Wetlands and Waters Delineation Report

Prepared for the

Environmental Assessment/Section 106 Compliance for Restoration of Parkland Adjacent to the Intelligence Community Campus-Bethesda George Washington Memorial Parkway

Montgomery County, Maryland

Prepared by



3101 Wilson Boulevard, Suite 900 Arlington, VA 22201

May 2019

Table of Contents

SITE DESCRIPTION	. 2
Introduction	. 2
Topography and Geology	. 2
Soils	. 2
Floodplains	. 2
Wetlands	. 3
FIELD INVESTIGATION – METHODOLOGY	. 3
FIELD INVESTIGATION – RESULTS	. 3
Uplands	. 3
Wetland Delineation Results	. 4
Water Feature Delineation Results	. 4
REFERENCES	. 7
	SITE DESCRIPTION Introduction Topography and Geology Soils Floodplains Wetlands FIELD INVESTIGATION – METHODOLOGY FIELD INVESTIGATION – RESULTS Uplands Wetland Delineation Results Water Feature Delineation Results REFERENCES

APPENDICES

Appendix A — Figures

- Figure 1: Project Vicinity Map
- Figure 2: Project Location Map
- Figure 3: NRCS Soil Survey Map
- Figure 4: FEMA 100 Year Floodplain Map
- Figure 5: NWI Map
- Appendix B USACE Wetland Determination Data Forms

Appendix C — Photographs

- Appendix D Wetland Delineation Plan
 - Figure 6: Wetland Delineation Plan Index Sheet
 - Figure 7: Wetland Delineation Plan
 - Figure 8: Wetland Delineation Plan
 - Figure 9: Wetland Delineation Plan

1.0 SITE DESCRIPTION

1.1 Introduction

AECOM environmental scientists conducted a field investigation on January 22-23, 2018 to determine the extent of wetlands and waters within a 27.6-acre study area on National Park Service (NPS) land. The study area is located in Montgomery County, Maryland and is shown in **Figures 1** and **2** (**Appendix A**). This report is prepared in support of an Environmental Assessment and Assessment of Effect for the restoration of channels, and stormwater conveyances on NPS land. Four riverine wetlands and two palustrine wetlands were delineated within the study area.

1.2 Topography and Geology

The U.S. Geological Survey (USGS) topographic quadrangle maps (quads) depict the study area with steep to moderate slopes that flatten around the Chesapeake and Ohio (C&O) Canal, as shown in **Figure 1** (USGS, 2017). Elevations within the study area range from 50 ft above mean sea level (amsl) in the south-southwest extent, to 216 ft amsl in the east extent. The study area is located in the Piedmont Plateau Province that is composed of hard, crystalline igneous and metamorphic rocks (MDDNR, 2008).

1.3 Soils

The U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS) Web Soil Survey indicates the study area is underlain by soils that are predominately non-hydric, including Brinklow-Blocktown channery silt loams, Blocktown channery silt loams, Gaila silt loams, and Lindside silt loam. The Soil Survey maps a small amount of the predominately hydric Melvin silt loam along the western edge of the study area (USDA NRCS, 2018). Soil units are shown in **Figure 3** and summarized in **Table 1**.

SOIL SYMBOL	DESCRIPTION	HYDRIC PERCENT	PERCENT OF AOI
1C	Gaila silt loam, 8 to 15 percent slopes	5	24.4
16D	Brinklow-Blocktown channery silt loams, 15 to 25 percent slopes	5	33.2
47A	Lindside silt loam, 0 to 3 percent slopes, occasionally flooded	10	5.7
48A	Melvin silt loam, 0 to 2 percent slopes, occasionally flooded	85	4.1
116E	Blocktown channery silt loam, 25 to 45 percent slopes, very rocky	5	26.6
W	Water	NA	6.0

Table 1: USDA NRCS Web Soil Survey Map Units

1.4 Floodplains

The Federal Emergency Management Agency's (FEMA) National Flood Hazard Layer (NFHL) data was reviewed for floodplains within the study area. The FEMA 100-year floodplain is located along the western edge of the study area, as shown in **Figure 4** (FEMA, 2017).

1.5 Wetlands

The U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping was used to assess the possibility of wetlands occurring on-site (USFWS, 2017). NWI mapping identifies one wetland, the C&O Canal, in the study area. The C&O Canal is mapped by NWI as a lacustrine limnetic unconsolidated bottom permanently flooded and excavated wetland (L1UBHx) and is located along the western edge of the study area (**Figure 5**).

2.0 FIELD INVESTIGATION – METHODOLOGY

The wetland delineation field work was performed in accordance with the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (USACE, 1987), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont (Version 2.0, USACE 2012). The wetland delineation field work was also performed in accordance with NPS Director's Order #77-1: Wetland Protection, the NPS Procedural Manual #77-1: Wetland Protection (NPS, 2016), and the Federal Geographic Data Committee (FGDC) *Classification of wetlands and deepwater habitats of the United States* (Wetlands Classification Standard) (FGDC, 2013).

The non-developed, unpaved portions of the study area, with the exception of active stream channels, have both vegetation and soils, and as such were investigated for both USACE and NPS regulated wetlands based on all three wetland parameters of hydrophytic vegetation, hydric soil, and wetland hydrology.

Water features were delineated in accordance with the U.S. Army Corps of Engineers (USACE) Jurisdictional Determination Instructional Guidebook (USACE and EPA, 2007), and the guidelines in the USACE Regulatory Guidance Letter No. 05-05, Ordinary High Water Mark Identification Regulatory Guidance Letter (USACE, 2005).

Delineated features were flagged in the field with consecutively numbered pink flags. Flags were located with a handheld, sub-meter Trimble Global Positioning System unit and were differentially corrected. USACE Wetland Determination Data Forms are provided in **Appendix B**. Site photographs from the field visit are included in **Appendix C**. A Wetland Delineation Map is provided in **Appendix D**.

3.0 FIELD INVESTIGATION – RESULTS

3.1 Uplands

The vast majority of the study area is comprised of uplands consisting predominately of forested uplands, along with roadways, maintained, mowed shoulders, the C&O Canal towpath, and stormwater conveyances. Observed plant species within the upland forest include northern red oak (*Quercus rubra*), box elder (*Acer negundo*), American beech (*Fagus grandifolia*), tulip poplar (*Liriodendron tulipifera*), black locust (*Robinia pseudoacacia*), sweetgum (*Liquidambar styraciflua*), and American sycamore (*Platanus occidentalis*).

There are several roadside drainage swales within the study area that do not meet wetland criteria. These drainage swales are located entirely within, and drain only, uplands. In addition, there is an erosional channel created by discharge of stormwater runoff from the adjacent Intelligence Community Campus-Bethesda (ICC-B) onto the hillside in the southeast portion of the study area. This erosional feature does not intercept groundwater, has no adjacent wetlands, and drains only uplands. The road side drainage swales and erosional feature located within the study area do not meet wetland criteria and therefore, have been identified as uplands.

3.2 Wetland Delineation Results

An overview of the study area and the wetland and water features that were delineated are illustrated on **Figure 6** (**Appendix D**). Two palustrine wetlands were delineated within the study area (herein referred to as Palustrine Wetlands D and F); they are illustrated on **Figures 7** and **8**, respectively. These features are also described in **Table 2**. The wetlands delineated within the study area meet all three wetland parameters of hydrophytic vegetation, hydric soil, and wetland hydrology, as summarized below.

Palustrine Wetland D is a palustrine emergent *Phragmites australis* seasonally flooded (PEM5C) wetland located adjacent to the C&O Canal, which is a perennial waters of the U.S. Palustrine Wetland D is located between the C&O Canal and the NPS Little Falls Pumping Station. Palustrine Wetland D is approximately 0.01 acre.

Palustrine Wetland D meets all three wetland parameters that are documented on USACE Wetland Determination Data Form D (**Appendix B**). This data form location is shown in Photo 1 (**Appendix C**). The primary wetland hydrology indicators include Surface Water (A1), High Water Table (A2), and Saturation (A3). The herbaceous stratum is dominated by phragmites (*Phragmites australis*, FACW). The hydric soil indicator at Data Form D is Depleted Matrix (F3).

Palustrine Wetland F is a palustrine emergent persistent temporarily flooded (PEM1A) wetland located between the C&O Canal and the Potomac River, both of which are perennial waters of the U.S. Maryland Department of the Environment (MDE) regulates activities in a 25-foot buffer around nontidal wetlands. Although Palustrine Wetland F is not located within the study area, the 25-foot buffer around Palustrine Wetland F extends into study area. Restoration activities related to this project could occur within the MDE designated 25-foot buffer around Palustrine Wetland F.

Palustrine Wetland F meets all three wetland parameters that are documented on USACE Wetland Determination Data Form F (**Appendix B**). This data form location is shown in Photo 2 (**Appendix C**). The primary wetland hydrology indicator is Water-Stained Leaves (B9). The herbaceous stratum is dominated by false nettle (*Boehmeria cylindrica*, FACW), and Japanese stiltgrass (*Microstegium vimineum*, FAC). The hydric soil indicator at this location is Depleted Matrix (F3).

3.3 Water Feature Delineation Results

Four water features were delineated within the study area and these features are illustrated on the Wetland Delineation Map (**Figure 6**). All four water features delineated within the study area qualify as Riverine Wetlands according to the FGDC Wetlands Classification Standard, and they are therefore subject to NPS Director's Order #77-1: Wetland Protection.

The largest water feature delineated within the study area is the C&O Canal, identified for the purposes of this delineation as Riverine Wetland CA/CB. The C&O Canal is a perennial waters of the U.S.

Two unnamed perennial streams were delineated within the study area and are identified as Riverine Wetland AA/AB and BA/BB. These riverine wetlands are relatively permanent non-navigable tributaries of the C&O Canal.

The fourth perennial stream delineated within the study area is identified as Riverine Wetland FA/FB. This riverine wetland is a relatively permanent non-navigable tributary of the Potomac River, which is a traditional navigable waters of the U.S.

A summary of the water features delineated within the study area is provided below. These water features are also described in **Table 2**.

Riverine Wetland AA/AB

Riverine Wetland AA/AB originates off-site, northeast of Wapakoneta Road, and flows southwest where it enters a 6 ft diameter culvert and continues to flow under MacArthur Blvd. Riverine Wetland AA/AB continues to the southwest of MacArthur Blvd for approximately 125 ft and flows through a 7 ft wide box culvert beneath the Clara Barton Parkway. Riverine Wetland AA/AB continues to flow southwest for approximately 55 ft to a drop inlet culvert that drains underneath the C&O Canal. The drop inlet is filled with sediment and appeared to accept only a small portion of Riverine Wetland AA/AB's stream flow. The remainder of Riverine Wetland AA/AB's stream flow drains another 55 ft west to its confluence with the C&O Canal. The portion of Riverine Wetland AA/AB's stream flow that enters the drop inlet culvert drains underneath the C&O canal and emerges as surface flow on the western side of the C&O canal. The surface flow that emerges from the western side of the C&O canal is identified as Riverine Wetland FA/FB and is further described below.

The width of Riverine Wetland AA/AB varies from about 5 to 20 ft wide. Ordinary high water mark indicators include a clear, natural line impressed on the bank, leaf litter disturbed, water staining, and presence of flood litter/debris. Riverine Wetland AA/AB is designated as riverine upper perennial rock bottom rubble (R3RB2) stream and is illustrated on **Figure 7**.

Riverine Wetland BA/BB

Riverine Wetland BA/BB originates just off-site at stormwater outfalls on ICC-B property and flows southwest where it enters a 4 ft diameter culvert and continues to flow under MacArthur Blvd. Riverine Wetland BA/BB continues to the southwest of MacArthur Blvd for approximately 200 ft and flows through a 3.5 ft wide box culvert beneath the Clara Barton Parkway. Riverine Wetland BA/BB continues to flow southwest for approximately 85 ft and confluences with the C&O Canal. The width of Riverine Wetland BA/BB varies from about 3 to 17 ft wide. Ordinary high water mark indicators include a clear, natural line impressed on the bank, leaf litter disturbed, water staining, and presence of flood litter/debris. Riverine Wetland BA/BB is designated as riverine upper perennial rock bottom rubble (R3RB2) stream and is illustrated on **Figure 8**.

Riverine Wetland CA/CB

Riverine Wetland CA/CB is the C&O Canal. Riverine Wetland CA/CB drains southeast along the western edge of the study area. Riverine Wetland CA/CB ranges from 45-55 ft wide within the study area. Ordinary high water mark indicators include a clear, natural line impressed on the bank, matted vegetation, leaf litter disturbed, sediment deposition, water staining, and presence of flood litter/debris. Riverine Wetland CA/CB is designated as riverine lower perennial unconsolidated permanently flooded excavated (R2UBHx) wetland and is illustrated on **Figures 7-9**.

Riverine Wetland FA/FB

The portion of Riverine Wetland AA/AB's flow that drains underneath the C&O canal through a culvert emerges on the western edge of the C&O Canal to form a channel. This channel has been identified as Riverine Wetland FA/FB and it flows southwest for approximately 100 ft to its confluence with the Potomac River. The width of Riverine Wetland FA/FB varies from about 4 to 7 ft wide. Ordinary high water mark indicators include a clear, natural line impressed on the bank, leaf litter disturbed, and water staining. This small, perennial seep channel is designated as riverine lower perennial stream bed sand (R2SB4) stream and is illustrated on **Figure 7**.

Feature ID	Cowardin Classification	Area (SF)	Linear Feet
Palustrine Wetland D	PEM5C	421	NA
Palustrine Wetland F	PEM1A	1,400	NA
Riverine Wetland AA/AB	R3RB2	9,465	914
Riverine Wetland BA/BB	R3RB2	11,359	1,124
Riverine Wetland CA/CB	R2UBHx	481	83
Riverine Wetland FA/FB	R2SB4	78,382	1,552
Sum	All Features	101,508	3,673

Table 2: Delineated Wetlands and Waters

4.0 **REFERENCES**

Federal Emergency Management Agency. 2017. National Flood Hazard Layer. Retrieved from http://www.floodmaps.fema.gov/NFHL/status.shtml [Accessed January 2018].

Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Maryland Department of Natural Resources. 2008. Maryland Geological Survey. Retrieved from <u>http://www.mgs.md.gov/geology/physiographic_map.html</u> [Accessed January 2018].

National Park Service. 2016. National Park Service Procedural Manual #77-1: Wetland Protection.

USACE. 1987. Corps of Engineers Wetland Delineation Manual. *Technical Report* Y-87-1, USACE Waterways Experiment Station. Vicksburg, MS.

USACE. 2005. Ordinary High Water Mark Identification Regulatory Guidance Letter. Retrieved from www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl05-05.pdf [Accessed January 2018].

USACE. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). Retrieved from http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/EMP_Piedmont_v2b.pdf [Accessed January 2018].

USACE and U.S. Environmental Protection Agency. 2007. U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook. Retrieved from www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/jd_guidebook_051207final.pdf [Accessed January 2018].

USDA NRCS. 2018. Web Soil Survey. Retrieved from websoilsurvey.sc.egov.usda.gov/ [Accessed January 2018].

USFWS. 2017. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Retrieved from https://www.fws.gov/wetlands/data/data-download.html [Accessed January 2018].

https://www.iws.gov/wetianus/uata/uata-uowinoau.html [Accessed January 2016].

U.S. Geological Survey. 2017. National Geospatial Program. Retrieved from http://www.arcgis.com/home/webmap/viewer.html?featurecollection=https%3A%2F%2Fbasemap.nationalmap .gov%2Farcgis%2Frest%2Fservices%3Ff%3Djson%26option%3Dfootprints&supportsProjection=true&supportsJS ONP=true [Accessed January 2018].

APPENDICES

APPENDIX A: Figures APPENDIX B: USACE Wetland Determination Data Forms APPENDIX C: Photographs APPENDIX D: Wetland Delineation Map

APPENDIX A

FIGURES









SOURCE: Flood Insurance Rate Map, 20060929, Montgomery County, MD 2006: Federal Emergency Management Agency (FEMA).



APPENDIX B

USACE WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site:		City/County:	Samplir	ng Date:
Applicant/Owner:			State:Sam	oling Point:
Investigator(s):		Section, Township, Range:		
Landform (hillslope, terrace, etc.):	Lo	cal relief (concave, convex, r	none):	Slope (%):
Subregion (LRR or MLRA):	Lat:	Long:		Datum:
Soil Map Unit Name:			NWI classification:	
Are climatic / hydrologic conditions on	the site typical for this time of ye	ear? Yes No	_ (If no, explain in Remarks.))
Are Vegetation <u>,</u> Soil <u>,</u> c	r Hydrologysignificantly	disturbed? Are "Norm	nal Circumstances" present?	Yes No
Are Vegetation, Soil, c	r Hydrologynaturally pr	oblematic? (If needed	l, explain any answers in Rer	narks.)
SUMMARY OF FINDINGS -	Attach site map showing	sampling point locat	tions, transects, impo	rtant features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes Yes Yes	No No No	Is the Sampled Area within a Wetland?	Yes	No
Remarks:					

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) 	 Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Moss Trim Lines (B16) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4)
Aquatic Fauna (B13)	
Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Saturation Present? Yes No Depth (inches): (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspect	Wetland Hydrology Present? Yes No
Remarks:	

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

Sampling Point:_____

	Absolute	Dominant Indi	icator	Dominance Test worksheet:	
Tree Stratum (Plot size:)	% Cover	Species? St	tatus	Number of Dominant Species	
1				That Are OBL, FACW, or FAC: (A	A)
2					,
2		·		Total Number of Dominant	D)
		·		Species Across All Strata: (i	в)
4	·	·		Percent of Dominant Species	
5		·		That Are OBL, FACW, or FAC: (A	A/B)
6		. <u> </u>			
7				Prevalence Index worksheet:	
		= Total Cover		Total % Cover of: Multiply by:	
50% of total cover:	20% of	total cover:		OBL species x 1 =	
Sapling/Shrub Stratum (Plot size:				FACW species x 2 =	
				FAC species x 3 =	
		·		FACIL species y 4 -	
2		·			
3				UPL species X 5 =	
4		. <u></u> . <u></u>		Column Totals: (A)	(B)
5.					
6				Prevalence index = B/A =	
7		·	—	Hydrophytic Vegetation Indicators:	
		·		1 - Rapid Test for Hydrophytic Vegetation	
8		·		2 - Dominance Test is >50%	
9		·		3 - Prevalence Index is <3.0 ¹	
		= Total Cover		4 - Morphological Adaptations ¹ (Provide suppo	rting
50% of total cover:	20% of	total cover:			in ung
Herb Stratum (Plot size:)				data in Remarks or on a separate she	eet)
1				Problematic Hydrophytic Vegetation' (Explain)	
··					
2		·		¹ Indicators of hydric soil and wetland hydrology mus	st
3		·		be present, unless disturbed or problematic.	
4		·	İ	Definitions of Four Vegetation Strata:	
5		. <u> </u>			
6				Tree – Woody plants, excluding vines, 3 in. (7.6 cm	n) or
7				height	S OF
0				inoight.	
0		·		Sapling/Shrub - Woody plants, excluding vines, le	ess
9		·		than 3 in. DBH and greater than or equal to 3.28 ft	(1
10		·		m) tall.	
11				Herb – All herbaceous (non-woody) plants, regardle	ess
		= Total Cover		of size, and woody plants less than 3.28 ft tall.	
50% of total cover:	20% of	total cover:			
Woody Vine Stratum (Plot size:)				Woody vine – All woody vines greater than 3.28 ft	IN
1			·		
··		·			
		·			
3		·			
4		·		Hydrophytic	
5		. <u> </u>		Vegetation	
		= Total Cover		Present? Yes No No	
50% of total cover:	20% of	total cover:			
Remarks: (Include photo numbers here or on a separate	sheet.)				

Depth Matrix	Redox Features	
(inches) Color (moist) %	$\frac{1}{10000000000000000000000000000000000$	Texture Remarks
<u> </u>		
Type: C=Concentration, D=Depletion, H	RM=Reduced Matrix, MS=Masked Sand Grains.	Location: PL=Pore Lining, M=Matrix.
Hydric Soli Indicators:		
Histosol (A1)	Dark Surface (S7)	2 cm Muck (A10) (MLRA 147)
Histic Epipedon (A2)	Polyvalue Below Surface (S8) (MLRA 14/	(, 148) Coast Prairie Redox (A16)
Black Histic (A3)	Thin Dark Surface (S9) (MLRA 147, 148)	(MLRA 147, 148) Diadmont Floadhlain Caile (F10)
Hydrogen Sullide (A4)	Loamy Gleyed Matrix (F2)	
Stratilied Layers (AS)	Image: Image: Apple text Image: Apple text <td>(INLRA 130, 147)</td>	(INLRA 130, 147)
Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)	Other (Evolution Dark Surface (TFTZ)
Thick Dark Surface (A12)	Redox Depressions (F8)	
Sandy Mucky Mineral (S1) (I RR N	Iron-Manganese Masses (F12) (I BR N	
MI RA 147, 148)	MI RA 136)	
Sandy Gleved Matrix (S4)	Umbric Surface (F13) (MLRA 136, 122)	³ Indicators of hydrophytic vegetation and
Sandy Redox (S5)	Piedmont Floodplain Soils (F19) (MLRA 1	(48) wetland hydrology must be present.
Stripped Matrix (S6)	Red Parent Material (F21) (MLRA 127. 14	47) unless disturbed or problematic.
Restrictive Laver (if observed):		
Depth (inches):		Hudrie Seil Bresent? Ves No
Depth (inches):		Hydric Soli Present? fes No
Remarks:		

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: National Park S	ervice	City/C	ounty: Montgomery C	County	Sampling Date: 1	/23/2018
Applicant/Owner National Pa	ark Service			State MD	Sampling Point	F
nvestigator(s) Patrick Mo	reland, Blair Jer	let Section	n Townshin Range	_ 01010	Oumping Form	
andform (hillsland, torrang, etc.	. Bottomland		of (conceve convex new	Concave	Sign	
andform (nillstope, terrace, etc.	P S' MI PA 148	Local reli	er (concave, convex, nor	7 125707		MGS 1984
Subregion (LRR or MLRA):	La		Long:	1.125707	Datum	100 1004
Soil Map Unit Name: Lindside	slit loam			NWI classifie	cation: PEIVITA	
Are climatic / hydrologic condition	ons on the site typical	for this time of year? Y	es X No	(If no, explain in F	Remarks.)	
Are Vegetation, Soil	, or Hydrology	significantly distur	bed? Are "Normal	I Circumstances"	present? Yes X	No
Are Vegetation Soil	or Hydrology	naturally problema	atic? (If needed, e	explain any answe	ers in Remarks.)	
	S - Attach site	nan showing sam	nling point locatio	one transacte	important for	aturas atc
SOMMART OF FINDING	15 - Allacii sile i	nap showing san		Jiis, transects	s, important lea	itures, etc.
Hydrophytic Vegetation Prese	nt? Yes X	No	is the Sampled Area			
Hydric Soil Present?	Yes X	No	within a Wetland?	Yes X	No	
Wetland Hydrology Present?	Yes X	No				·
			1.			
HYDROLOGY						
Wetland Hydrology Indicato	rs:			Secondary Indic	cators (minimum of t	wo required)
Primary Indicators (minimum	of one is required; che	ck all that apply)		Surface Soi	il Cracks (B6)	
Surface Water (A1)		_ True Aquatic Plants	(B14)	Sparsely Ve	egetated Concave S	surface (B8)
High Water Table (A2)	-	_ Hydrogen Sulfide Od	lor (C1)	Drainage P	atterns (B10)	
Saturation (A3)		_ Oxidized Rhizospher	es on Living Roots (C3)	Moss Trim I	Lines (B16)	
Water Marks (B1)		Presence of Reduce	d Iron (C4)	Dry-Season	Vater Table (C2)	
Drift Deposits (B2)		_ Recent from Reduction		Crayiish Bu	(isible on Aerial Im:	(00)
Algal Mat or Crust (B4)		Other (Explain in Re	marks)	Stunted or 3	Stressed Plants (D1	
Iron Deposits (B5)	-		indirity .	Geomorphi	c Position (D2)	,
Inundation Visible on Aer	ial Imagery (B7)			Shallow Aq	uitard (D3)	
X Water-Stained Leaves (B	(9)			Microtopogi	raphic Relief (D4)	
Aquatic Fauna (B13)	,			X FAC-Neutra	al Test (D5)	
Field Observations:		_				
Surface Water Present?	Yes No _X	Depth (inches):				
Water Table Present?	Yes No X	Depth (inches):				
Saturation Present?	Yes No X	Depth (inches): >36	6" Wetland	Hydrology Prese	ent? Yes	No <u>X</u>
Describe Recorded Data (stre	am gauge, monitoring	well, aerial photos, pro	evious inspections), if av	ailable:		
Remarks:						
Remarks:						

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

Sampling Point: F

	Absolute	Dominant	ndicator	Dominance Test worksheet:	
Tree Stratum (Plot size: 10'x10')	<u>% Cover</u>	Species?	Status	Number of Dominant Species	- 1
1	· · · · · · · · ·			That Are OBL, FACW, or FAC: 2 (A))
2				Total Number of Dominant	
3		<u> </u>		Species Across All Strata; 2 (B)	s
4.			n s-a-al	<u></u> , ,	<u>ا</u> ۲
5		898 69		Percent of Dominant Species	
6		10 50	. 	That Ale UBL, FACIN, OF FAC. 10074 (A	(1)
7				Prevalence Index worksheet:	
	0	7.1.10.	°`` c	Total % Cover of: Multiply by:	
		= Total Cove	r.	OBL species x 1 =	
50% of total cover:	20% 01	total cover			
Sapling/Shrub Stratum (Plot size: 10x10)					
1			9 	FAC species x 3 =	
2	21 <u></u>	<u></u>		FACU species X 4 =	1
3				UPL species x 5 =	- 1
4				Column Totals: (A) (a	9)
5.					
6				Prévalence Index = B/A =	
7		(C	10 D	Hydrophytic Vegetation Indicators:	
/		-		1 - Rapid Test for Hydrophylic Vegetation	
8	······			X 2 - Dominance Test is >50%	
9		-		3 - Prevalence Index is ≤3.0 ¹	
	<u> </u>	= Total Cove	ľ	4 - Morphological Adaptations ¹ (Provide support	ina
50% of total cover:	20% of	total cover:_		riate in Remarks or on a separate sheet)	
Herb Stratum (Plot size: 10'x10')		No. Alexandre		Problematic Hudrophulic Vegetation ¹ (Evaluit)	
1. Fasle Nettle (Boehmeria cylindrica)	40	<u>Y</u>	FACW		
2. Halberd-leaf Rose-mallow (Hibiscus laevis)	10	N	OBL		
3. Japanese Stiltgrass (Microstegium vimineum)	20	Y	FAC	Indicators of hydric soil and wetland hydrology must	t
4			. <u></u>	be present, unless disturbed or problematic.	
	83 	()) (V	•	Definitions of Four Vegetation Strata:	
ð	•••			Tree – Woody plants, excluding vines, 3 in, (7.6 cm)	ог
8		100000		more in diameter at breast height (DBH), regardless	of
7	e			height.	
8	<u></u>		<u>.</u>	Sanling/Shrub - Woody plants, excluding vines, les	s
9	- <u> </u>			than 3 in. DBH and greater than or equal to 3.28 ft (1	ī
10				m) tali.	
11			<u> </u>	Horb - All berbaceous (non-woody) plants, recentled	
	70	Total Cove	r	of size, and woody plants less than 3.28 ft tall.	
50% of total cover: 35	20% of	total cover:	14		
Woody Vine Stratum (Plot size: 10'x10')				Woody vine – All woody vines greater than 3.28 ft in	1
1 (1 tot bilds)					
1					
<u>د</u>	·	<u>(</u>)			
J	56 . 5	0			
4				Hydrophytic	
5		<u> </u>		Vegetation	- î
	0	= Total Cove	r.	Present? Yes A No	
50% of total cover:	20% of	total cover:_			
Remarks: (include photo numbers here or on a separate s	sheet.)			i. a 755 i. an	
S 1 1 1 1 1 1 1 1 1 1	0 1000000				
ti iti		1000 (B.1000)		i a ta	

SOIL

Sampling Point: F

Profile Des	cription: (Describe	to the dep	oth needed to docu	ment the i	ndicator	or confirm	n the absence	e of indicators.)
Depth	Matrix		Redo	x Features	s	1.1.		
(inches)	Color (moist)	%	Color (moist)		Type'	Loc ²	Texture	Remarks
0-5	2.5 Y4/2	98%	5YR 3/4	2%	С	<u>M</u>	Sil	Silty-Loam
5-18	2.5 Y4/2	70%	5YR 3/4	30%	С	Μ	Sil	Silty-Loam
		•						
				-				
			a series		-			
			그 특히 영문					
						<u></u>		
1Turne: C=C		lotion DM	-Doduced Matrix M				21 costion: F	-Dere Linice M-Metrix
Hydric Soil	Indicators:		-Reduced Matrix, M	3-IVIdSKeu	Sanu Gi	diris.	Location. P	ators for Problematic Hydric Soils ³ :
Histoso	(A1)		Dark Surface	e (S7)				cm Muck (A10) (MI RA 147)
Histic E	pipedon (A2)		Polyvalue Be	low Surfa	ce (S8) (I	ULRA 147	. 148) (Coast Prairie Redox (A16)
Black H	istic (A3)		Thin Dark Su	urface (S9)	(MLRA	147, 148)	,,	(MLRA 147, 148)
Hydroge	en Sulfide (A4)		Loamy Gleye	ed Matrix (F2)		F	Piedmont Floodplain Soils (F19)
Stratifie	d Lavers (A5)		X Depleted Ma	trix (F3)	-			(MLRA 136, 147)
2 cm M	uck (A10) (LRR N)		Redox Dark	Surface (F	6)		1	/ery Shallow Dark Surface (TF12)
Deplete	d Below Dark Surfac	e (A11)	Depleted Da	rk Surface	(F7)			Other (Explain in Remarks)
Thick D	ark Surface (A12)		Redox Depre	essions (Fi	8)		_	
Sandy M	Aucky Mineral (S1) (LRR N,	Iron-Mangan	ese Mass	es (F12) (LRR N,		
MLR	A 147, 148)		MLRA 13	6)				
Sandy (Gleyed Matrix (S4)		Umbric Surfa	ace (F13) (MLRA 1	36, 122)	³ Inc	dicators of hydrophytic vegetation and
Sandy F	Redox (S5)		Piedmont Flo	odplain S	oils (F19)	(MLRA 14	48) we	etland hydrology must be present,
Stripped	Matrix (S6)		Red Parent I	Material (F	21) (MLF	A 127, 14	7) ur	less disturbed or problematic.
Restrictive	Layer (if observed)	:				-		
Type:		100						
Depth (in	ches):	1					Hydric Soi	Present? Yes X No
Remarks:	ug to a depth	of 26"	Described to	10"				

Dug to a depth of 36". Described to 18".

APPENDIX C

PHOTOGRAPHS



Photo 1: Palustrine Wetland D (PEM5C), facing south towards the C&O Canal. Location of USACE Wetland Determination Data Form D.



Photo 2: Palustrine Wetland F (PEM1A), facing northwest towards the Potomac River. Location of USACE Wetland Determination Data Form F.



Photo 3: Riverine Wetland AA/AB (R3RB2), facing southwest towards MacArthur Boulevard.



Photo 4: Riverine Wetland BA/BB (R3RB2), facing northeast towards the ICC-B.



Photo 5: Riverine Wetland CA/CB (R2UBHx), facing southeast along the C&O Canal.



Photo 6: Riverine Wetland FA/FB (R2SB4), facing southwest towards the Potomac River.

APPENDIX D

WETLAND DELINEATION MAP

				A STATE OF BUILDING	and the second		a start the start star	The second s
				Conner and the	Sx 4		A de	
			and the second s	Allei			- ALLANDA	
		Same and	15	1 1 2 2 3			The "	Francis In
				0		ISWAR !!		
			9			March All	and the set	
			1		The We			iqure 8
						a all as the li		
						and states	T SHOL	
					Carting a		TAR I	
			198	X	and the state of t	ARA	N. 14 121	A PALATE
					Q	THE .		
						SH-		
					(ea)	ALC: NO	CREATE // CONTRACTOR MALE TO A 12	
			A. contra		Banto	in states is	AND	Figures
		Anna anna anna			Banton Pr			Figure
					Bernom Pure			Figure
			1		Bernom Physics			Figure
		an en	1		Banton Prove			Figure 9
			1		Bannan Terre			Figure 9
					Bannan Itu			Figure 9
					Bernon Russ			Figure 9
					Beamon Pure			Figure 9
elineated Wetlands and	Waters				Beamon Party			Figure 9
elineated Wetlands and	Waters Cowardin Classification	Area (SF)	Linear		Bannan Text			Figure 9
elineated Wetlands and Feature ID Palustrine Wetland D	I Waters Cowardin Classification PEM5C	Area (SF) 421	Linear Feet NA		Bannan Text			Figure 9
elineated Wellands and Feature ID Palustrine Wetland F	Waters Vaters PEM5C PEM1A	Area (SF) 421 1,400	Linear Feet NA NA		Bannan Itali			Figure 9
elineated Wetlands and Feature ID Palustrine Wetland D Palustrine Wetland AJ/AB	Waters Cowardin Classification PEM5C PEM1A R3RB2 R3RB2	Area (SF) 421 1,400 9,465	Linear Feet NA NA 914					Figure 9
Elineated Wetlands and Feature ID Palustrine Wetland D Palustrine Wetland F Riverine Wetland AA/AB Riverine Wetland BA/BB	I Waters Cowardin Classification PEM5C PEM1A R3RB2 R3RB2	Area (SF) 421 1,400 9,465 11,359	Linear Feet NA NA 914 1,124		Bannan Iter			Figure 9
Elineated Wełlands and Feature ID Palustrine Wetland D Palustrine Wetland AA/AB Riverine Wetland BA/BB Riverine Wetland CA/CB	A Waters Waters Cowardin Classification PEM5C PEM1A R3RB2 R3RB2 R3RB2 R2UBHx	Area (SF) 421 1,400 9,465 11,359 481	Linear Feet NA 914 1,124 83		Bannan Itali			Figure 9
Elineated Wellands and Feature ID Palustrine Wetland D Palustrine Wetland F Riverine Wetland AA/AB Riverine Wetland BA/BB Riverine Wetland CA/CB Riverine Wetland FA/FB	Waters Vaters EMSC PEM5C PEM1A R3RB2 R3RB2 R3RB2 R2UBHx R2SB4	Area (SF) 421 1,400 9,465 11,359 481 78,382	Linear Feet NA 914 1,124 83 1,552		Bannan Itali			Figure 9





and the second

Study Area

Riverine Wetland

Palustrine Wetland (PEM)

Data Frame

Dwn.By:	JLB	Figure.:
Proj.No.:	60548099	6





National Park Service

⊐Feet

Dwn.By:	JLB	Figure.:
Proj.No.:	60548099	7



AECOM	National Park Service	Wetland Delineation Plan	Scale:	1 inch = 80 feet	Date: 1/30/2018	Dwn.By: JLB	Figure.:
AECOM				0 40 80	Revisions:	Proj.No.: 60548099	8

ba5	ba4	ba2 ba1
bb5 bb4	bb3	a3 bb2 bb1
	The second	
1	Lege	end
2 Contraction		Study Area
A WARK		Riverine Wetland
E FEIT	111 sales (11 11 101 sales	Palustrine Wetland (PEM)
	•	Delineation Boundary Flag
	0	Wetland Delineation Data Form Location



AECOM	National Park Service	Wetland Delineation Plan	Scale:	1 inch = 80 feet	Date: 1/30/2018	Dwn.By: JLB	Figure.:
AECOM				0 40 80	Revisions:	Proj.No.: 60548099	9

<u></u>