



WETLAND AND WATERWAY INVESTIGATION REPORT

LILLY RUN

Harford County, MD

Submitted to:
Maryland Transportation Authority

April 2019



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1.0 INTRODUCTION

The Maryland Transportation Authority is proposing a stream restoration project in Harvre De Grace, Harford County, Maryland. To support this effort, Johnson, Mirmiran & Thompson (JMT) performed a wetland and waterway investigation to identify environmental resources that could be impacted within the Study Area.

The Study Area for this project totals approximately 14 acres and is located west of the intersection of North Juniata Street and Congress Avenue (**Figure 1**). The area consists of athletic fields and forested areas in the central portion of the Study Area. Lands to the south and east are industrial and consist of high-density development.

The Study Area is within the Atlantic Coastal Plain Physiographic Province. It lies in the Maryland Department of the Environment (MDE) 8-digit Lower Susquehanna River Watershed (#02120201; MDE, 2005) and U.S. Geological Survey (USGS) Watershed Boundary Dataset 8-digit Lower Susquehanna Watershed (#02050306; USGS, 2016).

2.0 METHODOLOGY

2.1 PUBLISHED INFORMATION

JMT reviewed several background data sources prior to completing the field work. These sources included topographic maps, soil survey maps, National Wetland Inventory (NWI) and Maryland Department of Natural Resources (MDNR) mapped wetlands, MDE mapped streams, Federal Emergency Management Agency (FEMA) floodplain maps, and recent aerial photographs.

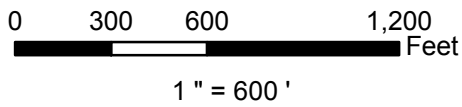
2.2 AGENCY COORDINATION

JMT coordinated with MDNR, U.S. Fish and Wildlife Service (USFWS), and Maryland Historic Trust (MHT) to determine whether state-protected species, federal-protected species, and/or known historical or archaeological sites are present within the Study Area.



Legend

Lilly Run Study Area



SOURCE: MD IMAP, MDE



FIGURE 1: VICINITY MAP

LILLY RUN
HARFORD COUNTY, MD

DATE: MAY 2019

2.3 FIELD INVESTIGATIONS

Field investigations are conducted to delineate potentially jurisdictional waters of the United States, including wetlands and waterways, within the Study Area. Wetland delineations are performed according to the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Regional Supplement, Version 2.0*, (US Army Corps of Engineers [USACE], 2010). The *Corps of Engineers Wetland Delineation Manual* states three criteria (wetland vegetation, wetland soils, and wetland hydrology) must be present for an area to qualify as a wetland, unless the area is significantly disturbed (atypical situation) or is considered a problem area (e.g., seasonally ponded soils). If the area is significantly disturbed or a problem area, then only two parameters must be evident to classify an area as a wetland. All delineated wetlands are classified into system, subsystem, class and subclass according to the *Classification of Wetlands and Deep Water Habitats of the United States* (Cowardin *et al.*, 1979).

Wetland (hydrophytic) vegetation is determined using the USACE National Wetland Plant List (NWPL), (Lichvar *et al.*, 2016). This document assigns a wetland indicator status to plants based on how frequently they occur in wetlands. The NWPL wetland indicator status and definitions are listed in **Table 1**.

Table 1: National Wetland Plant List Indicator Status Groups

Wetland Indicator Status	Definition
Obligate Wetland (OBL)	Almost always occur in wetlands
Facultative Wetland (FACW)	Usually occur in wetlands, but may occur in non-wetlands
Facultative (FAC)	Occur in wetlands or non-wetlands
Facultative Upland (FACU)	Usually occur in non-wetlands, but may occur in wetlands
Obligate Upland (UPL)	Almost never occur in wetlands

Source: Lichvar *et al.*, 2016

In order to delineate wetland boundaries, samples are taken periodically using an open-faced auger. Soil samples are collected at each wetland and upland sample point, and soil colors are recorded in the field using a Munsell soil color chart (Munsell Color, 2010).

Wetland and waterway boundaries are flagged in the field and documented using a Trimble® global positioning system (GPS) capable of sub-meter accuracy. Waterway boundaries are delineated at top of bank.

In the state of Maryland, both USACE and MDE regulate wetlands and waterways. USACE and the Environmental Protection Agency published the Clean Water Rule in the Federal Register (FR) on June 29, 2015 (80 FR 37053) to clarify which wetlands and waterways are regulated by USACE. The Clean Water Rule went into effect in many states, including Maryland, in August 2018. The delineated resources described within this report have been categorized per the Clean Water Rule to aid USACE regulators in determining jurisdiction. However, resources not jurisdictional to USACE may still be regulated by MDE.

A functional assessment was completed for each of the delineated wetlands using *The Highway Methodology Workbook Supplement: Wetland Functions and Values* and *Wetland Function Value Evaluation Form* (USACE, 1999).

3.0 FINDINGS

3.1 PUBLISHED INFORMATION

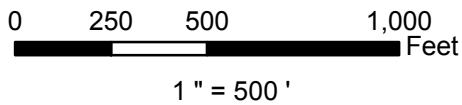
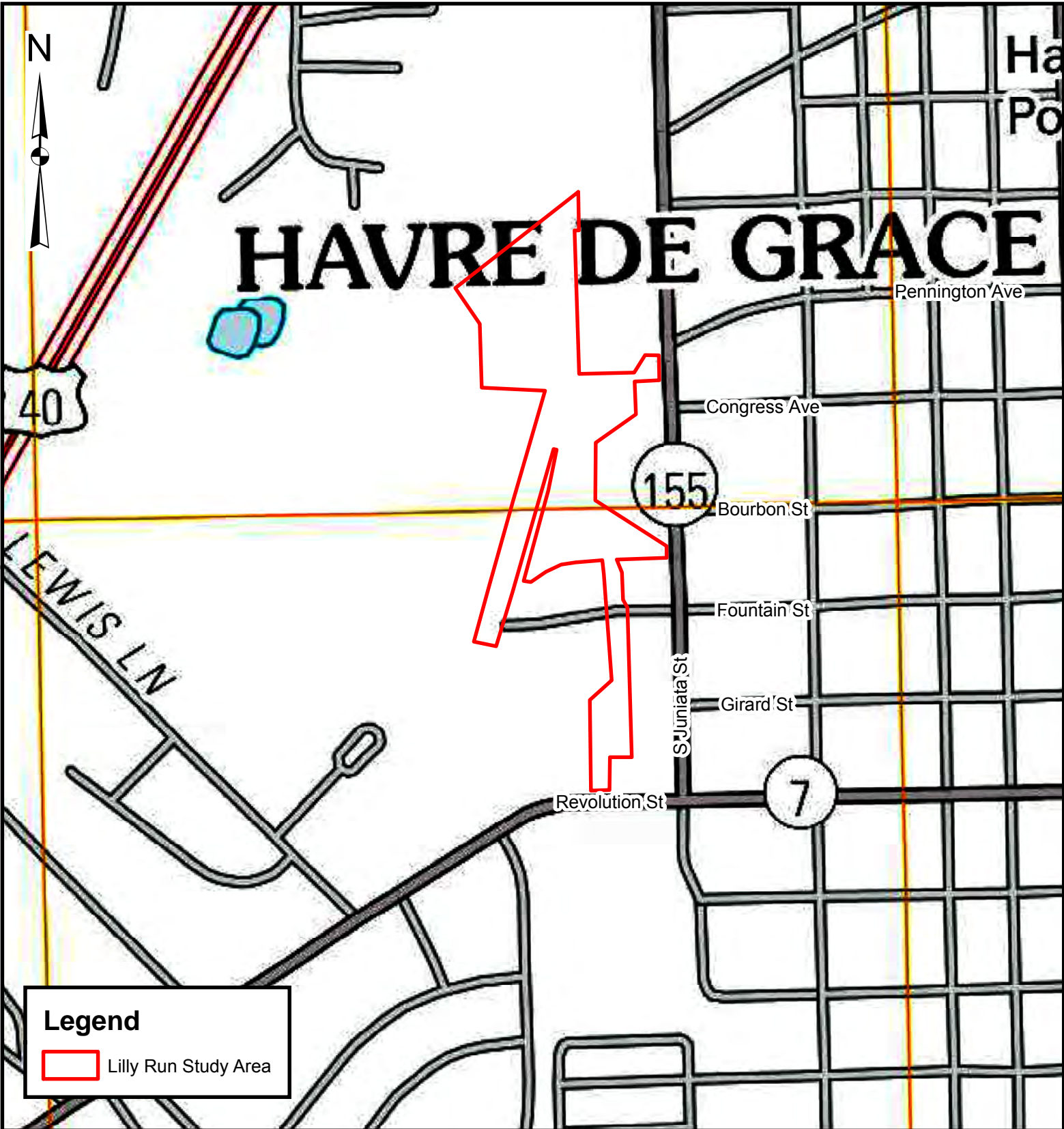
The Havre De Grace Topographic 7.5' x 7.5' Quadrangle (USGS, 2011) depicts no mapped waterway north of the Study Area (**Figure 2**).

The NWI (USFWS, 2002) and MDNR (2005) wetland datasets show no mapped wetlands within the Study Area, but one mapped riverine system (**Figure 3**).

The MDE Stream Designated Use Class Map (MDE, 2014) shows no mapped waterways are located within the Study Area (**Figure 3**).

The FEMA floodplain mapping for Harford County, Maryland (FEMA, 2016) depicts portions of the Study Area within the 100-year floodplain (FIRM Panel #24025C0211E) (**Figure 3**).

The Web Soil Survey for Harford County, Maryland, (USDA-NRCS, 2017) indicates that four soil survey units occur within the Study Area; of these, two soil units are predominantly hydric (**Figure 4**).



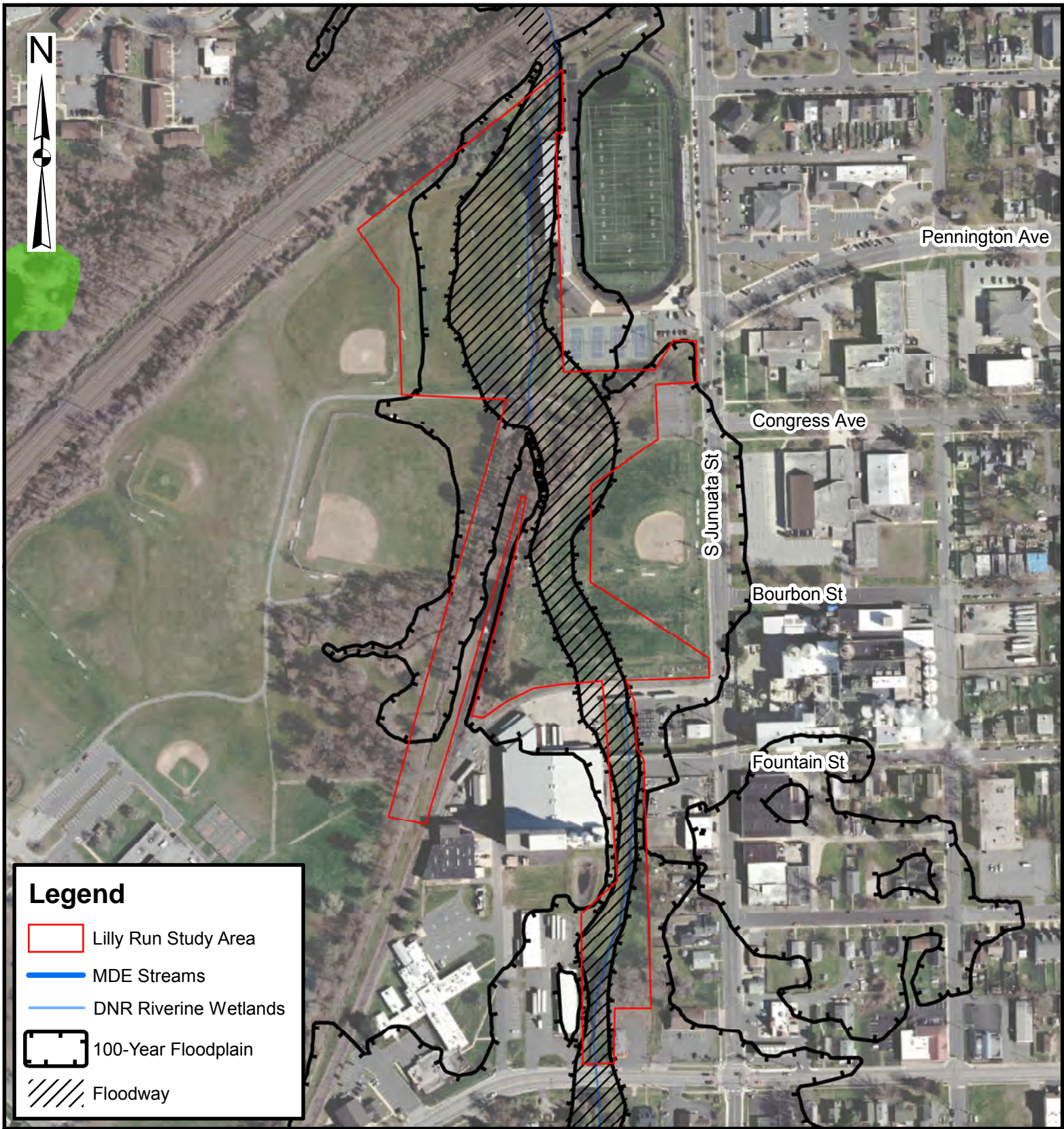
SOURCE: USGS



**FIGURE 2:
USGS TOPOGRAPHIC MAP**

LILLY RUN
HARFORD COUNTY, MD

DATE: MAY 2019



Legend

- Lilly Run Study Area
- MDE Streams
- DNR Riverine Wetlands
- 100-Year Floodplain
- Floodway

0 150 300 600
 Feet
 1" = 300'

SOURCE: MD IMAP, FEMA, DNR, USFWS NWI, MDE



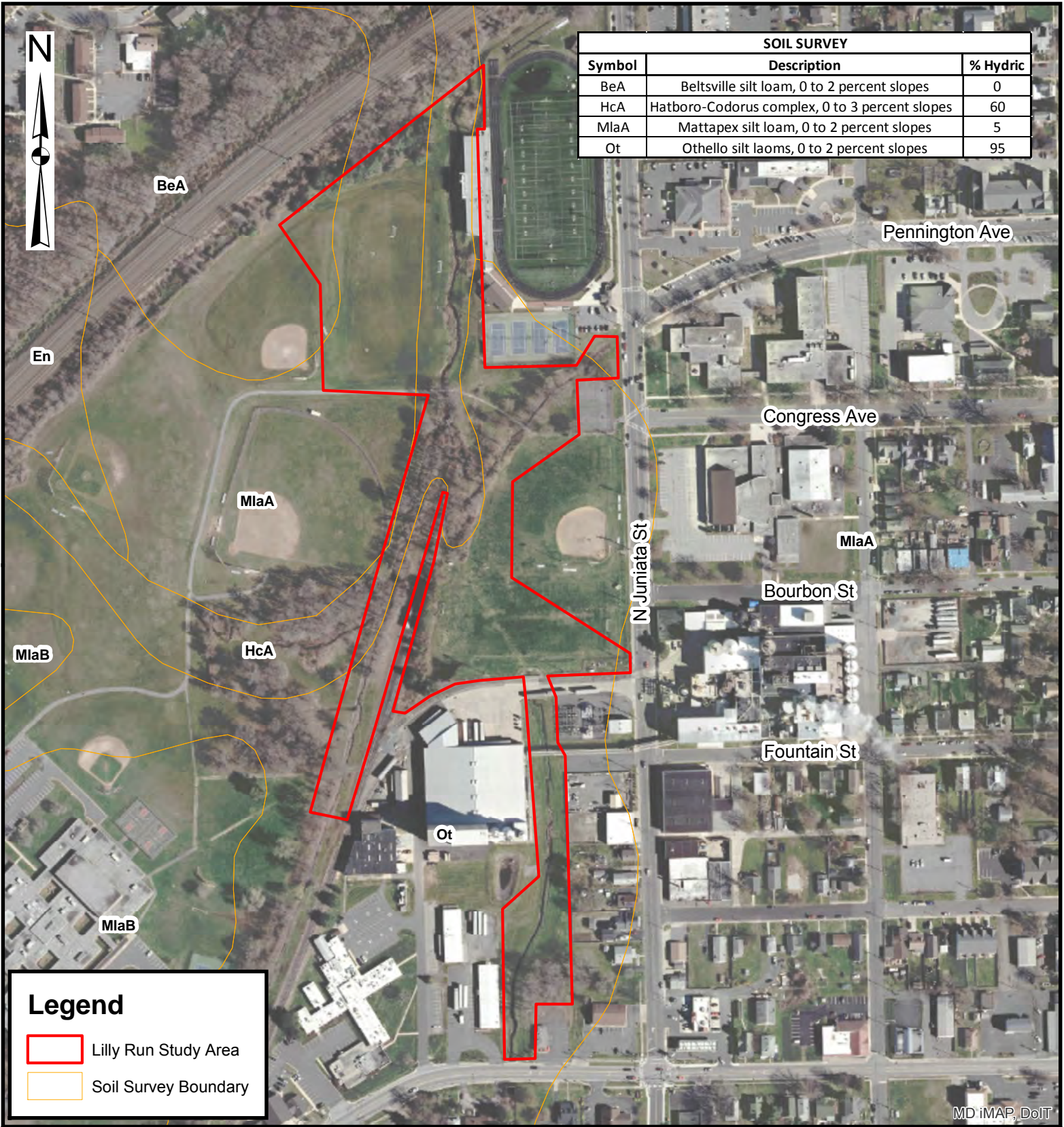
**FIGURE 3:
 PUBLISHED WATER RESOURCES**

LILLY RUN
 HARFORD COUNTY, MD

DATE: MAY 2019





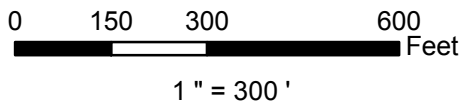
SOIL SURVEY		
Symbol	Description	% Hydric
BeA	Beltsville silt loam, 0 to 2 percent slopes	0
HcA	Hatboro-Codorus complex, 0 to 3 percent slopes	60
MlaA	Mattapex silt loam, 0 to 2 percent slopes	5
Ot	Othello silt laoms, 0 to 2 percent slopes	95



MD iMAP, DoIT

Legend

-  Lilly Run Study Area
-  Soil Survey Boundary



SOURCE: MD iMAP, NRCS, ESRI



FIGURE 4: SOIL SURVEY MAP

LILLY RUN
HARFORD COUNTY, MD

DATE: MAY 2019

3.2 AGENCY COORDINATION

Rare, Threatened, and Endangered Species

On February 20, 2018 JMT contacted MDNR Wildlife and Heritage Service and Environmental Review Program (ERP) using the online DNR Trilogy Letter Application. This application is used to determine if state-listed rare, threatened, or endangered species are present in the Study Area, as well as the presence of anadromous finfish or other fish. A response from MDNR Wildlife and Heritage Service and MDNR ERP are both outstanding.

Species lists generated by the USFWS Information for Planning or Consultation (IPaC) website indicated the possible presence of the federally listed Northern Long-eared Bat (*Myotis septentrionalis*) in the project area. According to the USFWS Chesapeake Bay Field Office (CBFO) website, the only counties in Maryland with documented hibernacula are Allegany, Garrett, and Washington Counties, and the only counties with documented maternity roosts are in Garrett and Allegany Counties. This project is located in Harford County Maryland and, therefore would not be located within 150 feet of a known maternity roost tree and/or within 0.25 miles of a known hibernaculum.

MDTA completed the *Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats* and will be submitting the key along with supporting project information to USFWS **Appendix A**.

No other federally listed threatened or endangered species are known to exist in the Study Area, other than occasional transient individuals. The USFWS Online Certification Letter dated March 20, 2019 documenting these results can be found in **Appendix A**.

Historical Resources

JMT contacted the Maryland Historic Trust (MHT) in a letter dated April 12, 2019 to determine if the proposed project may impact known historical or archeological sites. A response from MHT is still pending.

3.3 FIELD INVESTIGATIONS

Field investigations were conducted on March 27, 2019, to identify and delineate wetlands and waterways within the Study Area. JMT identified three non-tidal wetlands and six waterways. Locations of the delineated systems are shown on the Delineated Resource Maps in **Appendix B**.

At least one wetland sample plot was taken for each wetland, and one upland plot was taken for each wetland or shared between adjacent wetlands. Stream data sheets as well as Wetland Determination Data Forms for the representative wetland and upland sample plots are presented in **Appendix C**, and photographic documentation is included in **Appendix D**.

The identified wetlands and waterways are described below.

Wetlands

Wetland 01 (WET 01)

WET 01 is a palustrine, emergent wetland and is approximately 3,705 sf (0.085 acres) in size. It is located in the southern portion of the Study Area; it has formed within a small depression bordering an adjacent athletic field (**Appendix B, Map 2**). WET 01 receives hydrology from upland runoff from the adjacent athletic field. There is little vegetation within the wetland. Hay is also present, possibly as an attempt to reduce standing water on the athletic field. WET 01 does not have any functions or values and is considered to be a low-quality wetland.

The dominance test for hydrophytic vegetation was met. Due a lack of vegetation the only dominant species was water purslane (*Ludwigia palustris*, OBL), present in the herbaceous stratum.

Primary hydrologic indicators include surface water, high water table, saturation, and water stained leaves. Secondary hydrologic indicators include saturation visible on aerial imagery and FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland 02 (WET 02A and WET 02B)

WET 02A and WET 02B are two palustrine emergent wetlands, located to the east of Lilly Run in the northern portion of the Study Area (**Appendix B, Map 1**). WET 02A is approximately 1,783 sf (0.04 acres) in size, and WET 02B is 1,798 sf (0.041 Acres). Although the wetland polygons are separated, only one data point was taken due to similarities in soil, hydrology, and vegetation. WET 02A and WET 02B appear to be designed stormwater management systems; both wetlands are fed by drainage pipes originating from the adjacent sports complex. The vegetation that was observed within each wetland was most likely planted. WET 02A is also connected to Lilly Run through surface flow during periods of rainfall. Functions and values provided by WET 02 include sediment/toxicant retention and sediment/shoreline stabilization. WET 02A and WET 02B are moderate to high quality wetlands.

The dominance test for hydrophytic vegetation was met. In the tree stratum bald cypress (*Taxodium distichum*, OBL) was dominant. Dominant species in the herbaceous stratum included soft rush (*Juncus effusus*, OBL), cat tail (*Typha latifolia*, OBL), and common reed (*Phragmites australis*, FACW).

Primary hydrologic indicators included surface water, high water table, saturation, algal mat or crust, and presence of reduced iron. Secondary indicators included saturation visible on aerial imagery, geomorphic position, and the FAC-neutral test. The soil profile met the redox dark surface (F6) indicator.

Wetland 03 (WET 03)

WET 03 is a palustrine emergent wetland, located to the west of Lilly Run in the northern portion of the Study Area (**Appendix B, Map 1**). It is approximately 1,963 sf (0.045 acres) in size and has formed within a depression at the toe of an adjacent slope. Wet 03 receives hydrology from upland runoff and occasional flood flow from Lilly Run. Functions and values provided by WET 03 include floodflow alteration, wildlife habitat, sediment/toxicant retention, and sediment/shoreline stabilization. WET 03 is a moderate quality wetland.

The dominance test for hydrophytic vegetation was met. In the tree stratum box elder (*Acer negundo*, FAC) was dominant. Common reed was dominant in the herbaceous stratum.

Primary hydrologic indicators included surface water, high water table, saturation, and water stained leaves. Secondary indicators included drainage patterns, saturation visible on aerial imagery, and FAC-neutral test. The soil profile met the redox dark surface (F6) indicator.

Waterways

Watercourse 01 (WUS 01)

WUS 01 is a perennial stream located in the northeastern portion of the Study Area (**Appendix B, Map 1 and Map 2**). The stream flows to the southwest and eventually flows into WUS 02 (Lilly Run). The stream channel is approximately 3 to 5 feet wide with banks between 1 and 2.5 feet high; at the time of delineation flow within the channel varied between 2 and 6 inches deep. Substrate consists of cobble, gravel, sand, and silt.

Watercourse 02 (WUS 02 – Lilly Run)

WUS 02 is a perennial stream that runs up the center of the Study Area (**Appendix B, Map 1 and Map 2**). The stream flows to the north starting at the south end of the Study Area where portions of the stream are culverted under the athletic field that is located to the east of WET 01. WUS 01, WUS 03, WUS 04 and WUS 05 all contribute hydrology to WUS 02. The stream channel is approximately 6 to 15 feet wide with banks 3 to 18 feet high. The southern portion of WUS 02 has banks that are stabilized by rail-road ties, with large amounts of sediment build-up along the artificial banks. In the middle of the study area WUS 02 has artificial banks made of large stone. At the time of delineation flow within the channel varied between 4 to 18 inches in depth. Substrate varies between cobble, gravel, and sand.

Watercourse 03 (WUS 03)

WUS 03 is an ephemeral channel that runs parallel to the southern portion of WUS 02 (**Appendix B, Map 2**). The channel runs north and functions as a backwater channel of WUS 02. The stream channel is

approximately 2 feet wide with banks 1 foot high; at the time of the delineation, there was no flow observed within the channel. The substrate consists of silt and vegetation.

Watercourse 04 (WUS 04)

WUS 04 is an intermittent stream that originates from a small pipe that runs perpendicular to WUS 02 (**Appendix B, Map 2**). The stream flows to the west; it is a tributary to Lilly Run. The stream channel is approximately 3 feet wide with banks 3 feet in height; at the time of delineation there was no flow observed within the channel. The substrate consists of cobble, gavel, silt, and concrete.

Watercourse 05 (WUS 05)

WUS 05 is a perennial stream located in the western end of the Study Area (**Appendix B, Map 1 and Map 2**). The stream originates outside of the Study Area and flows to the north; it is a tributary to WUS 02. The stream channel is between 4 and 5 feet in width with banks approximately 3 feet high; at the time of delineation, flow within the channel varied between 4 and 6 inches deep. The substrate consists of gravel and sand.

Watercourse 06 (WUS 06)

WUS 06 is a perennial stream located to the west of WUS 05 (**Appendix B, Map 2**). The stream flows to the northeast; is a tributary to WUS 05. The stream channel is approximately 7 feet wide with banks 2 feet high; at the time of delineation, flow within the channel was 4 inches deep. The substrate consists of cobble, gravel, and sand.



4.0 CONCLUSIONS

JMT conducted a review of published information and performed field investigations based on the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* to identify potentially jurisdictional wetlands and WUS within the Study Area. Based on the results of the investigation, JMT identified three non-tidal wetlands and six waterways within the Study Area. **Table 2** summarizes the delineated resources.

Table 2: Summary of Delineated Resources

Wetland Name	Cowardin Classification
WET 01	PEM
WET 02A/WET 02B	PEM
WET 03	PEM
Waterway Name	Stream Classification
WUS 01	Perennial
WUS 02	Perennial
WUS 03	Ephemeral
WUS 04	Intermittent
WUS 05	Perennial
WUS 06	Perennial

Environmental resources identified in this report may be subject to verification and regulation by USACE and MDE. Impacts to these resources may require authorization by USACE and MDE as well as mitigation.

5.0 REFERENCES

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APPENDIX A AGENCY CORRESPONDENCE



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127

<http://www.fws.gov/chesapeakebay/>
<http://www.fws.gov/chesapeakebay/endsppweb/ProjectReview/Index.html>

In Reply Refer To:

March 20, 2019

Consultation Code: 05E2CB00-2019-SLI-0980

Event Code: 05E2CB00-2019-E-02427

Project Name: MDTA Phase II I-95 Improvements Lilly Run Mitigation Site

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

Project Summary

Consultation Code: 05E2CB00-2019-SLI-0980

Event Code: 05E2CB00-2019-E-02427

Project Name: MDTA Phase II I-95 Improvements Lilly Run Mitigation Site

Project Type: TRANSPORTATION

Project Description: The Maryland Transportation Authority (MDTA) is proposing the second implementation phase of the I-95 Section 200 Express Toll Lanes Improvements in Baltimore and Harford Counties. MDTA will be implementing stream restoration practices to enhance overall water quality and stream stability. Practices to be implemented include, but are not limited to, reconfiguration of horizontal and vertical profiles of existing stream channels using natural channel design techniques, bank stabilization, as well as conversion of concrete lined channels to more naturalized systems. Wetland creation may be implemented in addition. Implementation of these practices will require disturbance to active stream channels, however, the end result will be improvements to water quality.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/39.54692887235203N76.09940464040105W>



Counties: Harford, MD

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ Federal agencies may finish consultation with the NLEB 4(d) Rule Consultation Form at https://www.fws.gov/chesapeakebay/pdf/StreamlinedConsultationForm29Feb2016.pdf for projects with tree clearing = to or > 15 acres; send to Trevor_Clark@fws.gov Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- [R2UBH](#)
-



Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Jeannie Haddaway-Riccio, Secretary

Coordination Sheet for MD DNR Environmental Review Related to Project Locations

Date of Request:
March 13, 2019

Project Name and Location: MDTA Phase II I-95 Improvements Lilly Run Site

The Maryland Transportation Authority (MDTA) is proposing the second implementation phase of the I-95 Section 200 Express Toll Lanes Improvements in Baltimore and Harford Counties. MDTA will be implementing stream restoration practices to enhance overall water quality and stream stability. Practices to be implemented include, but are not limited to, reconfiguration of horizontal and vertical profiles of existing stream channels using natural channel design techniques, bank stabilization, as well as conversion of concrete lined channels to more naturalized systems. Wetland creation may be implemented in addition. Implementation of these practices will require disturbance to active stream channels, however, the end result will be improvements to water quality.

This letter addresses the Lilly Run Mitigation Site.

NAME OF STREAM(S) (and MDE Use Classification) WITHIN THE STUDY AREA:
Unnamed Tributary to Chesapeake Bay

DNR RESPONSE:

√ Generally, no instream work is permitted in Use I streams during the period of March 1 through June 15, inclusive, during any year.

ADDITIONAL RESOURCES NOTES:

Anadromous fish species, including yellow perch, herring species and white perch have been documented near this project site. No MBSS sites are located near the project and therefore no anadromous fish species have been documented near the project site. However, these streams do support many resident fish species documented in other locations.

The Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area shown on the map provided. As a result, we have no specific concerns regarding potential impacts or recommendations for protection measures at this time. Please let us know however if the limits of proposed disturbance or overall site boundaries change and we will provide you with an updated evaluation.

In addition, our analysis of the information provided also suggests that the forested area on or adjacent to the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird Species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of FIDS habitat is strongly encouraged by the Department of Natural Resources.

ADDITIONAL COMMENTS ON BMPS:

Existing riparian vegetation in the area of the stream channel should be preserved as much as possible to maintain aquatic habitat and provide shading to the stream. Areas designated for the access of equipment and for the removal or disposal of material should avoid impacts to the stream and associated riparian vegetation. Any temporarily disturbed areas should be restored and re-vegetated. The use of concrete or grouting required to conduct repairs should be managed to assure curing processes do not impact the stream or modify stream PH.

The project should be designed to maintain or enhance fish passage through the project area, particularly during low flow periods.

For projects when there is no reasonable alternative to the adverse effects on nontidal wetlands or other aquatic or terrestrial habitat, the applicant shall be required to provide measures to mitigate, replace, or minimize the loss of habitat.

The fisheries resources in the above area should be adequately protected by the instream work restrictions referenced above, stringent sediment and erosion control methods, and other Best Management Practices typically used for protection of stream resources.

MD DNR, Environmental Review Program signature



Gwen Gibson

DATE: May 6, 2019



Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats

A separate key is available for non-federal activities

Federal agency actions that involve incidental take not prohibited under the final 4(d) rule may result in effects to individual northern long-eared bats. Per section 7 of the Act, if a federal agency's action may affect a listed species, consultation with the Service is required. This requirement does not change when a 4(d) rule is implemented. However, for this 4(d) rule, the Service proposed a framework to streamline section 7 consultations when federal actions may affect the northern long-eared bat but will not cause prohibited take. Federal agencies have the option to rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities by using the framework. This key will help federal agencies determine if their actions may cause prohibited incidental take of northern long-eared bats as defined in the 4(d) rule under the Endangered Species Act and if separate section 7 consultation may be necessary. Also, the framework for streamlining northern long-eared bat section 7 consultation is provided.

1. Is the action area (i.e., the area affected by all direct and indirect project effects) located wholly **outside the White-nose Syndrome Zone**? For the most current version of the White-nose Syndrome Zone map, please see

www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

Yes, the action area is located wholly outside the white-nose syndrome zone.

Incidental take (see Definitions below) of northern long-eared bats is not prohibited in areas outside the White-nose Syndrome Zone. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

X No, the action area is located partially or wholly inside the white-nose syndrome zone.

Continue to #2

2. Will the action take place **within a cave or mine where northern long-eared bats hibernate** (i.e., hibernaculum) **or could it alter the entrance or the environment (physical or other alteration)** of a hibernaculum?

Yes, the action will take place within a northern long-eared bat hibernaculum or it could alter the entrance or the environment (physical or other alteration) of a hibernaculum.

Take (see Definitions below) of northern long-eared bats within hibernacula is prohibited, including actions that may change the nature of the hibernaculum's environment or entrance to it, even when the bats are not present. If your activity includes work in a

hibernaculum or it could alter its entrance or environment, please contact the Service's Ecological Services Field Office located nearest to the project area. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices.

X **No, the action will not take place within a northern long-eared bat hibernaculum or alter its entrance or environment.**
Continue to #3

3. Will the action involve **tree removal** (see definition below)?

No, the action does not include tree removal.

Incidental take (see Definitions below) from activities that do not involve tree removal and do not take place within hibernacula or would not alter the hibernaculum's entrance or environment (see Question #3), is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

X **Yes - continue to #4**

4. Is the action the **removal of hazardous trees** for protection of human life or property?

Yes, the action is removing hazardous trees.

Incidental take (see Definitions below) of northern long-eared bats as a result of hazardous tree removal is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

X **No, the action is not removing hazardous trees.**
Continue to #5

5. Will the action include one or both of the following: **1) removing a northern long-eared bat known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or 2) removing any trees within 0.25 miles of a northern long-eared bat hibernaculum at any time of year?**

X **No**
Incidental take (see Definitions below) from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or results from tree removal activities within 0.25 mile of a hibernaculum at any time. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if

they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes

Incidental take (see Definitions below) of northern long-eared bats is prohibited if it occurs as a result of removing a known occupied maternity roost tree or removing trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31 or as a result of removing trees from within 0.25 mile of a hibernaculum at any time of year. This does not mean that you cannot conduct your action; however, standard section 7 consultation procedures apply. Please contact your nearest Ecological Services Field Office. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices

How do I know if there is a maternity roost tree or hibernacula in the action area?

We acknowledge that it can be difficult to determine if a maternity roost tree or a hibernaculum is in your project area. Location information for both resources is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

When looking for information on the presence of maternity roost trees or hibernacula within your project area, our expectation is that the federal action agency will complete due diligence to determine if data is available. If information is not available, document your attempt to find the information and send it with your determination under step 1 of the framework (see below).

We do not require federal agencies to conduct surveys; however, we recommend that surveys be conducted whenever possible. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat. In addition, should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could have greater flexibility under section 7(a)(2) of the Act. Recommended survey methods are available at www.fws.gov/midwest/endangered/mammals/nleb.

Definitions

“Incidental take” is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

“Known hibernacula” are defined as locations where one or more northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence. Given the challenges of surveying for northern long-eared bats in the winter, any hibernacula with northern long-eared bats observed at least once, will continue to be considered “known hibernacula” as long as the hibernacula remains suitable for northern long-eared bat.

“Known occupied maternity roost trees” is defined in the 4(d) rule as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Once documented, northern-long eared bats are known to continue to use the same roosting areas. Therefore, a tree will be considered to be a “known occupied maternity roost” as long as the tree and surrounding habitat remain suitable for northern long-eared bat. The incidental take prohibition for known occupied maternity roosts trees applies only during the during the pup season (June 1 through July 31).

“Take” is defined by the ESA as ‘to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect’ any endangered species. Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take.

“Tree removal” is defined in the 4(d) rule as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats.

Optional Framework to Streamline Section 7 Consultation for the Northern Long-Eared Bat

The primary objective of the framework is to provide an efficient means for U.S. Fish and Wildlife Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in the programmatic intra-Service consultation for the final 4(d) rule and do not require separate consultation. Such verification is necessary because incidental take is prohibited in the vicinity of known hibernacula and known roosts, and these locations are continuously updated. Federal agencies may rely on this Biological Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the northern long-eared bat, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the northern long-eared bat, but would not cause prohibited incidental take. This documentation must follow these procedures:
 - a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. Activities that will occur within 0.25 mile of a known hibernacula or within 150 feet of known, occupied maternity roost trees during the pup season (June 1 to July 31) are not excepted pursuant to the final 4(d) rule. This determination must be updated annually for multi-year activities.
 - b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
 - c. For this determination, the action agency will rely on the definitions of prohibited activities provided in the final 4(d) rule and the activities considered in this consultation.
 - d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
 - e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
 - f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the northern long-eared bat is required; i.e., where the proposed project includes an activity not covered by the 4(d) rule and thus not addressed in the Biological Opinion and is subject to additional consultation.

- g. If the Service does not respond within 30 days under (f) above, the action agency may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the northern long-eared bat fulfilled through this programmatic Biological Opinion.

2. Reporting

- a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
- b. The action agency must provide the results of any surveys for the northern long-eared bat to the appropriate Service Field Office within their jurisdiction.
- c. Parties finding a dead, injured, or sick northern long-eared bat must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

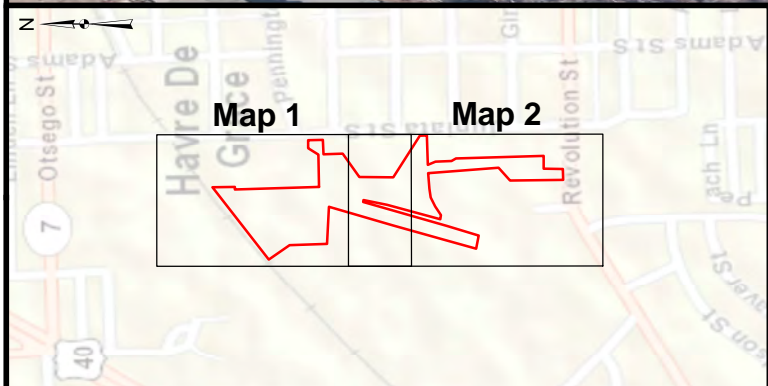
Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures to all Federal agencies whose actions may affect the northern long-eared bat:

1. Perform northern long-eared bat surveys according to the most recent Range-wide Indiana Bat/ northern long-eared bat Summer Survey Guidelines. Benefits from agencies voluntarily performing northern long-eared bat surveys include:
 - a. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. The Service and partners will use the survey data to better understand habitat use and distribution of northern long-eared bats, track the status of the species, evaluate threats and impacts, and develop effective conservation and recovery actions. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat.
 - b. Should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could inform greater flexibility under section 7(a)(2) of the Act. Such information could facilitate an expedited consultation and incidental take statement that may, for example, exempt taking associated with tree removal during the active season, but outside of the pup season, in known occupied habitat.

2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on northern long-eared bats. Conservation measures include:
 - a. Conduct tree removal activities outside of the northern long-eared bat pup season (June 1 to July 31) and/or the active season (April 1 to October 31). This will minimize impacts to pups at roosts not yet identified.
 - b. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed northern long-eared bat hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).
 - c. Manage forests to ensure a continual supply of snags and other suitable maternity roost trees.
 - d. Conduct prescribed burns outside of the pup season (June 1 to July 31) and/or the active season (April 1 to October 31). Avoid high-intensity burns (causing tree scorch higher than northern long-eared bat roosting heights) during the summer maternity season to minimize direct impacts to northern long-eared bat.
 - e. Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the northern long-eared bat active season (April 1 to October 31) in areas where northern long-eared bats are known to roost on bridges or where such use is likely.
 - f. Do not use military smoke and obscurants within forested suitable northern long-eared bat habitat during the pup season (June 1 to July 31) and/or the active season (April 1 to October 31).
 - g. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
 - h. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
 - i. Participate in actions to manage and reduce the impacts of white-nose syndrome on northern long-eared bat. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal.

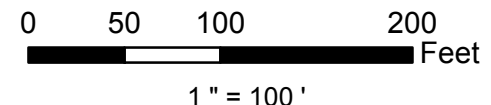


APPENDIX B DELINEATED RESOURCE MAPS



Legend

- Lilly Run Study Area
- Wetlands
- Wetland Buffer
- Upland Data Point
- Wetland Data Point
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Culverted Stream
- Contours



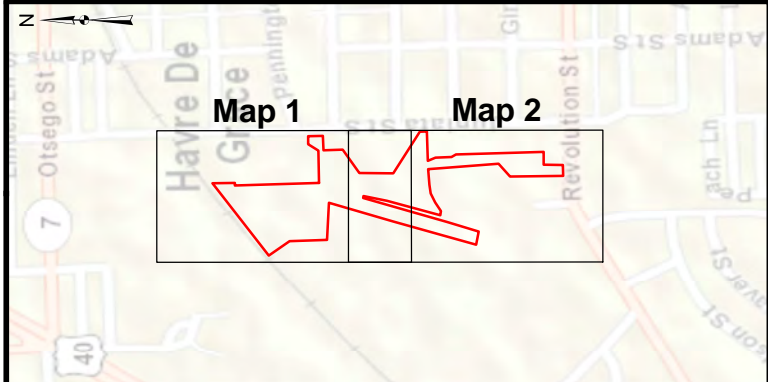
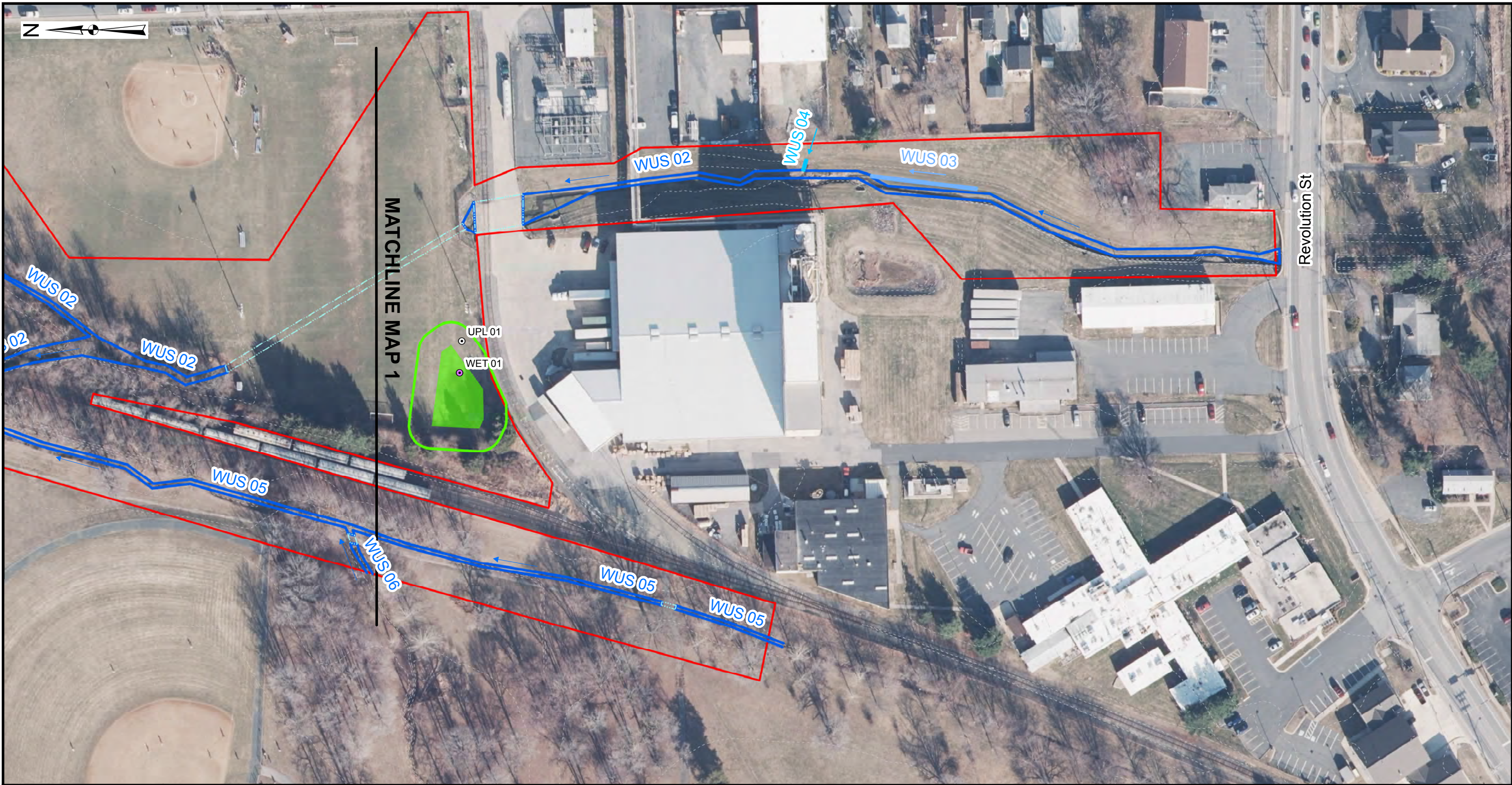
SOURCE: MD IMAP



**DELINEATED RESOURCES
MAP 1**

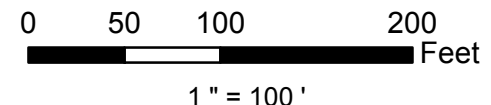
LILLY RUN
HARFORD COUNTY, MD

DATE: MAY 2019



Legend

- Lilly Run Study Area
- Wetlands
- Wetland Buffer
- Upland Data Point
- Wetland Data Point
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Culverted Stream
- Contours



SOURCE: MD IMAP



**DELINEATED RESOURCES
MAP 2**

LILLY RUN
HARFORD COUNTY, MD

DATE: MAY 2019



APPENDIX C
WETLAND, FUNCTIONS & VALUES, UPLAND, AND
STREAM DATASHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Lilly Run City/County: Harford County Sampling Date: 03/27/19
 Applicant/Owner: Maryland Transportation Authority State: MD Sampling Point: WET 01
 Investigator(s): L. Snyder, M. McCormick Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0 - 1
 Subregion (LRR or MLRA): 149A Lat: -76.098535 Long: 39.546003 Datum: NAD 83
 Soil Map Unit Name: Ot – Othello silt loams, 0 to 2 percent slopes NWI classification: PEM

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

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area Within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Low quality wetland fed by rainfall/upland runoff. Little to no vegetation present. Hay present in wetland. Photo WET 1: SW	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Mari Deposits (B15) (LLR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8)(LRR T, U)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1-4"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Sampling Point: WET 01

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
	_____ = Total Cover		
	50% of total cover: _____	20% of total cover: _____	
Sapling/Shrub Stratum (Plot size: <u>30'</u>)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
	_____ = Total Cover		
	50% of total cover: _____	20% of total cover: _____	
Herb Stratum (Plot size: <u>30'</u>)			
1. <u>Ludwigia palustris</u>	<u>50</u>	<u>Yes</u>	<u>OBL</u>
2. <u>Juncus effusus</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
	<u>60</u> = Total Cover		
	50% of total cover: <u>30</u>	20% of total cover: <u>12</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____ = Total Cover		
	50% of total cover: _____	20% of total cover: _____	

Dominance Test Worksheet:

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

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

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

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x1= _____
FACW species _____	x2= _____
FAC species _____	x3= _____
FACU species _____	x4= _____
UPL species _____	x5= _____
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0¹

Problematic Hydrophytic Vegetation¹ (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes No

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WET 01

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	10YR 4/2	60	5YR 4/6	20	C	M/PL	Loam	
	10YR 5/2	20						
5+	10YR 6/1	70	10YR 3/3	20	C	M	Loam	
			5YR 3/4	10	C	M	Loam	

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

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)
- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils ³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12) (LRR T, U)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Lilly Run City/County: Harford County Sampling Date: 03/27/19
 Applicant/Owner: Maryland Transportation Authority State: MD Sampling Point: WET 02
 Investigator(s): L. Snyder, M. McCormick Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0 - 2
 Subregion (LRR or MLRA): 149A Lat: -79.098371 Long: 39.549500 Datum: NAD 83
 Soil Map Unit Name: HcA – Hatboro-Codorus complex, 0 to 3 percent slopes NWI classification: PEM

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

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area Within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland is fed by pipe that is draining adjacent sports complex. WET 02A is a sperate system that receives hydrology the same way as WET 02. WET 02 and WET 02A have the same vegetation, hydrology, and soils.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Mari Deposits (B15) (LLR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8)(LRR T, U)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0.5"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Wetlands are designed facilities.	

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

Sampling Point: Wet 02

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <u><i>Taxodium distichum</i></u>	<u>30</u>	Yes	OBL	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>4</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>4</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100%</u> (A/B)
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
			<u>30</u> = Total Cover		
			50% of total cover: <u>15</u>	20% of total cover: <u>6</u>	
Sapling/Shrub Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index Worksheet:	
1. _____	_____	_____	_____	Total % Cover of:	Multiply by:
2. _____	_____	_____	_____	OBL species _____	x1= _____
3. _____	_____	_____	_____	FACW species _____	x2= _____
4. _____	_____	_____	_____	FAC species _____	x3= _____
5. _____	_____	_____	_____	FACU species _____	x4= _____
6. _____	_____	_____	_____	UPL species _____	x5= _____
7. _____	_____	_____	_____	Column Totals: _____ (A)	_____ (B)
8. _____	_____	_____	_____	Prevalence Index = B/A = _____	
			<u>25</u> = Total Cover		
			50% of total cover: <u>12.5</u>	20% of total cover: <u>5</u>	
Herb Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <u><i>Juncus effusus</i></u>	<u>5</u>	Yes	OBL	<input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation	
2. <u><i>Typha latifolia</i></u>	<u>15</u>	Yes	OBL	<input checked="" type="checkbox"/> 2 - Dominance Test is > 50%	
3. <u><i>Phragmites australis</i></u>	<u>5</u>	Yes	FACW	<input type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 ¹	
4. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹	(Explain)
5. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
11. _____	_____	_____	_____		
12. _____	_____	_____	_____		
			<u>25</u> = Total Cover		
			50% of total cover: <u>12.5</u>	20% of total cover: <u>5</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Definitions of Four Vegetation Strata:	
1. _____	_____	_____	_____	Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.	
2. _____	_____	_____	_____	Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.	
3. _____	_____	_____	_____	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.	
4. _____	_____	_____	_____	Woody vine – All woody vines greater than 3.28 ft in height.	
5. _____	_____	_____	_____		
			_____ = Total Cover		
			50% of total cover: _____	20% of total cover: _____	
				Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WET 02

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 3/1	80	7.5YR 3/4	20	C	M	Loam	
6+	10YR 3/1	85	10YR 3/6	15	C	M	Loam	

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

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LLR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LLR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)
- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils ³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12) (LRR T, U)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Lilly Run City/County: Harford County Sampling Date: 03/27/19
 Applicant/Owner: Maryland Transportation Authority State: MD Sampling Point: WET 03
 Investigator(s): L. Snyder, M. McCormick Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): Concave Slope (%): 0 - 3
 Subregion (LRR or MLRA): 149A Lat: -76.098512 Long: 39.549650 Datum: NAD 83
 Soil Map Unit Name: HcA – Hatboro-Codorus complex, 0 to 3 percent slopes NWI classification: PEM

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

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area Within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland receives hydrology from upland runoff from adjacent hillslope/train tracks. Phragmites present in wetland next to WUS 03. Moderate quality wetland.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Mari Deposits (B15) (LLR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8)(LRR T, U)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0.5"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Sampling Point: WET 03

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer negundo</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____

25 = Total Cover
 50% of total cover: 12.5 20% of total cover: 5

Sapling/Shrub Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____

_____ = Total Cover
 50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Phragmites australis</u>	<u>60</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Rosa multiflora</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
3. <u>Juncus effusus</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
4. <u>Clover sp.</u>	<u>5</u>	<u>No</u>	<u>NA</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____

85 = Total Cover
 50% of total cover: 42.5 20% of total cover: 17

Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

_____ = Total Cover
 50% of total cover: _____ 20% of total cover: _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	<u>2</u>	(A)
Total Number of Dominant Species Across All Strata:	<u>2</u>	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100%</u>	(A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x1= _____
FACW species _____	x2= _____
FAC species _____	x3= _____
FACU species _____	x4= _____
UPL species _____	x5= _____
Column Totals: _____	(A) _____ (B) _____
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0¹

_____ Problematic Hydrophytic Vegetation¹ (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes No

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WET 03

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/1	85	10YR 3/6	15	C	M	Clay loam	

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

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LLR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LLR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)

- Polyvalue Below Surface (S8) (LRR S, T,U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils ³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12) (LRR T,U)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Lilly Run City/County: Harford County Sampling Date: 03/27/19
 Applicant/Owner: Maryland Transportation Authority State: MD Sampling Point: UPL 01
 Investigator(s): L. Snyder, M. McCormick Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0 - 5
 Subregion (LRR or MLRA): 149A Lat: -76.098413 Long: 39.545999 Datum: NAD 83
 Soil Map Unit Name: Ot – Othello silt loams, 0 to 2 percent NWI classification: Upland

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 <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area Within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Mari Deposits (B15) (LLR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8)(LRR T, U)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Sampling Point: UPL 01

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	0 (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	1 (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC:	0% (A/B)
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
_____ = Total Cover					
50% of total cover: _____			20% of total cover: _____		
<u>Sapling/Shrub Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index Worksheet:	
1. _____	_____	_____	_____	Total % Cover of:	Multiply by:
2. _____	_____	_____	_____	OBL species _____	x1= _____
3. _____	_____	_____	_____	FACW species _____	x2= _____
4. _____	_____	_____	_____	FAC species _____	x3= _____
5. _____	_____	_____	_____	FACU species _____	x4= _____
6. _____	_____	_____	_____	UPL species _____	x5= _____
7. _____	_____	_____	_____	Column Totals: _____ (A)	_____ (B)
8. _____	_____	_____	_____	Prevalence Index = B/A = _____	
_____ = Total Cover					
50% of total cover: _____			20% of total cover: _____		
<u>Herb Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <i>Carex</i> sp.	40	Yes	NA	_____ 1 - Rapid Test for Hydrophytic Vegetation	
2. <i>Allium schoenoprasum</i>	15	Yes	FACU	_____ 2 - Dominance Test is > 50%	
3. <i>Trifolium</i> sp.	5	No	NA	_____ 3 - Prevalence Index is ≤ 3.0 ¹	
4. <i>Plantago lanceolata</i>	5	No	FACU	_____ Problematic Hydrophytic Vegetation ¹	(Explain)
5. <i>Taraxacum officinale</i>	5	No	FACU	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
11. _____	_____	_____	_____		
12. _____	_____	_____	_____		
_____ = Total Cover					
50% of total cover: <u>35</u>			20% of total cover: <u>14</u>		
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Definitions of Four Vegetation Strata:	
1. _____	_____	_____	_____	Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.	
2. _____	_____	_____	_____	Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.	
3. _____	_____	_____	_____	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.	
4. _____	_____	_____	_____	Woody vine – All woody vines greater than 3.28 ft in height.	
5. _____	_____	_____	_____		
_____ = Total Cover					
50% of total cover: _____			20% of total cover: _____		
				Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: UPL 01

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-15	10YR 3/3	100					Loam	

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

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)
- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils ³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12) (LRR T, U)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Lilly Run City/County: Harford County Sampling Date: 03/27/19
 Applicant/Owner: Maryland Transportation Authority State: MD Sampling Point: UPL 02
 Investigator(s): L. Snyder, M. McCormick Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 0 - 5
 Subregion (LRR or MLRA): 149A Lat: -76.098974 Long: 39.458974 Datum: NAD 83
 Soil Map Unit Name: HcA – Hatboro Codorus complex, 0 to 3 percent slopes NWI classification: Upland

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 <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area Within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Upland plot was taken close to the stream bank where wetland vegetation was present.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Mari Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8)(LRR T, U)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Sampling Point: UPL 02

Tree Stratum	(Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
		<u> </u> = Total Cover		
		50% of total cover: <u> </u>	20% of total cover: <u> </u>	
Sapling/Shrub Stratum	(Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Acer rubrum</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>
2.	<u>Alnus serrulata</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
3.				
4.				
5.				
6.				
7.				
8.				
		<u>75</u> = Total Cover		
		50% of total cover: <u>37.5</u>	20% of total cover: <u>15</u>	
Herb Stratum	(Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Rosa multiflora</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>Allium schoenoprasum</u>	<u>5</u>	<u>No</u>	<u>FACU</u>
3.	<u>Typha latifolia</u>	<u>2</u>	<u>No</u>	<u>OBL</u>
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		<u>27</u> = Total Cover		
		50% of total cover: <u>13.5</u>	20% of total cover: <u>5.4</u>	
Woody Vine Stratum	(Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1.	<u>Lonicera japonica</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>
2.				
3.				
4.				
5.				
		<u>5</u> = Total Cover		
		50% of total cover: <u>2.5</u>	20% of total cover: <u>1</u>	

Dominance Test Worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:
OBL species <u>2</u>	x1= <u>2</u>
FACW species <u>15</u>	x2= <u>30</u>
FAC species <u>60</u>	x3= <u>180</u>
FACU species <u>30</u>	x4= <u>120</u>
UPL species <u>0</u>	x5= <u>0</u>
Column Totals: <u>107</u> (A)	<u>332</u> (B)
Prevalence Index = B/A = <u>3.1</u>	

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is > 50%

 3 - Prevalence Index is ≤ 3.0¹

 Problematic Hydrophytic Vegetation¹ (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present?

Yes No

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: UPL 02

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 5/6	100					Loam	

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

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LLR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LLR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)
- Polyvalue Below Surface (S8) (LRR S, T,U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils ³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12) (LRR T,U)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Lilly Run City/County: Harford County Sampling Date: 03/27/19
 Applicant/Owner: Maryland Transportation Authority State: MD Sampling Point: UPL 03
 Investigator(s): L. Snyder, M. McCormick Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): None Slope (%): 0 - 2
 Subregion (LRR or MLRA): 149A Lat: -76.098888 Long: 39.549500 Datum: NAD 83
 Soil Map Unit Name: MlaA – Mattapex silt loam, 0 to 2 percent slopes NWI classification: Upland

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 <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area Within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Mari Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8)(LRR T, U)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Sampling Point: UPL 03

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer negundo</u>	25	Yes	FAC	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x1= _____ FACW species _____ x2= _____ FAC species _____ x3= _____ FACU species _____ x4= _____ UPL species _____ x5= _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>30'</u>)				
1. <u>Ligustrum vulgare</u>	15	Yes	UPL	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>				
Herb Stratum (Plot size: <u>30'</u>)				
1. <u>Hedera helix</u>	25	Yes	FACU	
2. <u>Rosa multiflora</u>	10	Yes	FACU	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: _____ 20% of total cover: _____				

Remarks: (If observed, list morphological adaptations below).

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: UPL 03

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 3/3	100					Loam	
6+	10YR 3/3	30	7.5 YR 4/6	40	C	M	Loam	
	10YR 5/3	30						

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

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) (LRR P, T, U)
- 5 cm Mucky Mineral (A7) (LRR P, T, U)
- Muck Presence (A8) (LRR U)
- 1 cm Muck (A9) (LRR P, T)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) (MLRA 150A)
- Sandy Mucky Mineral (S1) (LRR O, S)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR P, S, T, U)
- Polyvalue Below Surface (S8) (LRR S, T, U)
- Thin Dark Surface (S9) (LRR S, T, U)
- Loamy Mucky Mineral (F1) (LRR O)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) (LRR U)
- Depleted Ochric (F11) (MLRA 151)
- Iron-Manganese Masses (F12) (LRR O, P, T)
- Umbric Surface (F13) (LRR P, T, U)
- Delta Ochric (F17) (MLRA 151)
- Reduced Vertic (F18) (MLRA 150A, 150B)
- Piedmont Floodplain Soils (F19) (MLRA 149A)
- Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils ³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12) (LRR T, U)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? _____ Is wetland part of a wildlife corridor? _____ or a "habitat island"? _____

Adjacent land use _____ Distance to nearest roadway or other development _____

Dominant wetland systems present _____ Contiguous undeveloped buffer zone present _____

Is the wetland a separate hydraulic system? _____ If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? _____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. _____













Latitude _____ Longitude _____

Prepared by: _____ Date _____

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field _____

Corps manual wetland delineation completed? Y _____ N _____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge				
 Floodflow Alteration				
 Fish and Shellfish Habitat				
 Sediment/Toxicant Retention				
 Nutrient Removal				
 Production Export				
 Sediment/Shoreline Stabilization				
 Wildlife Habitat				
 Recreation				
 Educational/Scientific Value				
 Uniqueness/Heritage				
 Visual Quality/Aesthetics				
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? _____ Is wetland part of a wildlife corridor? _____ or a "habitat island"? _____

Adjacent land use _____ Distance to nearest roadway or other development _____

Dominant wetland systems present _____ Contiguous undeveloped buffer zone present _____

Is the wetland a separate hydraulic system? _____ If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? _____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. _____













Latitude _____ Longitude _____

Prepared by: _____ Date _____

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field _____

Corps manual wetland delineation completed? Y _____ N _____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge				
 Floodflow Alteration				
 Fish and Shellfish Habitat				
 Sediment/Toxicant Retention				
 Nutrient Removal				
 Production Export				
 Sediment/Shoreline Stabilization				
 Wildlife Habitat				
 Recreation				
 Educational/Scientific Value				
 Uniqueness/Heritage				
 Visual Quality/Aesthetics				
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? _____ Is wetland part of a wildlife corridor? _____ or a "habitat island"? _____

Adjacent land use _____ Distance to nearest roadway or other development _____

Dominant wetland systems present _____ Contiguous undeveloped buffer zone present _____

Is the wetland a separate hydraulic system? _____ If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? _____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. _____













Latitude _____ Longitude _____

Prepared by: _____ Date _____

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field _____

Corps manual wetland delineation completed? Y _____ N _____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge				
 Floodflow Alteration				
 Fish and Shellfish Habitat				
 Sediment/Toxicant Retention				
 Nutrient Removal				
 Production Export				
 Sediment/Shoreline Stabilization				
 Wildlife Habitat				
 Recreation				
 Educational/Scientific Value				
 Uniqueness/Heritage				
 Visual Quality/Aesthetics				
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Stream Datasheet

Project: Lilly Run **Date:** 03/27/19 **Stream ID:** WUS 01

Staff: MM, LS **Flow Type:** Perennial Intermittent Ephemeral

Flow Direction: Southwest **Drains Into:** WUS 02

Fed By: Culvert at the edge of the Study Area.

Bank Height: 1-3' **Water Depth:** 2-6" **Width:** 3-5'

Channel Gradient (%): 2 **Bank Stability:** Moderate

Avg. Bank Slope: Vertical 2:1 3:1 4:1 or greater

Mesohabitat: % Run: 80 % Riffle: 10 % Pool: 10

Substrate: Cobble Gravel Sand Silt
Veg Riprap Concrete Muck
Bedrock

Channel Characteristics: Natural Artificial Man-altered

OHWM: Clear, natural line impressed on the bank	<input type="checkbox"/>	Presence of litter and debris	<input checked="" type="checkbox"/>
Changes in character of soil	<input type="checkbox"/>	Destruction of terrestrial veg.	<input type="checkbox"/>
Shelving	<input checked="" type="checkbox"/>	Presence of wrack line	<input type="checkbox"/>
Vegetation matted down, bent, or absent	<input type="checkbox"/>	Sediment sorting	<input type="checkbox"/>
Leaf litter disturbed or washed away	<input checked="" type="checkbox"/>	Scour	<input type="checkbox"/>
Sediment deposition	<input type="checkbox"/>	Multiple observed/predicted flow events	<input type="checkbox"/>
Water staining	<input type="checkbox"/>	Abrupt change in plant community	<input type="checkbox"/>

Photos? Upstream Downstream

Connection to Traditional Navigable Waterway: Yes

Other Comments: _____

Stream Datasheet

Project: Lilly Run **Date:** 03/27/19 **Stream ID:** WUS 02 (Lilly Run)

Staff: MM, LS **Flow Type:** Perennial Intermittent Ephemeral

Flow Direction: Southwest **Drains Into:** Outside of Study Area

Fed By: Rainfall, Runoff, continues outside of the study area. WUS 1, 3, 4, 5.

Bank Height: 3-18' **Water Depth:** 4-18" **Width:** 6-15'

Channel Gradient (%): 3 **Bank Stability:** Moderate

Avg. Bank Slope: Vertical 2:1 3:1 4:1 or greater

Mesohabitat: % Run: 70 % Riffle: 20 % Pool: 10

Substrate: Cobble Gravel Sand Silt
Veg Riprap Concrete Muck
Bedrock

Channel Characteristics: Natural Artificial Man-altered

OHWM: Clear, natural line impressed on the bank	<input checked="" type="checkbox"/>	Presence of litter and debris	<input type="checkbox"/>
Changes in character of soil	<input type="checkbox"/>	Destruction of terrestrial veg.	<input type="checkbox"/>
Shelving	<input type="checkbox"/>	Presence of wrack line	<input type="checkbox"/>
Vegetation matted down, bent, or absent	<input type="checkbox"/>	Sediment sorting	<input type="checkbox"/>
Leaf litter disturbed or washed away	<input type="checkbox"/>	Scour	<input type="checkbox"/>
Sediment deposition	<input type="checkbox"/>	Multiple observed/predicted flow events	<input type="checkbox"/>
Water staining	<input type="checkbox"/>	Abrupt change in plant community	<input type="checkbox"/>

Photos? Upstream Downstream

Connection to Traditional Navigable Waterway: Yes

Other Comments: Channel is a mixture of bank types.

Stream Datasheet

Project: Lilly Run **Date:** 03/27/19 **Stream ID:** WUS 03

Staff: MM LS **Flow Type:** Perennial Intermittent Ephemeral

Flow Direction: North **Drains Into:** WUS 02

Fed By: Backwater channel of WUS 02

Bank Height: 1' **Water Depth:** 0 **Width:** 2'

Channel Gradient (%): 1 **Bank Stability:** Poor

Avg. Bank Slope: Vertical 2:1 3:1 4:1 or greater

Mesohabitat: % Run: 0 % Riffle: 0 % Pool: 0

Substrate: Cobble Gravel Sand Silt
Veg Riprap Concrete Muck
Bedrock

Channel Characteristics: Natural Artificial Man-altered

OHWM: Clear, natural line impressed on the bank	<input type="checkbox"/>	Presence of litter and debris	<input type="checkbox"/>
Changes in character of soil	<input type="checkbox"/>	Destruction of terrestrial veg.	<input type="checkbox"/>
Shelving	<input type="checkbox"/>	Presence of wrack line	<input type="checkbox"/>
Vegetation matted down, bent, or absent	<input checked="" type="checkbox"/>	Sediment sorting	<input type="checkbox"/>
Leaf litter disturbed or washed away	<input type="checkbox"/>	Scour	<input type="checkbox"/>
Sediment deposition	<input type="checkbox"/>	Multiple observed/predicted flow events	<input type="checkbox"/>
Water staining	<input type="checkbox"/>	Abrupt change in plant community	<input type="checkbox"/>

Photos? Upstream Downstream

Connection to Traditional Navigable Waterway: Yes

Other Comments: _____

Stream Datasheet

Project: Lilly Run **Date:** 03/27/19 **Stream ID:** WUS 04

Staff: MM LS **Flow Type:** Perennial Intermittent Ephemeral

Flow Direction: West **Drains Into:** WUS 02

Fed By: Pipe

Bank Height: 3' **Water Depth:** 0" **Width:** 3'

Channel Gradient (%): 2 **Bank Stability:** Poor

Avg. Bank Slope: Vertical 2:1 3:1 4:1 or greater

Mesohabitat: % Run: 0 % Riffle: 0 % Pool: 0

Substrate: Cobble Gravel Sand Silt
Veg Riprap Concrete Muck
Bedrock

Channel Characteristics: Natural Artificial Man-altered

OHWM: Clear, natural line impressed on the bank	<input type="checkbox"/>	Presence of litter and debris	<input type="checkbox"/>
Changes in character of soil	<input type="checkbox"/>	Destruction of terrestrial veg.	<input type="checkbox"/>
Shelving	<input type="checkbox"/>	Presence of wrack line	<input type="checkbox"/>
Vegetation matted down, bent, or absent	<input checked="" type="checkbox"/>	Sediment sorting	<input type="checkbox"/>
Leaf litter disturbed or washed away	<input type="checkbox"/>	Scour	<input type="checkbox"/>
Sediment deposition	<input type="checkbox"/>	Multiple observed/predicted flow events	<input type="checkbox"/>
Water staining	<input type="checkbox"/>	Abrupt change in plant community	<input type="checkbox"/>

Photos? Upstream Downstream

Connection to Traditional Navigable Waterway: Yes

Other Comments: Stream originates from small pipe to the west.

Stream Datasheet

Project: Lilly Run **Date:** 03/27/19 **Stream ID:** WUS 05

Staff: MM LS **Flow Type:** Perennial Intermittent Ephemeral

Flow Direction: North **Drains Into:** WUS 02

Fed By: Originates outside of the Study Area

Bank Height: 3' **Water Depth:** 4-6" **Width:** 4-5'

Channel Gradient (%): 3 **Bank Stability:** Poor

Avg. Bank Slope: Vertical 2:1 3:1 4:1 or greater

Mesohabitat: % Run: 80 % Riffle: 10 % Pool: 10

Substrate: Cobble Gravel Sand Silt
Veg Riprap Concrete Muck
Bedrock

Channel Characteristics: Natural Artificial Man-altered

OHWM: Clear, natural line impressed on the bank	<input type="checkbox"/>	Presence of litter and debris	<input type="checkbox"/>
Changes in character of soil	<input type="checkbox"/>	Destruction of terrestrial veg.	<input type="checkbox"/>
Shelving	<input checked="" type="checkbox"/>	Presence of wrack line	<input type="checkbox"/>
Vegetation matted down, bent, or absent	<input type="checkbox"/>	Sediment sorting	<input type="checkbox"/>
Leaf litter disturbed or washed away	<input type="checkbox"/>	Scour	<input type="checkbox"/>
Sediment deposition	<input type="checkbox"/>	Multiple observed/predicted flow events	<input type="checkbox"/>
Water staining	<input type="checkbox"/>	Abrupt change in plant community	<input type="checkbox"/>

Photos? Upstream Downstream

Connection to Traditional Navigable Waterway: Yes

Other Comments: _____

Stream Datasheet

Project: Lilly Run **Date:** 03/27/19 **Stream ID:** WUS 06

Staff: MM LS **Flow Type:** Perennial Intermittent Ephemeral

Flow Direction: Northeast **Drains Into:** WUS 05

Fed By: Culvert outside of the Study Area

Bank Height: 2' **Water Depth:** 4" **Width:** 7'

Channel Gradient (%): 3 **Bank Stability:** Moderate

Avg. Bank Slope: Vertical 2:1 3:1 4:1 or greater

Mesohabitat: % Run: 100 % Riffle: 0 % Pool: 0

Substrate: Cobble Gravel Sand Silt
Veg Riprap Concrete Muck
Bedrock

Channel Characteristics: Natural Artificial Man-altered

OHWM: Clear, natural line impressed on the bank	<input type="checkbox"/>	Presence of litter and debris	<input type="checkbox"/>
Changes in character of soil	<input type="checkbox"/>	Destruction of terrestrial veg.	<input type="checkbox"/>
Shelving	<input checked="" type="checkbox"/>	Presence of wrack line	<input type="checkbox"/>
Vegetation matted down, bent, or absent	<input type="checkbox"/>	Sediment sorting	<input type="checkbox"/>
Leaf litter disturbed or washed away	<input type="checkbox"/>	Scour	<input type="checkbox"/>
Sediment deposition	<input type="checkbox"/>	Multiple observed/predicted flow events	<input type="checkbox"/>
Water staining	<input type="checkbox"/>	Abrupt change in plant community	<input type="checkbox"/>

Photos? Upstream Downstream

Connection to Traditional Navigable Waterway: Yes

Other Comments: _____



APPENDIX D PHOTO DOCUMENTATION



WETLANDS, UPLANDS, AND WATERWAYS



1. WET 01 FACING SOUTHWEST



2. WET 01 UPLAND FACING SOUTHWEST



3. WET 02A FACING NORTH



4. WET 02A FACING NORTH



5. WET 02A FACING SOUTH



6. WET 02B FACING SOUTH



7. WET 02B FACING EAST



8. UPL 02 FACING NORTH



9. WET 03 FACING EAST



10. UPL 03 FACING WEST



11. WUS 01 FACING SOUTHWEST



12. WUS 01 FACING NORTHEAST



13. WUS 02 FACING WEST, SOUTHERN CULVERT



14. WUS 02 FACING NORTH



15. WUS 02 FACING NORTH



16. WUS 02 FACING NORTHWEST, CULVERT UNDER FIELD



17. WUS 02 FACING SOUTHEAST, END OF CULVERT



18. WUS 02 FACING SOUTH



19. WUS 02 FACING NORTH



20. WUS 02 FACING NORTH



21. WUS 02 FACING NORTH



22. WUS 03 FACING SOUTH



23. WUS 03 FACING NORTH



24. WUS 04 FACING NORTH



25. WUS 04 FACING WEST



26. WUS 05 FACING SOUTH



27. WUS 05 FACING SOUTH



28. WUS 06 FACING NORTHEAST



29. WUS 06 FACING SOUTHWEST



30. WUS 06 FACING WEST