery grounds. The wetland vegetation is dominated by cattail, sweet flag, soft rush, and sedges, with small pockets of willow

and silky dogwood. The wetland soil substrate contains soft mucky areas associated with the persistent groundwater hydrology and mucky substrate measuring to depth of twelve inches was observed. In addition to the mucky soils evidence suggests that the wetland contains sub-surface flows associated with persistent groundwater seeps. The wetland contains vegetative species common to bog turtle habitat and the micro-habitat conditions are consistent with the conditions commonly observed in bog turtle habitat. **Due to the presence of a persistent groundwater hydrology with sub-surface flow and the persistent mucky soil conditions, and microhabitat conditions Wetland INC-W-029 is considered PBTH.** Approximately 0.10-acre of DSA was identified. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-030

Wetland INC-W-030 is approximately 0.04-acre PEM resource located in the northeast portion of the Additional Project Area. The wetland situated in a shallow depression on downslope edge of a narrow-wooded strip within the mowed and maintained cemetery grounds. The wetland extends along the shallow depression with compacted soils at the location of a seasonal ground water discharge. The primary source of wetland hydrology is provided by the seasonal groundwater discharge and surface water runoff collection in the compacted soils. The wetland vegetation is dominated by Japanese stilt grass, and bulrush (*Scirpus atrovirens*). The wetland soil substrate was firm and lacked any mucky substrate. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due the lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-30 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-031

Wetland INC-W-031 is approximately 0.10-acre PEM resource located in the northeast portion of the Additional Project Area. The wetland situated in a shallow depression within a narrow-wooded strip in a mowed and maintained area of the cemetery grounds. The wetland extends along the shallow depression that conveys seasonal ground water discharge and stormwater water runoff from an upslope storm drain. The primary source of wetland hydrology is provided by the seasonal groundwater discharge and storm water runoff that collects in the shallow depression. The wetland vegetation is dominated by Japanese stilt grass, jewel weed, and arrow-leafed tearthumb (*Polygonum sagittatum*). The wetland soil substrate was firm and lacked any mucky substrate. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due the lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-31 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-032

Wetland INC-W-032 is approximately 0.56-acre PEM resource located in the north central portion of the Additional Project Area. The wetland is situated in a narrow swale that extends from a mowed and maintained area of the cemetery to into a wooded shrubby lot. The wetland originates at a seasonal groundwater seep at the edge of the mowed maintained cemetery grounds and extends within the swale that conveys a small heavily eroded intermittent drainage feature. The primary source of wetland hydrology is provided by the seasonal groundwater discharge that drains along the swale with contribution from additional groundwater seeps that originate within the wooded lot. While the wetland does contain some evidence of sub-surface flows, due to the heavily eroded condition of the intermittent channel the wetland soils are not persistently saturated and no mucky conditions were observed. The wetland vegetation is dominated by cattail, sweet flag, soft rush, sedges, and Japanese stilt grass. The wetland contains vegetative

species common to bog turtle habitat however, the micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due to the lack of persistent mucky soil conditions, and the lack of appropriate microhabitat conditions Wetland INC-W-032 is not considered PBTH. Approximately 0.10-acre of DSA was identified. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-033
Wetland INC-W-033 is approximately 0.11-acre PEM resource located in a bermed man-made basin on the north central edge of the Additional Project Area. The wetland is situated on the downstream side of a small bridge structure that crosses an intermittent drainage. The wetland originates from upslope seasonal hillslope groundwater seeps that is conveyed within a small heavily eroded intermittent drainage feature. The surrounding landscape consists of a maintained access drive and a small wooded lot. The wetland vegetation is dominated by cattail and reed canary grass bordered by willow and dogwood. The wetland soil substrate contained areas of soft soils associated with the saturated conditions however, no deep mucky substrate was observed. The wetland contains vegetative species common to bog turtle habitat however, the micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due to the man-made conditions and the lack of persistent mucky soil conditions, or a persistent spring-fed hydrology, Wetland INC-W-033 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-034
Wetland INC-W-034 is approximately 0.10-acre PEM resource located on the north central edge of the Additional Project Area. The wetland situated in a shallow depression within a wooded/shrubby lot outside of the mowed and maintained cemetery grounds. The wetland extends along the shallow depression that receives seasonal ground water discharge and collects surface water runoff in the depressional topography. The wetland vegetation is dominated by rice cutgrass (*Leersia oryzoides*), fowl mana grass (*Glyceria striata*), and moneywort (*Lysimachia nummularia*). The wetland soil substrate was firm and lacked any mucky substrate. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due the lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-34 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-035
Wetland INC-W-035 is approximately 0.10-acre PEM resource located on the north central edge of the Additional Project Area. The wetland situated in a shallow depression within a wooded/shrubby lot outside of the mowed and maintained cemetery grounds. The wetland extends along the shallow depression that receives seasonal ground water discharge and collects surface water runoff in the shallow depression. The wetland vegetation is dominated by sensitive fern (*Onoclea sensibilis*), fowl mana grass, and moneywort. The wetland soil substrate was firm and lacked any mucky substrate. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due the lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-35 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-036
Wetland INC-W-036 is approximately 0.37-acre palustrine unconsolidated bottom (PUB) resource located on the north central edge of the Additional Project Area. The wetland consists of a man-made impoundment at the edge of the maintained cemetery grounds. The wetland contains surface water that is greater than

twenty inches in depth. The wetland vegetation on the fringe of the impoundment is dominated by cattail. The wetland soil substrate was firm and lacked any mucky substrate. Due the man-made conditions and lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-36 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-037

Wetland INC-W-037 is approximately 0.15-acre PEM resource located in a bermed man-made storm water basin on the southwest corner of the Additional Project Area. The wetland is situated in the man-made depression that contains a small intermittent drainage. The wetland receives additional hydrology from several seasonal hillslope groundwater seeps that originate at the toe -of slope on the edge of the bermed impoundment. The surrounding landscape consists of a small wooded/shrubby lot and periodically mowed impoundment edges. The wetland vegetation is dominated by skunk cabbage, jewel weed, and rice cutgrass and is bordered by willow and dogwood. The wetland soil substrate contained areas of soft soils associated with the saturated conditions however, no deep mucky substrate was observed. The wetland contains vegetative species common to bog turtle habitat however, the micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due to the man-made conditions and the lack of persistent mucky soil conditions, or a persistent spring-fed hydrology, Wetland INC-W-033 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-038

Wetland INC-W-038 is approximately 0.10-acre PSS resource located in the northwest corner of the Additional Project Area. The wetland situated in a shallow depression within a wooded/shrubby lot outside of the maintained cemetery grounds. The wetland extends along the shallow depression that abutting a small heavily eroded intermittent channel. The primary source of wetland hydrology is provided by the seasonal groundwater discharge and storm water runoff that collets in the shallow depression. The wetland vegetation is dominated by lurid sedge (*Carex lurida*), Japanese stilt grass, jewel weed, and spice bush (*Lindera benzoin*). The wetland soil substrate was firm and lacked any mucky substrate. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due the lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-38 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Wetland INC-W-039

Wetland INC-W-039 is approximately 0.001-acre PEM resource located in the northwest edge of the Additional Project Area. The wetland situated in a shallow depression on upslope edge of a narrow-wooded strip within the mowed and maintained cemetery grounds. The wetland extends along the shallow depression with compacted soils at the location of a seasonal ground water discharge. The primary source of wetland hydrology is provided by the seasonal groundwater discharge and surface water runoff collection in the compacted soils. The wetland vegetation is dominated by sedges, and Japanese stilt grass. The wetland soil substrate was firm and lacked any mucky substrate. The wetland contains vegetative species common to bog turtle habitat however, the vegetative structure and micro-habitat conditions are not consistent with the conditions commonly observed in bog turtle habitat. Due the lack of a mucky soil conditions, persistent spring-fed hydrology, or a vegetative structure with micro-habitat conditions Wetland INC-W-39 is not considered PBTH. The location of the wetland is depicted on Figure 3. Additional wetland information is provided in Table 1.

Table 1- Wetland Identification Table

Resource ID / DSA[1] ID	Type (PEM/PFO/PSS)[2] (EPH, INT, PER)[3]	Latitude	Longitude	Approximate Wetland Acreage w/in Phase 1 Study Area (ac.)	Potential Bog Turtle Habitat or Travel Corridor (Y / N/ UK)[4]	Approx. Acreage of DSA (ac.)
INC-W-021	PEM	40.419000°	-76.554185°	2.21	N	N/A
INC-W-022	PEM	40.420917°	-76.553552°	0.49	N	N/A
INC-W-023	PEM	40.419725°	-76.562735°	0.03	N	N/A
INC-W-024	PEM	40.420635°	-76.564835°	0.12	N	N/A
INC-W-025	PEM	40.420268°	-76.564792°	0.13	Y	0.01
INC-W-026	PEM	40.419494°	-76.565813°	0.43	Y	0.10
INC-W-027	PEM	40.419953°	-76.567548°	0.10	N	N/A
INC-W-028	PEM	40.420921°	-76.568350°	0.27	Y	0.10
INC-W-029	PEM	40.420197°	-76.568141°	0.25	Y	0.10
INC-W-030	PEM	40.421705°	-76.565821°	0.04	N	N/A
INC-W-031	PEM	40.420949°	-76.565383°	0.10	N	N/A
INC-W-032	PEM	40.421140°	-76.571387°	0.56	N	N/A
INC-W-033	PEM	40.421161°	-76.573448°	0.11	N	N/A
INC-W-034	PEM	40.422194°	-76.574443°	0.10	N	N/A
INC-W-035	PEM	40.423552°	-76.571282°	0.10	N	N/A
INC-W-036	PUB	40.423215°	-76.570849°	0.37	N	N/A
INC-W-037	PEM	40.418551°	-76.576455°	0.15	N	N/A
INC-W-038	PSS	40.421182°	-76.574895°	0.10	N	N/A
INC-W-039	PEM	40.420337°	-76.576480°	0.001	N	N/A

1. PEM-Palustrine emergent, PFO-Palustrine forested PSS-Palustrine scrub-shrub, PUB-Palustrine unconsolidated bottom.
2. EPH-Ephemeral, INT-Intermittent, PER-Perennial.
3. Y-Yes, N-No, UK-unknown.

CONCLUSIONS AND COMMENTS

In October 2020 a Phase 1 Bog Turtle Habitat Assessment was completed for the Indiantown Gap National Cemetery Proposed Phase 5 Expansion Project. The results of this survey identified one wetland (INC-W-002) as potential bog turtle habitat. Due to the imminent project schedule a Phase 2 survey was completed for this wetland in the 2021 Phase 2 bog turtle survey season prior to receiving concurrence on the Phase 1 survey results from the USFWS. The results of the Phase 2 survey indicate the probable absence of bog

turtle in the surveyed wetland. Reports documenting the results of these surveys and are included in a separate submission.

In June 2021 due to recently proposed design refinements an Additional Project Area was added to the Project. As result, on June 10, 2021 a supplemental Phase 1 bog turtle survey was conducted for areas within 300-feet of the proposed LOD for the Additional Project Area. During this survey nineteen wetlands (INC-W-021 through INC-W-39) were investigated. Four wetlands (INC-W-025, INC-W-026, INC-W-028, and INC-W-029) were determined to be PBTH.

Because the Additional Project Area and PBTH was identified after the May requirements of the 2021 Phase 2 bog turtle survey season, conducting Phase 2 surveys for the additional wetlands was not feasible. As such, to try to maintain the proposed project schedule, with the approval of the USFWS, the VA has elected to assume presence of bog turtles in these additional wetlands for the purposes of this Project and employ avoidance measures to ensure no adverse effects to bog turtles. There are no proposed direct impacts to wetlands or watercourses in the Additional Project Area. The proposed disturbance to areas within 300-feet of the identified PBTH will be limited to widening of existing paved walk ways within the mowed and maintained cemetery grounds, installation of informational signage along existing roadways, and non-structural cosmetic maintenance of existing monuments and bridge structures. To avoid adverse effects to bog turtles, all disturbance within 300-feet of the PBTH identified on June 10, 2021, will be conducted during the bog turtle time-of year restriction period between October 01 and March 31, or will be conducted under the supervision of a Recognized Qualified Bog Turtle Surveyor. Due to the currently mowed and maintained conditions adjacent to the PBTH wetlands and the limited disturbance required to complete the work proposed for the Additional Project Area, it is suggested that installation of bog turtle habitat exclusion fencing would result in additional unnecessary disturbance and extend the duration of work time needed to complete the maintenance and upgrades in the areas within 300-feet of the PBTH. As such, it is the recommendation of TES&P's Recognized Qualified Bog Turtle Surveyor that habitat exclusion measures should not be required if the work is conducted under the supervision of a Recognized Qualified Bog Turtle Surveyor, or completed between October 1 and March 31. If additional unanticipated changes to the proposed improvements are encountered the use of habitat exclusion measures will be utilized at the digression of the onsite Recognized Qualified Bog Turtle Surveyor and would be reported to the USFWS immediately.

Thank you for your consideration of these proposed measures. If you have any questions regarding the Project, please feel free to contact me at any time at bthompson@thompsonesp.com or contact Andrew Glucksman of Mabbett at glucksman@mabbett.com.

Sincerely,
Thompson Environmental Surveys & Permitting, LLC.

Bridger Thompson
USFWS/PFBC Qualified Bog Turtle Surveyor
bthompson@thompsonesp.com
(717) 609-3301

Enclosures (4)
Figure 1: Original Project Location Map
Figure 2: Additional Project Area Location Map
Figure 3: Phase 1 Bog Turtle Survey Study Area Maps
Attachment A: PNDI Receipt
Attachment B: USFWS Phase 1 Bog Turtle Habitat Survey Field Forms
Attachment C: Photolog

REFERENCES

National Geographic Society. 2013. Seamless Layer 2013 (Topo Source: Seamless Digital Raster Graphic-N.P.S. Natural Physical Map & U.S.G.S. Topographic Map i-cubed USGS Quad: Glen Rock, PA).

U.S. Fish and Wildlife Service (USFWS). 2001. *Bog Turtle (Clemmys muhlenbergii), Northern Population Recovery Plan*. Hadley, Massachusetts.

USFWS. 2020 (revised). *Guidelines for Bog Turtle Surveys*. Accessed at www.fws.gov/northeast/nyfo/es/btsurvey.pdf

Figures

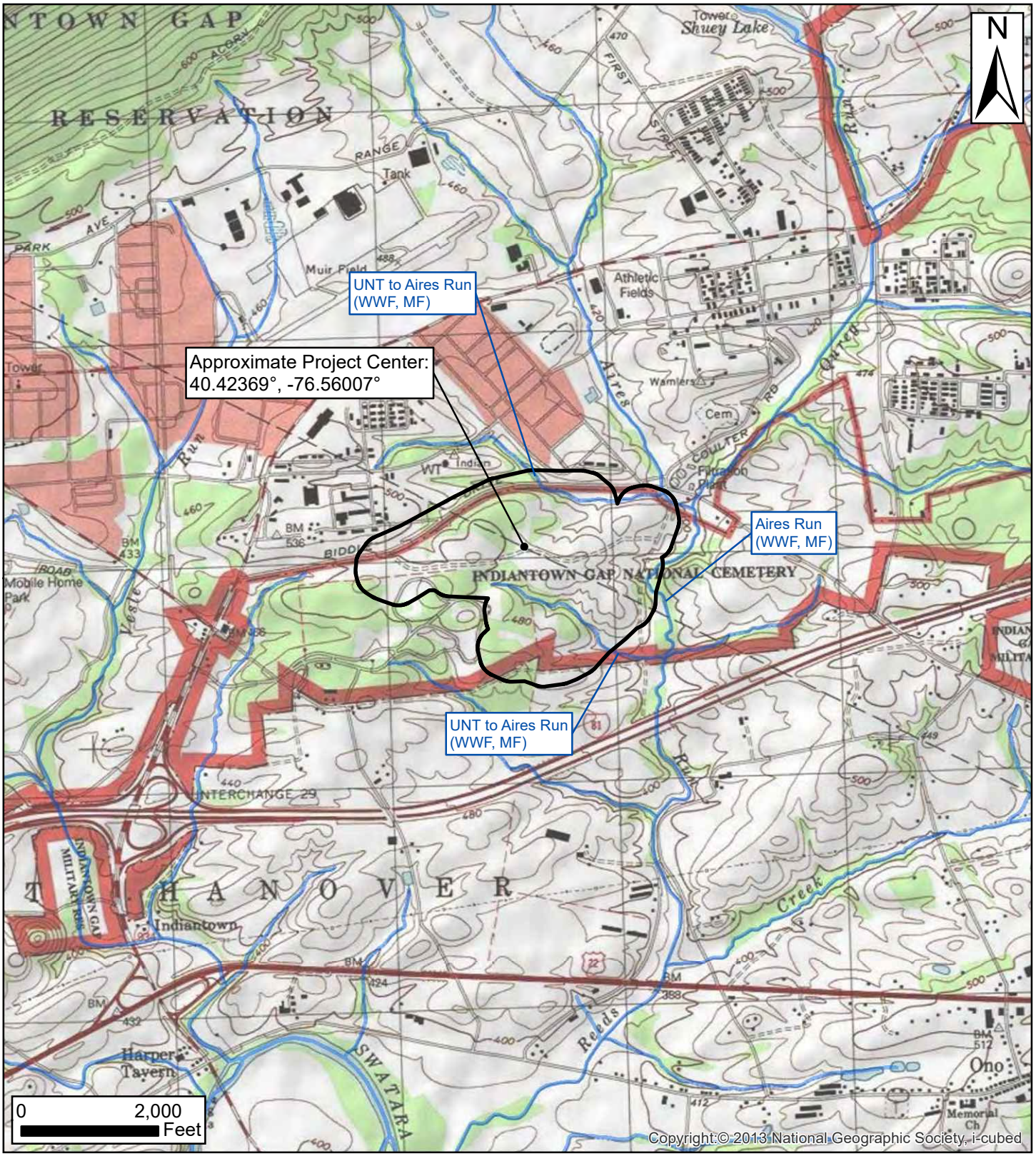
Figure 1:
Original Project Location Map

Figure 2:
Additional Project Area Project Location Map

Figure 2:
Phase 1 Bog Turtle Habitat Survey Map

INDIANTOWN GAP NATIONAL CEMETERY

Figure 1: Original Project Location Map



THOMPSON ENVIRONMENTAL
Surveys & Permitting, LLC.

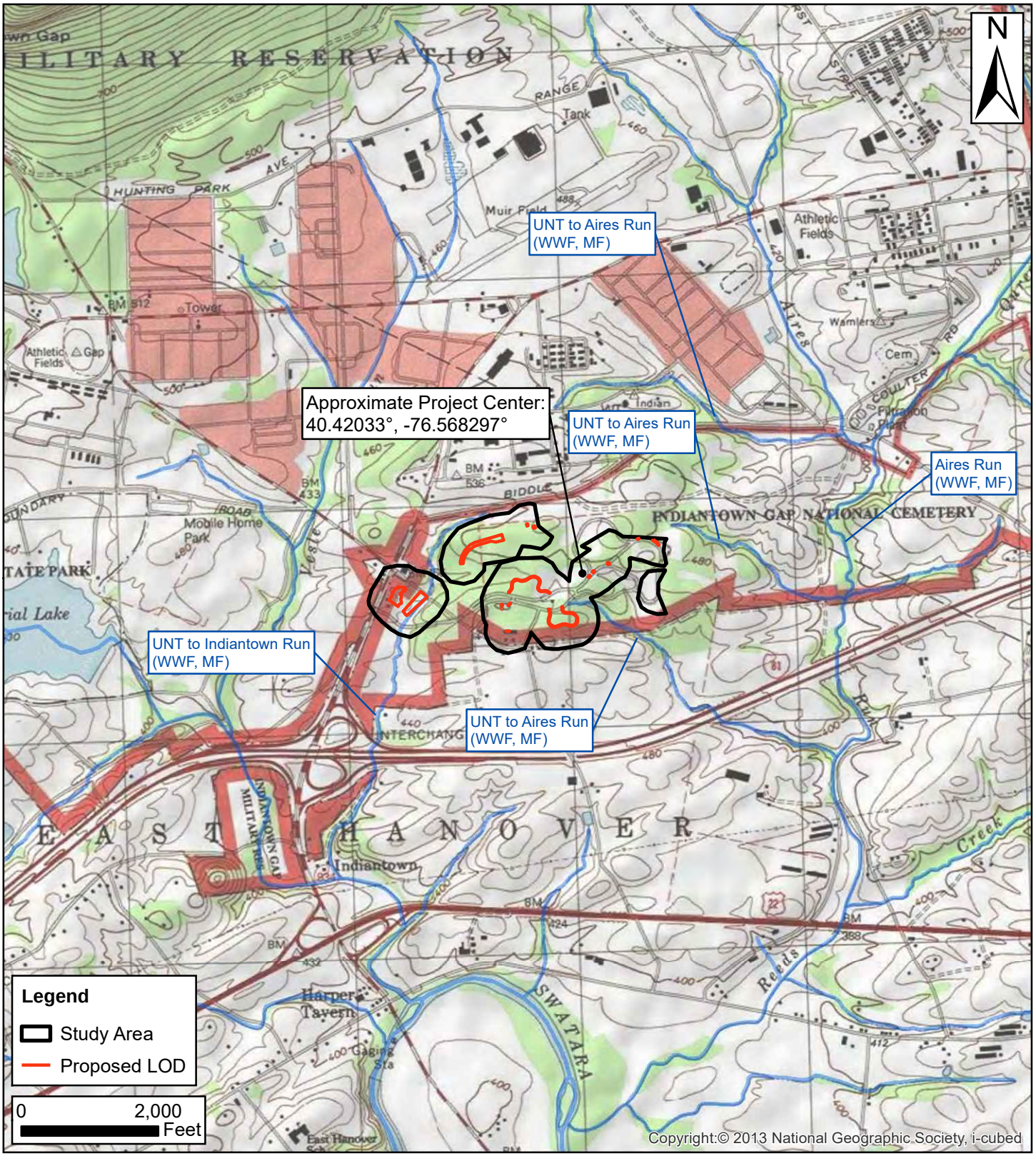
Date: 10/18/2020 | Created By: CMG

USGS 7.5' Quadrangle: Indiantown Gap
East Hanover and Union Townships
Lebanon County, Pennsylvania

Mabbett

INDIANTOWN GAP NATIONAL CEMETERY

Figure 2: Location Map

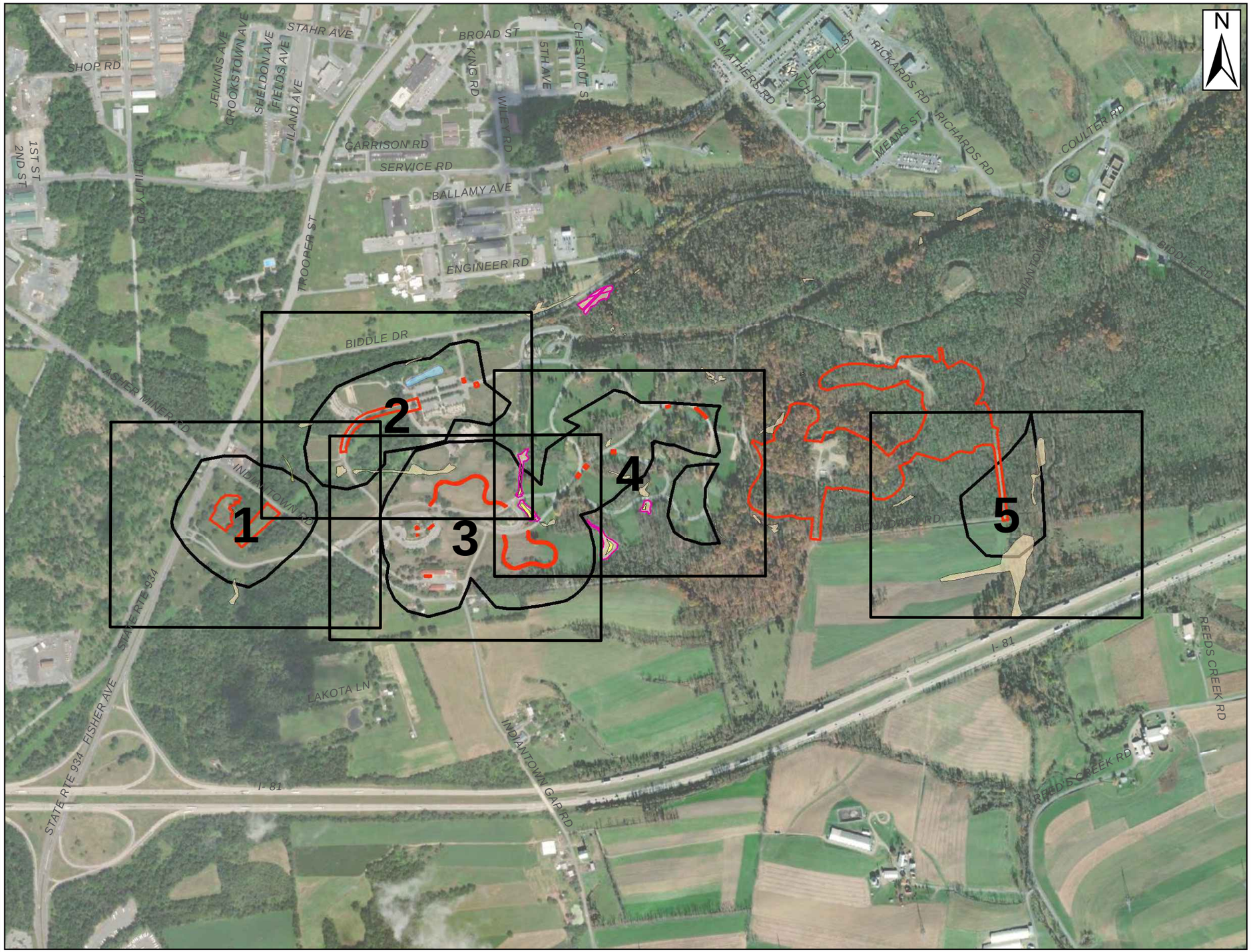


TES&P Thompson Environmental Surveys & Permitting, LLC.	**USGS 7.5' Quadrangle: Indiantown Gap** **East Hanover Township** **Lebanon County, Pennsylvania**	Mabbett
Date: 7/19/2021 | Created By: CMG		

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Phase 1 Bog Turtle Habitat Survey

Overview



Legend

- Potential Bog Turtle Habitat
- Designated Survey Area

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)
- Palustrine Scrub-Shrub
- Palustrine Unconsolidated Bottom (PUB)
- Proposed LOD
- Study Area

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Surveys & Permitting, LLC.

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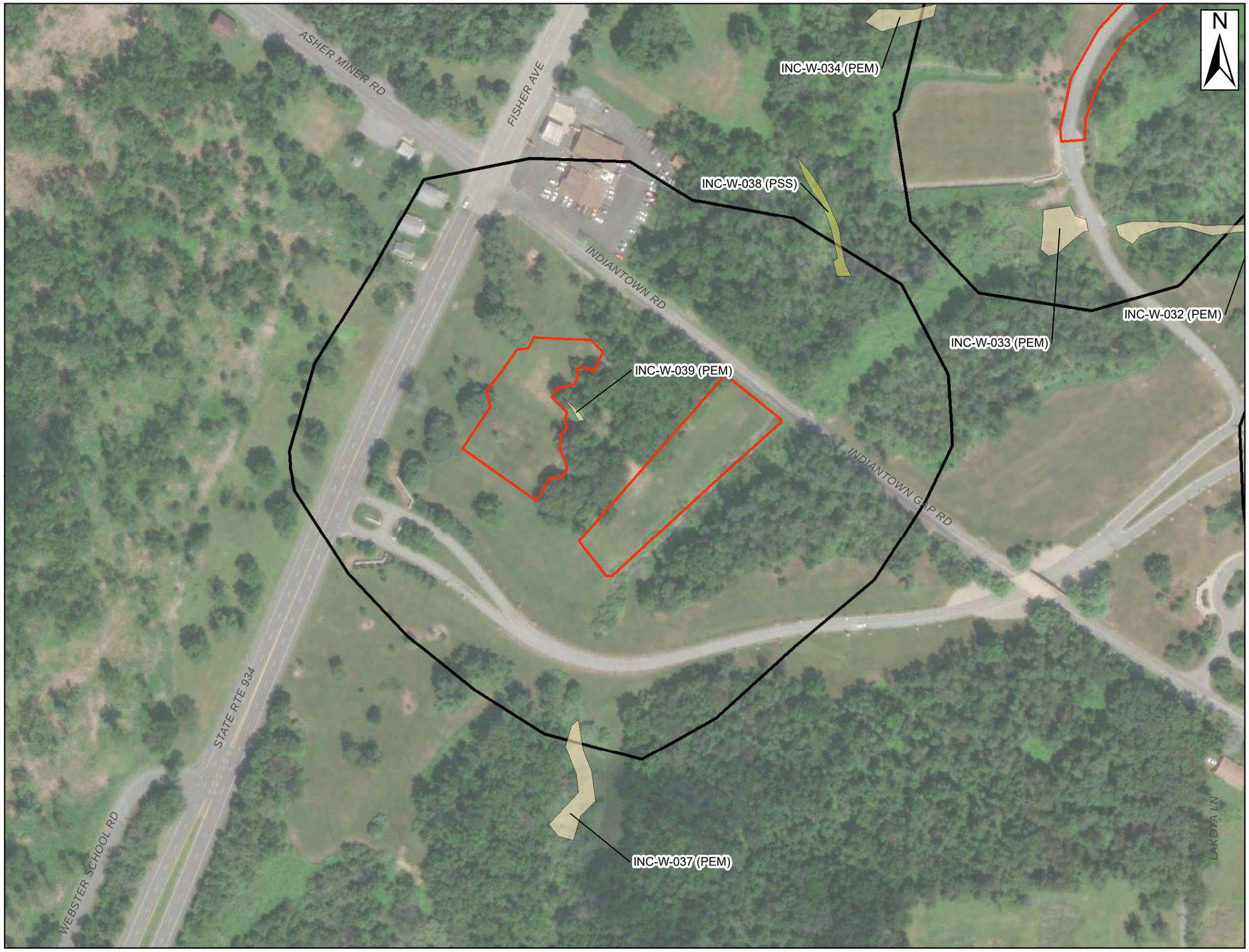
Date: 7/21/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Phase 1 Bog Turtle Habitat Survey



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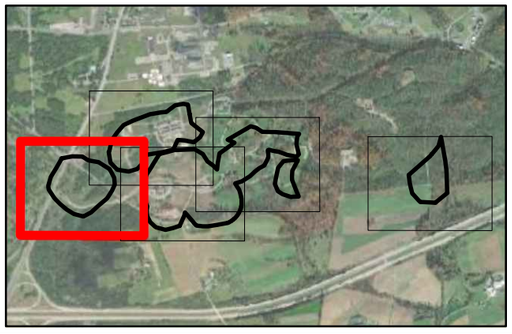

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Surveys & Permitting, LLC.

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Created By: CMG

Date: 7/21/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Phase 1 Bog Turtle Habitat Survey

Legend

- Potential Bog Turtle Habitat
- Designated Survey Area

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)
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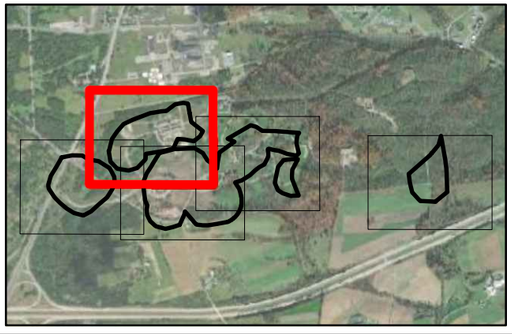
- Palustrine Unconsolidated Bottom (PUB)
- Proposed LOD
- Study Area



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Surveys & Permitting, LLC.

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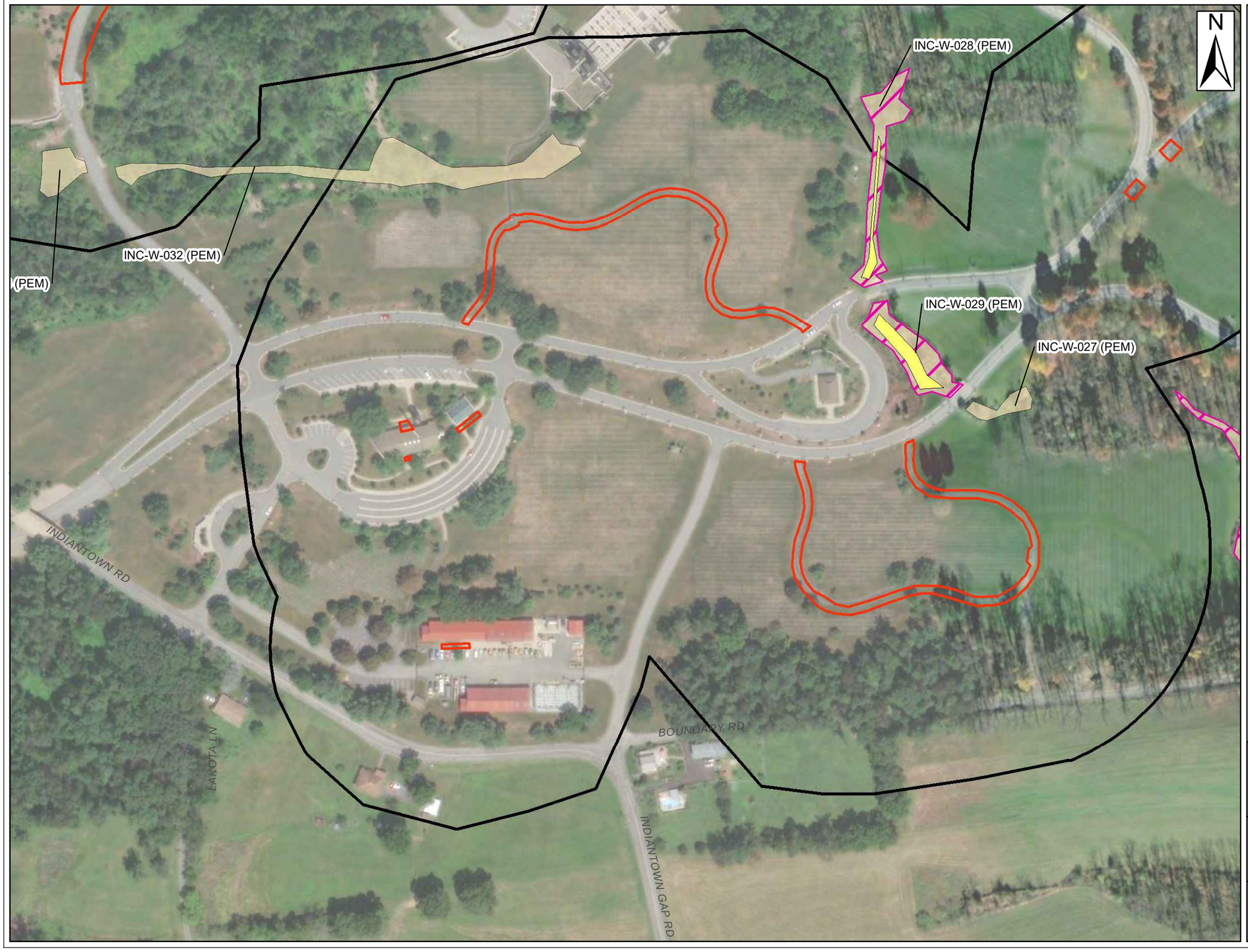
Date: 7/21/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Phase 1 Bog Turtle Habitat Survey



Legend

- Potential Bog Turtle Habitat
- Designated Survey Area

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)
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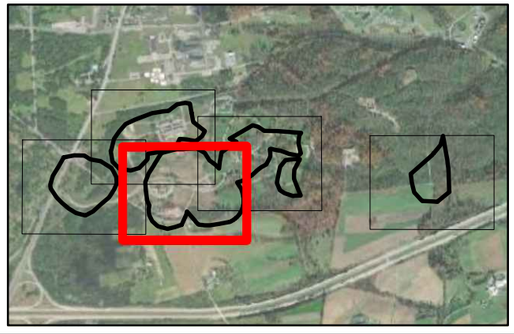
- Proposed LOD
- Study Area



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Surveys & Permitting, LLC.

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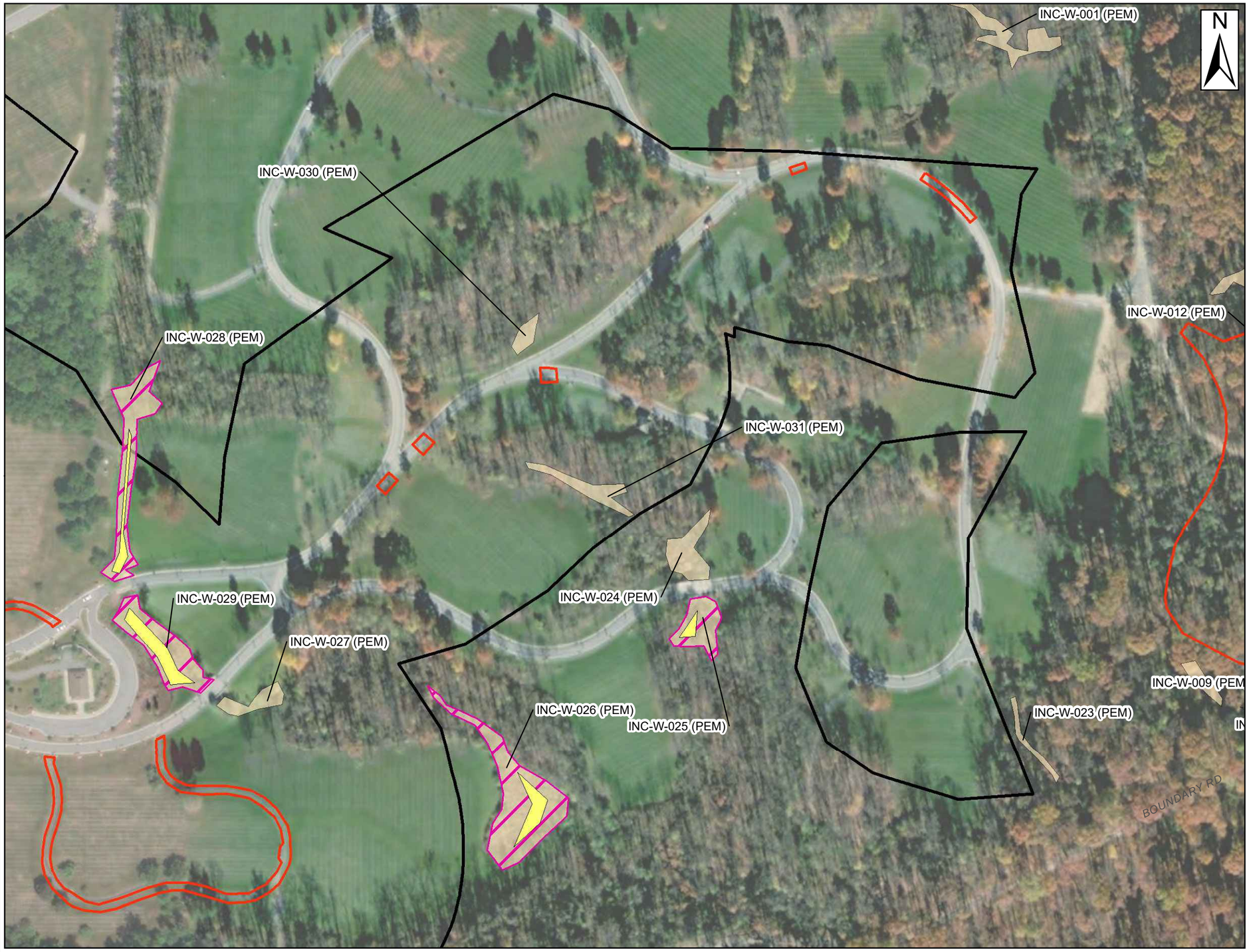
Date: 7/21/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Phase 1 Bog Turtle Habitat Survey

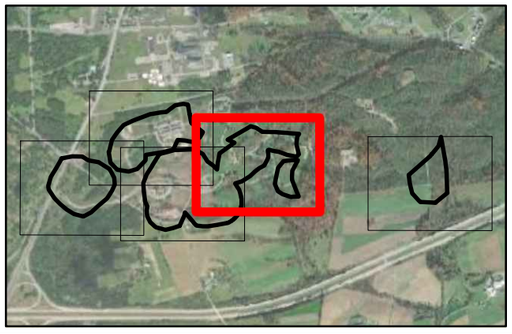


Legend

- Potential Bog Turtle Habitat
- Designated Survey Area

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)
- Palustrine Scrub-Shrub
- Palustrine Unconsolidated Bottom (PUB)
- Proposed LOD
- Study Area



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Surveys & Permitting, LLC.

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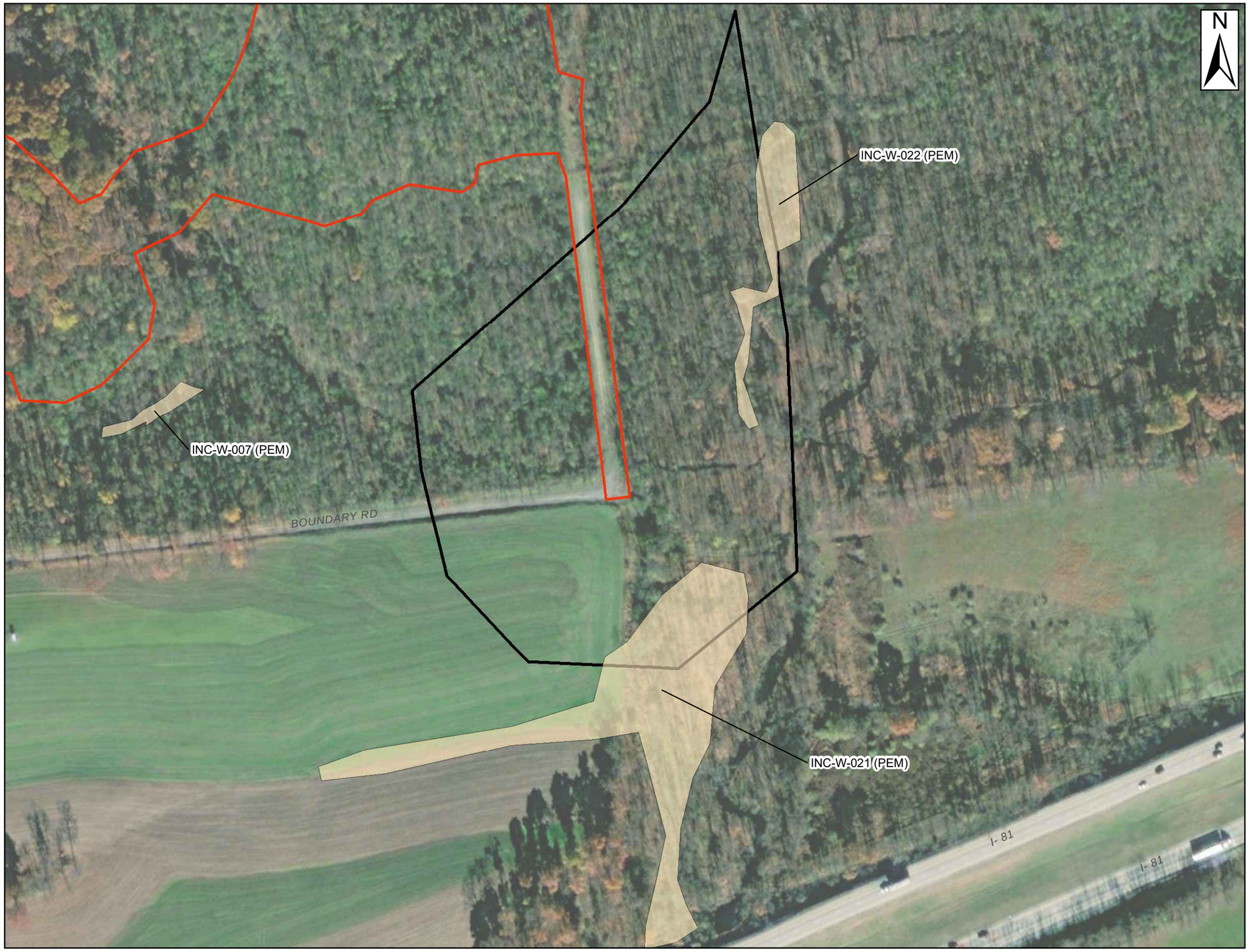
Created By: CMG

Date: 7/21/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3 Phase 1 Bog Turtle Habitat Survey



Legend

- Potential Bog Turtle Habitat
- Designated Survey Area

Approximate Wetland Cowardin Classification

- Palustrine Emergent (PEM)
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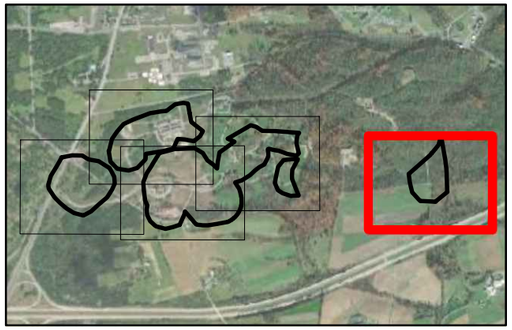
- Study Area



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THOMPSON ENVIRONMENTAL
Surveys & Permitting, LLC.

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Created By: CMG

Date: 7/21/2021

Attachment A

PNDI Receipt

1. PROJECT INFORMATION

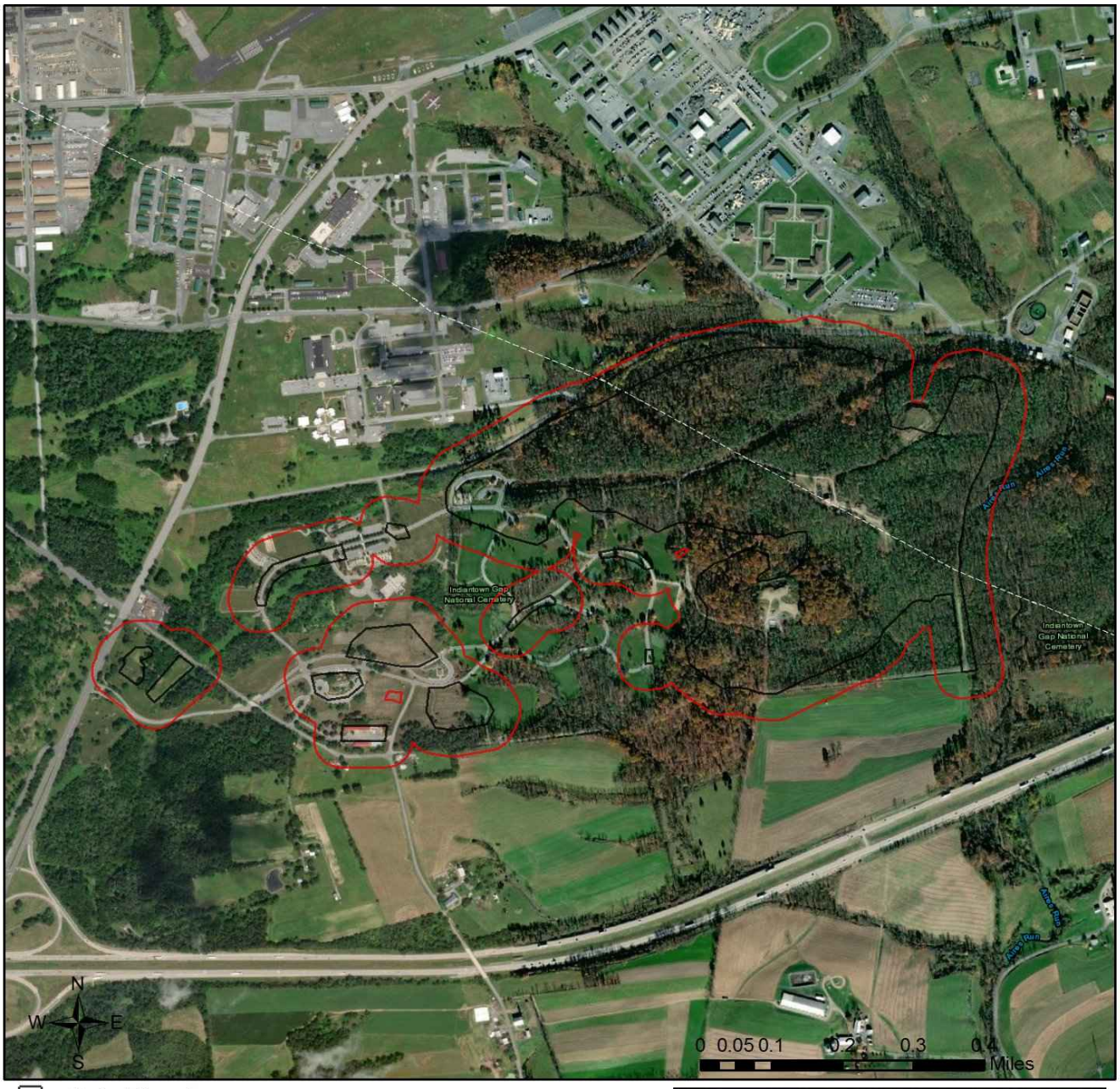
Project Name: **Final Indiantown Gap National Cemetery Phase 5 Expansion**
Date of Review: **7/9/2021 02:59:43 PM**
Project Category: **Development, Additions/maintenance to existing development facilities**
Project Area: **147.28 acres**
County(s): **Lebanon**
Township/Municipality(s): **EAST HANOVER TOWNSHIP; UNION TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **INDIANTOWN GAP**
Watersheds HUC 8: **Lower Susquehanna-Swatara**
Watersheds HUC 12: **Bow Creek-Swatara Creek; Reeds Run-Swatara Creek**
Decimal Degrees: **40.423303, -76.560872**
Degrees Minutes Seconds: **40° 25' 23.8910" N, 76° 33' 39.1392" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Final Indiantown Gap National Cemetery Phase 5 Expansion



Project Boundary

Buffered Project Boundary

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Final Indiantown Gap National Cemetery Phase 5 Expansion

Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Which of the following closest describes the proposed project?
Your answer is: A well or other groundwater extraction (e.g., groundwater pumping to facilitate mining, pump-and-treat operation) is proposed as part of this project, or in order to support some aspect of the project, and more than 1000 gallons per day will be extracted.

Q2: Are there any perennial or intermittent waterways (rivers, streams, creeks, tributaries) in or near the project area, or on the land parcel?
Your answer is: Yes

Q3: Describe how wastewater (effluent) will be handled (select one). For the purpose of this question, wastewater/effluent does not include stormwater runoff. If the project involves solely the renewal or modification of an existing discharge permit (e.g., NPDES permit), select from options 3, 4, 5, or 6 below.
Your answer is: All wastewater/effluent from this project/activity will be routed to an existing municipal wastewater treatment plant.

Q4: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: Someone qualified to identify and delineate wetlands has investigated the site, and determined that wetlands ARE located in or within 300 feet of the project area. (A written report from the wetland specialist, and detailed project maps should document this.)

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:
Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email the following information to the agency(s) (see AGENCY CONTACT INFORMATION). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies (but not USFWS).
*If information was requested by USFWS, applicants must email, or mail, project information to IR1_ESPenn@fws.gov to initiate a review. USFWS will not accept uploaded project materials.

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION
The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Mr. Fernando Fernández
Company/Business Name: U.S. Department of Veterans Affairs, Office of Construction and Facilities Management
Address: 425 I (eye) Street, NW, Room 6W317D
City, State, Zip: Washington, D.C. 20001
Phone: (202) 632-5529 Fax: ( )
Email: fernandez@va.gov

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

Attachment B

Phase 1 Bog Turtle Habitat Survey Field Forms for the Northern Population Range

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range

(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-021

PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.419000, -76.554185 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 2.21 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater X Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (2 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.

[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.

[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.

[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.

[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-021

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: Ho - Holly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	95%	None	N/A in.	N/A in.
PSS Portion of Wetland:	5%	None	N/A in.	N/A in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	(Japanese Stiltgrass *Microstegium vimineum*)	(Reed Canary Grass *Phalaris arundinacea*)	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-021

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located in wooded/shrubby gully along the flood plain of a small perennial watercourse.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
X None of it – the entire wetland is within the property boundaries
__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey was conducted for all wetlands w/in 300' of the Project Area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? X Yes __ No If yes, which ones?
Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not persistently spring fed and does not contain mucky soil substrate.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-022
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 41.420917, -76.553552 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.49 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse X Trib/Stream X Pond X Stormwater __ Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (10 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-022

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: Ho - Holly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	(Skunk Cabbage *Symplocarpus foetidus*)	Tearthumb Spp. *Polygonum* spp.	Sedges
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-022

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located in a wooded/shrubby floodway. situated in a high flow channel of a perennial watercourse.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
X None of it – the entire wetland is within the property boundaries
__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey conducted w/in 300' of Project Area

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? X Yes __ No If yes, which ones?
Green frog.

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is frequently flooded, does not contain a mucky soil substrate, is not persistently spring fed does not contain appropriate veg structure or micro-habitat conditions

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-023
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area
Coordinates 40.419725, -76.562735 **Project Type** Cemetery Expansion/Upgrades
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover Township, Lebanon County
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°
Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __
Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.03 acres, if known **# Wetlands w/in Project Area**[2] 19
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] X 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater X Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? wetland is located in a man-made stormwater swale.

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-023

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BeB- Brinkerton shaly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100 %	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-023

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland is located in a man made stormwater swale w/in a maintained cemetary grounds

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
X None of it – the entire wetland is within the property boundaries
__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
X None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey survey of the project area identified PEMH w/in 500 feet of this wetland

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is a man-made stormwater swale, no muck soil substrate, not spring fed

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-024
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.420635, -76.564835 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.12 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

X Rivulets (5 inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (4 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Bridge crossing results in retention of stormwater.

Estimate time period (in years) of disturbance*: __ ≤ 5 X 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-024

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WeD - Wilkert channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100 %	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	(Japanese Stiltgrass *Microstegium vimineum*)	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-024

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in depressional area on the upstream side of a small bridge. wetland extends along an intermittent drainage

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey identified PBTH w/in 100' of this wetland in the downstream side of the bridge structure

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? X Yes __ No If yes, which ones? Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland lacks mucky soil substrate. evidence of disturbance to hydrology. not persistently spring fed.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range

(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-025

PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.420268, -76.564792 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.13 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater X Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

X Rivulets (2 inches deep) X Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.

[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.

[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.

[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.

[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-025

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WcD - Wurtsel channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: 0.01 ac

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100	2%	6 in.	6 in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

Wetland Type/Vegetation

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	(Sensitive Fern *Onoclea sensibilis*)	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	(sedges)
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-025

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located on a gradual hillslope that extends to an intermittent drainage wetland is adjacent to maintained cemetery grounds

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? This wetland is PBTH

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? X Yes __ No If yes, which ones? Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

X Yes __ No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **soils** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

X Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

__ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland has spring fed hydrology and mucky soil substrate but is limited in size.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: NC-W-026
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area
Coordinates 40.419494, -76.565813 **Project Type** Cemetery Expansion/Upgrades
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover Township, Lebanon County
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°
Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __
Unknown **Drought Index*[1]** (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.43 acres, if known **# Wetlands w/in Project Area[2]** 19
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])
X Rivulets (2 inches deep) X Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-020

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

Wed- wetted channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: 0.10

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100 %	10	6 in.	10 in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	(Sweetflag *Acorus calamus*)	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	(Japanese Stiltgrass *Microstegium vimineum*)	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-026

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in large depressional area abutting a intermittent drainage

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? This wetland is PEM

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

X Yes __ No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **soils** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

__ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is persistently ground water fed and contains areas of mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-027
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.419953, -76.567548 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.10 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] X 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-027

Wetland Info

X Yes __ No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Portions have been periodically mowed.

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*:

Wed - Wetted channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

Wetland Type/Vegetation

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-027

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland extends from a mowed maintained lawn to a heavily eroded intermittent drainage

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey identified adjacent wetlands as PBTH

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? X Yes __ No If yes, which ones? Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not spring fed and does not contain mucky soil substrate.

Lead Surveyor – **please sign** below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-028
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area
Coordinates 40.420921, -76.568350 **Project Type** Cemetery Expansion/Upgrades
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover Township, Lebanon County
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°
Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __
Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.27 acres, if known **# Wetlands w/in Project Area**[2] 19
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater X Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes X No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
X Rivulets (2 inches deep) X Subsurface Tunnel/Rivulets __ Tire Ruts (____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? wetland is crossed by small bridge structure

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-028

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BrB - Brinkerton silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: 0.10

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	10%	6 in.	12 in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	(Japanese Stiltgrass *Microstegium vimineum*)	(Reed Canary Grass *Phalaris arundinacea*)	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-028

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a linear swale that conveys persistant spring fed hydrology. Wetland is surrounded by mowed maintained cemetery grounds.

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? This wetland and adjacent wetlands are PBTH.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

X Yes __ No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **soils** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

__ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is persistently spring fed and contains mucky soil substrate.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-029
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area
Coordinates 40.420197, -76.508141 **Project Type** Cemetery Expansion/Upgrades
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover Township, Lebanon County
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°
Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __
Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.25 acres, if known **# Wetlands w/in Project Area**[2] 19
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
X Springs/Seeps __ Springhouse X Trib/Stream __ Pond __ Stormwater X Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
X Rivulets (2 inches deep) X Subsurface Tunnel/Rivulets __ Tire Ruts (____inches deep)
X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is crossed by small bridge

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-029

__Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BrB - Brinkerton silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: 0.10

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	10%	6 in.	12 in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	(Reed Canary Grass *Phalaris arundinacea*)	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-029

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in wide depressional area that extends to a small intermittent drainage wetland is surrounded by a mowed maintained cemetary grounds

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No __ Unk

If yes, how did you conclude this? This wetland and adjacent wetlands are PBTH.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

X Yes __ No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **soils** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

X Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes __ No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

__ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is persistently spring fed and contains mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-030
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.421705, -76.565821 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours __ 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes __ No __ Unknown **Drought Index***[1] (Circle): none D0 D1 D2 D3 D4 **Wetland Photos Taken** __ Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.04 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) __Saturated soils present? If yes, year-round? __ Likely __ Unlikely__ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is associated w/ perched storm water in compacted soils

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-030

Wetland Info

X Yes __ No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:
portions periodically mowed

Rate (scale of 1-4) level of ~~vegetation disturbance~~* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WeD - Wickert channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus spp.*	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix spp.*
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus spp.*	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum spp.*	bulrush
Cattail *Typha spp.*	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum spp.*	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum spp.*	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-030

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in shallow compressed depression on the edge of a mowed maintained cemetary grounds

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase 1 survey identified PBTH in adjacent wetlands

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not spring fed, no mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-031
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.420949, -76.565383 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.10 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (X Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (10 inches deep) X Saturated soils present? If yes, year-round? __ Likely X Unlikely __ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is associated w/ collected stormwater discharge

Estimate time period (in years) of disturbance*: __ ≤ 5 X 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-031

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WeD - Wilkes channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100 %	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-031

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in depressional topo w/in a wooded strip that collects stormwater runoff

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? X Yes __ No __ Unk Habitat **off-site**? __ Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey identified adjacent wetlands as PBTH.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? X Yes __ No If yes, which ones?

Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not spring fed. wetland does not contain mucky substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-032
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.421140, -76.571387 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.56 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater X Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) X Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? __ Likely X Unlikely __ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-032

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BrB - Brinkerton silt loam
BeB - Bedington shaly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	(Tearthumb Spp. *Polygonum* spp.)	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	(Japanese Stiltgrass *Microstegium vimineum*)	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: NC-W-032

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Wetland extends from a narrow swale into a wooded gully surrounded by mowed maintained cemetary grounds

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?
X None of it – the entire wetland is within the property boundaries
__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?
__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of Project Area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____
Other herps observed? X Yes __ No If yes, which ones?
Box turtle

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.
X Yes __ No __ Unsure The **vegetation** criterion for bog turtle habitat is met.
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).
__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).
__ This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland lacks persistent spring fed hydrology. wetland lacks persistent mucky soil substrate

Lead Surveyor – **please sign** below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-033
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.421141, -76.573448 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.11 acres, if known **# Wetlands w/in Project Area**[2] _____

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] X 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (__ Seasonal Flooding[4] X Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (1 inches deep) X Saturated soils present? If yes, year-round? __ Likely X Unlikely __ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is a man-made storm basin

Estimate time period (in years) of disturbance*: __ ≤ 5 X 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-033

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WcD - Wurtsboro channery s.H loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	(Reed Canary Grass *Phalaris arundinacea*)	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-033

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a man-made storm basin that contains intermittent water course

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries

☐ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

☐ None of it ☐ All of it ☐ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? ☐ Yes ☒ No ☐ Unk Habitat **off-site**? ☐ Yes ☐ No ☐ Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of the Project area.

Species

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?_____

Other herps observed? ☐ Yes ☒ No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

☐ Yes ☒ No ☐ Unsure The **hydrology** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure The **soils** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure The **vegetation** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

☐ Yes ☒ No ☐ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

☒ This wetland does **NOT** have potential bog turtle habitat. ☐ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is man-made. no mucky soil substrate.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-034
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.422194, -76.574443 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.10 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 X 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse __ Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) __Saturated soils present? If yes, year-round? __ Likely __ Unlikely__ Unk

__ Yes X No Are there any signs of disturbance to ***hydrology*** (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-034

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: WeD- Weikert channery silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: NONE

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	NONE	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-034

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in depressional topography in small wooded lot adjacent to mowed maintained cemetary grounds

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of the Project Area

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Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not spring fed and does not contain a mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INL-W-035
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.423552, -76.571282 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.10 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

X Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

__ Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) __Saturated soils present? If yes, year-round? __ Likely __ Unlikely__ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-035

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BeC - Beddinton shaly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	(Sensitive Fern *Onoclea sensibilis*)	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-035

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a wooded/shrubby lot adjacent to a heavily eroded intermittent drainage

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of the Project area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not spring fed and does not contain a mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-036
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area
Coordinates 40.423215, -76.570849 **Project Type** Cemetery Expansion/Upgrades
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover Township, Lebanon County
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°
Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __
Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.37 acres, if known **# Wetlands w/in Project Area**[2] 19
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse __ Trib/Stream X Pond __ Stormwater __ Iron Bacteria __ Watercress
X Water Visible on Surface Evidence of Flooding __ Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) __Saturated soils present? If yes, year-round? __ Likely __ Unlikely__ Unk
X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? Wetland is a man-made impoundment

Estimate time period (in years) of disturbance*: __ ≤ 5 X6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-036

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BeC- Beddinton shaly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	_____	_____	_____ in.	_____ in.
PSS Portion of Wetland:	_____	_____	_____ in.	_____ in.
PFO Portion of Wetland:	_____	_____	_____ in.	_____ in.
POW/PUB Portion of Wetland:	100%	None	N/A in.	N/A in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impatiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-036

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is a man-made impoundment

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries

☐ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

☐ None of it ☐ All of it ☐ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? ☐ Yes ☒ No ☐ Unk Habitat **off-site**? ☐ Yes ☐ No ☐ Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of the Project Area.

Species

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?_____

Other herps observed? ☒ Yes ☐ No If yes, which ones?

painted turtle

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

☐ Yes ☒ No ☐ Unsure The **hydrology** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure The **soils** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure The **vegetation** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

☐ Yes ☒ No ☐ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

☒ This wetland does **NOT** have potential bog turtle habitat. ☐ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is a man-made impoundment

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

****Important**** Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-037
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.418551, -76.576455 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.15 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

X Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

X Small Puddles/Depressions (3 inches deep) X Saturated soils present? If yes, year-round? X Likely __ Unlikely __ Unk

X Yes __ No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)? wetland is located in a man-made storm basin

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 X 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-037

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: Ho - Holly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: NONE

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	NONE	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	(Rice Cutgrass *Leersia oryzoides*)	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	
(Cattail *Typha* spp.)	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	(Reed Canary Grass *Phalaris arundinacea*)	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-037

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a stormwater basin constructed along a heavily eroded intermittent drainage

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries

☐ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

☐ None of it ☐ All of it ☐ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? ☐ Yes ☒ No ☐ Unk Habitat **off-site**? ☐ Yes ☐ No ☒ Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of the Project Area.

Species

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?_____

Other herps observed? ☐ Yes ☒ No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

☐ Yes ☒ No ☐ Unsure The **hydrology** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure The **soils** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure The **vegetation** criterion for bog turtle habitat is met.

☐ Yes ☒ No ☐ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

☐ Yes ☒ No ☐ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

☒ This wetland does **NOT** have potential bog turtle habitat. ☐ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is heavily disturbed is no persistent spring fed no mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-038
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area
Coordinates 40.421182, -76.574895 **Project Type** Cemetery Expansion/Upgrades
Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.
County/Township/Municipality East Hanover Township, Lebanon County
Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental
Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°
Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __
Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.10 acres, if known **# Wetlands w/in Project Area**[2] 19
Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+
Estimate % Canopy Cover*[3] __ 0% __ ≤ 5 X 6-20 __ 21-40 __ 41-60 __ > 60
Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**
__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress
__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (__ Seasonal Flooding[4] __ Routine Flooding[5])
__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)
__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? __ Likely X Unlikely __ Unk
__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __6-10 __11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W038

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: Ho - Holly silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Wetland Type/Vegetation

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	(Jewelweed *Impatiens capensis*)	Rice Cutgrass *Leersia oryzoides*	(Spicebush *Lindera benzoin*)	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	(Sensitive Fern *Onoclea sensibilis*)	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	(Sedges)
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-038

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in wooded/shrubby draw along and within the floodplain of a small intermittent drainage

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No __ Unk

If yes, how did you conclude this? Phase I survey was conducted w/in 300' of the project Area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): wetland is not persistently spring fed no mucky soil substrate

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** [signature]

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Phase 1 Bog Turtle Habitat Survey Data Form** for the **Northern Population Range
(Revised April 29, 2020) Please do not edit document.

Wetland ID: INC-W-039
PNDI # (for PA): 737860

General Info

Property/Project Name Indiantown Gap National Cemetery Expansion Project- Additional Project Area

Coordinates 40.420337, -76.576480 **Project Type** Cemetery Expansion/Upgrades

Entity Requesting Phase 1 Survey Mabbett & Associates, Inc.

County/Township/Municipality East Hanover Township, Lebanon County

Lead Surveyor Bridger Thompson **Affiliation** Thompson Environmental

Other Assistants Present None

Date/Condition

Date of Survey 06/10/2021 **Time In** 07:00 **Time Out** 15:00 **Air Temp.** 75 F ° C°

Last Precipitation __ < 24 hours X 1-7 days __ > 1 week __ unknown **Drought conditions?** __ Yes X No __

Unknown **Drought Index***[1] (Circle): none (D0) D1 D2 D3 D4 **Wetland Photos Taken** X Yes __ No (Provide photo location map) **Notes** (*e.g.*, details about drought, flood, abnormally dry, and/or snow/ice conditions, and any other seasonal conditions observed):

Wetland Info

Wetland Size 0.001 acres, if known **# Wetlands w/in Project Area**[2] 19

Estimate wetland size (acres) __ < 0.1 __ 0.1 - 0.5 __ 0.5 - 1 __ 1 - 2 __ 2 - 4 __ 5+ __ 10+

Estimate % Canopy Cover*[3] __ 0% X ≤ 5 __ 6-20 __ 21-40 __ 41-60 __ > 60

Hydrology and Soils (check all that apply): **use additional pages to further discuss pertinent general wetland information**

__ Springs/Seeps __ Springhouse X Trib/Stream __ Pond X Stormwater __ Iron Bacteria __ Watercress

__ Water Visible on Surface Evidence of Flooding X Yes __ No If yes, (__ Seasonal Flooding[4] X Routine Flooding[5])

__ Rivulets (_____inches deep) __ Subsurface Tunnel/Rivulets __ Tire Ruts (_____inches deep)

__ Small Puddles/Depressions (____ inches deep) X Saturated soils present? If yes, year-round? __ Likely X Unlikely __ Unk

__ Yes X No Are there any signs of disturbance to *hydrology* (*e.g.*, drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver activity)?

Estimate time period (in years) of disturbance*: __ ≤ 5 __ 6-10 __ 11-20 __ > 20

For ditches that may be present, is there bog turtle habitat? If yes, describe:

None

[1] (*) Denotes reference to the **Supplemental Information** document that provides more details on this particular question.
[2] Each wetland must have a separate Phase 1 habitat assessment data form completed.
[3] Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are most prominent in the wetland and have the highest percent of coverage compared to other species.
[4] Seasonal flooding in wetlands/streams can occur as a result of spring snow melt/heavy rain that increases water levels in these systems.
[5] Routine flooding refers to tidally-influenced wetland/stream systems or the occurrence of normal rain patterns throughout the year.

Wetland ID: INC-W-039

__ Yes X No Are there any signs of disturbance to *vegetation* (*e.g.*, mowing, pasturing, burning)? If yes, describe:

Wetland Info

Rate (scale of 1-4) level of vegetation disturbance* (Circle): 1. Light to moderate grazing or mowing 2. No grazing, mowing, burning observed[6] 3. Moderate to high grazing or mowing 4. Mowing occurs during bog turtle active season

Soil types present*: BrB- Brinkton Silt loam

How much suitable habitat is in this wetland? Estimate acreage or percentage: None

Wetland Type	% of Total Wetland	% of Wetland Type w/Muck	Avg. Muck Depth	Max. Muck Depth
PEM Portion of Wetland:	100%	None	N/A in.	N/A in.
PSS Portion of Wetland:			in.	in.
PFO Portion of Wetland:			in.	in.
POW/PUB Portion of Wetland:			in.	in.

Wetland Type/Vegetation

CIRCLE all vegetation* from list below that is dominant (≥ 20% for each wetland type listed above) and add other species you observe that are not listed in table in the "notes" space provided below or in the extra table cells.

Alder Spp. *Alnus* spp.	Common Reed *Phragmites australis*	Jewelweed *Impotiens capensis*	Rice Cutgrass *Leersia oryzoides*	Spicebush *Lindera benzoin*	Willow spp. *Salix* spp.
Alder-leaved Buckthorn *Rhamnus alnifolia*	Dogwood Spp. *Cornus* spp.	Mile-A-Minute *Persicaria perfoliata*	Rough-leaved Goldenrod *Solidago patula*	Spike-Rush *Eleocharis palustris*	Woolly-fruited Sedge *Carex lasiocarpa*
American Elm *Ulmus americana*	Duck Potato *Sagittaria latifolia*	Multiflora Rose *Rosa multiflora*	Sensitive Fern *Onoclea sensibilis*	Swamp Rose *Rosa palustris*	Woolly Bulrush or Woolgrass *Scirpus cyperinus*
Arrowhead *Sagittaria latifolia*	Eastern Red Cedar *Juniperus virginiana*	Poison Sumac *Toxicodendron vernix*	Shrubby Cinquefoil *Dasiphora fruticosa*	Sweetflag *Acorus calamus*	Yellow-Green Sedge *Cyperus esculentus*
Carpetgrass *Axonopus fissifolius*	Eastern Tamarack *Larix laricina*	Porcupine Sedge *Carex hystericina*	Skunk Cabbage *Symplocarpus foetidus*	Tearthumb Spp. *Polygonum* spp.	sedges
Cattail *Typha* spp.	Grass-of-Parnassus *Parnassia glauca*	Purple Loosestrife *Lythrum salicaria*	Smooth Sawgrass *Cladium mariscoides*	. Tussock Sedge *Carex stricta*	
Cinnamon Fern *Osmundastrum cinnamomeum*	Inland sedge *Carex interior*	Red Maple *Acer rubrum*	Soft Rush or Common Rush *Juncus effusus*	Viburnum Spp. *Viburnum* spp.	
Common Boneset *Eupatorium perfoliatum*	Japanese Stiltgrass *Microstegium vimineum*	Reed Canary Grass *Phalaris arundinacea*	Sphagnum Moss *Sphagnum* spp.	White turtlehead *Chelone glabra*	

Notes on additional plant species (*e.g.*, sedge, rush, grass, shrub, tree species):

[6] No grazing, mowing, or burning is given a "2" rank as this is considered more harmful to bog turtle wetlands than Rank 1 (light to moderate grazing or mowing). Light to moderate habitat management is beneficial to suppressing succession of native and non-native plant species.

Wetland ID: INC-W-039

Describe surrounding landscape (*e.g.*, wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Wetland is located in a depressional area at the edge of a mowed maintained cemetary grounds. Wetland is located at the beginning of an eroded ditch

Landscape Info

How much of this wetland is located **off-site** (*i.e.*, outside the property boundaries or right-of-way)?

X None of it – the entire wetland is within the property boundaries

__ Some of it – _____ Acres or _____% of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the **off-site portion** was surveyed (on foot)?

__ None of it __ All of it __ Part of it (____ acres or ____% of the off-site portion)

Is there potential bog turtle habitat **within 300 feet***? __ Yes X No __ Unk Habitat **off-site**? __ Yes __ No X Unk

If yes, how did you conclude this? Phase I survey was conducted within 300' of the project Area.

Species

Were any bog turtles observed? __ Yes X No If yes, how many?_____

Other herps observed? __ Yes X No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

__ Yes X No __ Unsure The **hydrology** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **soils** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure The **vegetation** criterion for bog turtle habitat is met.

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (fair to good quality).

__ Yes X No __ Unsure This wetland **HAS** potential bog turtle habitat (low to very low quality).

X This wetland does **NOT** have potential bog turtle habitat. __ **UNSURE** if suitable habitat is present.

Notes (How did you reach this opinion?): Wetland is not spring fed. no mucky soil substrate.

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Print Name Bridger Thompson **Signature** Bridger Thompson

Date 06/10/2021

Contact Information bthompson@thompsonesp.com, 717-609-3301

Important Please include all Phase 1 data forms in a final Phase 1 bog turtle habitat assessment report (see Attachment 3 in *Guidelines for Bog Turtle Surveys* for checklist) and submit to your local state wildlife agency and U.S. Fish and Wildlife Service Field Office (see Attachment 1 in *Guidelines for Bog Turtle Surveys*).

Attachment C

Photo Log

Photograph: 1	**Date:** 06/10/21
Feature ID: Existing Conditions	
Direction: Southwest	
Description: View of the existing conditions in the mowed maintained cemetery grounds.	

Photograph: 2	**Date:** 06/10/21
Feature ID: Wetland INC-W-021	
Direction: South	
Description: View of the vegetative conditions in wetland INC-W-021.	

Photograph:	**Date:**
3	06/10/21

Feature ID:
Wetland INC-W-022

Direction:
North

Description:
View of the vegetative and surface water conditions in wetland INC-W-022.

Photograph:	**Date:**
4	06/10/21

Feature ID:
Wetland INC-W-023

Direction:
North

Description:
View of wetland INC-W-023.

Photograph:	**Date:**
5	06/10/21
Feature ID: Wetland INC-W-024	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-024.	

Photograph:	**Date:**
6	06/10/21
Feature ID: Wetland INC-W-025	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-025.	

Photograph:	**Date:**
7	06/10/21

Feature ID: Wetland INC-W-025

Direction: N/A

Description: View of the mucky soil substrate and hydrologic conditions in wetland INC-W-025.

Photograph:	**Date:**
8	06/10/21

Feature ID: Wetland INC-W-026

Direction: East

Description: View of the vegetative conditions in wetland INC-W-026.

Photograph:	**Date:**
9	06/10/21
Feature ID: Wetland INC-W-027	
Direction: Northwest	
Description: View of the vegetative conditions in wetland INC-W-027.	

Photograph:	**Date:**
10	06/10/21
Feature ID: Wetland INC-W-028	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-028.	

Photograph:	**Date:**
11	06/10/21
Feature ID: Wetland INC-W-029	
Direction: North	
Description: View of wetland INC-W-029.	

Photograph:	**Date:**
12	06/10/21
Feature ID: Wetland INC-W-030	
Direction: East	
Description: View of the vegetative conditions in wetland INC-W-030.	

Photograph:	**Date:**
13	06/10/21
Feature ID: Wetland INC-W-031	
Direction: South	
Description: View of wetland INC-W-031.	

Photograph:	**Date:**
14	06/10/21
Feature ID: Wetland INC-W-032	
Direction: West	
Description: View of the vegetative conditions in the swale portion of wetland INC-W-032.	

Photograph:	**Date:**
15	06/10/21

Feature ID:
Wetland INC-W-032

Direction:
West

Description:
View of the vegetative conditions in the wooded lot portion of wetland INC-W-032.

Photograph:	**Date:**
16	06/10/21

Feature ID:
Wetland INC-W-033

Direction:
North

Description:
View of the man-made basin identified as wetland INC-W-033.

Photograph:	**Date:**
17	06/10/21

Feature ID:
Wetland INC-W-034

Direction:
Northwest

Description:
View of the vegetative conditions in wetland INC-W-034.

Photograph:	**Date:**
18	06/10/21

Feature ID:
Wetland INC-W-035

Direction:
East

Description:
View of the vegetative conditions in wetland INC-W-035.

Photograph:	**Date:**
19	06/10/21
Feature ID: Wetland INC-W-036	
Direction: West	
Description: View of the impoundment identified as wetland INC-W-036.	

Photograph:	**Date:**
20	06/10/21
Feature ID: Wetland INC-W-037	
Direction: Southwest	
Description: View of the man-made storm water structure identified as wetland INC-W-037.	

Photograph:	**Date:**
21	06/10/21
Feature ID: Wetland INC-W-038	
Direction: Southwest	
Description: View of vegetative conditions in wetland INC-W-038.	

Photograph:	**Date:**
22	06/10/21
Feature ID: Wetland INC-W-039	
Direction: Southwest	
Description: View of vegetative conditions in wetland INC-W-039.	

ATTACHMENT 4

PNDI # 737860

1. PROJECT INFORMATION

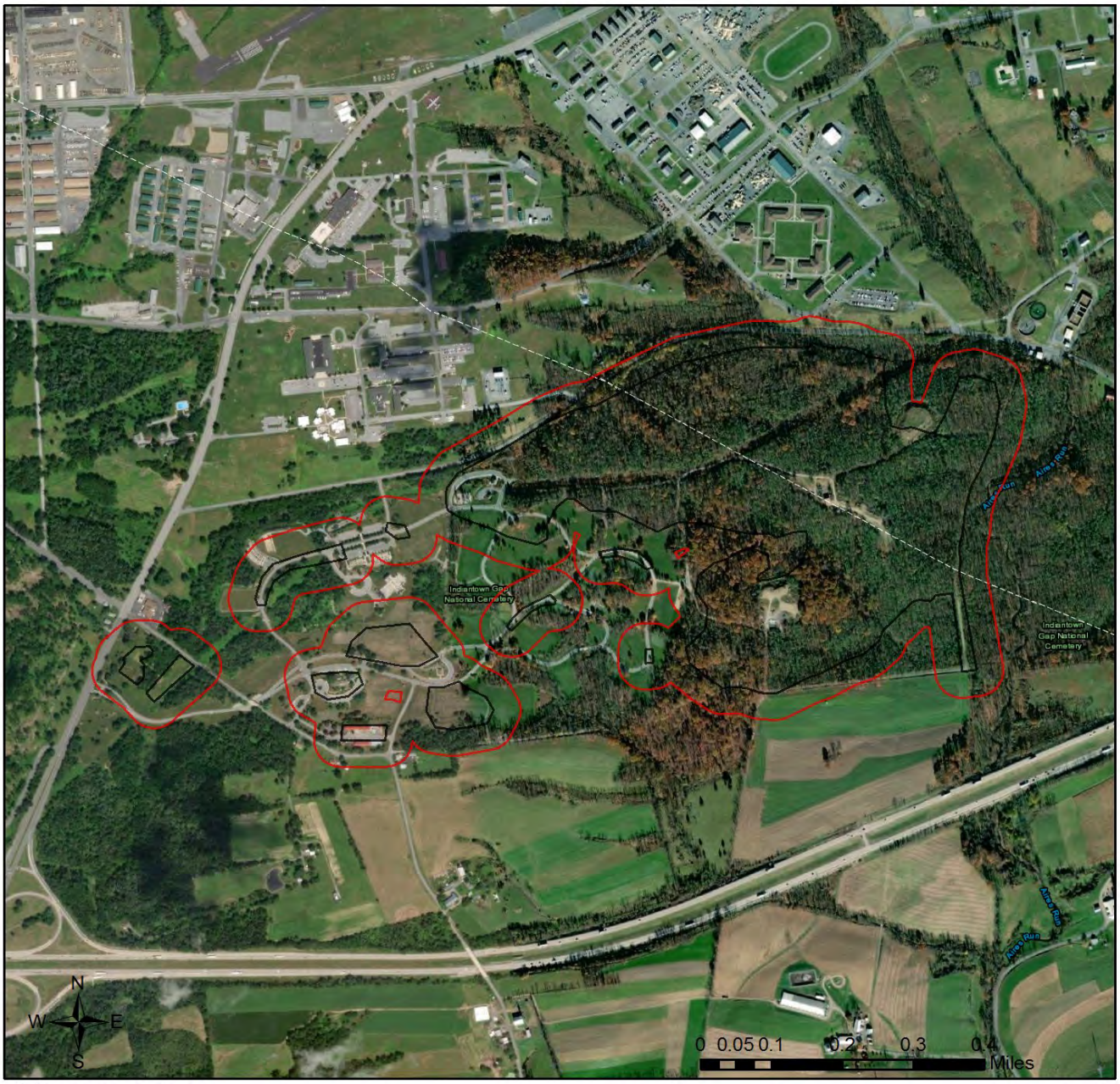
Project Name: **Final Indiantown Gap National Cemetery Phase 5 Expansion**
Date of Review: **7/9/2021 02:59:43 PM**
Project Category: **Development, Additions/maintenance to existing development facilities**
Project Area: **147.28 acres**
County(s): **Lebanon**
Township/Municipality(s): **EAST HANOVER TOWNSHIP; UNION TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **INDIANTOWN GAP**
Watersheds HUC 8: **Lower Susquehanna-Swatara**
Watersheds HUC 12: **Bow Creek-Swatara Creek; Reeds Run-Swatara Creek**
Decimal Degrees: **40.423303, -76.560872**
Degrees Minutes Seconds: **40° 25' 23.8910" N, 76° 33' 39.1392" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Final Indiantown Gap National Cemetery Phase 5 Expansion



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Final Indiantown Gap National Cemetery Phase 5 Expansion

Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Which of the following closest describes the proposed project?
Your answer is: A well or other groundwater extraction (e.g., groundwater pumping to facilitate mining, pump-and-treat operation) is proposed as part of this project, or in order to support some aspect of the project, and more than 1000 gallons per day will be extracted.

Q2: Are there any perennial or intermittent waterways (rivers, streams, creeks, tributaries) in or near the project area, or on the land parcel?
Your answer is: Yes

Q3: Describe how wastewater (effluent) will be handled (select one). For the purpose of this question, wastewater/effluent does not include stormwater runoff. If the project involves solely the renewal or modification of an existing discharge permit (e.g., NPDES permit), select from options 3, 4, 5, or 6 below.
Your answer is: All wastewater/effluent from this project/activity will be routed to an existing municipal wastewater treatment plant.

Q4: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.
Your answer is: Someone qualified to identify and delineate wetlands has investigated the site, and determined that wetlands ARE located in or within 300 feet of the project area. (A written report from the wetland specialist, and detailed project maps should document this.)

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:
Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email the following information to the agency(s) (see AGENCY CONTACT INFORMATION). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies (but not USFWS).
*If information was requested by USFWS, applicants must email, or mail, project information to IR1_ESPenn@fws.gov to initiate a review. USFWS will not accept uploaded project materials.

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION
The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Mr. Fernando Fernández
Company/Business Name: U.S. Department of Veterans Affairs, Office of Construction and Facilities Management
Address: 425 I (eye) Street, NW, Room 6W317D
City, State, Zip: Washington, D.C. 20001
Phone: (202) 632-5529 Fax: ( )
Email: fernandez@va.gov

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

FINAL REPORT JUNE 2, 2021

PHASE I ARCHAEOLOGICAL SURVEY FOR THE PROPOSED PHASE 5 EXPANSION AT THE INDIANTOWN GAP NATIONAL CEMETERY, ANNVILLE, EAST HANOVER TOWNSHIP, LEBANON COUNTY, PENNSYLVANIA

PROJECT NUMBER 2021PR03892

CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE

PREPARED FOR:

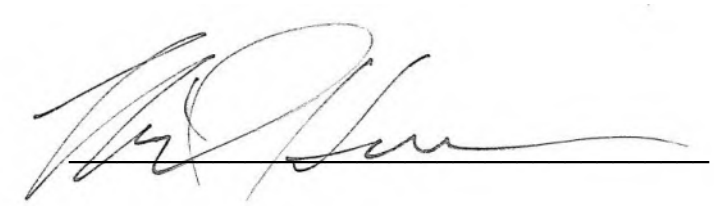
MABBETT & ASSOCIATES, INC.
40 OLD LOUISQUISSET PIKE, SUITE 200, BOX 13
NORTH SMITHFIELD, RHODE ISLAND 02896

R. CHRISTOPHER GOODWIN & ASSOCIATES, INC.
241 EAST FOURTH STREET, SUITE 100 ▪ FREDERICK, MD 21701

PHASE I ARCHAEOLOGICAL SURVEY FOR THE PROPOSED PHASE 5 EXPANSION AT THE INDIANTOWN GAP NATIONAL CEMETERY, ANNVILLE, EAST HANOVER TOWNSHIP, LEBANON COUNTY, PENNSYLVANIA

PROJECT NUMBER 2021PR03892

FINAL REPORT



MICHAEL B. HORNUM, PH.D.
PRINCIPAL INVESTIGATOR

BY

MICHAEL B. HORNUM, PH.D. AND THOMAS WAMBACH, M.A.

R. CHRISTOPHER GOODWIN & ASSOCIATES, INC.
241 EAST FOURTH STREET, SUITE 100
FREDERICK, MARYLAND 21701

JUNE 2021

FOR

MABBETT & ASSOCIATES, INC.
40 OLD LOUISQUISSET PIKE, SUITE 200, BOX 13
NORTH SMITHFIELD, RHODE ISLAND 02896

Executive Summary

This report presents the results of the Phase I archaeological survey for the proposed Phase 5 Expansion at the Indiantown Gap National Cemetery, Annville, East Hanover Township, Lebanon County, Pennsylvania. The project is located on federal property. As a federal undertaking, it will be reviewed under Section 106 of the National Historic Preservation Act of 1966. All work was completed following standards promulgated in *Archaeology and Historic Preservation: The Secretary of the Interior's Standards and Guidelines*, and in the revised *Guidelines for Archaeological Investigations in Pennsylvania* (PA SHPO 2017).

The Phase I survey was undertaken by R. Christopher Goodwin & Associates, Inc. (RCG&A) on behalf of Mabbett & Associates, Inc. from April 20 – 23, 2021. Approximately 8.5 acres (3.4 hectares) of the area of potential effects (APE) has been surveyed for archaeological resources previously and reviewed by the Pennsylvania State Historic Preservation Office (PA SHPO), and were not resurveyed. RCG&A completed a pedestrian reconnaissance of the remaining approximately 21.5 acres (8.7 hectares) of the APE. In undisturbed areas of 15 percent slope or less, systematic survey was undertaken using shovel tests excavated at 15 m (49.2 ft) intervals. Geomorphological review had indicated that no deep testing was needed. A total of 224 shovel tests were excavated. No archaeological artifacts were recovered and no archaeological sites were identified.

Since no artifacts were recovered and no archaeological sites were identified within the proposed project area, the proposed project will have no impact to archaeological historic properties, as defined in 36 CFR 800.16(l), in the studied areas. No further archaeological investigation is warranted or recommended.

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Chapter I

Introduction

This report presents the results of the Phase I archaeological survey for the proposed Phase 5 Expansion at the Indiantown Gap National Cemetery, Annville, East Hanover Township, Lebanon County, Pennsylvania (Figure 1). The project is located on federal property. As a federal undertaking, it will be reviewed under Section 106 of the National Historic Preservation Act of 1966. All work was completed following standards promulgated in *Archaeology and Historic Preservation: The Secretary of the Interior's Standards and Guidelines*, and in the revised *Guidelines for Archaeological Investigations in Pennsylvania* (PA SHPO 2017).

Project Location and Description

The U.S. Department of Veterans Affairs (VA) National Cemetery Administration (NCA) is proposing to construct and operate the Phase 5 expansion within the existing Indiantown Gap National Cemetery. The undertaking consists of the construction and operation of the Phase 5 cemetery expansion within an approximately 30-acre (12.1-hectare) area of potential effects (APE) (Figure 2). The Phase 5 expansion would provide burial capacity for approximately the next 10 years. Within the proposed Phase 5 expansion area boundary, the undertaking would provide new casket, columbarium, and in-ground cremation burial sites for veterans. Additionally, development would provide physical infrastructure improvements including new roadways to connect existing and new burial areas; new stormwater management features; extension of the irrigation utility; and landscaping at the new burial areas.

Research Objectives and Design

The objectives of the Phase I survey investigation were: (1) to locate, identify, and delineate all prehistoric and historic cultural resources within the project area; (2) to make preliminary assessments of the potential significance of those resources, applying the National Register Criteria for Evaluation [36 CFR 60.4 (a-d)]; (3) to assess the impact of proposed development activities on the cultural resources situated within the project boundaries; and (4) to formulate management recommendations concerning those resources. These objectives were accomplished through a combination of archival research and archaeological investigations that included systematic sub-surface shovel testing.

Project Personnel

The Phase I survey was undertaken by R. Christopher Goodwin & Associates, Inc. (RCG&A) on behalf of Mabbett & Associates, Inc. from April 20 – 23, 2021. Michael B. Hornum, Ph.D., served as Principal Investigator and Project Manager, and supervised all aspects of the study. Field investigations were directed by Thomas Wambach, M.A., and also included the participation of Kevin Clark, B.A., Dan Grose, B.A., and Hanah Romsburg, B.A. Kristopher R. West, M.A. was the project geomorphological consultant. Archival investigations were undertaken by Katherine Grandine, M.A.

Organization of the Report

Chapter I contains a brief description of the project. The natural and cultural settings of the project area are described in Chapter II, which also contains a discussion of previous research in the vicinity. Chapter III reviews the research methods used in these investigations. Chapter IV presents the results of the Phase I investigations. Chapter V summarizes the report and presents management recommendations. Appendix I contains resumes of key project personnel.

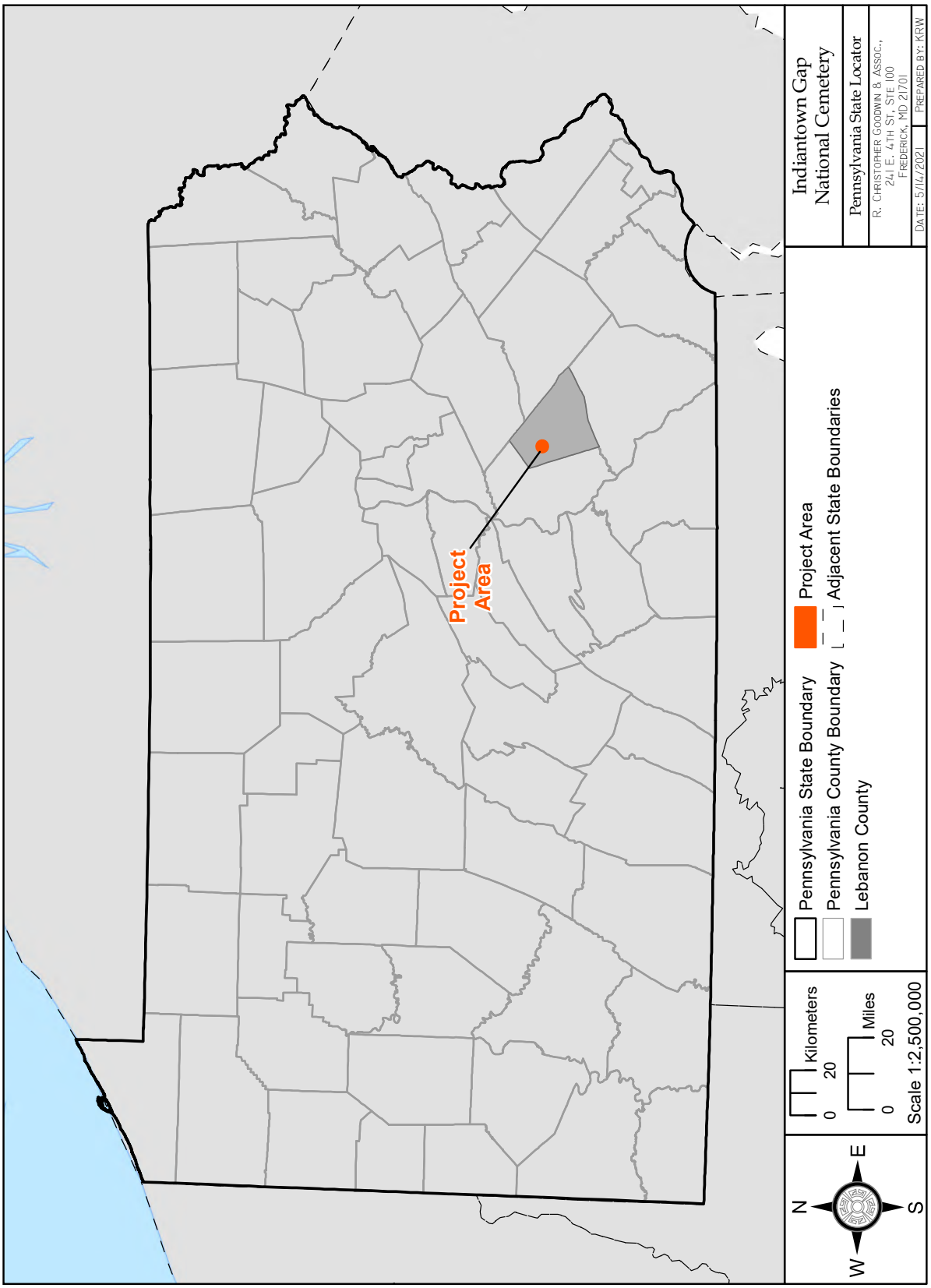

Figure 1. Map of Pennsylvania showing the project area locations

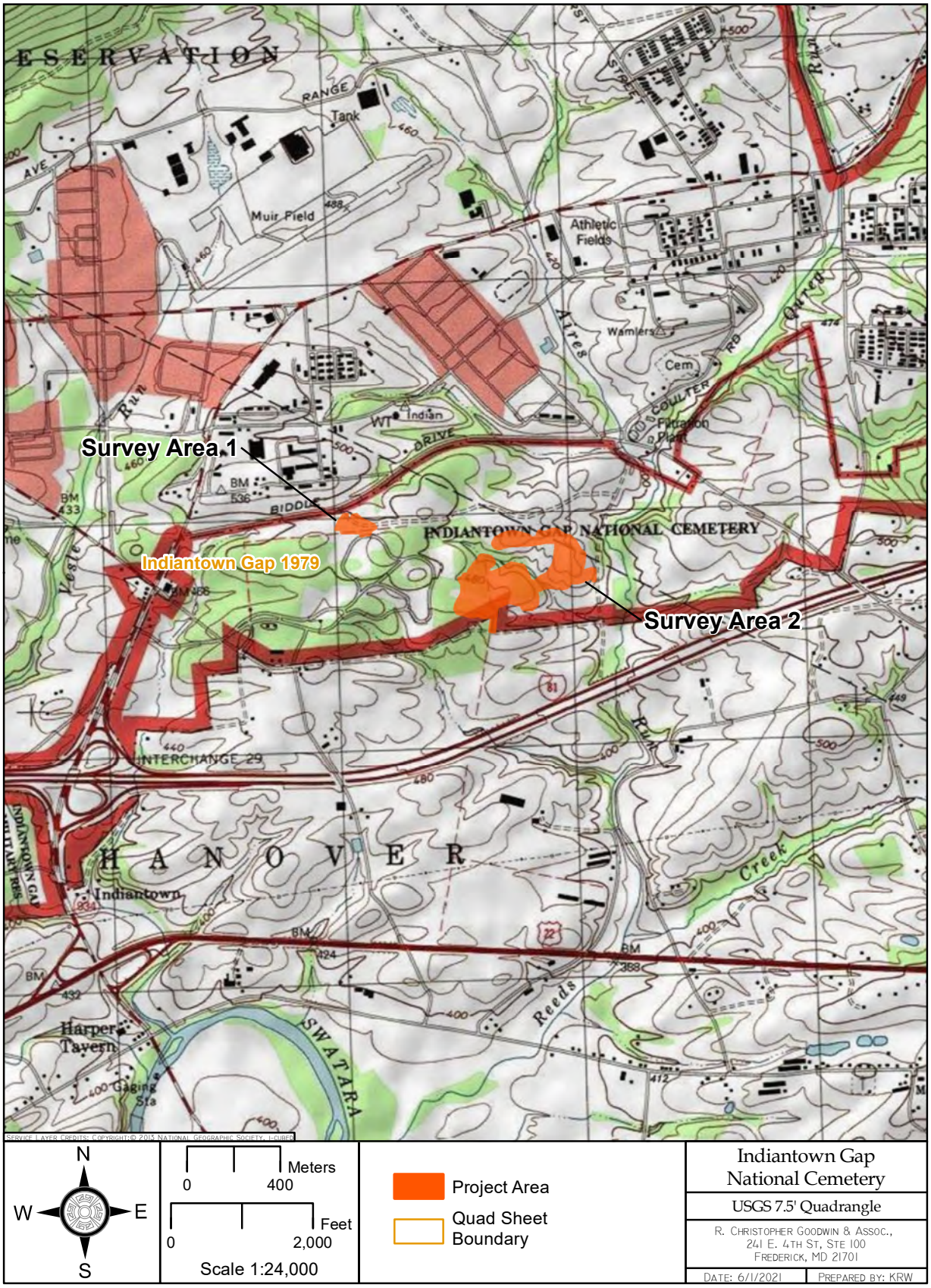

Figure 2. Excerpts from the USGS 7.5 minute 1979 Indiantown Gap, Pennsylvania quadrangle showing the proposed project area in Lebanon County

Chapter II

Natural and Cultural Setting

The Indiantown Gap National Cemetery property is located in Lebanon County, Pennsylvania, roughly 10 miles (mi) (16 kilometers [km]) northwest of the city of Lebanon. The major elements of the natural environment were important determinants of both prehistoric and historic settlement and subsistence patterns in the Susquehanna River watershed. Specific environmental parameters, such as geology, soils, and relative proximity to water, affected the quantity and variety of resources accessible to prehistoric populations. The earliest Euro-American settlers venturing into the region likewise sought out soils with properties advantageous to particular agricultural practices, selecting parcels neighboring major waterways, or emerging arterial road systems to facilitate trade and commerce. Thus, factors of climate, distribution of fauna and flora, the nature and distribution of soils, terrain and topography, and proximity to aquatic resources all have determined in part where people have settled and how they have exploited their surroundings (Evans 1978).

Physiography and Geology

The Indiantown Gap National Cemetery lies within the Great Valley section of the Ridge and Valley physiographic province (Pennsylvania Archaeological Research Unit 2). The terrain for the project area is characterized by ridges and slopes adjacent to unnamed tributaries of Qureg Run. Ground surface elevations range from approximately 420 to 514 ft (128 to 157 m) above mean sea level.

The bedrock deposits that underlie the Indiantown Gap National Cemetery property are composed of sediments of unequal hardness that crumpled and subsequently uplifted; erosion cut away valleys, leaving the harder strata as ridges. The bedrock deposits derive from four periods of geological development. Bedrock underlying the valley floors is Ordovician in age and includes shale, sandstone, limestone, and dolomite. The red and gray sandstones, conglomerates, and shales of the lower ridge slopes date from the Silurian period, while Devonian red sandstone, gray and black shales, limestone, and chert form the upper slopes. Ridgetop bedrock deposits are comprised of sandstone, shale, clay, coal, and limestone of the Mississippian and Devonian periods (Willard 1933:12, Map 7). A list of lithic resources that would have been available for prehistoric utilization included bedded and nodular cherts from the limestone and dolomite formations within the Great Valley; cobbles of quartz, quartzite, and metabasalt deposited by high order steams like the Susquehanna River; rhyolite in the Great Valley to the southwest; and jasper deposits located in Lehigh and Berks Counties to the north and east (Stewart 1980:7-8; Hatch et al. 1985:98).

Soils

The major soil association occurring within the Indiantown Gap National Cemetery study area is identified as the *Berks-Weikert-Bedington Association* (Holzer 1981). Soils of this association occupy convex tops, side slopes, and foot slopes of dissected ridges and hills in the west-central and northern portion of Lebanon County, and are formed from acid shale, sandstone, and siltstone (Holzer 1981:4 – 5). The soil series mapped in the project area include Bedington shaly silt loam, 3 to 8 percent slopes (BeB) and 15 to 25 percent slopes (BeD), Berks channery silt loam, 3 to 8 percent slopes (BkB), Comly silt loam 3 to 8 percent slopes (CmB), and Weikert channery silt loam, 3 to 8 percent slopes (WeB) and 15 to 25 percent slopes (WeD) (USDA NRCS 2021). The representative profiles for the soil series, as encountered in the field, are discussed with reference to the survey results in Chapter IV below.

Drainage and Hydrology

The project area falls within Lower Susquehanna (7) Watershed D (Swatara Creek sub-basin). The project area is drained by Qureg Run, which flows southward into Reeds Creek, which eventually empties into the Swatara Creek, a major tributary of the Susquehanna River.

Vegetation and Climate

Current vegetation in the project area included wooded areas that were mainly mixed deciduous trees, with some scattered conifers, and manicured grassy lawns. Humid, continental weather conditions characterize the climate of Lebanon County. Systems developed over the central United States, or Atlantic Ocean are mitigated significantly before reaching the project area. The city of Lebanon has recorded average daily maximum temperatures of 37°F in January and 86°F in July. Documented annual average precipitation at Lebanon is 42.3 inches (in) (107.4 centimeters [cm]), and is evenly distributed throughout the year. The frost-free growing season comprises 176 days, and typically extends from the end of April through mid-October (Holzer 1981:3).

Previous Cultural Resources Investigations

Watershed and Pre-Contact Predictive Model

The project area is located in Watershed 7D of the Lower Susquehanna River. The smaller watershed sub-basin associated with Swatara Creek currently features 60 archaeological sites recorded in Pennsylvania's State Historic and Archaeological Resource Exchange (PA-SHARE) (https://share.phmc.pa.gov/pashare). PA-SHARE also depicts Pre-Contact model probabilities of the APE. The model generally classifies the project area has having a moderate to high potential for Pre-Contact sites, with 61 percent having moderate potential, 20.7 percent high potential, and 18.3 percent no coding or presumed low potential.

Previous Survey and Previously Recorded Sites and Built Resources

Portions of the current project area, measuring approximately 8.5 acres (3.4 hectares) in total, are overlapped by a previous 2010 survey by MACTEC (Avery 2010; A.D. Marble and MACTEC 2012). This survey was conducted for a proposed expansion of the Indiantown Gap National Cemetery, and included two alternatives that totaled 36.5 acres (14.8 hectares). Three archaeological sites were identified and are discussed below. Three other surveys are located within 0.5 mi (0.8 km) of the current project area. These studies included an addendum archaeological survey for proposed training facilities at the National Guard Training Center at Fort Indiantown Gap (French 2001), a larger archaeological survey for the National Guard Training Center at Fort Indiantown Gap (Hunter 2007), both located north of the current study, and a small archaeological survey for a sewer south of the current project area (Young 2003).

The project area mostly is within the Fort Indiantown Gap Historic District (Key # 107363), which the PA SHPO has determined to be eligible for the inclusion on the National Register of Historic Places (NRHP). Previous survey has resulted in the recordation of 15 archaeological sites within a 0.5 mi (0.8 km) radius of the project (Table 1). Nine of the sites were prehistoric period occupations and six of the sites were historic period occupations. Four sites have been determined by the PA SHPO to not be eligible for inclusion on the NRHP, ten of the sites have not been evaluated for eligibility for the NRHP, and one has been destroyed. Two sites, 36LE0516 and 36LE0517, are located within or immediately adjacent to the project footprint. Both of these sites have been determined by the PA SHPO to not be eligible for inclusion on the NRHP. Site 36LE0518, located southwest of one of the current project area, is an historic house site that was considered potentially NRHP eligible by the surveyors (Avery 2010; A.D. Marble and MACTEC 2012). Prehistoric components, when identifiable by time period, include the Late Archaic, Transitional, and Late Woodland periods, while historic sites range from the nineteenth to twentieth centuries.

Prehistoric Cultural Sequence

Prehistoric cultural periods recognized for Pennsylvania traditionally have included the Paleo-Indian (ca. 13,000 – 8,000 B.C.), Archaic (ca. 8,000 – 1,000 B.C.), the Woodland (ca. 1,000 B.C. – A.D. 1500), and Contact (ca. A.D. 1500 –

Table 1. Previously recorded archaeological sites located within 0.5 mi (0.8 km) of the proposed project area

Site Number	Site Name	Site Type	Chronological Period	Topographic Setting	Level of Investigation	Investigation Method	NRHP Status / Determination of Eligibility (DOE)	Comments/ Sources
36LE0030	Unknown	Open Habitation, Pre-Contact	Unknown Prehistoric	Stream bench	Amateur	Collection	Unevaluated	
36LE0031	Unknown	Open Habitation, Pre-Contact	Archaic, Transitional	Stream bench	Amateur	Collection	Unevaluated	
36LE0032	Unknown	Open Habitation, Pre-Contact	Archaic, Transitional	Terrace	Amateur	Collection	Unevaluated	
36LE0033	Unknown	Open Habitation, Pre-Contact	Archaic, Late Archaic, Transitional	Stream bench	Amateur	Collection	Unevaluated	
36LE0034	Unknown	Open Habitation, Pre-Contact	Woodland	Terrace	Amateur	Collection	Destroyed	
36LE0052	Unknown	Open Habitation, Pre-Contact	Transitional, Late Woodland	Stream bench	Amateur	Collection	Unevaluated	
36LE0053	Unknown	Open Habitation, Pre-Contact	Unknown Prehistoric	Hill ridge/toe	Amateur	Collection	Unevaluated	
36LE0361	Unknown	Open Habitation, Pre-Contact	Unknown Prehistoric	Steam bench	Amateur	Collection	Unevaluated	
36LE0501	FS-06-22	Historic Domestic Site	19th century	Not listed	Phase I	Shovel testing	Unevaluated	
36LE0502	FS 06-25	Historic - Unknown/Other/Multiple Types	19th - 20th centuries	Not listed	Phase I	Not listed	SHPO: Not Eligible	Low density
36LE0503	FS 06-26	Historic - Unknown/Other/Multiple Types	Unknown Historic	Not listed	Phase I	Not listed	SHPO: Not Eligible	Low density
36LE0516	Indiantown Gap National Cemetery 2	Historic - Unknown/Other/Multiple Types	20th century	Middle slopes	Phase I	Shovel testing	SHPO: Not Eligible	
36LE0517	Indiantown Gap National Cemetery 3	Open Habitation, Pre-Contact	Unknown Prehistoric	Upper slopes	Phase I	Shovel testing	SHPO: Not Eligible	
36LE0518	Gerberich/ Bomberger	Historic Farmstead	19th century	Hill ridge/toe	Phase I	Shovel testing	Unevaluated	
36LE0566	Gerberich Site	Historic Farmstead	19th - 20th centuries	Not listed	Phase I	Not listed	Unevaluated	

1750). Originally developed as cultural historical units, these traditions are defined by diagnostic artifact forms and assemblages. In recent years this scheme has been adjusted, with an emphasis on cultural adaptations to changing ecological conditions modifying a system primarily intended to treat temporal and spatial questions. As a result, the various terms continue to be used, but their use is now as much behavioral as classificatory.

Although the terms "Paleo-Indian," "Archaic," and so on are the same throughout the eastern United States, the corresponding use of McKern's (1939) Midwestern Taxonomic Method, even as revised by Willey and Phillips (1958), has been abandoned over most of the Mid-Atlantic region. In Pennsylvania especially, this was a conscious decision by Witthoft (e.g., 1952), who found it more useful to substitute the term "period" for "tradition." Recently this has been systematized to some extent by Custer (1984) who, in addition to the term "period," uses "complex" to replace "phase." This alternative to McKern's system is well established in the regional literature and is the basis of Pennsylvania's State Plan for the Conservation of Archaeological Resources (Raber 1985a, 1985b).

More recently, many archaeologists (e.g., Custer 1996) have combined these periods into new groupings on cultural and ecological grounds. In particular, Custer (1985, 1996), Gardner (1980), and Stewart (1980) all have combined the traditional Paleo-Indian period with the Early Archaic. Earlier dates for the onset of the traditionally defined Paleo-Indian period currently are in a state of flux, particularly since the discovery of a pre-Clovis or "proto-Clovis" component at the Cactus Hill site in Sussex County, Virginia (Boyd 2003:68). Custer (1996) has proposed to group the Paleo-Indian and Early Archaic as Hunter-Gatherer I, described the Middle Archaic as Hunter-Gatherer II, posited the Late Archaic and Traditional as Intensive Gathering-Formative Culture Period I, changed the Early - Middle Woodland to Intensive Gathering-Formative Cultural Period II, and transformed the Late Woodland into the Village Life Cultural Period. The following synthesis of prehistoric cultural change follows the diachronic framework proposed by Custer (1996), and it utilizes data from the Ridge and Valley physiographic province of Pennsylvania, as well as from similar geomorphologic settings within neighboring areas of the Middle Atlantic region.

Paleo-Indian/Early Archaic (ca. 13,000 - 6,500 B.C)

This period corresponds to Custer's (1996) Hunter-Gather I Cultural Period. The Paleo-Indian/Early Archaic period is defined as the time from about 13,000 B.C. to 6,500 B.C. The somewhat early designation for the onset of this period is seen as a median date falling between the earliest dates advanced by researchers such as Adovasio (et al. 1977) and later dates proposed by more conservative investigators (Custer 1985:27). The 13,000 B.C. time frame also corresponds with C-14 and other dates recently obtained for the pre-Clovis levels at the Cactus Hill site (Boyd 2003:68). Technologically, the earliest, pre-Clovis phases of this period have been documented as a collection of blade flakes, possibly utilized as tools, from the Cactus Hill site. Traditionalists mark the onset of the Paleo-Indian period with the appearance of the Clovis, Mid-Paleo, and Dalton projectile point styles. Diagnostic point types after 8,000 B.C. include the side-notched and corner-notched projectile points traditionally assigned to the Early Archaic, including the Palmer, Charleston, Amos, and Kirk corner-notched point types (Gardner 1980:3; Custer 1996:96). Despite these apparent technological and stylistic differences in projectile point manufacture, investigations conducted at the Flint Run Paleo-Indian Complex in the Shenandoah Valley suggest a continuity of general adaptive patterns throughout this period (Gardner 1979, 1983).

In North America, the Paleo-Indian period is defined as the way of life associated with the earliest, terminal Pleistocene human inhabitants. It has been commonly believed that these people migrated from eastern Siberia into the Northern Great Plains by way of an ice free corridor thought to have existed in western Canada between the Cordillarian and Laurentide ice sheets. The time for this initial occupation was thought to be around 13,000 B.P., based on two sets of evidence. First, access along the ice free corridor

was thought to be possible only between 13,500 - 11,850 B.P. Second, the earliest agreed upon evidence of a human presence in North America occurred at a series of mammoth kill sites in the southwestern United States. These sites, located directly south of the southern end of the ice free corridor, returned radiocarbon dates that all fell between 11,650 - 11,000 B.C.

Contained within those kill sites was a distinctive type of fluted spear point, a Clovis point, examples of which had been found in every state in the United States, in every country in Central America, and in most countries in South America. In most of those cases, however, the Clovis points were not in datable contexts (if they were in context at all, which was seldom the case outside of the western United States). Consequently, the interpretation of the so called Clovis sites in the western United States came to be applied to all situations in which Clovis points occurred.

Clovis points were, and often still are, viewed as associated with small bands of migratory hunters who focused on Pleistocene megafauna, particularly proboscinians: mammoths in the western United States, mastodons in the eastern United States. This association of large Pleistocene game with Clovis points was reinforced by the simultaneous disappearance of both around 11,000 B.C., a disappearance that led Martin (1967) to propose that the extinction of the megafauna was a consequence of overkill by the people using the Clovis points.

In the western United States there was a switch after 11,000 B.C. to the hunting of bison, which continued as late as 8,500 B.C. and is considered part of the Paleo-Indian period. In the eastern United States, it is believed that there was a similar switch, although one focusing on the use of forest resources. This would be considered the start of the Archaic Tradition.

The reason that Hatch et al. (1985) combines Paleo-Indian with Early Archaic is that the general interpretation of the Paleo-Indian Tradition breaks down in the eastern United States. Traditionally the earliest that people could have been in North America, given a migratory path between the ice sheets, was 11,850 B.C. when the ice free corridor was thought to have closed due to what was termed the Valderan readvance. Reexamination of the stratigraphic evidence for the Valderan by Evenson et al. (1976) indicated that it never happened: There was no advance; there was no quick opening and closing of access to the Northern Plains. In addition, dates were obtained from occupations in the East: 12,570 B.P. from Duchess Quarry Cave in New York (Funk et al. 1969); 12,010 B.C. from Little Salt Spring in Florida (Clausen et al. 1979); and 16,175 B.C. from Meadowcroft Rockshelter in western Pennsylvania (Adovasio et al. 1977). Of these, the most telling is the date from Little Salt Spring in Florida, which indicated that people had been present in that area long enough to develop the cultural practices necessary to survive in what was then a xerophytic ecosystem.

In addition to the evidence suggesting a much older (if not longer) occupation in the eastern United States, there is still no known association of Paleo-Indian artifacts with Pleistocene megafauna in the eastern United States. There is also little direct evidence about subsistence. Griffin (1977) summarized the general feeling that hunting was probably the most important subsistence activity, and this is consistent with the caribou remains from Duchess Quarry Cave. The ascription of hunting, however, remains based on a functional interpretation of stone tools that were analyzed before the advent of high-magnification analysis (Keeley 1980). The results from the Shawnee-Minisink Site in northeastern Pennsylvania (Kauffman and Dent 1982) do not contradict the idea of hunting, although there is sufficient evidence to indicate the use of blackberry, ground-cherry, and hawthorn plum as well as fish.

The image that is now emerging, which forms the basis of the cultural adaptive model used by Hatch et al. (1985), is one analogous to the Subarctic cultures like the Ojibwa (Rogers 1962), Cree (Rogers 1969), and Slave (Honigmann 1946) on the Canadian Shield. These have dispersed family hunting groups during the late fall, winter, and early spring, with a focus on hunting and trapping. From the late spring through the early fall the family hunting groups gather at fish spawning sites, and it is during that time that plant foods high in ascorbic acid, such as blackberry, are collected. Subarctic peoples

tend to operate in well defined, if extensive territories, and Eisenberg's (1978; cf. Stewart 1979) interpretation of raw material acquisition for Clovis points in the Delaware basin suggests that this may have been the case for Paleo-Indians as well.

The environmental setting for this 8,500-year time span was conditioned by the Late Pleistocene/Holocene transition. Climatic episodes defined by Carbone (1976) for the Shenandoah Valley are broadly applicable to the study area (Kavanagh 1982). Climatic episodes include the Late Glacial (ca. 15,000 - 8,500 B.C.) and the Pre-Boreal/Boreal (8,500 - 6,700 B.C.) (Custer 1984, Kavanagh 1982).

The Late Glacial episode represents the Terminal Pleistocene and the "last effects of the glaciers upon climate in the Middle Atlantic area" (Custer 1984:44). Pollen data and faunal remains suggest a mosaic of varied environments, including grasslands mixed with coniferous spruce-pine forest, and deciduous forest along streams, rivers, and wetlands (Carbone 1976; Watts 1983; Custer 1996:97-98). In the Piedmont areas of eastern Pennsylvania, grasslands would have been restricted to swampy floodplains, scattered upland bogs, and specialized soil areas, and deciduous forest would have dominated the major river terraces (Custer 1996:98). Carbone (1976) described Late Glacial vegetation in the Shenandoah Valley, which is continuous with the Great Valley in Maryland and Pennsylvania, as composed of microhabitats, including mixed deciduous gallery forests near the rivers, mixed coniferous-deciduous forest and grasslands in the foothills and on valley floors, coniferous forest on the high ridges, and alpine tundra in the mountains (Kavanagh 1982:8).

The Pre-Boreal/Boreal climatic episode was a period of transition from the late Pleistocene into the full Holocene. Climatic change involved warmer summer temperatures and continued wet winters, and vegetation shifted in response. In the Shenandoah Valley, the period was characterized by "the expansion of coniferous and deciduous elements and a reduction in open habitats" (Carbone 1976:186). Similarly, eastern Pennsylvania saw a reduction of open grasslands and a spread of forests dominated with pine, spruce, and some oak (Custer 1996:99-100).

Gardner (1979, 1983) has identified distinctive site types in the Shenandoah Valley Paleo-Indian settlement system, and Custer (1984, 1996) has suggested that these types may be more widely applicable to the entire Middle Atlantic region, including eastern Pennsylvania. The site types include: (1) quarry sites, located at lithic outcrops or cobble beds; (2) quarry reduction stations, on level ground near quarries; (3) base camps, including quarry-related base camps near stream confluences within 1 - 2 km of quarries, and non-quarry base camps, centrally located within areas of maximum game availability; (4) base camp maintenance stations, at game-attractive locations within a 3 km radius of a base camp; and (5) outlying hunting stations, located more than 3 km from base camp locations (Custer 1985:31; 1996:108-109). Isolated point finds also are frequent. If a Subarctic culture analog is applicable, the only site type missing is a large warm season fishing camp that, if preserved, would be in the floodplain sediments. Sites in eastern Pennsylvania include seasonal riverine base camps, interior quarry sites, and upland hunting stations.

The largest documented Paleo-Indian site in Pennsylvania, the Shoop Site in Dauphin County, east of the Susquehanna River, does not support Gardner's model. Carr (1989) notes that the Shoop Site is located far from potential lithic sources; this settlement may have served as a spot for the hunting of a variety of migratory game. Several Paleo-Indian and Early Archaic sites have been identified in floodplain and terrace settings along the Delaware River, and at quarries, low-order streams, springs, and sinkholes.

The riverine sites include the Shawnee-Minisink Site, the Upper Shawnee Island Site (36MR45), and the Harry's Farm Site in the Upper Delaware River Valley, as well as Site 36BU44 in the Middle Delaware River Valley (Custer 1996:110-115). While Site 36BU44 has yielded fluted points, the assemblage from the Shawnee-Minisink Site (36MR43) produced a richer assemblage of Paleo-Indian and Early Archaic materials (McNett 1985). The Paleo-Indian levels yielded radiocarbon dates of 8800+/-600 B.C. and 8640+/-300 B.C., as well as hearths, lithic reduction areas, a Clovis point, side and endscrapers, spokeshaves, retouched flakes; flake

knives, discoidal and tabular cores, and hammerstones. Various types of carbonized seeds and fish bones were recovered from the hearths (Dent and Kauffman 1985). The Early Archaic deposits recovered from the site produced a more diverse lithic artifact assemblage, including a greater variety of lithic raw material types, than those recovered from the Paleo-Indian phase. Plant remains from the Early Archaic occupations indicated a continuity of resource exploitation with the earlier Paleo-Indian phase (Dent and Kauffman 1985).

The Early Archaic, then, is seen to be a continuation of Paleo-Indian in the sense that it represents populations responding to the collapsing spruce and spruce-pine forests (Dumont 1981). The low carrying capacity of these forests, combined with the changing ecological community, are seen by Funk and Wellman (1984) as the reasons for the low frequency of Early Archaic sites in the upper Susquehanna basin.

Middle Archaic (6,500 – 3,000 B.C.)

This period corresponds to Custer's (1996) Hunter-Gather II Cultural Period. Custer (1985, 1996) departs from the traditional tripartite division of the Archaic period. In addition to expanding the previously accepted chronological parameters of the Middle Archaic, dating the period between ca. 6,500 and 3,000 B.C. (Stewart and Cavallo 1991), Custer also includes the traditional Late Archaic subperiod (ca. 3,000 - 1,000 B.C.) with the Early and Middle Woodland periods, labeling them the "transitional phase" (Custer 1985) or the "Intensive Gathering-Formative Culture Period" (Custer 1996).

The Archaic Tradition in the eastern United States generally refers to pre-ceramic sites associated with the nomadic hunter-gatherer populations that occupied the emerging Holocene deciduous forests. The Woodland period was originally defined by the appearance of ceramics and the assumed presence of maize and sedentary villages, since at the time the term was devised (the 1930s) it was believed that ceramics, agriculture/horticulture, and village life were mutually inclusive.

Linking the Archaic and Woodland is the Transitional Period, first defined by Witthoft (1953) and restricted in appellation to the archaeology of the northeastern and mid-Atlantic regions of the United States. The Transitional Period is exactly what the name suggests: a time during which the life styles associated with the Archaic began to switch over to those associated with the Woodland. Research over the last two decades has revealed that, with the exception of pottery manufacture, the changes in cultural adaptation from the Archaic through the Woodland were not as great as first thought, being more of a degree in the efficiency of using deciduous forest resources than in the kind of resources used (Caldwell 1958; Ford 1974; Custer 1984). The Middle Archaic - Early Woodland Phase, as set forth by Hatch et al. (1985), reflects the current understanding of a progressively improving cultural adaptation to a deciduous forest ecosystem.

The majority of species typical of the modern temperate deciduous forest were re-established across the eastern United States between 8,500 B.C. and 4,000 B.C., depending on the type of tree and location being considered. The one general feature that all of the eastern forests have in common is the large number of oak present. This ranges from around 30 percent of the mature fruiting canopy trees in the maple-beech forests of Ohio and Indiana to 60 percent in the oak-chestnut forests that existed along the east coast (Braun 1950). Combining the oak with other nut trees like hickory, chestnut, and beech (walnut seldom makes up more than 2 percent of a mature deciduous forest); these forests represented a vast abundance of food. The autumn nut crop is now, and in all likelihood was in the past, at the base of most food chains in the eastern forest ecosystem, the productivity of which directly determines the population size and reproductive rates of deer, raccoon, turkey, and squirrel.

The Middle Archaic represents the inception of what Caldwell (1958) termed primary forest efficiency. Caldwell stressed the vast bounty and variety of food sources in the eastern forests, noting that prehistoric peoples need only have moved to the proper location during a given season to maximize resource acquisition. Thus, in the eastern United States in general the Middle and Late Archaic is seen to represent mobile hunting gathering peoples who were exploiting seasonal resources and scheduling their movements accord-

ingly: tree nuts (mast), deer, and waterfowl in the fall; deer and small game in the winter; small game and waterfowl in the spring; and fish in the summer. In many parts of the southeastern and midwestern United States the Middle Archaic is also associated with large freshwater bivalve middens.

Human groups of the Archaic period were adjusting to evolving Post-Pleistocene mesic oak-hemlock forest environments. More heterogeneous faunal and floral communities were available for exploitation in the moderating climate of the Holocene (Raber 1985b:11). Archaic lifeways were characterized by a broadening of the subsistence base, which presumably included a greater reliance on small game, fish, shellfish, and plant foods (Cleland 1976). New technologies and tools, including grinding stones, axes, and adzes, accompanied these changes. A wider of variety of lithic materials was used during the Middle Archaic than during earlier periods, including more frequent use of non-cryptocrystalline materials such as argillite, quartzite, quartz, and rhyolite (Stewart and Cavallo 1991:30-34).

The major temporally diagnostic artifacts for the Middle Archaic have been divided into three chronological groups, at least in eastern Pennsylvania (Custer 1996:134 – 145). During the early part of the period (ca. 6,500 – 5,500 B.C.) the dominant point types are bifurcates (Kanawha, LeCroy, St. Albans), and Kirk stemmed. During the period from ca. 5,500 – 4,500 B.C., various stemmed and notched types are common, including the Morrow Mountain I and II, Otter Creek, Stark, Vosburg, and Piney Island types. The late Middle Archaic (ca. 4,500 – 3,000 B.C.) is represented by types that continue into the Late Archaic, such as the Lamoka, Halifax and Kittatinny types, and the Brewerton series. The earliest triangular projectile points/knives, including the so-called Hunterbrook type, have been found in Middle Archaic contexts (Stewart and Cavallo 1991:25, 31).

Groundstone tool technology makes its initial appearance in the assemblages from Middle Archaic sites. In addition to this change in technology is a notable shift in lithic raw material preference. Previously, exploitation was focused exclusively on high quality cryptocrystalline materials; in the Middle Archaic Period, exploitation patterns appear to emphasize the expedient use of locally available lithic materials, such as rhyolite, local chert and other comparatively low grade materials for tools. Grooved axes, atlatl weights, and milling stones support the idea of increased importance of plants in the diet.

Human populations appear to have increased during the Archaic Period. According to Kratzer et al. (1987:7-8), the increased occurrence of bifurcated-base projectile points during the early Middle Archaic period may have been related to the development of new subsistence strategies geared to the emerging deciduous forests and their resources. The increase in human populations may have led to more intensive utilization of specific territories and to greater reliance upon more localized sources of lithic raw materials. Custer (1996:155-156) currently recognizes two major types of sites associated with the Middle Archaic: the base camp, which includes Custer's earlier (1985) macro-band and micro-band base camps, and the procurement site. Stewart and Cavallo (1991:29-30) suggest a significant focus on interior and riverine wetland areas.

Evidence of Middle Archaic settlement in central Pennsylvania is limited to small collections of projectile points taken from the surfaces of multi-component sites. These Archaic components indicate "a pattern of widely scattered, relatively small occupations" (Archaeological and Historical Consultants 1987:3-4). Lithic procurement in the Adams and Franklin counties region probably focused on the abundant rhyolite sources available at the interface of the Uplands and the Ridge and Valley provinces. As early as 1933, Henry Deisher wrote about a rhyolite Indian quarry located "ten miles southwest of Gettysburg" (Deisher 1933:18-19). Frost's (1935) survey of Adams County point collections showed that over 90 percent of the projectile points recovered from sites within the county were fabricated from gray rhyolite, while an additional 2.9 percent were made of red rhyolite (Frost 1935:20).

Late Archaic (3,000 – 1,000 B.C.)

Following Witthoft (1953), Custer (1985:36) combined the time periods traditionally labeled Late Archaic, Early Woodland, and Middle

Woodland, into one culturally distinct chronological unit that he has termed "Transitional." Recently, Custer (1996:163) has re-termed this period the Intensive Gathering-Formative Culture Period, and designated the earlier stages of this period as Intensive Gathering-Formative Culture Period I.

During the earlier phases of this expanded period, human adaptation in Pennsylvania required increasingly specialized hunting and gathering practices. Sites that focused principally on the procurement of mast or fish began to appear in the archaeological record. Base camp settlements were located near reliable surface water, on floodplains and terraces near rivers and high order streams, and appear to have been repeatedly reoccupied seasonally (Custer 1996:187-189). Evidence suggests that a number of other sites were frequented regularly for scheduled subsistence and other tasks. The resultant small transient camps are found in several kinds of upland and lowland settings within restricted territories, and contain varied tool assemblages (Raber 1985b; Kratzer et al. 1987:8; Custer 1996:189).

Technological changes during the Late Archaic include an increase in the number and variety of groundstone tools, including axes, celts, adzes, pestles, and net weights. These artifacts, together with steatite vessels, bespeak a greater reliance on plant resources and fish than in previous periods. The caching of artifacts suggests that sites were repeatedly revisited. The appearance of storage pits implies longer-term occupations, and the use of large platform hearths may be associated with fish processing (Custer 1996:183-187). Stewart (1988) and others argue that Late Archaic peoples initiated the first concerted exchange of goods in the Middle Atlantic region, perhaps in response to the marked territoriality of the period. Rhyolite from the South Mountain area of the Pennsylvania and Maryland Blue Ridge, argillite from the Middle Delaware Valley, and steatite from the Pennsylvania and Maryland Piedmont all have been found in eastern and central Pennsylvania (Custer 1996:190).

Two cultural traditions have been identified in Pennsylvania during the Late Archaic: Laurentian (Ritchie 1965) and Piedmont (Kinsey 1972). Both traditions have been identified primarily through the distribution of projectile point styles (Dragoo 1959; Michaels and Smith 1967). The Laurentian tradition is associated with notched Laurentian points, including Brewerton Corner Notched, Brewerton Ear Notched, Brewerton Side Notched, Lamoka, Otter Creek, and Vosburg (Graybill 1993; Justice 1987; Ritchie 1961). The Piedmont Tradition is associated with narrow bladed, stemmed projectile points, including Bare Island (Kinsey 1959; Ritchie 1961); Lackawaxen Stemmed (Kinsey 1972); Lamoka (Ritchie 1961); Merrimack Stemmed (Dincauze 1976); Normanskill (Ritchie 1961); Squibnocket Stemmed (Ritchie 1965); Sylvan Stemmed and Side Notched (Funk 1965); Wading River (Ritchie 1965); and other stemmed varieties. In Pennsylvania, the two traditions may reflect broad territories of Late Archaic hunters and gatherers, with those of the Laurentian tradition focused on the mixed deciduous and coniferous forests of northern regions of the state, and those of the Piedmont tradition concentrated in the varied hardwood forests in the southern portion of the state (Custer 1996:190).

During the Late Archaic/Early Woodland Transitional period (2,000-1,000 B.C.), ceremonial objects such as gorgets, bannerstones, and birdstones appeared for the first time. Mortuary ceremonialism also has been associated with this period. Cremated burials with grave goods, including steatite vessels presumably filled with food offerings, have been identified in formal cemeteries at sites dating to this period throughout the northeast United States [New England (Dincauze 1968); New Jersey, New York, and Pennsylvania (Hawkes and Linton 1916; Regensburg 1970; Ritchie 1959)].

Pottery also first appears in the archaeological record during the Transitional Period. Marcey Creek Plain, a steatite tempered with plain exterior surface, has been recovered from Orient Phase Transitional Archaic Period sites (Manson 1948; Smith 1971). Vessel forms mimic the steatite bowls from earlier periods. Some researchers associate the appearance of Marcey Creek Plain ceramics with increasing sedentism and the need for longer-term storage capacity (Gardner 1981; Ritchie 1965). Although the introduction of ceramic technology has been used to mark a

transition between the Archaic and Woodland periods it has become apparent that ceramics were adopted at widely different times, even by groups in the same region. Therefore the latter portion of the Late Archaic and the early portion of the Early Woodland period may be characterized as a Transitional Period.

Transitional period sites, like those of the Late Archaic, are found in riverine alluvial deposits and in upland locations, suggesting a continuation of Late Archaic lifeways that included a broad-based subsistence pattern founded essentially on forest and riverine products (Dragoo 1959). However, settlement in upland and interior areas decreased. The increase in floodplain settlements may be due to the transition towards semi-sedentism (Gardner 1981; Kinsey 1972; Turnbaugh 1975, 1977; Witthoft 1953), or an increased reliance on streams and rivers for water travel and trade networks.

Early Woodland (1,000 - 500 B.C.)/ Middle Woodland (500 B.C. - A.D. 1000)

The remainder of Custer's Intensive Gathering-Formative Culture Period (Intensive Gathering-Formative Culture Period II) encompasses what traditionally has been known as the Early and Middle Woodland phases. Trends previously associated with the Late Archaic period appear to have intensified during this time. Early and Middle Woodland peoples relied increasingly on riverine food resources, covering relatively long distances in their subsistence pursuits (Mayer-Oakes 1955; Archaeological and Historical Consultants 1987:3-5).

Fishtail points/knives already had occurred in deposits from the last portion of the Late Archaic, and they also commonly are found with the earliest ceramic types that mark the Early Woodland period. Fishtail points/knives traditionally have been associated with the so-called Transitional or Orient Phases (Kinsey 1972:355-361; Kraft 1975:41). Other temporally diagnostic lithic artifacts for the Early Woodland include the Adena, Hellgrammite, and Meadowood point/knife types, as well as various stemmed and notched points that appear to represent continuations of the broadspear and Normanskill types common in the later part of the Late Archaic. Middle Woodland diagnostic point/knife types include the Jack's Reef pentagonal, Jack's Reef corner-notched, Fox Creek stemmed, Rossville, and Snyder's Dovetail types. Towards the end of the Middle Woodland period, triangular points/knives, which become the dominant Late Woodland form, begin to appear (Custer 1996:227-232), likely in association with the more widespread inclusion of bow-and-arrow technologies in Woodland subsistence patterns.

The traditional Early Woodland (1,000 B.C. – A.D. 200) and Middle Woodland (A.D. 200 - 1000) periods are marked by a more intensive use of ceramics. The earliest ceramics generally were steatite tempered. One such ceramic type, Marcey Creek ware, has been recovered from sites across the entirety of the state of Pennsylvania. By ca. 800 B.C., regional variations appear. In the Susquehanna Valley, ceramic variation has permitted the definition of two cultural complexes – the Bare Island during the Early Woodland and the Three Mile Island during the Middle Woodland (Custer 1996:244-247). The former has yielded a variety of ceramic types including the steatite tempered Bare Island cord-marked and the crushed quartz tempered Vinette I and Accokeek wares (Custer 1996:219-227). The latter is associated with crushed quartz tempered Susquehanna net and fabric impressed, sand/grit tempered Susquehanna cord-marked and Popes Creek, and later shell tempered Mockley, sand/grit Point Peninsula, and advanced mica-schist tempered and grit/sand tempered corded varieties (Custer 1996:219-227).

Regional settlement patterns show that during the Early and Middle Woodland periods, floodplains and terraces along major and minor drainages were the foci of multifamily base camps. Platform hearths continue to appear. Large numbers of small hearths, deep storage pits, and refuse pits occur at these base camps. Above ground lodges constructed of post supports and semi-subterranean pit dwellings both have been documented on various sites from the period. Hatch et al. (1985) propose a "multiple base camp/radial pattern secondary site model," similar to the kind suggested by Custer (1984, 1987). Base camps would be located on valley floors, in places that would maximize access to

as many different microenvironmental zones as possible. Radiating out from those base camps and located in each of those zones would be special and/or limited activity campsites, the function of which would have been to provide the raw materials needed for everyday activities life at the base camp. This kind of settlement pattern was common across the eastern and midwestern United States, being well documented in Illinois (Roper 1979), Wisconsin, and Iowa (Alex 1980).

There are no well defined Adena, Meadowood or Middlesex sites in eastern Pennsylvania, but there is some evidence from sites in the Susquehanna Valley for participation in Adena and Hopewell related trade networks. For example, pipes and birdstones typical of Adena and Meadowood sites do occur in caches or associated with cremation burials. Some stone burial mounds also have been identified (Custer 1996:246).

The Middle Woodland, at least at the start, appears to be a continuation of the Late Archaic - Early Woodland trajectory of increasing population, social organizational complexity, and material culture elaboration. The subsistence base remained the same as that found in the Late Archaic: heavy use of tree nuts; continued use of indigenous cultigens; selective or preferential predation on those terrestrial fauna most involved in the feeding on tree nuts; extensive fishing; and the hunting of waterfowl. The late Middle Woodland represents the abandonment of at least millennia of elaboration. Ceramics are often described as poorly made and decorated (e.g., Griffin 1952 ed.). The extensive trading network disappeared. In the Midwest the evidence suggests a return to egalitarian sociopolitical organizations: tribes and bands. The population appears to have declined.

No special reference is made by Hatch et al. (1985) to Middle Woodland settlement patterns for the Ridge and Valley Province, and the best that can be said for the moment is that, like earlier times, there were seasonally occupied base camps located in lowland areas, and a series of limited activity sites scattered throughout tributary drainages. Thematically this is a "hollow exploitation model," discussed most recently by Stevenson (1982) for Pennsylvania. Consistent with Fehr (1983), Middle Woodland base camps sites in somewhat similar ecological settings in the forested Midwest tend to be found at the base of slopes (Struever 1968).

Research in the upper Susquehanna generally is consistent with the Hatch et al. (1985) model. Funk and Rippeteau (1977) discuss eleven Late Archaic through Middle Woodland sites. Of the 63 components encountered, 56 (88.9 percent) were located directly along the Susquehanna at the time of occupation. Many of these contained indirect evidence of fishing, usually in the form of netsinkers. Botanical remains often included black walnut (*Juglans nigra*) shells, indicative of a floodplain orientation. Funk and Rippeteau (1977) suggest that during the Late Archaic the sites were occupied in the spring and/or summer, but by the Middle Woodland they were being used in the fall and/or winter. This interpretation was based on the presence of the charred nutshells, which they evidently felt were processed and consumed at the time of collection.

Late Woodland (A.D. 1000 - 1500)

Custer (1996) has designated this period as the Village Life Cultural Period. The Late Woodland is generally used to denote egalitarian, tribal, village-dwelling populations dependent to some extent on maize. The appearance of the Late Woodland, or the emergence of the lifestyle evidenced by Late Woodland sites, corresponds with both the sudden adoption of maize as food by peoples in the eastern United States (ca. A.D. 850 in the lower Mississippi basin to ca. A.D. 1000 elsewhere). This also corresponds to the start of the Neo-Atlantic climatic optimum.

With a relatively moderate climate compared to preceding centuries as well as a longer growing season, the amount of energy available in the eastern forest ecosystems increased. The late Middle Woodland Tradition appears to have included values premised on a lower energy flow, such that human populations increased during the Neo-Atlantic. This was a case of climatically induced system enrichment, a common byproduct of which is population growth (Frisch 1978). The increased energy flow represented by a more moderate climate, combined with an additional food source within the system -- maize

-- that was more efficient in converting solar energy to biomass than the native temperate plants, appear to have literally fueled increased cultural elaboration. The previous subsistence regime was not abandoned. Tree nuts still formed an important part of the diet. The prey selectively hunted -- deer, turkey, raccoon -- are equally heavy consumers of maize as they are of tree nuts. Fishing and fowling persist. However, of the earlier indigenous cultigens, only sunflower would continue in use.

Around A.D. 1200 - 1250 the climate again started to shift into a minimum, with cooler annual temperatures and shorter growing seasons. This minimum, known as the Pacific I Episode in North America, corresponds globally to major cultural changes. Populations decreased; fortification of villages increased. It is at this time that Late Woodland peoples in the northeastern United States began to locate their villages in defendable positions and/or surround them with stockades.

Most of what is know about prehistoric peoples in the Ridge and Valley Province and adjacent regions is of Late Woodland peoples. For instance, of the 15 sites selected by Hatch et al. (1985) as examples of excavated sites in the Ridge and Valley Province, eleven are Late Woodland. This kind of bias toward later sites is common in the eastern United States and is a consequence of the accessibility of the sites themselves: They tend to be located in heavily plowed floodplain areas; they are close to the present soil/sediment surface; and they are productive in the number of artifacts produced. Thus, knowledge of the Late Woodland in the Susquehanna basin is, by comparison with previous traditions/periods, very good.

In Central Pennsylvania there are two main chronological subdivisions: Clemson Island and Shenk's Ferry. The first part of the Late Woodland, more clearly evident in the Upper than the Lower Susquehanna Valley, is associated with the Clemson Island culture. Clemson Island people continued the earlier Woodland practice of agriculture, hunting, fishing, and gathering wild plants. They also made grit-tempered pottery and broad-based, triangular projectile points. Their settlements consist of small villages with several oval or sub-rectangular huts (Archaeological and Historical Consultants 1987:3-6). Some of the Clemson Island (and later Late Woodland) sites also contain semisubterranean features known as "keyhole" structures. Smith (1976) interpreted these features as sweathouses, but Hatch and Daugirda (1980) have argued for their utilization as smoking facilities. Jones (1931) excavated the Clemson Island type site near the Dauphin County village of Halifax in 1929. There he investigated a plow disturbed earthen mound, which originally might have been 40 ft in diameter and 8 ft high. Skeletal remains of 19 individuals were present, as were a small number of lithic artifacts and much pottery. The pottery frequently exhibited rows of deep punctuations just below the rim of the vessel.

The later Late Woodland period is dominated by the Shenks Ferry cultural complex. The main ceramic types associated with that complex are the Shenks Ferry Series, the Lancsater Incised Series, and the Funk Incised Series (Custer 1996:266-267). After A.D. 1300, the Shenks Ferry ceramic repertoire begins to add collars and triangular plat designs, probably under the influence of the Iroquoian styles (Custer 1996:270-272). Diagnostic lithic artifacts include Levanna and Madison triangular points/knives (Custer 1996:265). Three phases of the Shenks Ferry Complex have been defined for the Lower Susquehanna Valley – the Blue Rock, Lancaster, and Funk. A final Grubb Creek Phase also has been suggested. Some scholars (e.g., Stewart 1990) have suggested that Shenks Ferry emerges from early Late Woodland Clemson Island traditions of the Upper Susquehanna, while others (e.g., Graybill 1989) have suggested that it is more closely related to the Montgomery Focus of the Maryland Piedmont; the issue has not been resolved (Custer 1996:274-275).

The Shenks Ferry settlement pattern includes seasonal encampments of short duration, hamlets, and villages. During the Blue Rock Phase, seasonal camps and hamlets are the only sites identified. Seasonal camps occur in a variety of topographic settings and appear as lithic scatters in the archaeological record. Hamlets also appear in a variety of settings and include post molds, hearths, small sheet middens, and graves.

Wild plants and animals continued to comprise a significant portion of the subsistence effort during this phase, although some corn and bean domesticates also appear to have been utilized (Custer 1996:276-278). By the Lancaster and Funk phases, villages with a floodplain association have generally replaced hamlets as the dominant site type. The villages are stockaded and houses, storage/refuse pits, hearths, and graves are common. Examples of Shenks Ferry villages include the Frey Farm-Haverstick Site, the Kauffman II Site, the Murry Site, the Schultz-Funk Site, and the Slackwater Site (Custer 1996:278-285).

European Contact (A.D. 1500 – 1750)

The Contact Period can be divided into an early phase (A.D. 1500 – 1675), during which the Susquehannocks became the dominant socio-economic force in eastern Pennsylvania, and a later phase (A.D. 1675 - 1750) during which the effects of epidemic diseases on Native American populations were profound and these populations were gradually forced to the west by European settlement expansion. The Susquehannock culture gradually replaced that of Shenks Ferry. The Susquehannocks were historically known Indians who began to build large stockaded villages near the major rivers of central Pennsylvania during the sixteenth century.

Characteristic artifacts of the Susquehannocks include shell-tempered pottery and small, narrow triangular projectile points (Archaeological and Historical Consultants 1987:3-6). These small upper Susquehanna River villages evidently were abandoned by 1575 as the Susquehannock moved south into Lancaster County and constructed large stockaded villages including the Schultz Site near Manor Township (Kent 1984:319-333). Their southward migration is theorized to be related to pressure from the Five Nations Iroquois and/or the better trade opportunities of the south (Jennings 1978). They controlled the fur trade throughout Pennsylvania during the early seventeenth century, and, through warfare with adjacent tribes, they became the dominant Indian population within the region between 1610 and 1660 (Becker 1985:45-47). The Susquehannocks also established hegemony over a vast area that included the Delaware and upper Potomac rivers. The Lenape of the Middle and Lower Delaware basin appear to have been their subjects. The Susquehannocks competed with the Seneca and other groups in New York for control over the lucrative fur trade with the Europeans, and Susquehannock sites show significant quantities of European trade goods. In 1675, these people were forced out of central Pennsylvania into the lower Potomac Valley. The Lenape do not appear to have been active in the fur trade, and fewer European goods are found at Contact Period Lenape sites (Custer 1996:305-315). Most Native Americans had left eastern Pennsylvania by 1750 (Custer 1996:316).

Historic Cultural Sequence

Colonial Period (1681-1785)

In 1681, William Penn received a land grant from King Charles II for land west of the Delaware River, and established the proprietorship of Pennsylvania (Klein and Hoogenboom 1980:21). A devout Quaker, Penn administered the colony as a refuge from religious persecution, and intended the colony to be a land of ethnic and religious diversity. Between 1681 and the outbreak of the Revolutionary War, English, Germans, and Scots-Irish colonists sought a new life in Penn's colony, one that would be free from religious and political unrest (Klein and Hoogenboom 1980:45).

Penn's land policy was complicated by the presence of the Native Americans living within the boundaries of his original settlement. Penn initially had negotiated mutually acceptable land transactions with the indigenous populations to ensure peaceful relations. By 1683, the thousands of settlers who flocked to the colony forced Penn to purchase additional land from the colony's Native American tribes, including the Delawares, Shawnees, Susquehannocks, and other Iroquoian groups. However, Penn's generous and fair-minded policies began to erode during the early eighteenth century as demands for additional land continued to escalate (Cuff et al. 1989:82). Eventually, Native American discontent with European trading practices and additional purchases of land led to conflict and mass emigration toward Ohio. European colonials known as the "Paxton Boys" murdered the remaining Susquehannocks

near Conestoga in 1763 (Jennings 1978:366). The present boundary of Lebanon County is located within William Penn's original land grant from King Charles II. Lebanon County is bordered by Schuylkill and Berks Counties to the northeast, Dauphin County to west, and Lancaster County to the south.

The fertile valleys east of the Susquehanna River along tributaries such as the Swatara Creek, attracted settlers beginning in the 1720s. A group of fifteen German Palatine families who had been living at Schoharie, New York, migrated to the Lebanon Valley in 1723. As Conrad Weiser later wrote, the group proceeded

> . . .from schochary to the SusqueHana River. . .and descended the stream to the Mouth of Suartaro Creek. . . .From there they came to tulpehockin. . .others followed [and] took lands without permission of the authorities. . .and against the will of the Indians for the land had not yet been bought from Them, there was no one among the People to control them, everyone did as he liked. . . . (quoted in Wallace 1945:31).

The Tulpehocken settlement was located midway between the present cities of Lebanon and Reading; at the time of the German migration from New York, this region was virtually uninhabited. Wallace (1945:36) observes that, when Conrad Weiser arrived there in 1729, "from crest to crest of the Blue and South Mountains that flanked it the forest stretched unbroken except where some Delawares or Shawnees had made clearings for their corn, or where the Palatines were setting up their homesteads and extending their plantations." The first purchases of land on the Blue Mountain, which at that time was incorporated as part of Lancaster County, were made ca. 1736 (U.S. Army Corps of Engineers 1995:III-11).

The French and Indian War, which began in 1754, devastated the settlements along the Susquehanna and its tributaries. In 1755, a combined force of 1,500 French and Indians left Fort Duquesne (Pittsburgh) to raid the settlements to the east. By October, this force had reached the Susquehanna Valley, where they proceeded to raid and burn settlements at Penn's Creek (Selinsgrove), and then reportedly crossed the Susquehanna. By November, 1755, the French and their Indian allies were raiding settlements and plantations along the Blue Mountains and along Swatara Creek (Wallace 1945:404-412).

Despite repeated petitions, the Assembly in Philadelphia lagged in sending assistance to the frontier settlements. As refugees streamed east in advance of the enemy, residents of the Lebanon Valley sought to organize their own defenses. Finally, at a January, 1756, conference at Carlisle, the Assembly agreed to establish three major forts along the Blue Mountain range at Lehigh Gap, at the Schuylkill River, and at Tolihaio on the Shamokin Trail (Wallace 1945:424). Smaller defenses also were established; a force of 50 was stationed at Manada Gap (Wallace 1945:425) and Brown's Fort was located near Indiantown Gap (U.S. Army Corps of Engineers 1995:III-13). Despite these defensive measures, however, Indian raids continued to take their toll in the Indiantown area, and home sites frequently were abandoned (Wallace 1945:489; U.S. Army Corps of Engineers 1995:III-12). The Blue Mountain frontier remained insecure until the conclusion of the war in 1763.

By 1776, approximately 300,000 European settlers inhabited the commonwealth (Klein and Hoogenboom 1980:45), principally between the Delaware and Susquehanna Rivers. By 1785, population in the area east of the Susquehanna had grown sufficiently to warrant the creation of Dauphin County by dividing off the northern sections of what had been Lancaster County; the area included that portion that now is incorporated in Fort Indiantown Gap. John Harris' Ferry was selected as the seat of the new county. The town, laid out in 200 quarter-acre lots by John Harris's son-in-law William Maclay, originally was named Louisbourg in honor of Louis XVI, but it was renamed Harrisburg in 1791.

Agrarian Expansion and Town Development (1785 – 1861)

Although the Revolutionary War slowed the process of Pennsylvania settlement, communities established before the war experienced steady development during the 1770s and 1780s (Cuff et al. 1989:83). By February 16, 1813, the regions east of Harrisburg had acquired sufficient population

to warrant the creation of Lebanon County by an Act of Assembly (U.S. Army Corps of Engineers 1995:III-11). The county seat, Lebanon, was laid out in 1750, chartered as a borough on February 20, 1821, and then as a city in 1885.

The regions east of Harrisburg, including the Lebanon Valley, remained primarily agrarian. Local crops consisted of wheat and corn (Hatch et al. 1985:107), and lumbering developed as a profitable enterprise on the wooded slopes of mountain ridges like the Blue Mountains. Home sites and agricultural complexes were located in valleys between the mountain ridges; grist and lumber mill sites were located close to streams to exploit the readily available water power (U.S. Army Corps of Engineers 1995:III-13).

In 1836, one industrial complex was established within the present boundaries of Fort Indiantown Gap. This was the Manada Furnace, which went into blast in 1836. A small company town, with tenant housing for furnace workers and their families, was established at the furnace. The principal reason for locating an iron-manufacturing complex in this location was the availability of large amounts of timber for charcoal, and small cabin and hut sites associated with charcoal burning dotted the mountain slopes. Iron ore was obtained from the Cornwall mines in southern Lebanon County, and limestone for flux could be acquired from quarries in the Valley approximately 10 miles south of Manada (U.S. Army Corps of Engineers 1995:III-14). The Manada Furnace continued to operate until 1875; in common with other charcoal-fired furnaces of the region like the one at Cornwall, it could no longer operate profitably in the era of modern hot-blast anthracite furnaces (Bitner 1990:23).

Civil War (1861 – 1865)

Pennsylvania played a crucial role in influencing both political and military events of the Civil War. This influence was due in large measure to the industrial development and innovation of the decade preceding the war. Ships, blankets, cannons, locomotives, rifles, and agricultural produce all helped to sustain the Union war effort. The state was considered "the Union's arsenal" (Stevens 1960:201). Almost 360,000 men served in the 248 battalions which formed the Pennsylvania regiments, with more than 33,000 killed or mortally wounded in combat operations (Licht 2002:211).

In late June of 1863, believing that the Union army was south of the Potomac, General Robert E. Lee's Army of Northern Virginia entered Adams County. Lee's objectives included cutting the Pennsylvania Railroad to disrupt Union communications, scattering Union forces, threatening the state capital at Harrisburg, and replenishing much-needed supplies (Wiley 1897:40; Klein and Hoogenboom 1980:283). One objective of the Confederate raiding party led by General Richard Ewell was the capture of the Camelback Bridge which was built by Theodore Burr in 1817, and spanned the Susquehanna River by way of City Island. After a number of small skirmishes on the western shore of the river during 28 – 29 June the Rebel force withdrew without accomplishing their goal of seizing the state capital, and then marched south to join the fierce battle at Gettysburg.

Post-War Period (1865 – 1918)

From the Civil War to the turn of the twentieth century, Pennsylvania experienced its "Golden Age" as the leading industrial state of the nation. The economic and technological developments of the late nineteenth century transformed Pennsylvania. The period was characterized by the rapid displacement of agriculture in the region by major industries and the concomitant development of a transportation infrastructure. After the Civil War period, numerous communities had been established within the Lebanon Valley itself; the principal centers of population lay in the middle of the valley along the present day US Rt. 422 and the Reading Railroad. The smaller contiguous valleys of the Blue Mountain chain also contained a fully developed complement of churches, mills, schools, roadways, and home and farm sites. By 1875, communities within the immediate Fort Indiantown Gap region included Manada Furnace, Indiantown Gap, Ranktown, Bordnersville, and Keiserstown. Of particular interest were the settlements of Africa, a community of freedmen, and St. Joseph's Spring, a resort hotel complex located on the north slope of Blue Mountain (U.S. Army Corps of Engineers 1995:13-14). The use

of the mountain ridges adjacent to the Lebanon Valley for development of resorts was a relatively common late nineteenth century phenomenon; for example, the present resort community of Mount Gretna, located on South Mountain, was first established in 1884 (Bitner 1990:24-26).

Modern Period (1918 – Present).

For the Commonwealth of Pennsylvania, the period after World War I can be characterized as one of "enormous industrial development, extensive resource exploitation, and rapid urbanization." These three forces, which actually originated during the preceding period, intensified. This intensification brought about major social and economic changes. Chief among these was the dramatic increase in population. Around the turn of the century, road systems were improved and the automobile became a viable means of quick, affordable, and efficient transportation throughout the state. Electric trolley lines also linked the smaller communities of the Lebanon Valley like Annville with major cities such as Lebanon and Harrisburg (Martha Rudnicki, personal communication, 1995). The completion of the Pennsylvania Turnpike in 1940 capped numerous decades of road system improvement; the turnpike was the first of its kind in the country (Hatch et al. 1985:105).

During the early twentieth century, however, farming began to decline in importance in the region. This agricultural decline related directly to the establishment of the installation known today as Fort Indiantown Gap, because it presented the potential for the purchase of large tracts of land at relatively inexpensive prices. The installation at Fort Indiantown Gap was established by the State of Pennsylvania in 1931 to replace an older, inadequate, Pennsylvania National Guard (PNG) facility at Mount Gretna (U.S. Army Corps of Engineers 1995:III-14-15).

The first PNG encampment in the Lebanon Valley region had been established at Mount Gretna as Camp Siegfried in 1885, on a tract of land encompassing 120 ac. (Bitner 1990:28-29), and the PNG presence there quickly escalated. The annual encampment at Gretna contributed materially to the development of the resort facilities there; troop parades and other activities were major events for viewing by vacationers. However, by 1930, the Gretna facility lacked sufficient room to accommodate the requirements for operating modern weapons systems and the increased numbers of troops involved. The movement of the PNG training site to Indiantown Gap, coupled with the Great Depression, was responsible for the decline of Mount Gretna as a resort (Bitner 1990:155-156).

As initial construction of the facilities at Indiantown Gap began in 1932, the state government continued to expand the installation's boundaries. By 1934, the installation encompassed 10,000 ac. Activities at the installation included field artillery, cavalry, and infantry training. Through the 1930s, both the physical plant and the scope of training were enlarged. By 1939, the installation incorporated an aircraft landing field, a quartermaster's depot, several regimental camp sites, and numerous support buildings, most of which were constructed by the Civil Works Administration (CWA) and the Public Works Administration (PWA) programs of the federal government (U.S. Army Corps of Engineers 1995:III-16-18). Also worthy of note was the construction of the Appalachian Trail, a Civilian Conservation Corps (CCC) project; portions of the trail extended along the boundary of the installation on the southern slope of Blue Mountain.

In 1940, as World War II began in Europe and the possibility loomed that the United States could become involved in the conflict, the Indiantown Gap facility was leased by the State of Pennsylvania to the federal government. During the war, over 1,000 temporary buildings were constructed within the cantonment, and training areas were enlarged. At the end of the war, Fort Indiantown Gap served as a separation center until it was declared inactive in 1946 (U.S. Army Corps of Engineers 1995:22-24).

The outbreak of the Korean War in 1951 saw reactivation of the installation under federal authority, and in 1957 the facility became the headquarters of the 21st Army Corps, with responsibility to supervise Army Reserve units. The camp again was pressed into federal service during the 1970s and 1980s, when it served as a resettlement center for almost 200,000 Cuban, Vietnamese and Cambodian refugees (U.S. Army Corps of Engi-

neers 1995:24-25). The Indiantown Gap National Cemetery was established through a land transfer of 677 acres (274 hectares) in 1976. The first interment was in 1982 (A.D. Marble and MACTEC 2012).

Chapter III

Research Design and Methods

Research Design and Objectives

The objectives of the Phase I survey investigation were: (1) to locate, identify, and delineate all prehistoric and historic cultural resources within the project area; (2) to make preliminary assessments of the potential significance of those resources, applying the National Register Criteria for Evaluation [36 CFR 60.4 (a-d)]; (3) to assess the impact of proposed development activities on the cultural resources situated within the project boundaries; and (4) to formulate management recommendations concerning those resources.

Archival Research Methods

Background research provided data on previously recorded resources in the project area and within a 0.5 mile (0.8 km) vicinity, and identified historic contexts and themes that provided guidance in assessing the potential significance of archaeological sites identified in or near the project area. PA-SHARE, the online inventory of architectural and archaeological sites and cultural resource surveys maintained by the Pennsylvania Bureau for Historic Preservation, provided information on previously recorded sites, structures, and surveys in the project area and the vicinity. Archival research focused on secondary-source county histories and historic maps. The results of the site file research are summarized at the beginning of Chapter II in the section, *Previous Investigations*.

Archaeological Field Methods

Approximately 8.5 acres (3.4 hectares) of the APE had been surveyed for archaeological resources previously and reviewed by the PA SHPO, and was not resurveyed. RCG&A completed a pedestrian reconnaissance of the remaining approximately 21.5 acres (8.7 hectares) of the APE. The reconnaissance complemented the background research by documenting slopes, disturbances, and any potential surface archaeological features. In undisturbed areas of 15 percent slope or less, systematic survey was undertaken. Since the study area was largely wooded and none of it was under active cultivation, the systematic survey consisted of shovel tests excavated at 15 meter (m) (49.2 foot [ft]) intervals.

In accordance with the PA SHPO guidelines, shovel tests measured a minimum of 57 cm (22.4 in) in diameter and were excavated to a minimum depth of 10 cm (3.9 in) into culturally sterile subsoil, except where soil conditions prevented full excavation. Soil were removed according to natural stratigraphic horizons and screened through 0.635 cm (0.25 in) hardware cloth. The location of each shovel test within the sampling pattern, the depths of the stratigraphic zones, and the presence or absence of cultural materials were recorded in the field. Soil characteristics, including color and texture, were recorded following standard soil nomenclature. Standard records and catalogues followed the revised *Guidelines for Archaeological Investigations in Pennsylvania* (PA SHPO 2017).

Prior to the archaeological survey, a geoarchaeological and geomorphological review of the proposed project area was conducted to assess the potential for cultural deposits buried beyond the depth of standard archaeological shovel testing. The review consisted of an initial map study to locate alluvial landforms in the project area. Data examined to locate alluvial landforms included topographic maps, Natural Resources Conservation Service (NRCS) soil series data, and the National Hydrology Dataset (NHD). The geoarchaeological and geomorphological review

identified no alluvial land in the project area. The results of the review indicated it was unlikely that any deeply buried cultural deposits would exist beyond the depth of Phase I shovel testing for the proposed project area. Therefore, no deep testing was recommended or undertaken.

Records and Curation

No artifacts were identified or recovered. Upon completion of the project, all records, photographs, and field notes will be curated at the Pennsylvania State Museum.

Chapter IV

Results of Archaeological Survey Investigations

Project Specific Archival Investigation Results

The proposed Phase 5 cemetery expansion includes two areas, measuring approximately 2.5 acres (1.0 hectare) and 27 acres (10.9 hectares), respectively. As noted above in Chapter II, two previously recorded archaeological sites, 36LE0516 and 36LE0517, are located within or immediately adjacent to the larger project area. Site 36LE516 consisted of a poured concrete foundation with deep fill composed of dark gray shale inside. Site 36LE517 consisted of a small lithic scatter at the edge of a steep slope. Both of these sites have been determined by the PA SHPO to not be eligible for the inclusion on the NRHP.

No structures are present in either area on the 1979 Indiantown Gap quadrangle map (cf. Figure 2). Other topographic maps, extending back to 1892, similarly depict no structures in either project area (NETRonline 2021). The 1875 Beers *County Atlas of Lebanon, Pennsylvania* shows one structure, noted as belonging to "DU. Gerberich," on the eastern edge of the larger project area (Figure 3). No evidence for this occupation was encountered during the survey.

Field Investigation Results

Survey Area 1

Survey Area 1 measured approximately 1.5 acres (0.61 hectares), and is situated south of Biddle Drive, and east of Committal Shelter 1 and the Honor Guard Building. An additional approximately 1.0 acre (0.40 hectares) of area proposed for the Phase 5 expansion was surveyed previously (A.D. Marble and MACTEC 2012) and was not resurveyed. The project area is partially wooded and partially grass covered.

A total of 15 shovel tests were excavated at 15 m (49.2 ft) intervals (Figure 4). Eight planned shovel tests were not excavated due to disturbances resulting from paved roads, gravel roads, road ditches, and slope inclines greater than 15 percent (Figure 5). The typical soil profile (ST N1030 E1030) consisted of 28 cm (11 in) of dark brown (10YR 3/3) silt loam underlain by at least 10 cm (3.9 in) of yellowish brown (10YR 5/4) silty clay loam. In some cases, the upper stratum was dark yellowish brown (10YR 4/4) or brown (10YR 4/3) and the lower one in one case was light olive brown (2.5Y 5/6). These strata variations all reflect the range of Ap and Bt horizons belonging to the Comly soil series mapped in the survey area (USDA NRCS 2021).

No archaeological artifacts were recovered and no archaeological sites were identified. Since no artifacts were recovered and no archaeological sites were identified within Survey Area 1, the proposed project will have no impact to archaeological historic properties, as defined in 36 CFR 800.16(l), in the studied area. No further archaeological investigation is warranted or recommended.

Survey Area 2

Survey Area 2 measured approximately 20 acres (8.09 hectares), and is situated north of Old Cumberland Street, west of Indiantown Road, and east of the existing cemetery drive. An additional approximately 7 acres (2.83 hectares) of area proposed for the Phase 5 expansion was surveyed previously (A.D. Marble and MACTEC 2012) and was not resurveyed. The project area included deciduous forest, an area of previous landscape modification (approximately 2.8 acres), and actively disturbed zones (approximately 0.5 acres).

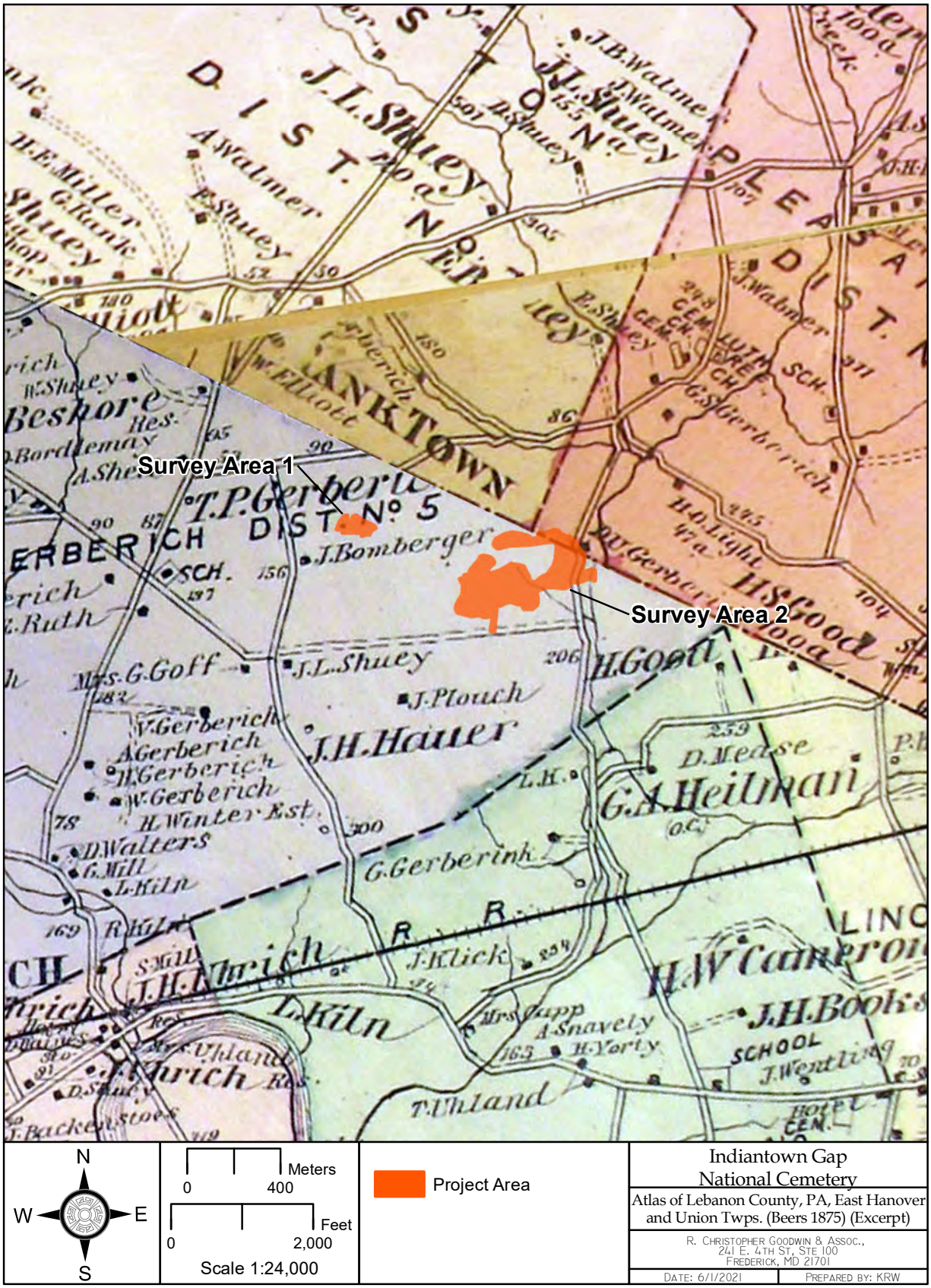

Figure 3. **Excerpts from Beers' 1875 County Atlas of Lebanon, Pennsylvania, East Hanover and Union Townships, showing the project area**

Figure 4. Aerial photograph, showing Survey Area 1 archaeological testing

Figure 5. Photograph of Survey Area 1, looking west

A total of 209 shovel tests were excavated at 15 m (49.2 ft) intervals (Figure 6). A total of 135 planned shovel tests were not excavated due to disturbances resulting from artificial landform development, gravel roads, active construction, and to wet areas and slope inclines greater than 15 percent (Figures 7 – 9). Area 2 is mapped as containing three different soil series. Weikert channery silt loams make up the majority of the surveyable area, followed by Berks channery silt loam, and Bedington shaly silt loam. The typical soil profile (ST E1120 E1210) for the Weikert soil series consisted of 28 cm (11 in) of brown (10YR 4/3) silt loam underlain by at least 10 cm (3.9 in) of yellowish brown (10Y 5/6) silty clay loam. Both soil horizons include varying percentages of channery with Ap and Bw horizons containing 5-10 percent channery. The typical soil profile (ST E1330 N1045) for the Berks soil series consisted of 25 cm (9.8 in) of brown (10YR 4/3) silty loam underlain by at least 10 cm (3.9 in) of yellowish brown (10YR 5/6) silty clay loam. While the soil consistency of the typical shovel test and its neighbors was silty clay loam, both the Ap and Bw1 horizons contain 10 percent rock inclusions, aligning well within the Berks soil series channery texture. Finally, the typical soil profile (ST E1405 N1135) for the Bedington soil series consisted of 30 cm (11.8 in) of dark brown (10YR 3/2) silt loam underlain by at least 10 cm (3.9 in) of yellowish brown (10YR 5/6) silt loam. Both the Ap and Bt1 horizons contain 15 percent rock, aligning well within the soil series descriptions for Bedington shaly silt loam. These strata reflect the range of soil horizons belonging to their respective soil series mapped in multiple portions of the survey area (USDA NRCS 2021).

A concrete block foundation was identified near ST N955 E1135 (cf. Figure 6). This foundation measured 1.38 x 3.20 m (4.53 x 10.50 ft) and was 1.05 m (3.44 ft) deep inside (Figure 10). No artifacts were identified inside nor around the foundation, either on the surface or in the nearby shovel test. With the absence of artifacts, the date of this foundation is uncertain, but the appearance of the blocks was modern, and the remains were not defined as an archaeological site.

No archaeological artifacts were recovered and no archaeological sites were identified. Since no artifacts were recovered and no archaeological sites were identified within Survey Area 2, the proposed project will have no impact to archaeo-

Figure 6. Aerial photograph, showing Survey Area 2 archaeological testing

Figure 7. Photograph of Survey Area 2, looking north through disturbed area

Figure 8. Photograph of Survey Area 2, looking south from the southeastern section of project

Figure 9. Photograph of Survey Area 2, looking south

Figure 10. Photograph of Survey Area 2, looking west at concrete block foundation

logical historic properties, as defined in 36 CFR 800.16(l), in the studied area. No further archaeological investigation is warranted or recommended.

Statewide Pre-Contact Probability Model Comparison

The Pre-Contact Model generally classified the project area has having a moderate to high potential for Pre-Contact sites, with 61 per cent having moderate potential, 20.7 per cent high potential, and 18.3 per cent no coding or presumed low potential (Table 2). The survey did not confirm the prediction of moderate to high archaeological potential as no Pre-Contact artifacts were recovered. No evidence of the historic oc-cupation along the eastern edge of Survey Area 2 was identified either.

Table 2. Statewide Pre-Contact Probability Model comparison

Sensitivity Tier	Area within this Tier	Percent of Total Project Area	Method(s) Used to test this tier	Number of Sites Located
High	18,009 sq. m.	20.7 per cent	STPs (15 m) – 72.4%; Pedestrian – 27.6% (more sloped or disturbed than expected)	0
Moderate	53,054 sq. m.	61 per cent	STPs (15 m) – 60.9%; Pedestrian – 39.1% (more sloped or disturbed than expected)	0
No Coding (Low)	15,945 sq. m.	18.3 per cent	STPs (15 m) – 43.7%; Pedestrian – 56.3%	0

Chapter V

Summary and Recommendations

Summary

This report has presented the results of the Phase I archaeological survey for the proposed Phase 5 Expansion at the Indiantown Gap National Cemetery, Annville, East Hanover Township, Lebanon County, Pennsylvania. The project is located on federal property. As a federal undertaking, it will be reviewed under Section 106 of the National Historic Preservation Act of 1966. All work was completed following standards promulgated in *Archaeology and Historic Preservation: The Secretary of the Interior's Standards and Guidelines*, and in the revised *Guidelines for Archaeological Investigations in Pennsylvania* (PA SHPO 2017).

The Phase I survey was undertaken by RCG&A on behalf of Mabbett & Associates, Inc. from April 20 – 23, 2021. Approximately 8.5 acres (3.4 hectares) of the APE has been surveyed for archaeological resources previously and reviewed by the PA SHPO, and were not resurveyed. RCG&A completed a pedestrian reconnaissance of the remaining approximately 21.5 acres (8.7 hectares) of the APE. In undisturbed areas of 15 percent slope or less, systematic survey was undertaken using shovel tests excavated at 15 m (49.2 ft) intervals. Geomorphological review had indicated that no deep testing was needed. A total of 224 shovel tests were excavated. No archaeological artifacts were recovered and no archaeological sites were identified.

Recommendations

Since no artifacts were recovered and no archaeological sites were identified within the proposed project area, the proposed project will have no impact to archaeological historic properties, as defined in 36 CFR 800.16(l), in the studied areas. No further archaeological investigation is warranted or recommended.

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ACKNOWLEDGMENTS

This report was prepared with the assistance and support of many individuals, agencies, and institutions. R. Christopher Goodwin & Associates, Inc. would like to thank the staff of the Pennsylvania State Historic Preservation Office, Harrisburg, for providing information regarding previously recorded cultural resources near the project area. We also extend thanks to Mr. Andrew Glucksman of Mabbett & Associates, Inc., Ms. Tiffany Haile of AE Works, and all of the U.S. Department of Veterans Affairs personnel who have helped to facilitate all aspects of this project.

Michael B. Hornum, Ph.D., served as Principal Investigator and Project Manager, and supervised all aspects of the study. Field investigations were directed by Thomas Wambach, M.A., and also included the participation of Kevin Clark, B.A., Dan Grose, B.A., and Hanah Romsburg, B.A. Kristopher R. West, M.A. was the project geomorphological consultant. Archival investigations were undertaken by Katherine Grandine, M.A. The report graphics were done by Kristopher R. West, M.A. The report was produced by Ms. Sharon Little.

APPENDIX I

RESUMES OF KEY PROJECT PERSONNEL

MICHAEL B. HORNUM, PH.D. — SENIOR PROJECT MANAGER

Dr. Michael Hornum earned a Ph.D. in Classical and Near Eastern Archaeology from Bryn Mawr College. Dr. Hornum has served as field supervisor or project manager on dozens of projects for a variety of private, county, state, and federal clients. He has directed or managed projects in Florida, Indiana, Kentucky, Maryland, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. His experience cuts across all phases of archeological investigation, including surveys, evaluations, data recoveries, and archaeological damage assessments. Since joining R. Christopher Goodwin & Associates, Inc. in 1993, Dr. Hornum's projects have included investigations at prehistoric and historic sites, ranging from the late Paleo-Indian through the Late Woodland periods, and from the late seventeenth through the early nineteenth centuries.

Dr. Hornum has extensive experience in ensuring Sections 106 and 110 compliance on Federal installations. His projects have included large Phase I surveys at Aberdeen Proving Ground, Fort George G. Meade, Naval Surface Warfare Center Carderock, Naval Air Station (NAS) Oceana, Naval Security Group Activity (NSGA) Northwest, Naval Radio Transmitter Facility (NRTF) Driver, and Naval Weapons Station (NWS) Yorktown. Dr. Hornum also has managed archaeological evaluations at Aberdeen Proving Ground, NSGA Northwest, the USDA's Beltsville Agricultural Research Center (BARC), and Naval Air Station (NAS) Patuxent River. Dr. Hornum has guided data recovery excavations at Aberdeen Proving Ground, NSGA Northwest, BARC, and NAS Patuxent River. He also has designed interpretative exhibits for Navy installations in Virginia, West Virginia, and Puerto Rico. These exhibits have included panels, artifact display cases, and in one case, an interactive computer kiosk. Dr. Hornum also has worked with Aberdeen Proving Ground, NAS Oceana, NWS Yorktown, and NSGA Northwest to create Integrated Cultural Resources Management Plans (ICRMPs) for managing archaeological resources at these installations.

Dr. Hornum has considerable experience in establishing archaeological compliance for major pipeline projects. During the FGT Phase III expansion project, Dr. Hornum directed three archaeological evaluations of prehistoric sites, and served as project manager for the data recovery at Site 8LE2105. Dr. Hornum managed the Pennsylvania portion of the Independence Pipeline project, which included survey and archaeological evaluations of six sites. Dr. Hornum also served as project manager for over 50 miles of pipeline replacement (Line 1278) in eastern Pennsylvania, including survey, archaeological evaluations of thirteen sites, and data recovery at three sites. Dr. Hornum managed Phase I through III investigations for both the Eastern Market Expansion Project in Ohio, West Virginia, and Virginia, and the Rockies Express East Project in Ohio and Indiana. Dr. Hornum managed the data recovery investigations at Site 46MR139 in Marshall County, West Virginia for the Appalachian Gateway Project. Dr. Hornum managed the archaeological investigations for the TEMAX, TEAM 2012, and TEAM 2014 projects across southern Pennsylvania, the East Side Expansion Project in eastern Pennsylvania and New Jersey, the Line MB Extension Project in Maryland, the Leach XPress Project in Kentucky, Ohio, Pennsylvania, and West Virginia, the WB XPress Project in Virginia and West Virginia, and the Eastern Panhandle Project in Maryland, Pennsylvania, and West Virginia.

Dr. Hornum also has worked with other private clients, and with state and local agencies to bring their projects into compliance. Among his Maryland projects were archaeological data recovery at Site 18HO284 in Howard County, nine evaluations at Chapman's Landing in Charles County, and archaeological survey at the proposed Tanyard Cove, Beech Tree, and Willow Grove developments in Anne Arundel and Prince George's counties. His Virginia and West Virginia projects include archaeological surveys at several properties for Virginia Natural Gas, Inc., Eastern Associated Coal Corporation, and Norfolk and Southern Railroad. In Pennsylvania, Dr. Hornum directed archaeological survey for Pennsylvania DOT's proposed Kittanning Bypass, and was instrumental in creating an Archaeological Protection Plan for the City of Pittsburgh.

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U.S. Department of Veterans Affairs

Indiantown Gap National Cemetery Phase 5 Expansion Project

Aquatic Resource Delineation Report

Prepared by:

Thompson Environmental Surveys & Permitting, LLC.

July 2021

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Appendices

1 Introduction

Thompson Environmental Surveys & Permitting, LLC. (TES&P) has prepared this Aquatic Resource Delineation Report to document studies conducted for Mabbett & Associates, Inc. (Mabbett) at the Indiantown Gap National Cemetery Phase 5 Expansion Project (Project). The studies were preformed to identify existing conditions within the Project area for future project planning, design, and permitting purposes. The delineation results will allow future project teams to modify project plans and avoid/minimize potential impacts to regulated resources. The Project area consists of an approximately 250-acre site located at Fort Indiantown Gap, south of Biddle Drive and west of Indiantown Road in Union and East Hanover Townships, Lebanon County, Pennsylvania (**Figure 1 - Project Location Map**). The Study Area boundaries are depicted on Figures 1, 2, and 3. The coordinates for the approximate Project center are 40.42360° and -76.55986°. This report documents the methodology and results of the aquatic resource investigations performed by TES&P for the Project.

2 Background

The Project is located within the United States Geological Survey (USGS) Indiantown Gap, PA 7.5-minute series topographical quadrangle (USGS, 2013). Land cover within the Project area consists of mowed maintained open areas, forest, wetlands, watercourses; and floodplain/riparian areas. Land uses in the vicinity of the Project consisted of developed military training ranges and facilities, maintained cemetery grounds, transmission line right-of-way, and primary and secondary roadways. The Project area drains north and east to Aires Run and south to mindianyown Run both of which are located in Swatara Creek Watershed and the Lower Susquehanna River basin.

Both Aires Run and Indiantown Run have a PA Code, Title 25, Chapter 93 designated protected aquatic life uses of Warm Water Fishes, Migratory Fishes (WWF, MF) (Commonwealth of PA, 2018a). The Pennsylvania Department of Environmental Protection (PADEP) does not list Aires Run, Indiantown Run or any of their tributaries located within the vicinity of the Project as having an Existing Use Classification (PADEP, 2019).

The Pennsylvania Fish and Boat Commission (PFBC) does not list Aires Run or Indiantown Run as Stocked Trout Waters (PFBC, 2018a and 2018b), or as Wild Trout Waters (PFBC, 2018c). However, wetlands which serve as habitat for fauna or flora listed as ‘‘threatened’’ or ‘‘endangered’’ under the Endangered Species Act of 1973, or wetlands that are hydrologically connected to or located within 1/2-mile of wetlands identified as habitat for flora or fauna listed as ‘‘threatened’’ or ‘‘endangered’’ are considered Exceptional Value.

According to the 2016 Final Pennsylvania Integrated Water Quality Monitoring and Assessment Report, no watercourses within the vicinity of the Project are listed as siltation impaired waterbodies (PADEP, 2016).

Three (3) wetlands identified by the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) are located within proximity to the Project Study Area. These wetlands are classified as riverine, unknown perennial, unconsolidated bottom, permanently flooded (R5UBH) and riverine, intermittent, unconsolidated bottom, permanently flooded (R4SBC) (**Figure 2 – Soil and NWI Map).**

Study Area Soils were investigated and one soil unit within the Study Area was determined to be hydric, three soil units were determined to have hydric inclusions. Table 1 contains a comprehensive list of soil map units located within the Study Area and lists their hydric ratings (NRCS, 2018). Soil map units are depicted in Figure 2.

Table 1
Study Area Soils

Soil Map Unit	Description	Hydric Rating
BeB	Bedington shaly silt loam, 3 to 8 percent slopes	No
BeD	Bedington shaly silt loam, 15 to 25 percent slopes	No
BkB	Berks channery silt loam, 3 to 8 percent slopes	Inclusions of Brinkerton
BkD	Berks channery silt loam, 15 to 25 percent slopes	Inclusions of Brinkerton
CmB	Comly silt loam, 3 to 8 percent slopes	Inclusions of Brinkerton
Ho	Holly silt loam	Yes
WeB	Weikert channery silt loam, 3 to 8 percent slopes	Inclusions of Brinkerton
WeD	Weikert channery silt loam, 15 to 25 percent slopes	No

3 Methodology

TES&P identified and delineated wetlands and watercourses within the Study Areas on October 07, 08, 2020, April 28, 2021, and June 10, 2021. The resources identified by TES&P are potentially regulated under the Clean Water Act of 1972 as *Waters of the United States* and under PA Code, Title 25, Chapter 105 as *Regulated Waters of this Commonwealth* (Clean Water Act of 1972; Commonwealth of PA, 2009b,). During field investigations all wetlands and watercourses located within the Study Area were identified and delineated. The location of each identified resource was recorded using a high-precision, handheld GPS receiver.

Prior to initiating the field delineation efforts, TES&P conducted a detailed desktop review of the Project area. The existing sources used for the desktop investigation included: United States Geological Survey (USGS), PA 7.5-minute series topographical quadrangle, (USGS, 2013); the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS, 2018) Soil Survey Geographic (SSURGO) Database for Lebanon County, Pennsylvania, the United States Fish and Wildlife Service (USFWS, 2018) National Wetland Inventory (NWI) polygon for Pennsylvania, and aerial imagery.

During field investigations wetlands were identified and delineated using the Modified Routine Wetland Delineation Method described in the United States Army Corps of Engineers' (USACE) Wetland Delineation Manual, Technical Report Y-87-1, using criteria described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (Environmental Laboratory, 1987a; USACE 2012). During field investigations, data was collected for each delineated wetland and an adjacent upland sample point including dominant vegetation, soil characteristics, hydrology, and other information necessary to complete USACE (2012) Wetland Determination Data Forms.

Wetlands within the Study Area were classified according to the USFWS Classification of Wetlands and Deepwater Habitats for the United States. Wetland classifications were based upon vegetation type and dominance: palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO), and palustrine unconsolidated bottom (PUB). Dominant vegetation was evaluated on percent aerial cover for each stratum: tree, sapling/shrub, herbaceous, and woody vine (Cowardin et al., 1979).

Each plant species was assigned an indicator status based on the National Wetland Plant List (Lichvar et al., 2016). The following indicator statuses were assigned: obligate (OBL), facultative wet (FACW), facultative (FAC), facultative upland (FACU), upland (UPL), no status (NS), or not indicated (NI). The Munsell Soil-Color Chart (Munsell, 2009) was utilized to assess soils.

Once TES&P biologists determined that an area met the criteria to be considered a wetland, data and photos were collected, and the resource boundary was surveyed. A high-precision, handheld, global positioning system (GPS) receiver (model GeoXH handheld, Trimble, Sunnyvale, CA) was used to record the boundaries of each wetland.

To identify and delineate watercourses, TES&P performed an on-site evaluation based on typical watercourse characteristics such as defined streambed and streambanks, exclusion of terrestrial vegetation, hydrologically-sorted substrate material, and the presence of an ordinary high-water mark (OHWM). If a watercourse was delineated, information was collected for each resource including but not limited to approximate top of bank width, approximate channel depth, flow depth, channel substrate, and channel morphology. The extent of each watercourse was recorded with a GPS unit. For watercourses exhibiting an average width at the OHWM of ten feet or greater, both left and right banks were recorded. For watercourses with average width at the OHWM of less than ten feet, the centerline of the channel was recorded.

4 Results

Fourteen (14) wetlands, nineteen (19) watercourses and one (1) constructed storm basin were identified and delineated within the Study Area. Locations of the identified resources are depicted on **Figure 3**. Data forms for the individual wetlands are included in Appendix B. Photographs of the resources are included in Appendix C. Descriptions of the identified wetlands and watercourses are summarized below.

Wetlands

A total of (16) wetlands were located and delineated within the Study Area. All of the fourteen wetlands, were classified as PEM. The total area of wetlands identified within the study area was 1.09 acres. The landform/geomorphic settings of these wetlands included floodplains, hillside seep/springs and closed topographic depressions/isolated systems. According to PA Code, Title 25, Chapter 105.17 (1, paragraph i), Wetlands which serve as habitat for fauna or flora listed as ‘‘threatened’’ or ‘‘endangered’’, or wetlands that are hydrologically connected to or located within 1/2-mile of habitat for fauna or flora listed as ‘‘threatened’’ or ‘‘endangered’’ are considered EV under the Endangered Species Act of 1973. An initial Phase 1 Bog Turtle Habitat Survey was completed by TES&P concurrently with the Aquatic Resources Survey one wetland INC-W-002 was identified as potential bog turtle habitat. F second Phase 1 survey was conducted in June of 2021 and four assitional wetlands were identified as potential bog turtle habiat. Phase 1 Bog Turtle Habitat Survey Report and Phase 1 Bog Turtle Addendum were completed by TES&P and submitted to the United States Fish and Wildlife Service (USFWS) under separate cover. The results of these reports are currently under review by the USFWS, pending the results of the USFWS review all wetlands identified within the Study Area are considered EV until a Phase 2 Bog Turtle Presence/Probable Absence Survey has determined the probable absence of bog turtles in wetlands identified as potential bog turtle habitat. Refer to Table 2 for classifications and sizes of the field-identified wetlands. Detailed wetland information is provided on the wetland data forms in Appendix B. Photographs of each wetland can be found in Appendix C.

Table 2
Field Identified Wetlands

Wetland ID	Classification	Delineated Size (ac)	Total Delineated Size (ac)
INC-W-001* **	PEM	0.14	0.14
INC-W-002* **	PEM	0.37	0.37
INC-W-003**	PEM	0.01	0.01
INC-W-004**	PEM	0.02	0.02

Wetland ID	Classification	Delineated Size (ac)	Total Delineated Size (ac)
INC-W-005**	PEM	0.01	0.01
INC-W-006**	PEM	0.04	0.04
INC-W-007* **	PEM	0.10	0.10
INC-W-008* **	PEM	0.08	0.08
INC-W-009* **	PEM	0.04	0.04
INC-W-010**	PEM	0.01	0.01
INC-W-011**	PEM	0.02	0.02
INC-W-012**	PEM	0.20	0.20
INC-W-013**	PEM	0.01	0.01
INC-W-015**	PEM	0.04	0.04
INC-W-019**	PEM	0.02	0.02
INC-W-020**	PEM	0.01	0.01
Total Wetlands:	**14**	**Total Area PEM:**	**1.12**
* Wetlands extend outside the Study Area. ** Exceptional Value Wetland PEM – Palustrine Emergent PFO – Palustrine Forested PSS – Palustrine Scrub-Shrub		**Total Area PSS**	**0.00**
		Total Area PFO	**0.00**
		Total Area PUB	**0.00**
		Total Wetland Area	**1.12**

Wetlands in the Project Area were typical of systems located in areas with historically disturbed land use including residential/developed areas, agriculture, or forested lowlands. The areas with steep slopes or low-lying topography and saturated soil conditions are generally unsuitable for development so these areas frequently remained as forested or wooded lots. In the areas that have been developed the natural hydrology has commonly been manipulated to maximize suitable areas for building. Subsequently, the Study Area contains multiple man-induced and disturbed areas that have been identified as wetlands. The areas that have not been utilized or developed typically are bordered by wooded gullies containing perennial or intermittent watercourses and wetlands. A combination of these characteristics was evident throughout the Study Area. Typical wetland vegetation, soil characteristics, and hydrology identified within the identified wetlands are discussed below.

Vegetation

Wetlands in the project area displayed a combination of the vegetative species common to the region. The most common herbaceous plant species observed were Japanese stilt grass (*Microstegium vimineum*), jewelweed (*Impatiens capensis*), cattail (*Typha Latifolia*), and arrowleaved tearthumb (*Persicaria sagittata*). The most common shrub species observed were spicebush (*Lindera benzoin)* and multiflora rose (*Rosa multiflora*). The most common tree species observed were green ash (*Fraxinus pennsylvanica*), and red maple (*Acer rubrum*).

Soils

Wetland soils varied by wetland, but some generalizations can be made. The most common matrix hues were 10YR or 7.5YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture was silt loam underlain

by a clay loam layer. Upland soils typically displayed hues of 10YR or 7.5YR with values between 4 and 6 with chroma ranging from 3 to 4.

Hydrology

The most common primary indicators of hydrology observed within the Project Area wetlands were Surface Water (A1), High Water Table (A2), and Saturation (A3). However, the region has experience very dry conditions over the last three months and observed indicators of hydrology were difficult to determine in many circumstances. The most common secondary indicators observed were Saturation Visible on Aerial Imagery (C9), and Drainage Patterns (B10). The primary sources of hydrology differed between wetland types. Seasonal high groundwater, groundwater discharge, and surface water runoff collection were the primary sources of hydrology observed.

Watercourses

TES&P identified and delineated ten (10) ephemeral (EPH) watercourses, seven (7) intermittent (INT) watercourses, and two (2) perennial (PER) watercourses within the Study Area (**Figure 3**). A summary of the delineated watercourses is provided in Table 3. Photographs of each watercourse can be found in Appendix C.

Table 3 Field Identified Watercourses

Resource ID	Classification	Total Delineated Size (lf)
INC-S-001	PER	1279.51
INC-S-002	INT	1214.26
INC-S-003	EPH	426.90
INC-S-004	EPH	56.51
INC-S-005	INT	165.43
INC-S-006	INT	53.26
INC-S-007	EPH	25.73
INC-S-008	INT	588.83
INC-S-009	EPH	133.43
INC-S-010	EPH	589.44
INC-S-011	EPH	311.85
INC-S-012	PER	2485.74
INC-S-013	INT	80.13
INC-S-014	EPH	343.15
INC-S-015	INT	285.04
INC-S-016	EPH	485.85
INC-S-017	INT	189.98
INC-S-018	EPH	164.31
INC-S-019	EPH	136.00
Totals:	**19**	**8877.35**

Watercourses within the Study Area ranged from small EPH surface water drainage courses, INT watercourses that convey seasonal ground water hydrology, and PER watercourses that contain persistent surface water flow. Generally a watercourse that only conveys surface water from precipitation events was considered EPH, watercourses that originate in wetlands or at the discharge of seasonal groundwater seeps were classified as INT and watercourses that contained a persistent surface flow associated with connection to the ground water table were classified as PER. PER watercourses also typically contained species of aquatic organisms including finfish and macroinvertebrate species that require persistent surface water for survival.

6 Summary

TES&P conducted aquatic resource delineations on October 2020, April 2021, and June 2021 within the approximately 250-acre Study Area for the Indiantown Gap national Cemetery Expansion Project. This field effort resulted in the delineation of sixteen (16) wetlands and nineteen (19) watercourses.

This report was prepared by:
Thompson Environmental Surveys & Permitting, LLC.

Bridger J. Thompson

Senior Biologist/Owner

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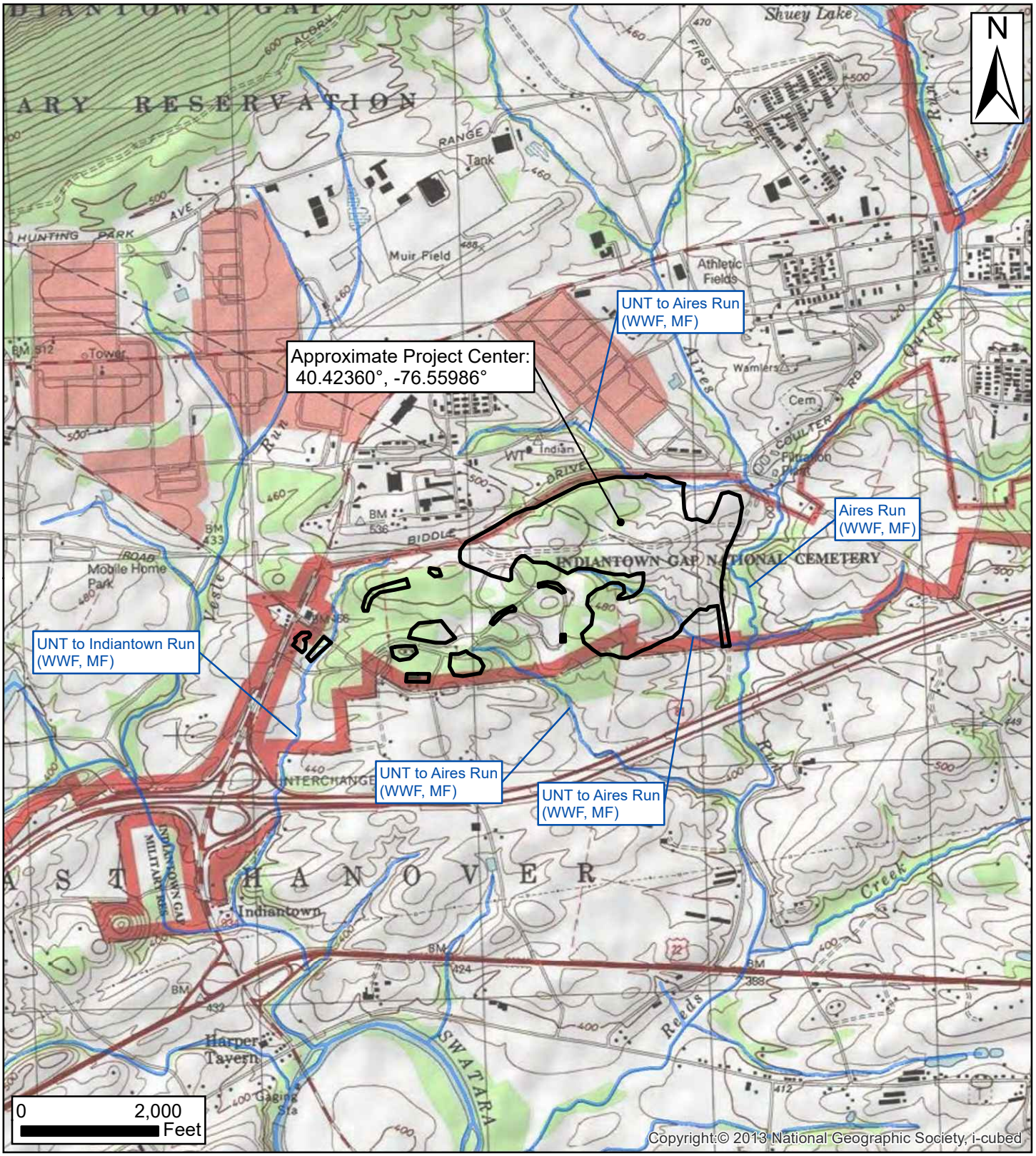
Appendix A
Figures

INDIANTOWN GAP NATIONAL CEMETERY

Figure 1: Location Map



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Date: 7/19/2021 | Created By: CMG

USGS 7.5' Quadrangle: Indiantown Gap
East Hanover and Union Townships
Lebanon County, Pennsylvania

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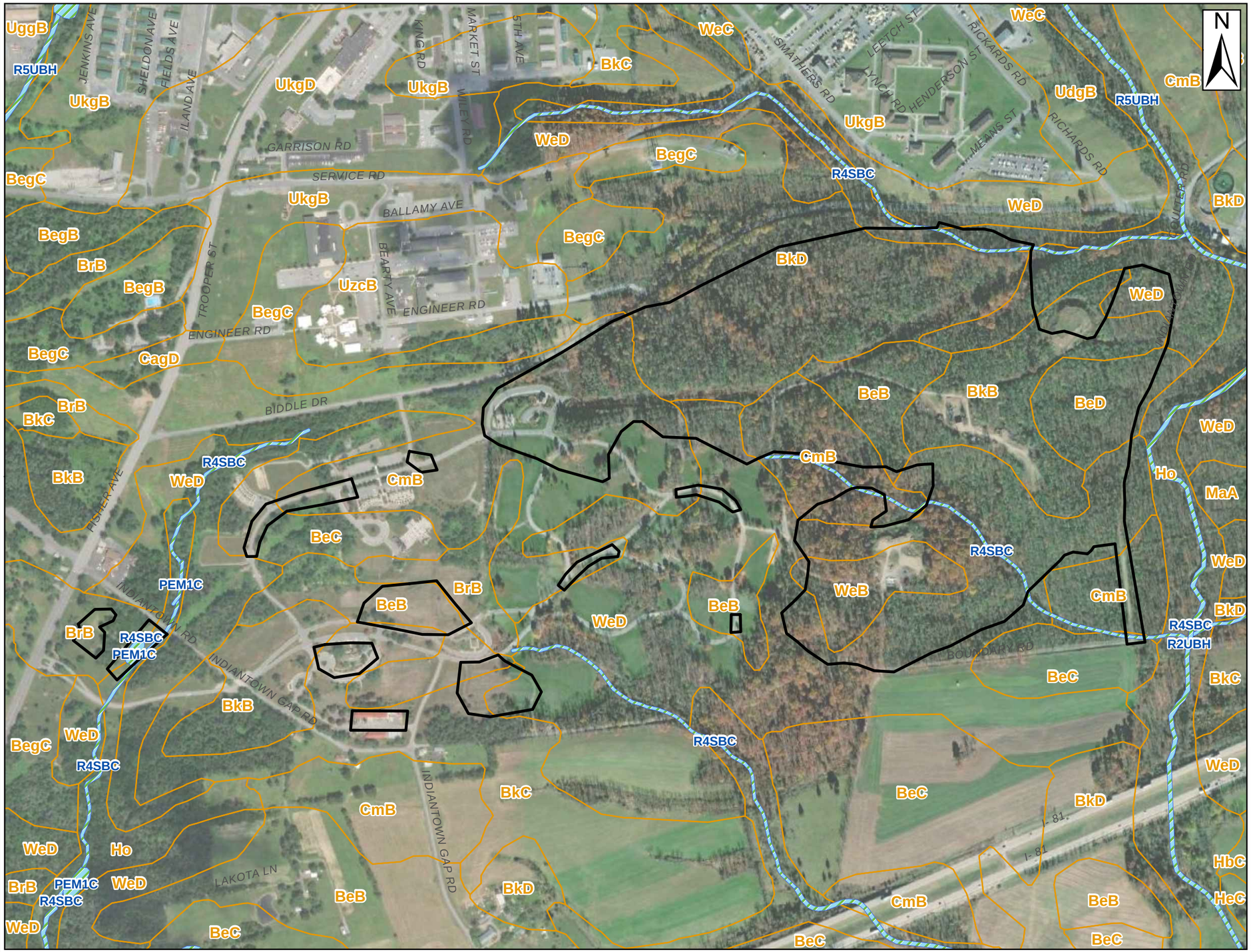
INDIANTOWN GAP NATIONAL CEMETERY

Figure 2: National Wetlands Inventory (NWI) Wetlands and Soil Map Units



Legend

- NWI Wetland
- Soil Map Unit
- Study Area

Data Source:
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0 300 600 Feet

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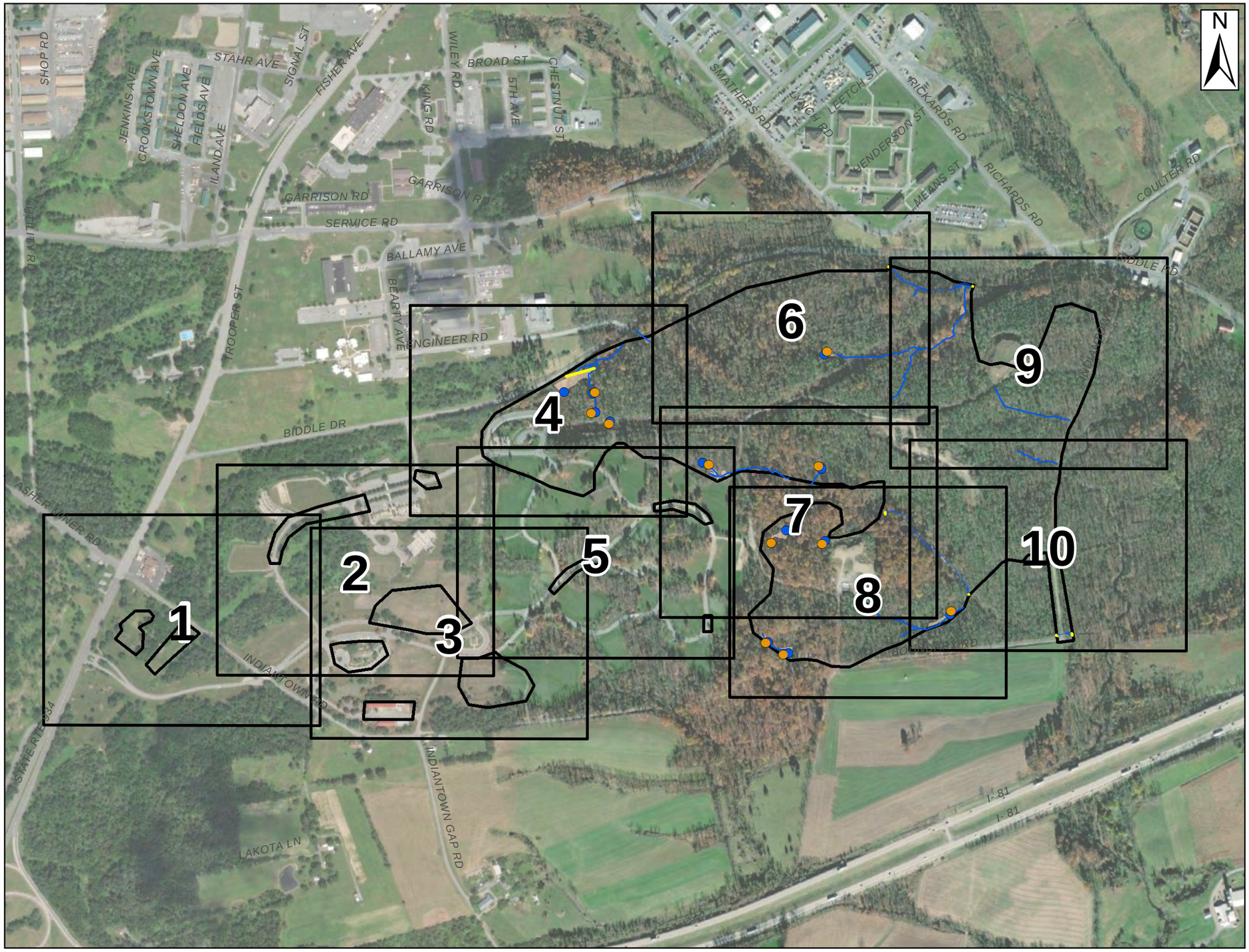
Date: 7/19/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Delineated Aquatic Resources

Overview



Legend

- Upland Sample Point
- Wetland Sample Point
- Open End
- Delineated Watercourse
- Delineated Watercourse Area
- Stormwater Basin

Delineated Wetland Cowardin Classification

- Palustrine Emergent (PEM)
- PEM/Vernal Pool
- Study Area

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0 335 670 Feet

Created By: CMG

Date: 8/26/2021

INDIANTOWN GAP NATIONAL CEMETERY

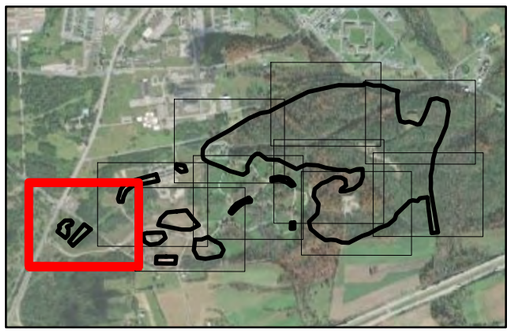
Figure 3: Delineated Aquatic Resources

Legend

- Upland Sample Point
- Wetland Sample Point
- Open End
- Delineated Watercourse
- Delineated Watercourse Area
- Stormwater Basin

Delineated Wetland Cowardin Classification

- Palustrine Emergent (PEM)
- PEM/Vernal Pool
- Study Area



Mabbett

TES&P
THOMPSON ENVIRONMENTAL
Surveys & Permitting, LLC.

0 75 150 Feet

Created By: CMG

Date: 8/26/2021

INDIANTOWN GAP NATIONAL CEMETERY

Figure 3: Delineated Aquatic Resources

Legend

- Upland Sample Point
- Wetland Sample Point
- Open End
- Delineated Watercourse
- Delineated Watercourse Area
- Stormwater Basin

Delineated Wetland Cowardin Classification

- Palustrine Emergent (PEM)
- PEM/Vernal Pool
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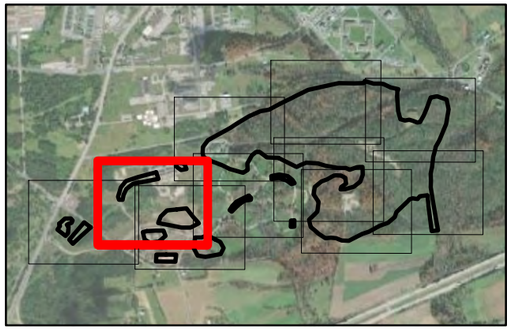

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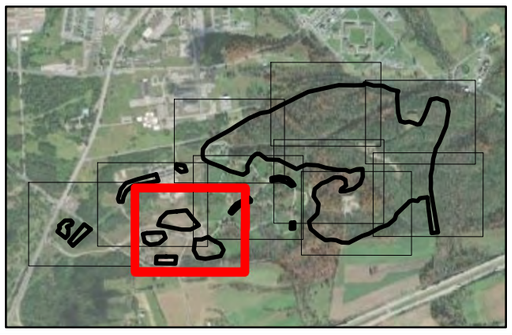

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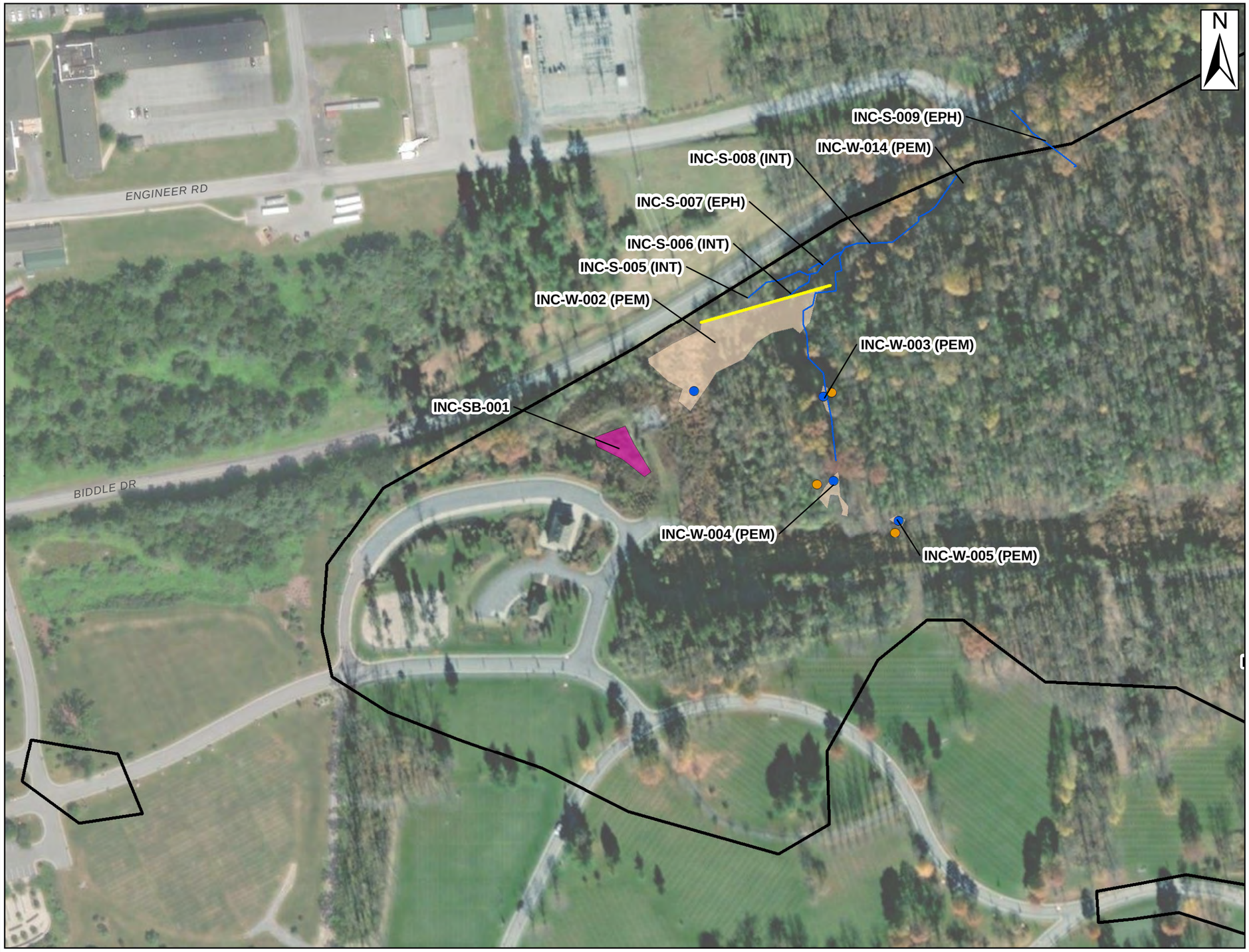

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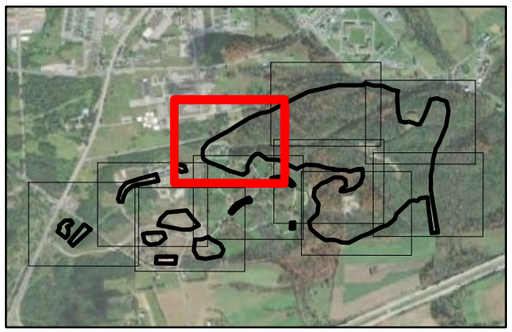

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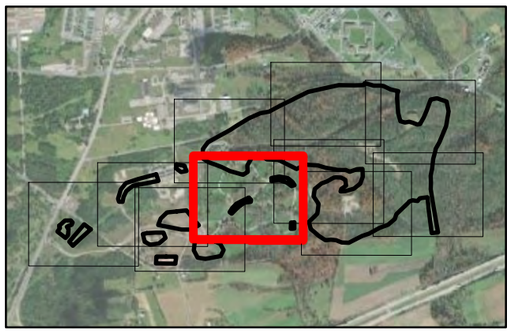

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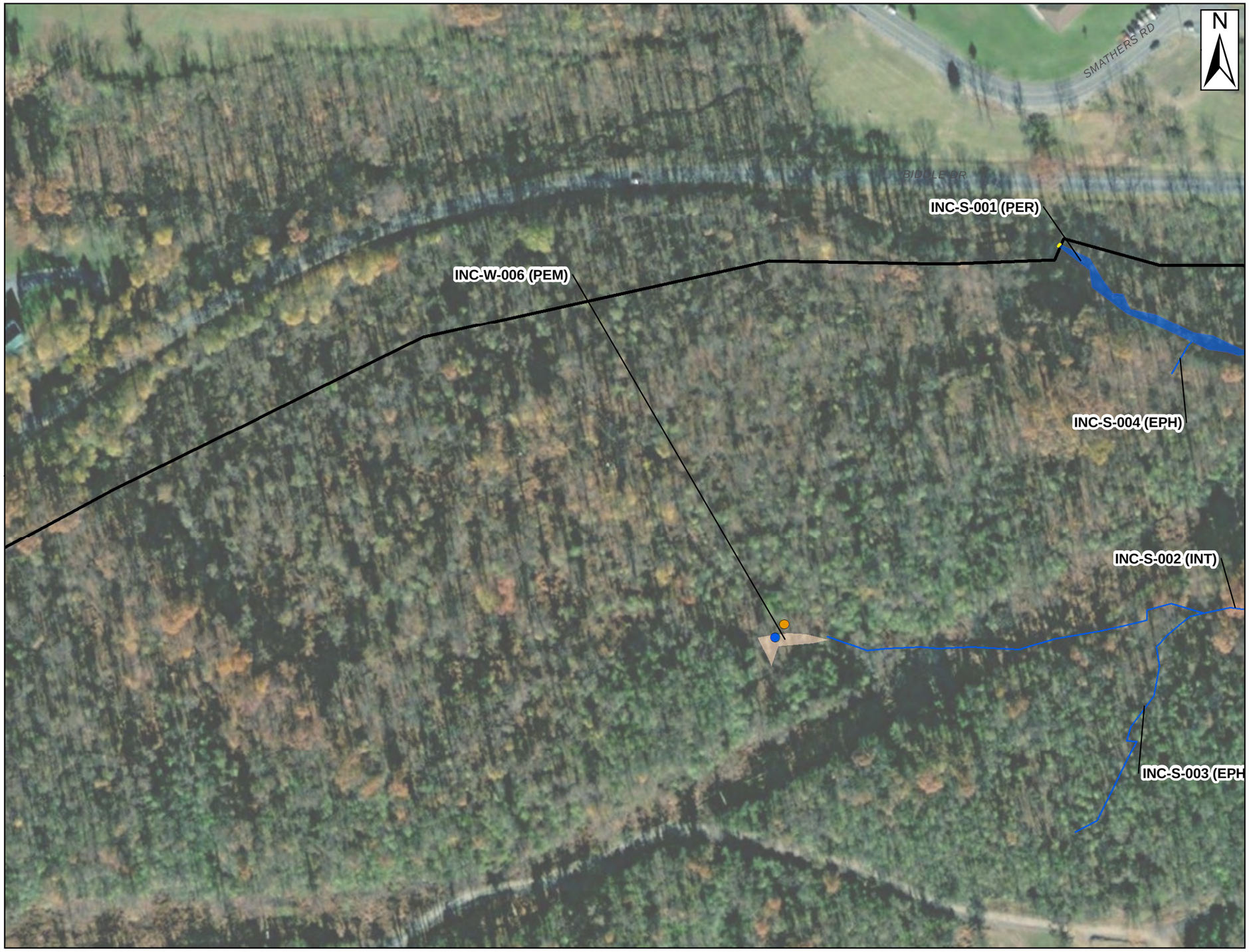

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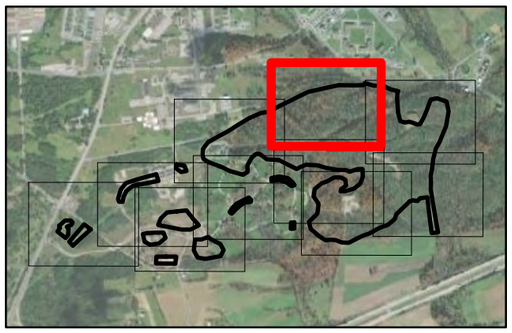

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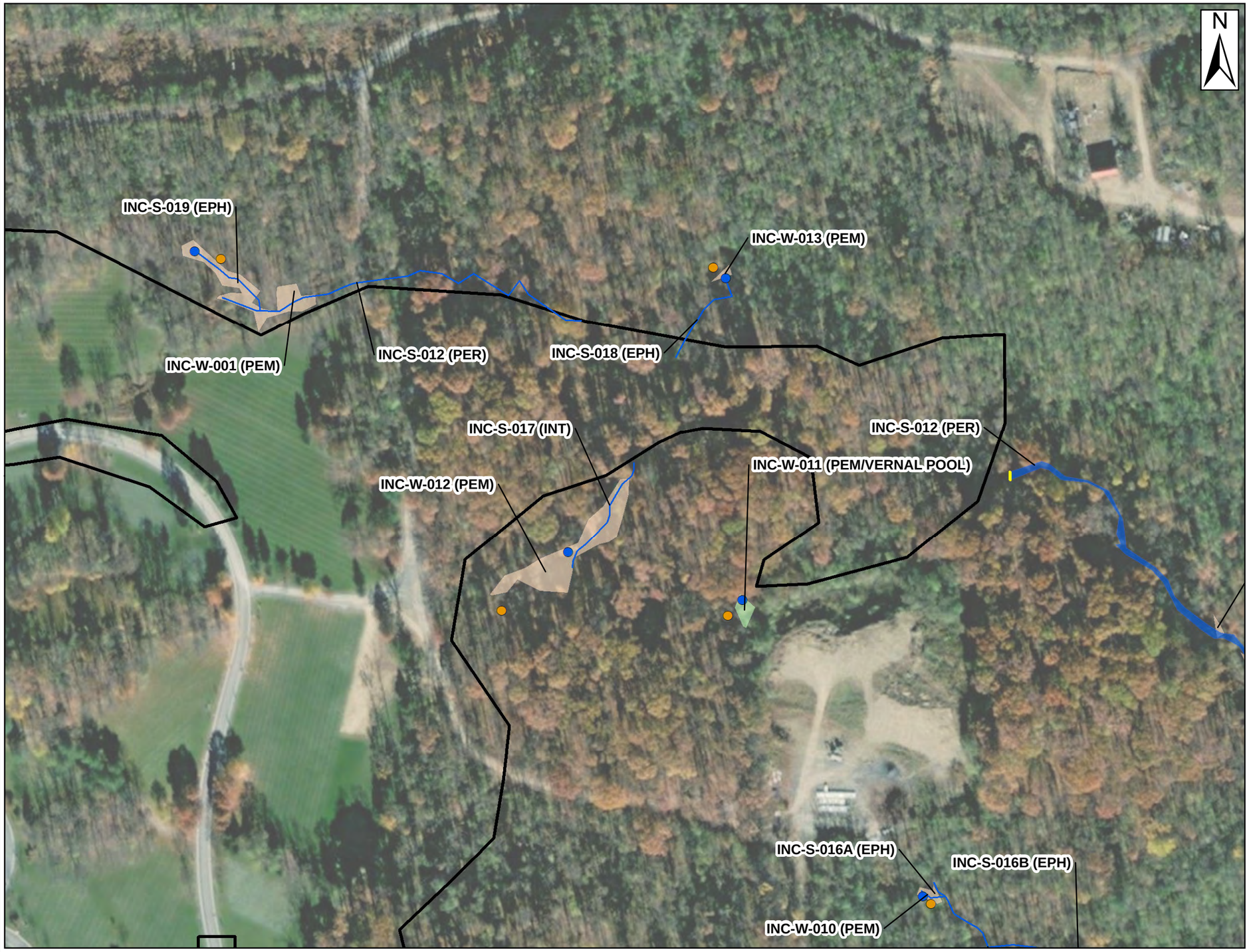

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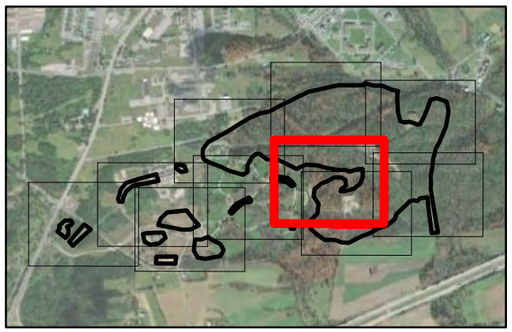

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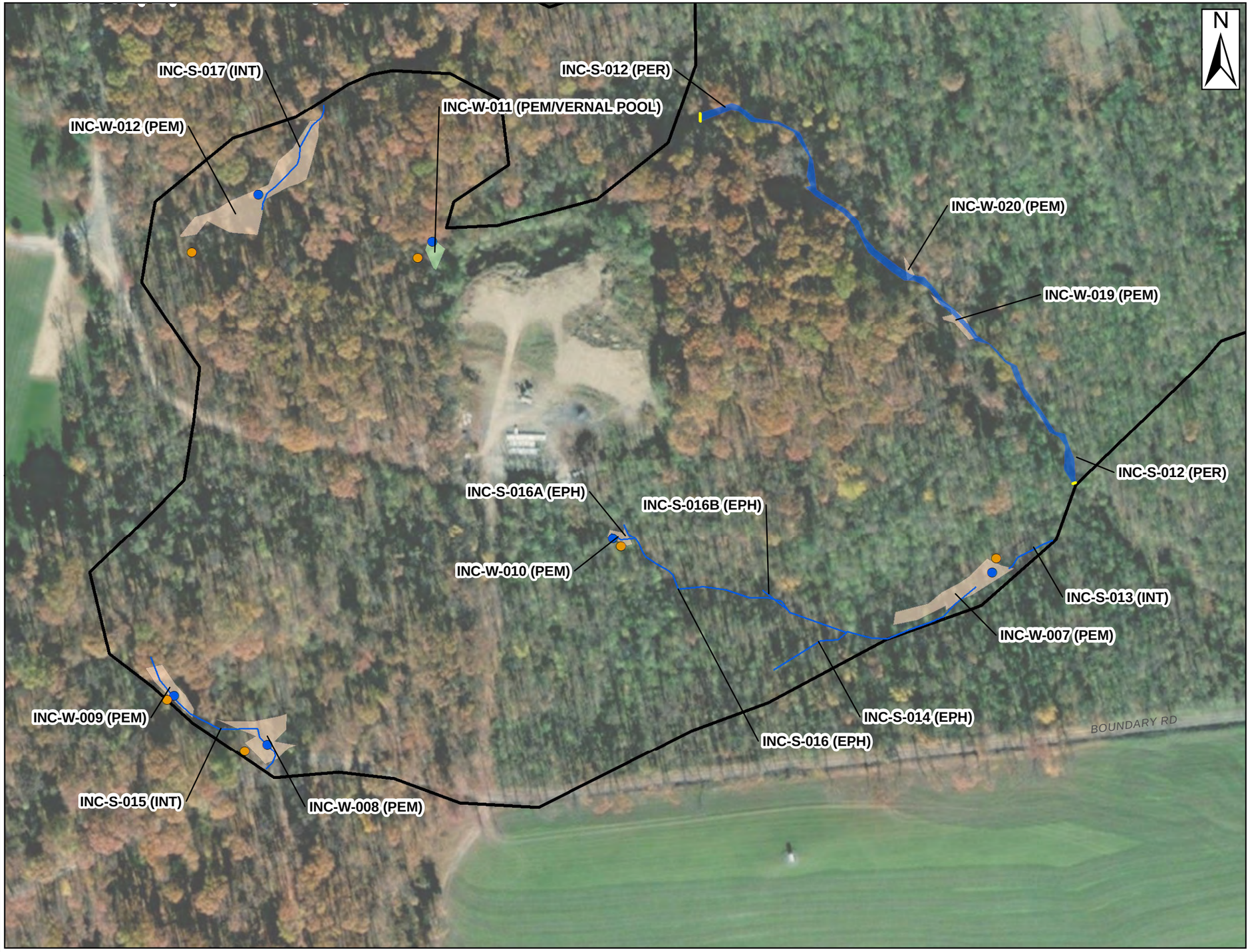

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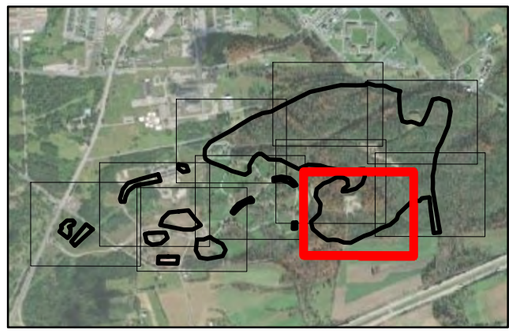

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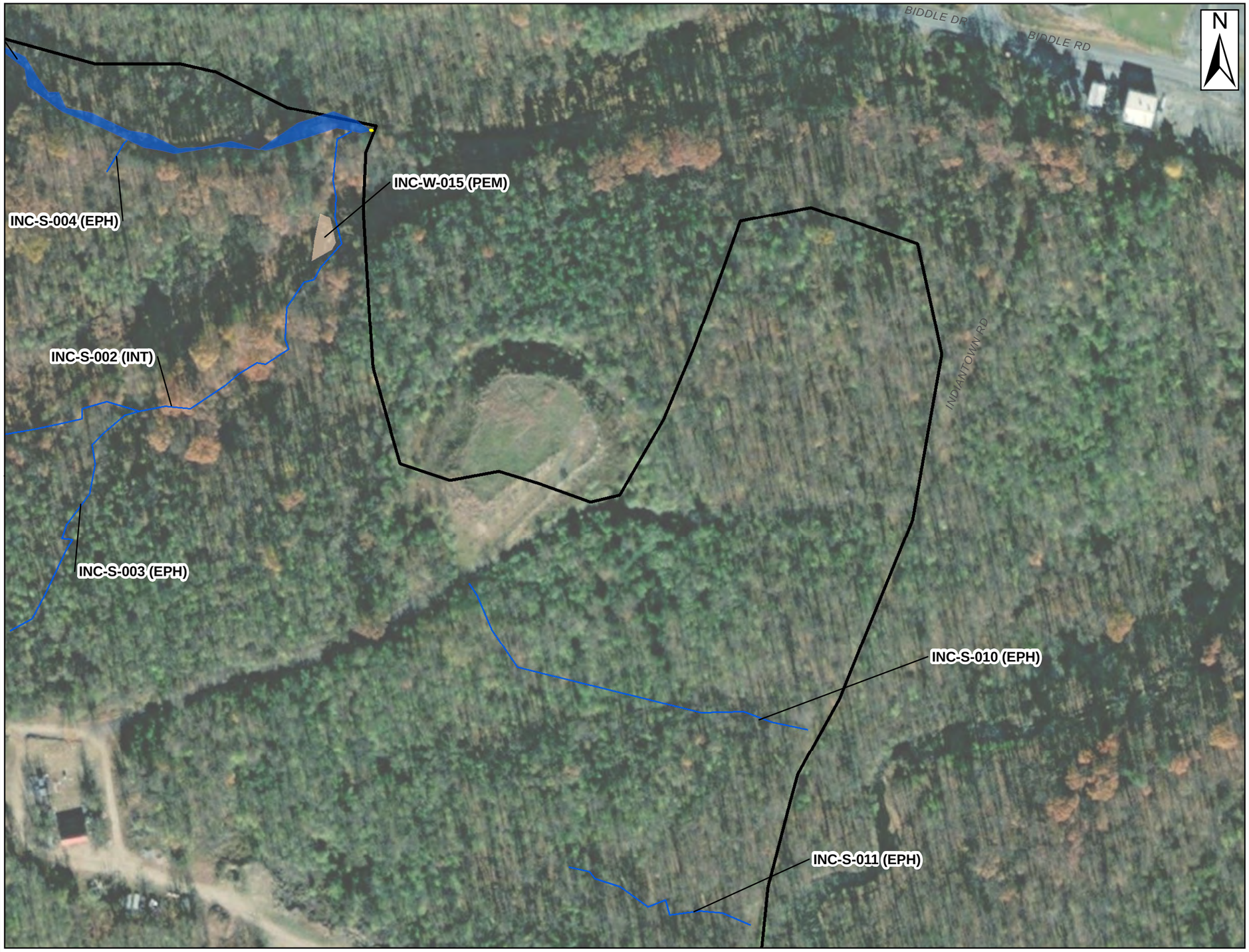

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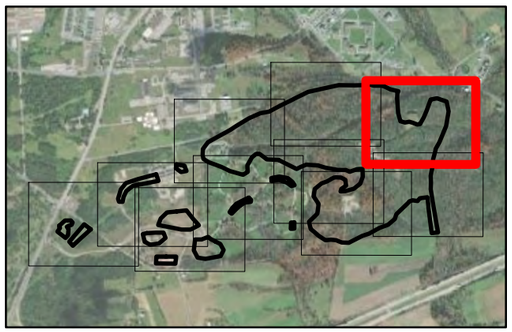

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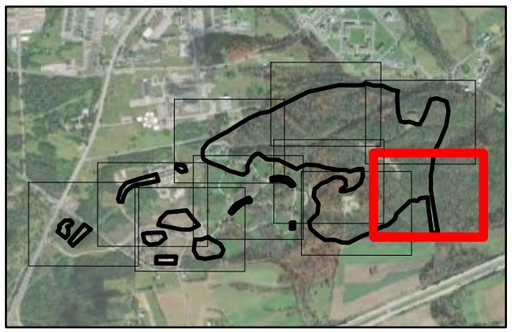

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Appendix B

USACE Regional Supplement Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-001 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Channel (active) **Local relief (concave, convex, none):** concave **Slope:** 5.2 **% /** 3.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42326035 **Long.:** -76.56311225 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** R4SBC

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression along a small watercourse discharge in a disturbed wooded shrubby lot. The wetland boundary is defined by the saturated soil conditions with low chroma redox soils.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ◉ No ○	Depth (inches):	0.5
Water Table Present?	Yes ○ No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉ No ○	Depth (inches):	0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

The primary source of hydrology is associated with the discharge of a seasal groundwater seep that is confined in a eroded channel.

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

Sampling Point: INC-W-001 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Lindera benzoin	10	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	62.5%	FAC
2. Glyceria striata	20	☑	25.0%	OBL
3. Pilea pumila	10	☐	12.5%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	20	x 1 =	20
FACW species	10	x 2 =	20
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		220 (B)

Prevalence Index = B/A = 2.444

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-001 (PEM)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-4	10YR 4/2	100					Silt Loam	
4-12	10YR 4/1	80	2.5YR 5/8	20	C	M	Silty Clay	
12-20	10YR 5/1	80	2.5YR 5/8	20	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Surface water infiltration is slightly restricted by a shallow clay layer.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-001 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

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

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42322812 **Long.:** -76.56297435 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a wooded/shrubby lot adjacent to a maintained cemetery grounds.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
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Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
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- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

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

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

Remarks:

No evidence of hydrology. The region is experiencing very dry drought like conditions.

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

Sampling Point: INC-W-001 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Carya ovata	30	☑	75.0%	FACU
2. Acer rubrum	10	☑	25.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	40	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Cornus florida	10	☑	50.0%	FACU
2. Lindera benzoin	10	☑	50.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	60	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	60	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	80	x 3 =	240	
FACU species	40	x 4 =	160	
UPL species	0	x 5 =	0	
Column Totals:	120	(A)	400	(B)

Prevalence Index = B/A = 3.333

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-001 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-12	10YR	5/3	100						Silt Loam	
12-20	10YR	5/3	95	2.5YR	5/6	5	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-002 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Footslope **Local relief (concave, convex, none):** concave **Slope:** 3.5 **% /** 2.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42458409 **Long.:** -76.56640268 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression along a roadside fillslope. The wetland contains multiple persistent groundwater discharge areas. The wetland boundary is defined by the saturated soil conditions with low chroma redox soils and vegetation dominatedby bulrush and sensitive fern.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1.5	
Water Table Present?	Yes ◉	No ○	Depth (inches): 3	**Wetland Hydrology Present?** Yes ◉ No ○
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-002 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	50.0%	FAC
2. Typha latifolia	20	☑	20.0%	OBL
3. Scirpus atrovirens	10	☐	10.0%	OBL
4. Juncus effusus	10	☐	10.0%	FACW
5. Onoclea sensibilis	10	☐	10.0%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30	
FACW species	20	x 2 =	40	
FAC species	50	x 3 =	150	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	220	(B)

Prevalence Index = B/A = 2.200

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-002 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-16	2.5Y	5/2	95	5YR	5/6	5	C	M	Silt Loam	
16-20	2.5Y	5/4	90	5YR	5/6	10	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Surface water infiltration is slightly restricted by a shallow clay layer.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-002 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Footslope **Local relief (concave, convex, none):** concave **Slope:** 7.0 **% /** 4.0 **°**

Subregion (LRR or MLRA): **Lat.:** 40.424616 **Long.:** -76.566243 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a wooded/shrubby area adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-002 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Elaeagnus umbellata	30	☑	75.0%	UPL
2. Crataegus crus-galli	10	☑	25.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	40	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Setaria pumila	10	☐	14.3%	FAC
2. Microstegium vimineum	50	☑	71.4%	FAC
3.	10	☐	14.3%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	10	x 4 =	40	
UPL species	30	x 5 =	150	
Column Totals:	100	(A)	370	(B)

Prevalence Index = B/A = 3.700

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-002 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-3	2.5Y	4/4	100						Silt Loam	
3-20	2.5Y	5/4	100						Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-003 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Channel (active) **Local relief (concave, convex, none):** concave **Slope:** 10.5 **% /** 6.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42455362 **Long.:** -76.56571245 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a slight gully on a moderately sloped hillside. The wetland is associoated with seasonal groundwater discharge within the gully. The wetland boundary is defined by the saturated soil conditions and the flat topography within the gully.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-003 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	50.0%	FAC
2. Scirpus atrovirens	20	☑	20.0%	OBL
3. Persicaria pensylvanica	10	☐	10.0%	FACW
4. Pilea pumila	10	☐	10.0%	FACW
5. Impatiens capensis	10	☐	10.0%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20	
FACW species	30	x 2 =	60	
FAC species	50	x 3 =	150	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	230	(B)

Prevalence Index = B/A = 2.300

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-003 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-20	2.5Y	5/1	90	5YR	5/6	10	C	M	Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-003 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Gulch or Gully **Local relief (concave, convex, none):** convex **Slope:** 10.5 **% /** 6.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42457045 **Long.:** -76.56566819 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a shallow gully in a wooded/shrubby area adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-003 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Carya ovata	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	20	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Elaeagnus umbellata	20	☑	33.3%	UPL
2. Lindera benzoin	20	☑	33.3%	FAC
3. Berberis thunbergii	10	☐	16.7%	FACU
4. Rubus idaeus	10	☐	16.7%	FAC
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	60	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	10	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	10	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	40	x 3 =	120	
FACU species	30	x 4 =	120	
UPL species	20	x 5 =	100	
Column Totals:	90	(A)	340	(B)

Prevalence Index = B/A = 3.778

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-003 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-20	2.5Y	4/3	100						Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-004 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** concave **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42421048 **Long.:** -76.56566246 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression on a wooded/shrubby hillside adjacent to a transmission ROW. The wetland is associated with a seasonal groundwater discharge in a shallow depression. The wetland boundary is defined by the low chroma redox and saturated soil conditions.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ◉ No ○	Depth (inches):	0.5
Water Table Present?	Yes ○ No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉ No ○	Depth (inches):	0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-004 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	30	☑	30.0%	FAC
2. Juncus effusus	20	☑	20.0%	FACW
3. Pilea pumila	10	☐	10.0%	FACW
4. Impatiens capensis	20	☑	20.0%	FACW
5. Scirpus atrovirens	20	☑	20.0%	OBL
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	20	x 1 =	20
FACW species	50	x 2 =	100
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		210 (B)

Prevalence Index = B/A = 2.100

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-004 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-20	2.5Y	5/1	90	5YR	5/6	10	C	M	Silt Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-004 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42419661 **Long.:** -76.56575307 **Datum:**

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a in a wooded/shrubby area adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-004 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Juglans nigra	20	☑	50.0%	FACU
2. Carya ovata	20	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	40	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Lindera benzoin	20	☑	33.3%	FAC
2. Berberis thunbergii	10	☐	16.7%	FACU
3. Rubus idaeus	10	☐	16.7%	FAC
4. Elaeagnus umbellata	20	☑	33.3%	UPL
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	60	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	30	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	30	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	50	x 4 =	200	
UPL species	20	x 5 =	100	
Column Totals:	130	(A)	480	(B)

Prevalence Index = B/A = 3.692

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-004 (UPL)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-12	2.5Y 4/4	100					Silt Loam	
12-20	2.5Y 5/4	100					Silty Clay	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-005 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** concave **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.4240437 **Long.:** -76.56531849 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression along a transmission line ROW. The wetland is associated with a seasonal grounwater discharge within a disturbed area of the ROW. The wetland boundary is defined by the low chroma redox soils and the slight depressional topography.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-005 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	50.0%	FAC
2. Onoclea sensibilis	40	☑	40.0%	FACW
3. Vernonia noveboracensis	10	☐	10.0%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	50	x 2 =	100	
FAC species	50	x 3 =	150	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	250	(B)

Prevalence Index = B/A = 2.500

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-005 (PEM)

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

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

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Surface water infiltration is slightly restricted by a shallow clay layer.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-005 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42399472 **Long.:** -76.56533848 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a in a periodically maintained transmission line ROW adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-005 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Elaeagnus umbellata	10	☑	100.0%	UPL
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	30	☑	42.9%	FAC
2. Setaria pumila	30	☑	42.9%	FAC
3. Solidago canadensis	10	☐	14.3%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	10	x 4 =	40	
UPL species	10	x 5 =	50	
Column Totals:	80	(A)	270	(B)

Prevalence Index = B/A = 3.375

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-005 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-12	2.5Y	4/4	100						Silt Loam	
12-20	2.5Y	5/4	100						Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-006 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

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

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42520499 **Long.:** -76.56015938 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression within a natural gully in a wooded/shrubby lot. The wetland is associated with the discharge of a seasonal groundwater seep at the headwater of a small intermittent channel. The wetland boundary follows the saturated low chroma redox soils and the vegetation containing arrowleaf tearthumb.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 0.5	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-006 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Persicaria sagittata	30	☑	33.3%	OBL
2. Microstegium vimineum	30	☑	33.3%	FAC
3. Setaria pumila	10	☐	11.1%	FAC
4. Juncus effusus	10	☐	11.1%	FACW
5. Mentha arvensis	10	☐	11.1%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30	
FACW species	20	x 2 =	40	
FAC species	40	x 3 =	120	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	90	(A)	190	(B)

Prevalence Index = B/A = 2.111

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-006 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc[2]	Texture	Remarks
0-16	7.5YR	4/1	90	5YR	5/8	10	C	M	Silt Loam	
16-20	7.5YR	5/2	90	5YR	5/8	10	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 07-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-006 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 7.0 **% /** 4.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42525837 **Long.:** 40.42525837 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a in a wooded/shrubby lot adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-006 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Juglans nigra	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	20	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Rosa multiflora	10	☑	25.0%	FACU
2. Elaeagnus umbellata	20	☑	50.0%	UPL
3. Lindera benzoin	10	☑	25.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	40	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	50	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	30	x 4 =	120	
UPL species	20	x 5 =	100	
Column Totals:	110	(A)	400	(B)

Prevalence Index = B/A = 3.636

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-006 (UPL)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-16	7.5YR 4/4	100					Silt Loam	
16-20	7.5YR 5/3	100					Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-007 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Gulch or Gully **Local relief (concave, convex, none):** concave **Slope:** 5.2 **% /** 3.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42042552 **Long.:** -76.55724517 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a slight depression within a natural gully that contains multiple chanelized seasonal groundwater seeps. The wetland boundary is defined by the saturated soil conditions and the vegetation containging arrowleaf tearthumb.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-007 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Persicaria sagittata	20	☑	20.0%	OBL
2. Scirpus atrovirens	20	☑	20.0%	OBL
3. Microstegium vimineum	30	☑	30.0%	FAC
4. Onoclea sensibilis	10	☐	10.0%	FACW
5. Impatiens capensis	10	☐	10.0%	FACW
6. Persicaria pensylvanica	10	☐	10.0%	FACW
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40	
FACW species	30	x 2 =	60	
FAC species	30	x 3 =	90	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	190	(B)

Prevalence Index = B/A = 1.900

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-007 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc[2]	Texture	Remarks
0-4	2.5Y	4/2	100						Silt Loam	
4-12	2.5Y	5/1	90	5YR	5/6	10	C	M	Silty Clay	
12-20	2.5Y	5/4	80	5YR	5/6	20	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Surface water infiltration is slightly restricted by a shallow clay layer.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-007 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Gulch or Gully **Local relief (concave, convex, none):** concave **Slope:** 5.2 **% /** 3.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42048333 **Long.:** -76.55722319 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in wooded shrubby gully adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

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

Sampling Point: INC-W-007 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Juglans nigra	30	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	30	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Elaeagnus umbellata	50	☑	100.0%	UPL
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	50	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	30	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	30	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	30	x 3 =	90	
FACU species	30	x 4 =	120	
UPL species	50	x 5 =	250	
Column Totals:	110	(A)	460	(B)

Prevalence Index = B/A = 4.182

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-007 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	4/4	100						Silt Loam	
6-20	10YR	5/4	90	5YR	5/6	10	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-008 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Channel (active) **Local relief (concave, convex, none):** concave **Slope:** 5.2 **% /** 3.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.41976273 **Long.:** -76.56112754 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression along a small intermittent channel. The wetland contains multiple persistent groundwater discharge areas. The wetland boundary is defined by the saturated soil conditions and the low topography.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1	
Water Table Present?	Yes ◉	No ○	Depth (inches): 3	**Wetland Hydrology Present?** Yes ◉ No ○
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-008 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Lindera benzoin	10	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	55.6%	FAC
2. Impatiens capensis	20	☑	22.2%	FACW
3. Persicaria sagittata	20	☑	22.2%	OBL
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	20	x 1 =	20
FACW species	20	x 2 =	40
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		240 (B)

Prevalence Index = B/A = 2.400

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-008 (PEM)

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

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

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-008 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Gulch or Gully **Local relief (concave, convex, none):** concave **Slope:** 7.0 **% /** 4.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.41973822 **Long.:** -76.56124892 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located on a slight slope in a wooded/shrubby lot adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

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

Sampling Point: INC-W-008 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Carya glabra	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	20	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Rosa multiflora	10	☑	16.7%	FACU
2. Rubus idaeus	10	☑	16.7%	FAC
3. Cornus florida	10	☑	16.7%	FACU
4. Elaeagnus umbellata	30	☑	50.0%	UPL
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	60	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	20	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	20	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	30	x 3 =	90	
FACU species	40	x 4 =	160	
UPL species	30	x 5 =	150	
Column Totals:	100	(A)	400	(B)

Prevalence Index = B/A = 4.000

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-008 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-10	10YR	4/4	100						Silt Loam	
10-20	10YR	5/4	90	5YR	5/6	10	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-009 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Swale **Local relief (concave, convex, none):** concave **Slope:** 3.5 **% /** 2.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.41996921 **Long.:** -76.56162197 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a excevated swale that receives surface water runoff from an upslope culvert and maintained cemetery grounds. The wetland boundary is defined by the topography of the swale and the saturated soil conditions.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 0.5	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-009 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	50.0%	FAC
2. Epilobium coloratum	20	☑	20.0%	FACW
3. Persicaria pensylvanica	10	☐	10.0%	FACW
4. Scirpus atrovirens	10	☐	10.0%	OBL
5. Typha latifolia	10	☐	10.0%	OBL
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	20	x 1 =	20
FACW species	30	x 2 =	60
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		230 (B)

Prevalence Index = B/A = 2.300

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-009 (PEM)

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

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

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-009 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Swale **Local relief (concave, convex, none):** concave **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.41995301 **Long.:** -76.56166132 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located ion the edge of a constructed swale adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-009 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Rubus idaeus	10	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	80	☑	88.9%	FAC
2. Solidago canadensis	10	☐	11.1%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	90	x 3 =	270	
FACU species	10	x 4 =	40	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	310	(B)

Prevalence Index = B/A = 3.100

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-009 (UPL)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-4	10YR 3/4	100					Silt Loam	
4-16	10YR 5/4	100					Silty Clay	
16-20	10YR 5/6	100					Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-010 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42058597 **Long.:** -76.55926842 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in sligh depression on a wooded /shrubby hill slope that contains small ephemeral drainage channels. The wetland boundary is defined by the topography and the low chronma redox soils.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-010 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	30	☑	30.0%	FAC
2. Epilobium coloratum	20	☑	20.0%	FACW
3. Scirpus atrovirens	20	☑	20.0%	OBL
4. Persicaria pensylvanica	10	☐	10.0%	FACW
5. Bidens frondosa	20	☑	20.0%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	20	x 1 =	20
FACW species	50	x 2 =	100
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		210 (B)

Prevalence Index = B/A = 2.100

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-010 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc[2]	Texture	Remarks
0-6	10YR	4/2	90	5YR	5/6	10	C	M	Silt Loam	
6-12	10YR	4/2	80	5YR	5/6	10	C	M	Silty Clay	
12-20	10YR	5/2	80	5YR	5/6	10	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Surface water infiltration is slightly restricted by a shallow clay layer.

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-010 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.4205541 **Long.:** -76.55922625 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located on a slight hill slope a in a wooded/shrubby lot adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

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

Sampling Point: INC-W-010 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Juglans nigra	30	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	30	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Elaeagnus umbellata	30	☑	50.0%	UPL
2. Lonicera tatarica	20	☑	33.3%	FACU
3. Rubus idaeus	10	☐	16.7%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	60	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	30	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	30	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	50	x 4 =	200
UPL species	30	x 5 =	150
Column Totals:	120 (A)		470 (B)

Prevalence Index = B/A = 3.917

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-010 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	4/4	100						Silt Loam	
6-12	10YR	4/3	100						Silty Clay	
12-20	10YR	5/3	95	5YR	5/6	5	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-011 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

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

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42180631 **Long.:** -76.56021074 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression that receives surface water runoff from an upslope fill area . The wetland boundary is defined by the topography of the depression and the non-vegetated concave surface. The wetland can be more percisely classified as a vernal pool.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-011 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	10	☑	33.3%	FAC
2. Scirpus atrovirens	10	☑	33.3%	OBL
3. Persicaria pensylvanica	10	☑	33.3%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	30	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	10	x 1 =	10
FACW species	10	x 2 =	20
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		60 (B)

Prevalence Index = B/A = 2.000

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-011 (PEM)

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

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

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-011 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

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

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42174219 **Long.:** -76.56029029 **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a wooded area adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-011 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Carya ovata	20	☑	66.7%	FACU
2. Quercus alba	10	☑	33.3%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	30		= Total Cover	
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0		= Total Cover	
Shrub Stratum (Plot size: 15 feet)				
1. Rosa multiflora	10	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10		= Total Cover	
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	10	☑	50.0%	FAC
2. Alliaria petiolata	10	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	20		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0		= Total Cover	

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	10	x 3 =	30	
FACU species	50	x 4 =	200	
UPL species	0	x 5 =	0	
Column Totals:	60	(A)	230	(B)

Prevalence Index = B/A = 3.833

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-011 (UPL)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	2.5Y	4/4	100						Silt Loam	
6-12	2.5Y	5/3	100						Silty Clay	
12-20	2.5Y	5/4							Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-012 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Gulch or Gully **Local relief (concave, convex, none):** concave **Slope:** 5.2 **% /** 3.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42201072 **Long.:** -76.56113794 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a natural gully in a wooded/shrubby lot that receives surface water runoff from an upslope maintained cemetery grounds. The area also contains multiple seasonal groundwater discharge areas that confluence into a heavily eroded channel.The wetland boundary is defined by the saturated soil conditions.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-012 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	80	☑	80.0%	FAC
2. Scirpus atrovirens	10	☐	10.0%	OBL
3. Impatiens capensis	10	☐	10.0%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10	
FACW species	10	x 2 =	20	
FAC species	80	x 3 =	240	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	270	(B)

Prevalence Index = B/A = 2.700

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-012 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	4/3	100						Silt Loam	
6-12	10YR	4/1	90	5YR	5/6	10	C	M	Silty Clay	
12-20	10YR	5/2	80	5YR	5/6	20	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-012 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Gulch or Gully **Local relief (concave, convex, none):** concave **Slope:** 5.2 **% /** 3.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42177665 **Long.:** -76.56149774 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located in a in a wooded area upsope and adjacent to the wetland boundary.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-012 (UPL)

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1. Carya ovata	30	☑	75.0%	FACU
2. Juglans nigra	10	☑	25.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	40	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Rosa multiflora	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	80	☑	88.9%	FAC
2. Solidago canadensis	10	☐	11.1%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	80	x 3 =	240	
FACU species	70	x 4 =	280	
UPL species	0	x 5 =	0	
Column Totals:	150	(A)	520	(B)

Prevalence Index = B/A = 3.467

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-012 (UPL)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-12	10YR 4/4	100					Silt Loam	
12-20	10YR 5/3	100					Silty Clay	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-013 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** concave **Slope:** 3.5 **% /** 2.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42312287 **Long.:** -76.56027776 **Datum:** NAD-83

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a shallow depression that receives surface water runoff from an upslope maintenance area. The wetland boundary is defined by the slight topography and the saturated low chroma redox soils.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-013 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	80	☑	80.0%	FAC
2. Impatiens capensis	10	☐	10.0%	FACW
3. Onoclea sensibilis	10	☐	10.0%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	20	x 2 =	40	
FAC species	80	x 3 =	240	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	280	(B)

Prevalence Index = B/A = 2.800

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

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

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

Soil

Sampling Point: INC-W-013 (PEM)

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-4	2.5Y	4/3	100						Silt Loam	
4-12	2.5Y	4/2	90	5YR	5/6	10	C	M	Silty Clay	
12-20	2.5YR	5/3	80	5YR	5/6	20	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-013 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** concave **Slope:** 7.0 **% /** 4.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.42316726 **Long.:** -76.56034244 **Datum:**

Soil Map Unit Name: CmB-Comly silt loam, 3 to 8 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located adjacent to the wetland in a in a wooded /shrubby lot downslope of a maintenance area.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-013 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 feet)				
1. Juglans nigra	20	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	20	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Elaeagnus umbellata	30	☑	60.0%	UPL
2. Rosa multiflora	10	☑	20.0%	FACU
3. Lonicera tatarica	10	☑	20.0%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	50	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	80	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	80	x 3 =	240	
FACU species	40	x 4 =	160	
UPL species	30	x 5 =	150	
Column Totals:	150	(A)	550	(B)

Prevalence Index = B/A = 3.667

Hydrophytic Vegetation Indicators:

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

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

Definition of Vegetation Strata:

Four Vegetation Strata:

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

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

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

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

Five Vegetation Strata:

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

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

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

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

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

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

Soil

Sampling Point: INC-W-013 (UPL)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-12	10YR 4/4	100					Silt Loam	
12-20	10YR 5/3	100					Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-015 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Channel (active) **Local relief (concave, convex, none):** concave **Slope:** 10.5 **% /** 6.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.425976 **Long.:** -76.556871 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

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

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

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

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

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

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a a natural gully within a transmission line ROW that contains a small intermittent channel. The wetland is associated with a narrow floodplain for the channel and toe-of-slope ground water discharge. The wetland boundary is defined by the topography of the floodplain and the saturated soil conditions.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Remarks:

The region is experiencing very dry and drought like conditions.

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

Sampling Point: INC-W-015 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	80	☑	80.0%	FAC
2. Onoclea sensibilis	10	☐	10.0%	FACW
3. Festuca rubra	10	☐	10.0%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	10	x 2 =	20	
FAC species	80	x 3 =	240	
FACU species	10	x 4 =	40	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	300	(B)

Prevalence Index = B/A = 3.000

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: INC-W-015 (PEM)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	4/3	100						Silt Loam	
6-14	10YR	4/2	90	5YR	5/6	10	C	M	Silty Clay	
14-20	10YR	5/2	90	5YR	5/6	10	C	M	Clay Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 08-Oct-20

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC_W-015 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Toeslope **Local relief (concave, convex, none):** concave **Slope:** 36.4 % / 20.0 °

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.426018 **Long.:** -76.556949 **Datum:** NAD-83

Soil Map Unit Name: BkD-Berks channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ○ No ◉ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located on a steep hillslope adjacent to the wetland in periodically maintained transmission line ROW.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The region is experiencing very dry and drought like conditions.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: INC W-015 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Rubus idaeus	10	☑	50.0%	FAC
2. Lonicera japonica	10	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	60	☑	60.0%	FAC
2. Solidago canadensis	10	☐	10.0%	FACU
3. Festuca rubra	20	☑	20.0%	FACU
4.	10	☐	10.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	70	x 3 =	210	
FACU species	40	x 4 =	160	
UPL species	0	x 5 =	0	
Column Totals:	110	(A)	370	(B)

Prevalence Index = B/A = 3.364

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☐ **Dominance Test is > 50%**
- ☐ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: INC_W-015 (UPL)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-10	10YR 4/3	100					Silt Loam	
10-20	10YR 5/3	100					Silty Clay	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 28-Apr-21

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-019 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** concave **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.421396° **Long.:** -76.557350° **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** R4SBC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in and along the floodplain of a small perennial watercourse. The wetland boundary follows the saturated soils conditions and tussock sedge.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: INC-W-019 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Lindera benzoin	10	☑	50.0%	FAC
2. Rosa multiflora	10	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Carex stricta	30	☑	50.0%	OBL
2. Microstegium vimineum	30	☑	50.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	60	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	30	x 1 =	30	
FACW species	0	x 2 =	0	
FAC species	40	x 3 =	120	
FACU species	10	x 4 =	40	
UPL species	0	x 5 =	0	
Column Totals:	80	(A)	190	(B)

Prevalence Index = B/A = 2.375

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: INC-W-019 (PEM)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-4	10YR	4/4	100						Silt Loam	
4-20	5GY	4/1	80	2.5YR	5/8	20	C	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 28-Apr-21

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-019 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.421467° **Long.:** -76.557340° **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located adjacent to the wetland in a in a wooded /shrubby lot upslope of the floodplain.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No evidence of hydrology.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: INC-W-019 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Rosa multiflora	20	☑	66.7%	FACU
2. Elaeagnus umbellata	10	☑	33.3%	UPL
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	30	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	71.4%	FAC
2. Alliaria petiolata	20	☑	28.6%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	50	x 3 =	150	
FACU species	40	x 4 =	160	
UPL species	10	x 5 =	50	
Column Totals:	100	(A)	360	(B)

Prevalence Index = B/A = 3.600

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☐ **Dominance Test is > 50%**
- ☐ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: INC-W-019 (UPL)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-4	10YR 4/4	100					Silt Loam	
4-20	10YR 5/4	100					Silty Clay	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 28-Apr-21

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-020 (PEM)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** convex **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.421677° **Long.:** -76.557662° **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** R4SBC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

Wetland data point collected to document the existing conditions. The data point is located in a a natural gully that contains a small perennial channel. The wetland is associated with a narrow floodplain for the channel.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 4	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: INC-W-020 (PEM)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	50	☑	62.5%	FAC
2. Symplocarpus foetidus	10	☐	12.5%	OBL
3. Alliaria petiolata	10	☐	12.5%	FACU
4. Carex stricta	10	☐	12.5%	OBL
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	20	x 1 =	20
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	80 (A)		210 (B)

Prevalence Index = B/A = 2.625

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: INC-W-020 (PEM)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc[2]	Texture	Remarks
0-4	10YR	4/4	100						Silt Loam	
4-20	2.5YR	5/1	80	2.5YR	5/8	20	C	M	Silty Clay	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Indiantown Gap National Cemetery Expansion Project **City/County:** East Hanover, Lebanon Co. **Sampling Date:** 28-Apr-21

Applicant/Owner: Mabbett & Associates, Inc. **State:** PA **Sampling Point:** **INC-W-020 (UPL)**

Investigator(s): Bridger Thompson **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** concave **Slope:** 8.7 **% /** 5.0 **°**

Subregion (LRR or MLRA): MLRA 147 in LRR S **Lat.:** 40.421727° **Long.:** -76.557720° **Datum:** NAD-83

Soil Map Unit Name: WeD-Weikert channery silt loam, 15 to 25 percent slopes **NWI classification:** N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Upland data point collected to verify the wetland boundary. The data point is located adjacent to the wetland in along the floodplain.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: INC-W-020 (UPL)

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size: 15 feet)				
1. Lindera benzoin	10	☑	50.0%	FAC
2. Rosa multiflora	10	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 10 feet)				
1. Microstegium vimineum	60	☑	75.0%	FAC
2. Alliaria petiolata	20	☑	25.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	70	x 3 =	210	
FACU species	30	x 4 =	120	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	330	(B)

Prevalence Index = B/A = 3.300

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☐ **Dominance Test is > 50%**
- ☐ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: INC-W-020 (UPL)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc²	Texture	Remarks
0-4	10YR 4/3	100					Silt Loam	
4-20	10YR 5/3	100					Silty Clay	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

Appendix C
Photo Log

Photograph:	**Date:**
1	10/07/20
Feature ID: Existing Conditions	
Direction: Southwest	
Description: View of the existing facing southwest from the edge of the Study Area into the maintained cemetery grounds.	

Photograph:	**Date:**
2	10/08/20
Feature ID: Existing Conditions	
Direction: North	
Description: View of the typical wooded/shrubby conditions found throughout the Study Area.	

Photograph:	**Date:**
3	10/08/20

Feature ID:

Existing Conditions

Direction:

South

Description:

View of the open forested conditions found throughout the Study Area.

Photograph:	**Date:**
4	10/08/20

Feature ID:

Existing Conditions

Direction:

Northeast

Description:

View of the existing transmission line right-of-way that bisects the Study Area running east to west.

Photograph:	**Date:**
5	10/07/20

Feature ID:
Wetland INC-W-001 (PEM)

Direction:
Northwest

Description:
View of wetland data point INC-W-001 (PEM).

Photograph:	**Date:**
6	10/07/20

Feature ID:
Upland INC-W-001 (UPL)

Direction:
East

Description:
View of upland data point INC-W-001 (UPL).

Photograph:	**Date:**
7	10/07/20
Feature ID: Wetland INC-W-002 (PEM)	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-002 (PEM).	

Photograph:	**Date:**
8	10/07/20
Feature ID: Upland INC-W-002 (UPL)	
Direction: East	
Description: View of upland data point INC-W-002 (UPL).	

Photograph:	**Date:**
9	10/07/20
Feature ID: Wetland INC-W-003 (PEM)	
Direction: South	
Description: View of wetland data point INC-W-003 (PEM) facing upstream along the intermittent channel.	

Photograph:	**Date:**
10	10/07/20
Feature ID: Upland INC-W-003 (UPL)	
Direction: East	
Description: View of upland data point INC-W-003 (UPL).	

Photograph:	**Date:**
11	10/07/20
Feature ID: Wetland INC-W-004 (PEM)	
Direction: East	
Description: View of wetland data point INC-W-004 (PEM).	

Photograph:	**Date:**
12	10/07/20
Feature ID: Upland INC-W-004 (UPL)	
Direction: West	
Description: View of upland data point INC-W-004 (UPL) facing west from the wetland core.	

Photograph:	**Date:**
13	10/07/20

Feature ID:

Wetland INC-W-005 (PEM)

Direction:

North

Description:

View of the vegetative conditions in wetland INC-W-005 facing north within the transmission line right-of-way.

Photograph:	**Date:**
14	10/07/20

Feature ID:

Upland INC-W-005 (UPL)

Direction:

East

Description:

View of upland data point INC-W-005 (UPL) facing east along the transmission line right-of-way.

Photograph:	**Date:**
15	10/07/20
Feature ID: Wetland INC-W-006 (PEM)	
Direction: Southwest	
Description: View of the vegetative conditions in wetland INC-W-006.	

Photograph:	**Date:**
16	10/07/20
Feature ID: Upland INC-W-006 (UPL)	
Direction: West	
Description: View of upland data point INC-W-006 (UPL).	

Photograph: 17	**Date:** 10/08/20
Feature ID: Wetland INC-W-007 (PEM)	
Direction: North	
Description: View of the vegetative conditions in wetland INC-W-007.	

Photograph: 18	**Date:** 10/07/20
Feature ID: Upland INC-W-007 (UPL)	
Direction: West	
Description: View of upland data point INC-W-007 (UPL).	

Photograph:	**Date:**
19	10/08/20
Feature ID: Wetland INC-W-008 (PEM)	
Direction: Northwest	
Description: View of the vegetative conditions in wetland INC-W-008.	

Photograph:	**Date:**
20	10/08/20
Feature ID: Upland INC-W-008 (UPL)	
Direction: West	
Description: View of upland data point INC-W-008 (UPL) facing west from the wetland edge.	

Photograph:	**Date:**
21	10/08/20

Feature ID:
Wetland INC-W-009 (PEM)

Direction:
North

Description:
View of wetland INC-W-009 facing north toward the maintained cemetery grounds.

Photograph:	**Date:**
22	10/08/20

Feature ID:
Upland INC-W-009 (IPL)

Direction:
West

Description:
View of upland data point INC-W-009 (UPL) facing upslope from the center of the constructed swale that contains the wetland.

Photograph:	**Date:**
23	10/08/20

Feature ID:
Wetland INC-W-010 (PEM)

Direction:
Northwest

Description:
View of the vegetative conditions at wetland data point INC-W-010 (PEM).

Photograph:	**Date:**
24	10/08/20

Feature ID:
Upland INC-W-010 (UPL)

Direction:
North

Description:
View of upland data point INC-W-010 (UPL).

Photograph:	**Date:**
25	10/08/20

Feature ID:
Wetland INC-W-011 (PEM)

Direction:
North

Description:
View of the vernal pool/PEM conditions of wetland INC-W-011 (PEM).

Photograph:	**Date:**
26	10/08/20

Feature ID:
Upland INC-W-011 (UPL)

Direction:
West

Description:
View of the conditions at upland data point INC-W-011 (UPL).

Photograph:	**Date:**
27	10/08/20
Feature ID: Wetland INC-W-012 (PEM)	
Direction: East	
Description: View of the vegetative conditions at wetland data point INC-W-012 (PEM).	

Photograph:	**Date:**
28	10/08/20
Feature ID: Upland INC-W-012 (UPL)	
Direction: Northeast	
Description: View of upland data point INC-W-012 (UPL).	

Photograph:	**Date:**
29	10/08/20
Feature ID: Wetland INC-W-013 (PEM)	
Direction: North	
Description: View of wetland data point INC-W-013 (PEM).	

Photograph:	**Date:**
30	10/08/20
Feature ID: Upland INC-W-013 (UPL)	
Direction: East	
Description: View of upland data point INC-W-013 (UPL).	

Photograph:	**Date:**
31	10/07/20
Feature ID: Wetland INC-W-015 (PEM)	
Direction: Northwest	
Description: View of the typical vegetative conditions found in wetland INC-W-015.	

Photograph:	**Date:**
32	10/07/20
Feature ID: Upland INC-W-015 (UPL)	
Direction: Southwest	
Description: The vegetative conditions at the upland data point INC-W-015 (UPL)	

Photograph:	**Date:**
33	04/28/21

Feature ID:
Wetland INC-W-019 (PEM)

Direction:
Northeast

Description:
View of the typical vegetative conditions found in wetland INC-W-019.

Photograph:	**Date:**
34	04/28/21

Feature ID:
Upland INC-W-019 (UPL)

Direction:
Southeast

Description:
View of vegetative conditions at the upland data point INC-W-019-(UPL).

Photograph:	**Date:**
35	04/28/21

Feature ID:
Wetland INC-W-020 (PEM)

Direction:
Southeast

Description:
View of the typical vegetative conditions found in wetland INC-W-020.

Photograph:	**Date:**
36	04/28/21

Feature ID:
Upland INC-W-020 (UPL)

Direction:
Northwest

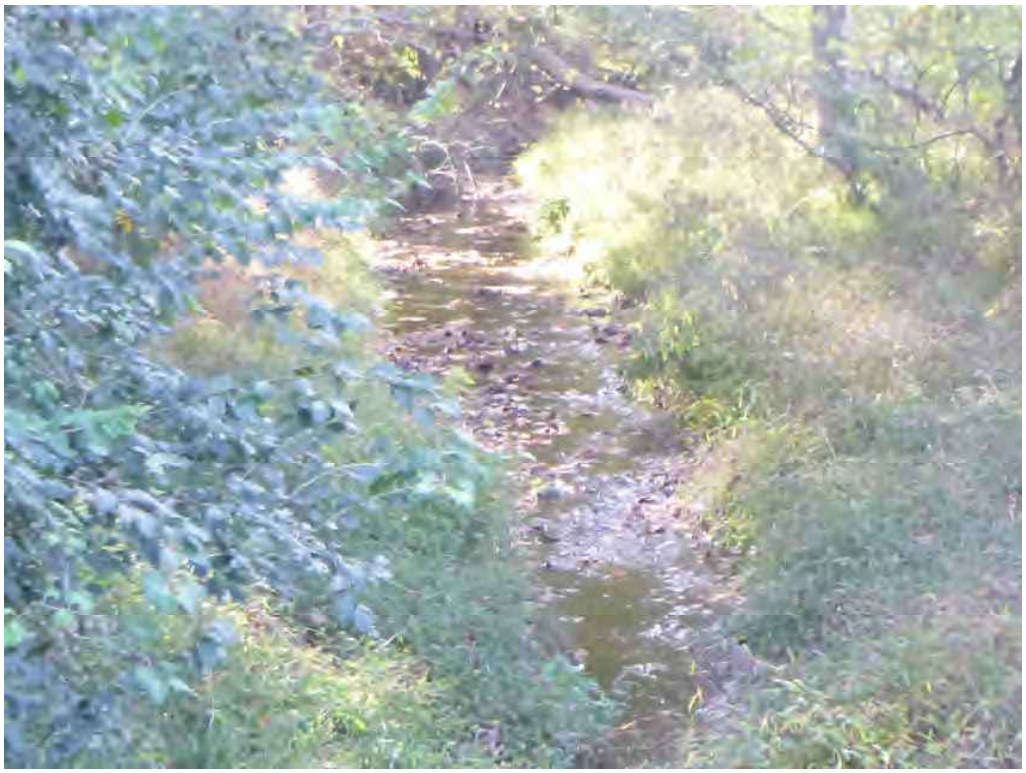
Description:
View of the vegetative condition at the upland data point INC-W-020 (UPL).

Photograph:	**Date:**
37	10/07/20

Feature ID:
Watercourse INC-S-001 (PER)

Direction:
Northwest

Description:
View facing upstream on watercourse INC-S-001.



Photograph:	**Date:**
38	10/07/20

Feature ID:
Watercourse INC-S-002 (INT)

Direction:
South

Description:
View facing upstream on watercourse INC-S-002.

Photograph:	**Date:**
39	10/07/20

Feature ID:
Watercourse INC-S-003 (EPH)

Direction:
North

Description:
View facing downstream on watercourse INC-S-003.

Photograph:	**Date:**
40	11/02/20

Feature ID:
Watercourse INC-S-004 (EPH)

Direction:
North

Description:
View of channel INC-S-004.

Photo Not Currently Available

Photograph:	**Date:**
41	10/08/20
Feature ID: Watercourse INC-S-005 (INT)	
Direction: East	
Description: View facing downstream on watercourse INC-S-005.	

Photograph:	**Date:**
42	10/08/20
Feature ID: Watercourse INC-S-006 (INT)	
Direction: North	
Description: View of facing upstream on watercourse INC-S-006 where it connects to wetland INC-W-002.	

Photograph:	**Date:**
43	10/08/20

Feature ID:

Watercourse INC-S-007 (EPH)

Direction:

North

Description:

View facing upstream on watercourse INC-S-007from the confluence with INC-S-005.

Photograph:	**Date:**
44	10/08/20

Feature ID:

Watercourse INC-S-008 (INT)

Direction:

South

Description:

View of the watercourse INC-S-008 facing upstream from the confluence with INC-S-005.

Photograph:	**Date:**
45	10/07/20
Feature ID: Watercourse INC-S-009 (PER)	
Direction: South	
Description: View facing upstream on watercourse INC-S-009.	

Photograph:	**Date:**
46	10/07/20
Feature ID: Watercourse INC-S-010 (EPH)	
Direction: East	
Description: View of watercourse INC-S-010 facing downstream from the its origin.	

Photograph:	**Date:**
47	10/07/20
Feature ID:	
Watercourse INC-S-011 (EPH)	
Direction:	
South	
Description:	
View facing upstream on watercourse INC-S-0.	

Photograph:	**Date:**
48	10/08/20
Feature ID:	
Watercourse INC-S-012 (PER)	
Direction:	
North	
Description:	
View of watercourse INC-S-012 facing upstream.	

Photograph:	**Date:**
49	10/08/20

Feature ID:
Watercourse INC-S-013 (INT)

Direction:
North

Description:
View facing upstream on watercourse INC-S-013 where it drains from wetland INC-W-007.

Photograph:	**Date:**
50	10/08/20

Feature ID:
Watercourse INC-S-014 (EPH)

Direction:
West

Description:
View facing upstream on watercourse INC-S-014.

Photograph:	**Date:**
51	10/08/20

Feature ID:

Watercourse INC-S-015 (INT)

Direction:

South

Description:

View facing upstream on watercourse INC-S-015 where it drains from wetland INC-W-009.

Photograph:	**Date:**
52	10/08/20

Feature ID:

Watercourse INC-S-016 (EPH)

Direction:

South

Description:

View facing downstream on INC-S-016.

Photograph:	**Date:**
53	10/08/20

Feature ID:
Watercourse INC-S-017 (INT)

Direction:
Southwest

Description:
View facing upstream on watercourse INC-S-017.

Photograph:	**Date:**
54	10/08/20

Feature ID:
Watercourse INC-S-018 (EPH)

Direction:
South

Description:
View facing downstream on INC-S-018.

Photograph:	**Date:**
55	10/08/20

Feature ID:

Watercourse INC-S-019 (PER)

Direction:

North

Description:

View of the typical channel conditions on INC-S-019.