

POTOMAC YARD METRORAIL STATION

APPENDIX H

# **APPENDIX H**

## **Wetland Delineation Report**



DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NORFOLK DISTRICT  
FORT NORFOLK  
803 FRONT STREET  
NORFOLK VA 23510-1011

SEPTEMBER 27, 2017

## **APPROVED JURISDICTIONAL DETERMINATION**

Northern Virginia Regulatory Section  
NAO-2012-02012 (Potomac Yard Metrorail)

Mr. Jason Kacamburas P.E., CCM  
Potomac Yard Metro Coordinator  
City of Alexandria - Department of Project Implementation  
301 King Street, Suite 3200  
Alexandria, VA 22314

Dear Mr. Kacamburas:

This letter is in regard to your request for a re-verification of an approved jurisdictional determination for waters of the U.S. (including wetlands) on property known as the Potomac Yard Metrorail Station, located on an approximately 117.0 acre parcel in Alexandria and Arlington County, Virginia.

Site conditions remain the same and a jurisdictional determination has found waters and/or wetlands regulated under Section 10 of the Rivers and Harbors Act (33 U.S.C. 403) and/or Section 404 of the Clean Water Act (33 U.S.C. 1344) on property listed above. Nontidal and/or tidal wetlands and/or waters have been identified on the site. This letter shall serve to confirm the wetlands delineation by AECOM, Inc. as surveyed and shown on the maps titled, "Potomac Yard Metrorail Station" dated April 2012 (copies enclosed).

Our basis for this determination is the application of the Corps' 1987 Wetland Delineation Manual and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region and the positive indicators of wetland hydrology, hydric soils, and hydrophytic vegetation. The wetland is a water of the United States and is part of a tributary system to interstate waters (33 CFR 328.3(a)). These waters meet the Corps' definition of waters of the United States, are part of a tributary system to interstate waters (33 CFR 328.3 (a)) and have an ordinary high water mark or high tide line. This letter is not confirming the Cowardin classifications of these aquatic resources.

Discharges of dredged or fill material, including those associated with mechanized landclearing, into jurisdictional waters and/or wetlands on this site will require a Department of the Army permit and may require authorization by state and local authorities, including a Virginia Water Protection Permit from the Virginia

Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC) and/or a permit from your local wetlands board. This letter is a confirmation of the Corps jurisdiction for the waters and/or wetlands on the subject property and does not authorize any work in these jurisdictional areas. Please obtain all required permits before starting work in the delineated waters/wetland areas.

This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the North Atlantic Division Office at the following address:

ATTN: Mr. James Haggerty, Regulatory Program Manager  
United States Army Corps of Engineers  
CENAD-PD-OR  
Fort Hamilton Military Community  
301 General Lee Avenue  
Brooklyn, NY 11252-6700  
Email: [james.w.haggerty@usace.army.mil](mailto:james.w.haggerty@usace.army.mil)

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 C.F.R. part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **\*\*November 27, 2017.\*\*** It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

This jurisdictional determination is valid for a period of five years from the date of this letter unless new information warrants revision prior to the expiration date. If you have any questions, please contact Ms. Theresita Crockett-Augustine in the Northern Virginia Field Office at 18139 Triangle Plaza, Suite 213, Dumfries, Virginia 22026, (757) 201-7194 or [theresita.m.crockett-augustine@usace.army.mil](mailto:theresita.m.crockett-augustine@usace.army.mil).

Sincerely,



Theresita Crockett-Augustine  
Environmental Scientist  
Northern Virginia Regulatory Section

Enclosures

## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: City of Alexandria		File Number: NAO-2012-02012	Date: 9/27/2017
Attached is:		See Section below	
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
X	APPROVED JURISDICTIONAL DETERMINATION	D	
	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

**SECTION I -** The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx> or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**E: PRELIMINARY JURISDICTIONAL DETERMINATION:** You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

**REASONS FOR APPEAL OR OBJECTIONS:** (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

**ADDITIONAL INFORMATION:** The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision and/or the appeal process you may contact:

If you only have questions regarding the appeal process you may also contact:

Mr. James Haggerty  
Regulatory Program Manager (CENAD-PD-OR)  
U.S. Army Corps of Engineers  
Fort Hamilton Military Community  
301 General Lee Avenue  
Brooklyn, New York 11252-6700  
Telephone number: 347-370-4650

**RIGHT OF ENTRY:** Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

\_\_\_\_\_  
Signature of appellant or agent.

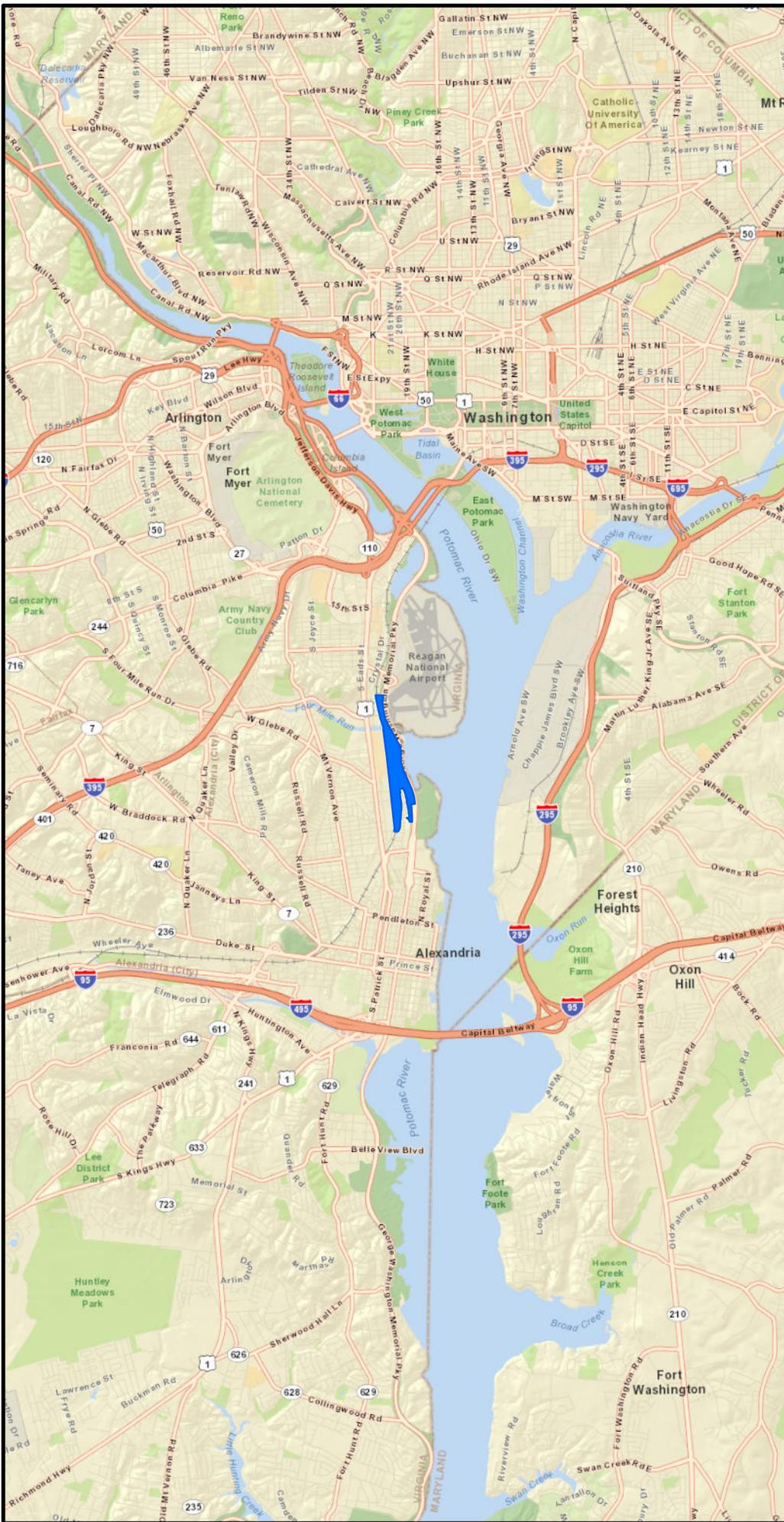
Date:

Telephone number:

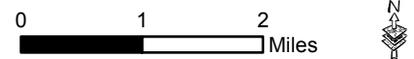
**Figure 1**  
**Regional Vicinity**

**LEGEND**

- Study Area
- ★ Project Location

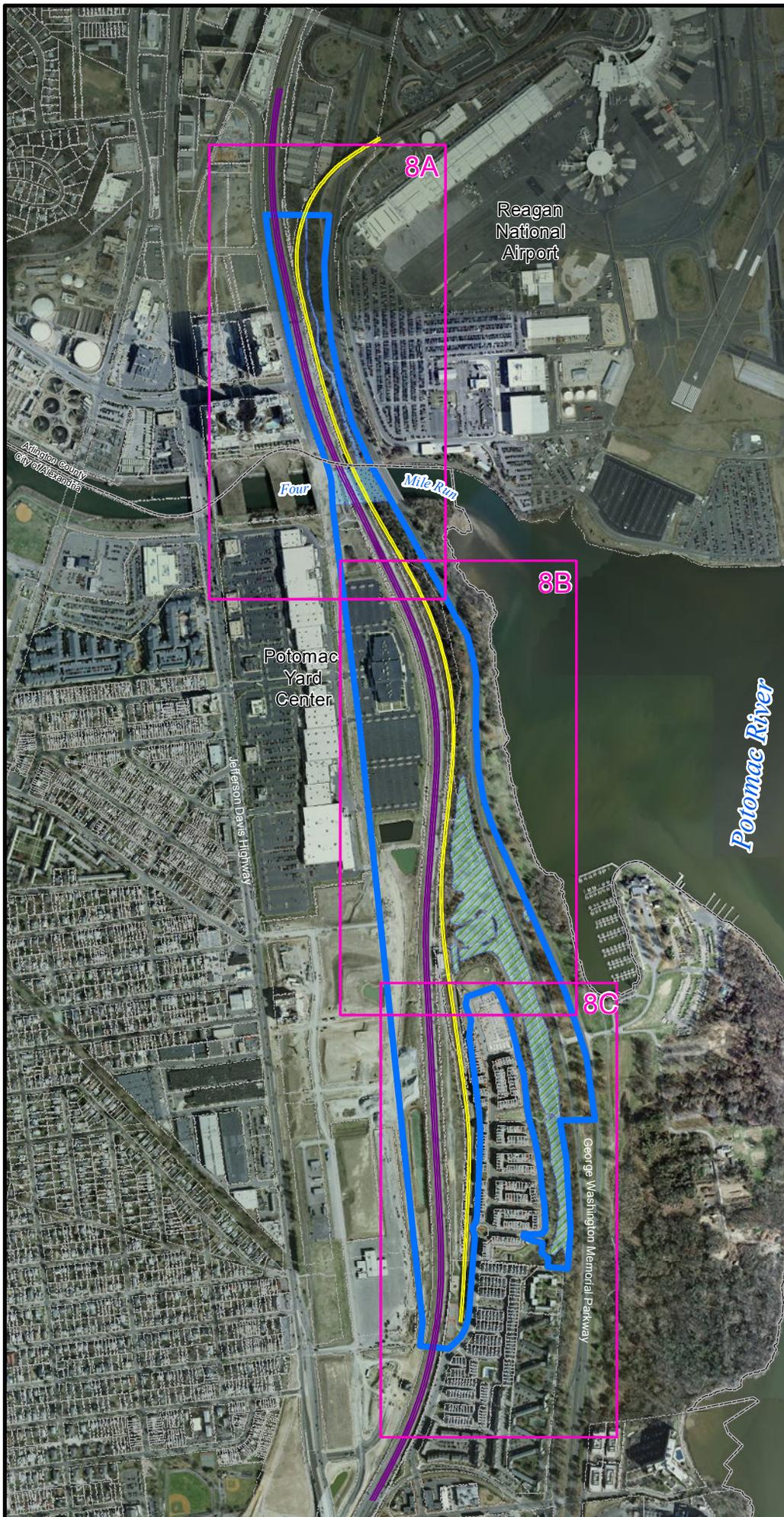


Source: ESRI Data & Maps, DeLorme 2009



**POTOMAC YARD**  
**METRO RAIL STATION EIS**

**Figure 8  
Wetland Delineation  
with Aerial Photography -  
Overall**



**LEGEND**

-  Study Area
-  Tracks - WMATA
-  Tracks - CSXT
-  Waters of the U.S.
-  USACE/Section 404 Wetland
-  Parcels
-  City Boundary
-  Index Grid

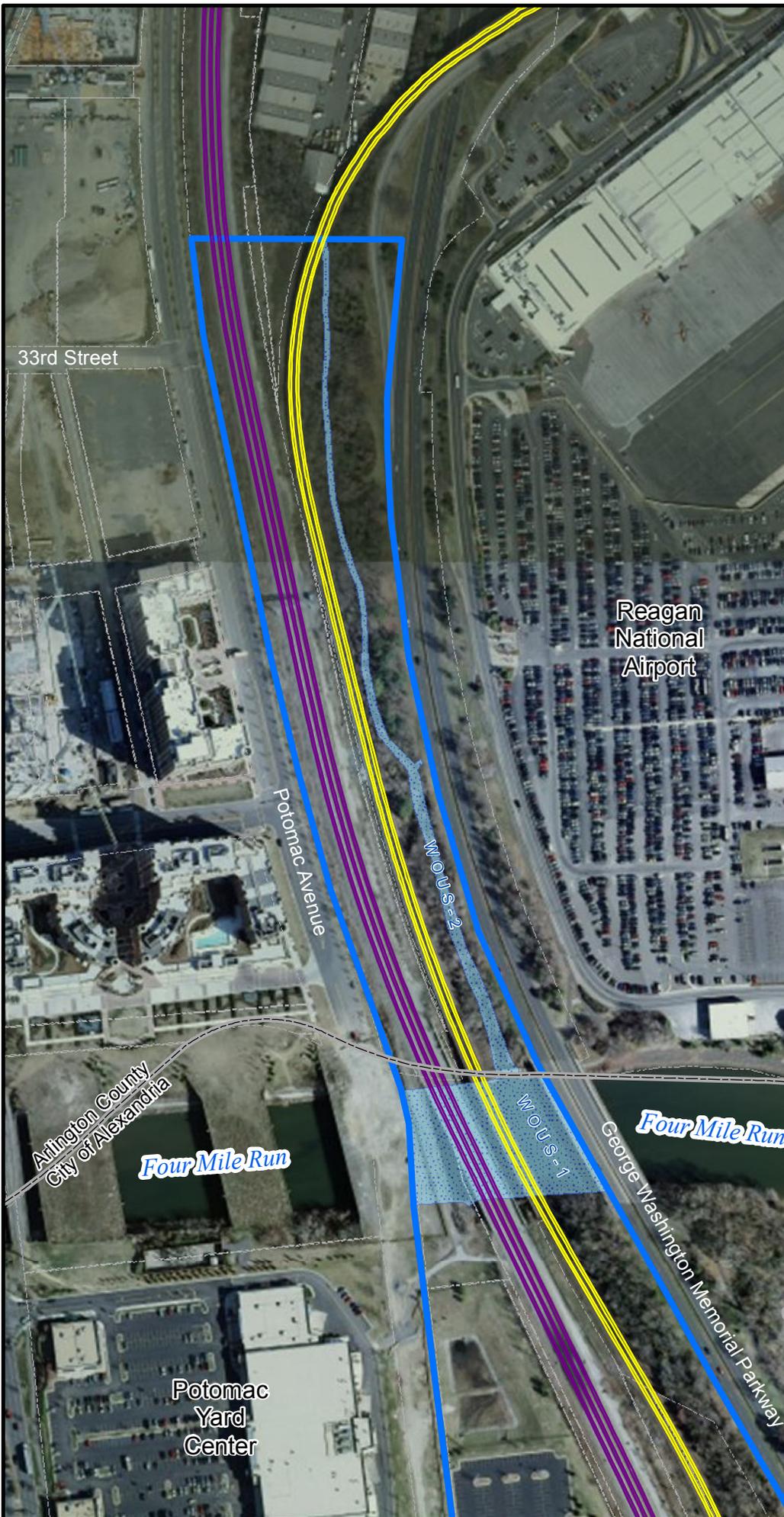
Source: City of Alexandria 2010  
Arlington County 2011  
WMATA 2011  
ESRI 2011

0 500 1,000  
Feet



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 8A  
Wetland Delineation  
with Aerial Photography -  
North**

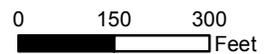


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Waters of the U.S.
- Parcels

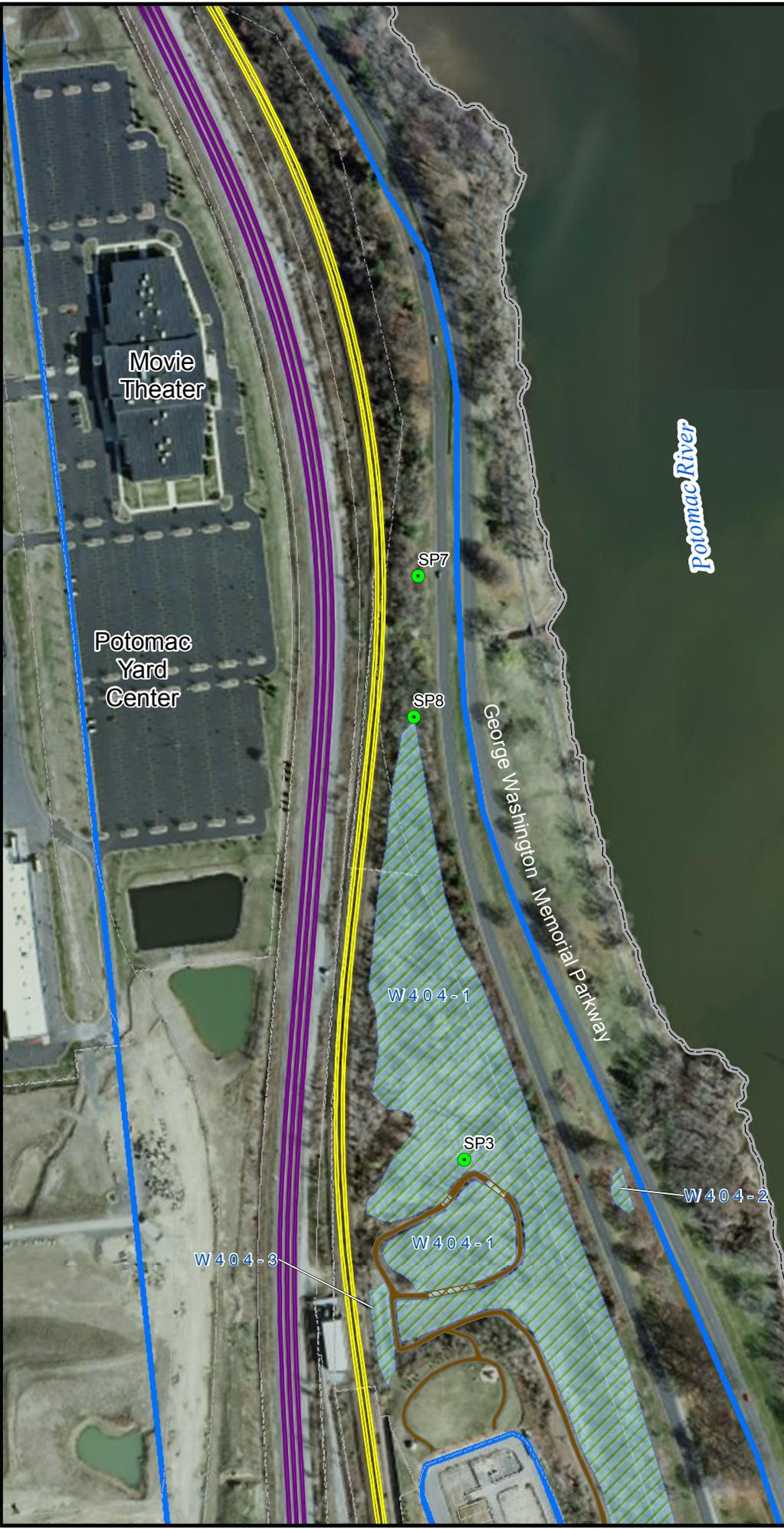
	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>	Measurements apply to entire study area.		

Source: City of Alexandria 2010, WMATA 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 8B  
Wetland Delineation  
with Aerial Photography -  
Central**



**LEGEND**

- Study Area
- City Boundary
- Tracks - WMATA
- Tracks - CSXT
- Wetland Sample Points
- USACE/Section 404 Wetland
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>			
Measurements apply to entire study area.			

Source: City of Alexandria 2010,  
WMATA 2011, ESRI 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 8C  
Wetland Delineation  
with Aerial Photography -  
South**

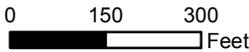


**LEGEND**

- Study Area
- City Boundary
- Tracks - WMATA
- Tracks - CSXT
- Wetland Sample Points
- USACE/Section 404 Wetland
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>	Measurements apply to entire study area.		

Source: City of Alexandria 2010, WMATA 2011





**DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NORFOLK DISTRICT  
FORT NORFOLK  
803 FRONT STREET  
NORFOLK VIRGINIA 23510-1011**

SEPTEMBER 27, 2017

**Supplemental Preapplication Information**

Project Number: NAO-2012-02012 (Potomac Yard Metrorail)  
Applicant: City of Alexandria  
Project Location: Alexandria and Arlington County, Virginia

1. A search of the Virginia Department of Historic Resources data revealed the following:

- No known historic properties are located on the property.
- The following known architectural resources are located on the property:

DHR ID	Address	Restricted	Property Names
029-0218-0003	George Washington Memorial Parkway	-	Bridge, George Washington Memorial Parkway over Four Mile Run (Descriptive)
029-0218	Mount Vernon Memorial Highway	Unrestricted	George Washington Memorial Highway (portion) (Descriptive), Mount Vernon Memorial Highway (NRHP Listing)
029-0228-0131	Mount Vernon Memorial Highway/GWMP	-	Mount Vernon Trail (Current Name)
500-0001	CSX Tracks	-	Richmond, Fredericksburg and Potomac Railroad Historic District (Historic)

- The following known archaeological resources are located on the property:

DHR ID	Site Name	Site Category	Time Period	NR Eligible	Restricted
44AX0204	-	Domestic, DSS Legacy	Woodland (1200 B.C. - 1606 A.D.), 19th Century (1800 - 1899)	-	Restricted: No release
44AX0222	-	DSS Legacy	19th Century (1800 - 1899), 20th Century: 1st half (1900 - 1949)	-	Restricted: No release
44AX0221	-	DSS Legacy, Industry/Processing/Extraction	Prehistoric/Unknown (15000 B.C. - 1606 A.D.), 18th Century (1700 - 1799), 19th Century (1800 - 1899), 20th Century: 1st quarter (1900 - 1924)	-	Restricted: No release
44AX0207	Campsite No. 1 of American Wagon Train Sept. 1781	Military/Defense	Colony to Nation (1751 - 1789), Early National Period (1790 - 1829)	-	Restricted: No release
44AX0220	-	DSS Legacy, Industry/Processing/Extraction	Prehistoric/Unknown (15000 B.C. - 1606 A.D.), 18th Century (1700 -	-	Restricted: No release

1799), 19th Century (1800  
- 1899), 20th Century: 1st  
quarter (1900 - 1924)

The following known historic resources are located in the vicinity of the property (potential for effects to these resources from future development):

NOTE:

- 1) *The information above is for planning purposes only. In most cases, the property has not been surveyed for historic resources. Undiscovered historic resources may be located on the subject property or adjacent properties and this supplemental information is not intended to satisfy the Corps' requirements under Section 106 of the National Historic Preservation Act (NHPA).*
- 2) *Prospective permittees should be aware that Section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant.*

2. A search of the data supplied by the U.S. Fish & Wildlife Service, the Virginia Department of Conservation and Recreation and the Virginia Department of Game and Inland Fisheries revealed the following:

- No known populations of threatened or endangered species are located on or within the vicinity of the subject property.
- The following federally-listed species may occur within the vicinity of the subject property.
- The following state-listed (or other) species may occur within the vicinity of the subject property:

**VDGIF Anadromous Fish Use Waters**

Unique ID	Upstream Boundary	Status	Stream Name	Confirmed Species
C25	approx. 500 m upstr. of Arlington Ridge Rd	confirmed	Fourmile run	STB/YEP

***Please note this information is being provided to you based on the preliminary data you submitted to the Corps relative to project boundaries and project plans. Consequently, these findings and recommendations are subject to change if the project scope changes or new information becomes available and the accuracy of the data.***

**IPaC**

U.S. Fish &amp; Wildlife Service

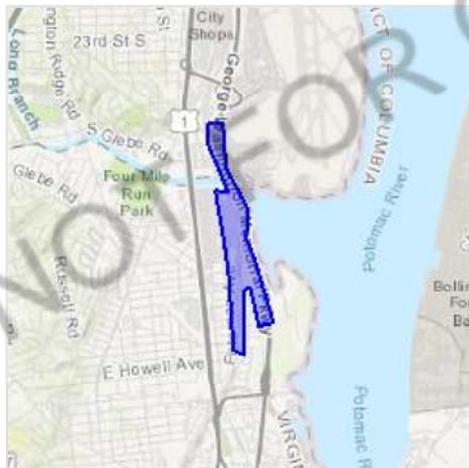
# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Alexandria and Arlington counties, Virginia



## Local office

Virginia Ecological Services Field Office

(804) 693-6694

(804) 693-9032

6669 Short Lane

Gloucester, VA 23061-4410

<http://www.fws.gov/northeast/virginiafield/>

NOT FOR CONSULTATION

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

<sup>1</sup> are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service.

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

THERE ARE NO ENDANGERED SPECIES EXPECTED TO OCCUR AT THIS LOCATION.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service

3. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are [USFWS Birds of Conservation Concern](#) that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the [E-bird data mapping tool](#) (year-round bird sightings by birders and the general public) and [Breeding Bird Survey](#) (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the [E-bird Explore Data Tool](#).

NAME	BREEDING SEASON
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> <a href="https://ecos.fws.gov/ecp/species/9399">https://ecos.fws.gov/ecp/species/9399</a>	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i>	Breeds May 20 to Jul 31
Canada Warbler <i>Wilsonia canadensis</i>	Breeds May 20 to Aug 10
Cerulean Warbler <i>Dendroica cerulea</i> <a href="https://ecos.fws.gov/ecp/species/2974">https://ecos.fws.gov/ecp/species/2974</a>	Breeds Aug 20 to Jul 20

Dunlin <i>Calidris alpina arctica</i>	Breeds elsewhere
Golden-winged Warbler <i>Vermivora chrysoptera</i> <a href="https://ecos.fws.gov/ecp/species/8745">https://ecos.fws.gov/ecp/species/8745</a>	Breeds May 1 to Jul 20
Hudsonian Godwit <i>Limosa haemastica</i>	Breeds elsewhere
Kentucky Warbler <i>Oporornis formosus</i>	Breeds Apr 20 to Aug 20
Least Tern <i>Sterna antillarum</i>	Breeds Apr 20 to Sep 10
Lesser Yellowlegs <i>Tringa flavipes</i> <a href="https://ecos.fws.gov/ecp/species/9679">https://ecos.fws.gov/ecp/species/9679</a>	Breeds elsewhere
Prairie Warbler <i>Dendroica discolor</i>	Breeds May 1 to Jul 31
Prothonotary Warbler <i>Protonotaria citrea</i>	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	Breeds May 10 to Sep 10
Red-throated Loon <i>Gavia stellata</i>	Breeds elsewhere
Rusty Blackbird <i>Euphagus carolinus</i>	Breeds elsewhere
Semipalmated Sandpiper <i>Calidris pusilla</i>	Breeds elsewhere
Short-billed Dowitcher <i>Limnodromus griseus</i> <a href="https://ecos.fws.gov/ecp/species/9480">https://ecos.fws.gov/ecp/species/9480</a>	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i>	Breeds May 10 to Aug 31

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

#### Breeding Season (■)

Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

#### Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

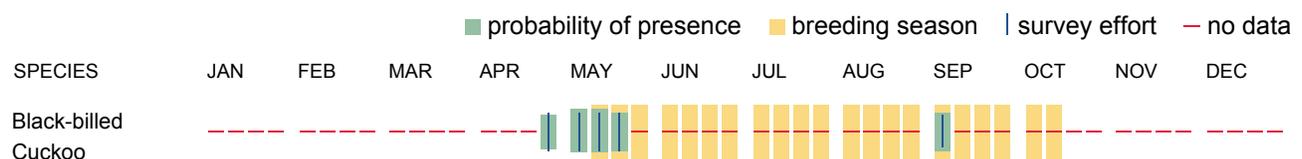
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

#### No Data (-)

A week is marked as having no data if there were no survey events for that week.

#### Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.





**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The

best information about when birds are breeding can be found in [Birds of North America \(BNA\) Online](#) under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a [subscription](#). [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

#### **What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the [Endangered Species Act \(ESA\)](#).

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#). The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

#### **What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available.

#### **How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

## Facilities

### Wildlife refuges

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

THERE ARE NO REFUGES AT THIS LOCATION.

## Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

## Wetlands in the National Wetlands Inventory

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](#).

This location overlaps the following wetlands:

### FRESHWATER EMERGENT WETLAND

[PEM1/FO1Eh](#)

[PEM1Eh](#)

[PEM1C](#)

### FRESHWATER FORESTED/SHRUB WETLAND

[PFO1Eh](#)

[PFO1R](#)

### FRESHWATER POND

[PUBHx](#)

### RIVERINE

[R1UBV](#)

A full description for each wetland code can be found at the National Wetlands Inventory website:

<https://ecos.fws.gov/ipac/wetlands/decoder>

### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

**Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

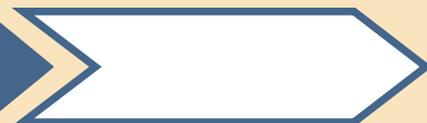
NOT FOR CONSULTATION

# POTOMAC YARD METRORAIL STATION ENVIRONMENTAL IMPACT STATEMENT



## Waters of the U.S. (Including Wetlands) Delineation Report

February 2012





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## 1.0 INTRODUCTION

The City of Alexandria is proposing the construction of a new Metrorail station located along the existing Blue and Yellow Lines between the Ronald Reagan Washington National Airport and the Braddock Road Metrorail stations within the Potomac Yard mixed-use development site in Alexandria, Virginia (see Figures 1 and 2). The project management team consists of the Federal Transit Administration (FTA), the City of Alexandria, the National Park Service (NPS), and the Washington Metropolitan Area Transit Authority (WMATA). As part of the planning process, the project management team wishes to determine the extent, if any, of Waters of the United States (WOUS), including wetlands, located in the areas being considered for the proposed Metrorail station.

### 1.1 Purpose

The purpose of this report is to document the methodology and results of the delineation of WOUS, including wetlands, within the 117.8-acre investigation study area (see Figures 1 and 2). Field investigations for WOUS, including wetlands, were conducted from October 2011 to December 2011.

This report does not constitute a jurisdictional determination of Waters of the United States. All WOUS and wetland boundaries presented in this report are preliminary and subject to verification by the U.S. Army Corps of Engineers (USACE), Norfolk District, and the Virginia Department of Environmental Quality (VDEQ). Portions of these WOUS and wetlands, which are tidal, would also be regulated by the Virginia Marine Resources Commission (VMRC). Findings in this report are subject to review by the U.S. Environmental Protection Agency (EPA). This report does not constitute a stream characterization determination, since such determinations must be verified by VDEQ, nor does it constitute a resource protection area determination, which must be verified by the City of Alexandria.

### 1.2 Regulatory Requirements

#### 1.2.1 Federal Regulations

Under Section 404 of the Clean Water Act (CWA)(33 U.S.C. § 1251. et seq.), the deposition of dredge or fill materials into federally jurisdictional wetlands or WOUS is regulated by the USACE. Mitigation may be required if impacts to wetlands are expected to occur. Before a permit can be approved, reasonable proof that avoidance or minimization of wetland impacts will be attempted must be provided to the USACE.

Any future projects associated with wetlands or WOUS that fall under the jurisdiction of the USACE must be reviewed in accordance with Section 404 of the Clean Water Act. If any proposed project would potentially impact WOUS, a Section 404 (b)(1) analysis would be conducted. If the wetlands would be avoided and erosion near a wetland would be controlled, a permit is generally not required.

#### 1.2.2 State Regulations

Since 1992, the Virginia Water Protection Permit Program has served as the Commonwealth's Section 401 Certification process for both tidal and nontidal impacts permitted under Section 404 of the Clean Water Act. In 2000, the General Assembly removed the dependence of the State nontidal wetlands program on the issuance of a Federal permit, thus enabling VDEQ to use the Virginia Water Protection Permit Program to regulate activities in wetlands. Such activities as certain types of excavation in wetlands and fill in isolated wetlands (which may not be under Federal jurisdiction) were added to the activities already regulated through the Section 401 Certification process.

VDEQ can provide Section 401 Certification through issuing a Virginia Water Protection individual or general permit or by certifying USACE nationwide or regional permits. Some USACE permit certifications contain conditions which must be met for the certification to apply. Some USACE permits are not Section 401 certified, and, thus, impacts under these USACE permits would also require a Virginia Water Protection permit to ensure State natural resources are protected.

## 1.3 Organization

The report is organized into the following sections:

- Section 2.0: Site Description, provides an overview of the study area, including a description of historical uses of the site, as well as existing topography, hydrology, soils, wetlands as identified in the National Wetland Inventory, and floodplains.
- Section 3.0: Methodology, describes the process followed to identify WOUS, including wetlands, in the study area. The section describes the process for both the in-office review and the field investigation.
- Section 4.0: Results, describes the water features and wetlands that were identified within the investigation study area.
- Section 5.0: References, includes citations of documents referenced in report.

## 2.0 SITE DESCRIPTION

The study area investigated for WOUS, including wetlands, is approximately bounded by Potomac Avenue on the west, George Washington Memorial Parkway on the east, Slaters Lane on the south, and the Ronald Reagan Washington National Airport Access Road on the north (see Figure 2). The existing residential neighborhood between the George Washington Memorial Parkway and the WMATA right-of-way (Potomac Greens) is excluded from the study area. The study area is 117.8 acres in size and is located partly within the City of Alexandria and partly within Arlington County, Virginia.

Potomac Yard served as a railroad switching and maintenance yard until 1990, and was used by Norfolk Southern Corporation, Delaware and Hudson Railway, Consolidated Rail Corporation, the Richmond, Fredericksburg, and Potomac Railroad (RF&P), and CSX Transportation (CSXT). Locomotive engines were fueled at the site from four 25,000-gallon above ground storage tanks (ASTs). Diesel fuel from these tanks was pumped through underground piping to a dispensing system in the fueling area of Potomac Yard. Since 1990, Potomac Yard has undergone extensive dismantling, including the removal of most of the switching track, locomotive maintenance facilities and associated buildings. Most of the former railroad yard has been redeveloped (e.g., the Potomac Greens neighborhood and the Potomac Yard Shopping Center).

EPA designated Potomac Yard as a “Superfund” site in 1992 (EPA, 2011). Investigations identified hazardous chemicals of concern such as: metals (specifically, arsenic, antimony, cadmium, lead, mercury, and thallium), pesticides (chlordane), and petroleum hydrocarbons. An underground plume of free product (diesel fuel and oil) was identified and remediated under the supervision of VDEQ.

Due to extensive remediation, EPA removed the Superfund designation in 2004 (EPA, 2011). EPA considers Potomac Yard, including the study area, safe for people and the environment. According to the conditions of a 2004 removal order, many of the existing outfalls were closed or regraded, and stormwater drains were re-routed into Four Mile Run. According to EPA, these actions decreased the threat to humans and the environment, as well as long-term ecological threats (EPA, 2011).

During the field investigation for the WOUS and wetlands delineation, field investigators noted likely petrochemical contamination in some of the soil samples. Proper safety procedures will need to be followed during any subsequent field work.

The following sections describe features of the site based on U.S. Geological Survey (USGS) topographic mapping and aerial imagery, Federal Emergency Management Agency (FEMA) flood maps, National Wetlands Inventory (NWI) data, and Natural Resources Conservation Service (NRCS) soils data. These data sources were used for preliminary investigation and informational purposes only. Section 3.2 describes the methodology used for the field investigation, which yielded the results described in Section 4.0.

## 2.1 Topography

Figure 3 shows the site topography and existing features. The study area is generally a flat, low-lying area with an average topographic elevation change less than a range of 30 to 50 feet. USGS topographic data is shown in Figure 4. The ground surface slopes to the north toward Four Mile Run and east toward the Potomac River.

## 2.2 Hydrology

Figure 5 depicts local hydrology. The study area is situated within the Middle Potomac-Anacostia-Occoquan watershed (HUC 02070010). Surface water bodies within, or adjacent to, the study area include Four Mile Run and the Potomac River. Network intermittent streams, ditches, and stormwater management features connect to the Potomac River or Four Mile Run. Four Mile Run flows into the Potomac River; each is considered a Traditional Navigable Body of Water (TNW) by the USACE.

## 2.3 Natural Resources Conservation Service (NRCS) Soil Survey

According to the NRCS Soil Survey, three types of soil occur in the study area: Grist Mill Sandy Loam, Urban Land, and Urban Land-Udorthents Complex soils (see Figure 6). None of these soil types meets the hydric criteria. For additional details on each soil type, see Appendix B. Relevant soil information is summarized in Table 1 below.

**Table 1: NRCS Soil Survey Data, Study Area, City of Alexandria and Arlington County, Virginia**

Soil	Symbol	Hydric	Erosion Factor (Kf)
Grist Mill Sandy Loam	40	No	0.24
Urban Land	95	No	-*
Urban Land-Udorthents Complex	12	No	-*

Source: NRCS, 2011

\* NRCS does not indicate an erosion factor for Urban Land or Urban Land-Udorthents Complex soils.

## 2.4 National Wetlands Inventory

The NWI map for the project area (U.S. Fish and Wildlife Service [USFWS], 2011) shows several WOUS, including wetlands, within the study area (see Figure 5). The NWI data depict three main types of wetlands within the study area:

- Freshwater Emergent Wetlands (PEM, PUB)
- Freshwater Forested/Shrub Wetlands (PFO)
- Palustrine Scrub-Shrub (PSS)

Four Mile Run and the Potomac River are both identified in the NWS database and, as noted above, are located within, or adjacent to, the study area.

## 2.5 Federal Emergency Management Agency Floodplain Profile

According to the FEMA Flood Insurance Rate Maps (51013C0083C and 5155190033E), portions of the study area are within the 100-year and 500-year floodplains (see Appendix C).

## 3.0 METHODOLOGY

The identification of WOUS, including wetlands, in the study area followed a two-step process: an in-office review of available resource information, followed by a site walk and field investigation.

While most of the study area was included in the field investigation (i.e., full delineation), a portion of the study area only received an in-office review and site walk, but not a full delineation. Based on the in-office review and the site walk, it was presumed that a full delineation was not necessary for the portion of land between the CSXT railroad tracks and the WMATA railroad tracks.

### 3.1 In-Office Review

Available resource information was reviewed to evaluate the potential of jurisdictional waters of the U.S., including wetlands, that may occur in the study area. These data included USGS topographic mapping and aerial imagery, FEMA flood maps (Section 2.5), NWI data (Section 2.4), and NRCS soils data (Section 2.3). The in-office review is used for preliminary investigation and informational purposes only. It is not used to make a wetlands determination.

### 3.2 Field Investigation

Following the in-office review of resource documentation, a site walk and field investigation for WOUS, including wetlands, were performed on several dates from October to December 2011.

#### 3.2.1 Applicable Procedures

The field investigation was performed in accordance with the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and, where applicable, in accordance with methods identified in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Coastal Plain Region* (USACE, 2010).

The George Washington Memorial Parkway, administered by NPS, is located on the east side of the study area. Therefore, in addition to using the USACE methodology, WOUS and wetland boundaries on NPS property were also delineated using the methods described in the *National Park Service Procedural Manual #77-1: Wetland Protection* (April 2011 edition). The NPS method essentially requires one wetland characteristic to be identified, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.*, 1979), for a wetland boundary to be determined. All data pertaining to WOUS, including wetlands that were identified on NPS property using the NPS method, including maps and *National Park Service Procedural Manual #77-1: Wetland Protection*, can be found in Appendix D.

#### 3.2.2 Sampling Points

For purposes of USACE review, all WOUS, including wetland boundaries, that are presented in Figures 7, 7A, 7B, 7C and Figures 8, 8A, 8B, and 8C were determined using the methodology as described in the 1987 *Delineation Manual* and the 2010 *Atlantic and Coastal Plain Regional Supplement*. This methodology requires the investigation of the following three wetland parameters at selected sampling points within a study area:

- Hydrophytic vegetation
- Hydric soils
- Hydrological characteristics

For an area to be classified as a wetland, positive indicators of each of the three parameters must be present, with the exception of problem areas. The sampling points are positioned to ascertain upland/wetland boundaries and to record significant spatial changes in wetland plant communities. Data for all sample points are listed on the data sheets provided in Appendix A.

#### 3.2.3 Hydrophytic Vegetation

Using the 1987 Manual and Regional Supplement methodology, dominant species of vegetation at any wetland, including associated upland control sampling points were identified and recorded. Vegetative data were interpreted and individual plant species were checked against the *Official National List of Plant Species that Occur in Wetlands: 1988 – Region 1* (Reed, 1988) to determine their appropriate regional wetland indicator status.

#### 3.2.4 Hydric Soils

Under the 1987 Manual and Regional Supplement methodology, soil pits or borings may be required at wetland and upland control sampling points to reveal soil profiles and to investigate positive indicators of hydric (wetland) soils. Where possible, soil pits should be dug to at least 16 inches in depth. This process

was followed, and mapped soils were compared to field-examined profiles and matched with data found on the NRCS's Web Soil Survey website.

Field indicators of hydric soils were determined using the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Coastal Plain Region* (based on Version 7.0 of the *Field Indicators of Hydric Soils in the United States*). Hydric soils are defined as those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Hydric soil indicators relate to color, structure, organic content, and the presence of reducing conditions.

If present, the abundance, contrast, and size of the redoximorphic features of each sample point were described on the data sheets (see Appendix A). Under this methodology, color characteristics (hue, value, and chroma) are recorded using Munsell® charts (GretagMacbeth, 2000), and observations are typically focused on the area immediately below the "A" horizon or 10 inches, whichever is shallower. All soil colors were determined from moist undisturbed peds using Munsell soil color charts based on samples using a soil auger.

### 3.2.5 Hydrological Characteristics

At each sampling point, hydrology was assessed according to the indicators found in the Regional Supplement. Observations were made on the presence of surface water, water table, and soil saturation. A checklist of primary and secondary indicators was followed to determine if wetland hydrology was present. At least one primary indicator or two secondary indicators are required for positive wetland hydrology identification.

### 3.2.6 Extent of WOUS, including Wetlands

Data collected to determine the extent of WOUS, including wetlands, within the study area can be found in Appendix A. WOUS and wetland features identified during this investigation are presented in Figures 7 and subsequent Figures 7A, 7B, and 7C, which illustrate associated topographic features, and in Figures 8, 8A, 8B, and 8C, which present all WOUS and wetland features on aerial imagery.

Sample points and boundaries on the associated figures indicate areas where vegetation, soils, and hydrology were assessed on the USACE data forms. Locations were marked using Global Positioning System (GPS) equipment and then flagged. A Trimble® Geo XH GPS unit (GeoExplorer® Series), typically accurate to less than one horizontal meter, was used to record the locations of jurisdictional boundaries, data points, and other pertinent features. Aerial photography was used to supplement the GPS data to determine the true extent of the WOUS and wetland boundaries. The GPS data were downloaded, differentially corrected, and superimposed onto existing aerial photographs and topography to create the figures presented in this report. Arcview GIS software was used to calculate all proposed jurisdictional boundaries and other pertinent features.

GPS data were collected in the thalweg of each stream/river, as well as at the Ordinary High Water Mark (OHWM) near the top of each stream bank. The thalweg is the deepest part of the stream/river bed and was interpreted from a combination of aerial imagery and subsequent visual determination in the field. The OHWM was distinguished by drift marks, bent foliage, and stained leaves or high water marks.

## 4.0 RESULTS

A total of two water features and three wetlands were identified. Table 2 provides a summary of the WOUS, including wetlands, that were identified within the study area.

WOUS and wetland features identified during this investigation are presented in Figure 7 and subsequent Figures 7A, 7B, and 7C, which illustrate associated topographic features, and Figures 8, 8A, 8B, and 8C, which present all WOUS and wetland features on aerial imagery.

The observed upland area surrounding the wetlands is dominated by broadleaf deciduous trees, including Red Maple (*Acer rubrum*) and Sweetgum (*Liquidambar styraciflua*). Also present are the evergreen trees

species American Holly (*Ilex opaca*) and Eastern Redcedar (*Juniperus virginiana*). Understory species that are common across the study area include American Holly (*Ilex opaca*), Greenbriar (*Smilax rotundifolia*), and Japanese Stiltgrass (*Microstegium vimineum*). Species common to the wetland area are Black Willow (*Salix nigra*), Broadleaf Cattail (*Typha latifolia*), and the Common Reed (*Phragmites australis*).

**Table 2: Waters of the U.S. (WOUS), including Wetlands, located within the Study Area, City of Alexandria and Arlington County, Virginia**

ID	Square Feet	Acres	Linear Feet
<i>Wetlands</i>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>TOTAL</b>	540,653	12.42	-
<i>Waters of the U.S.</i>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1,795
<b>TOTAL</b>	115,923	2.66	2,191

The features listed in Table 2 and described and mapped in this report are likely Jurisdictional WOUS and are therefore subject to Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. Wetland boundaries presented in this report are preliminary and subject to verification by USACE, Norfolk District and VDEQ.

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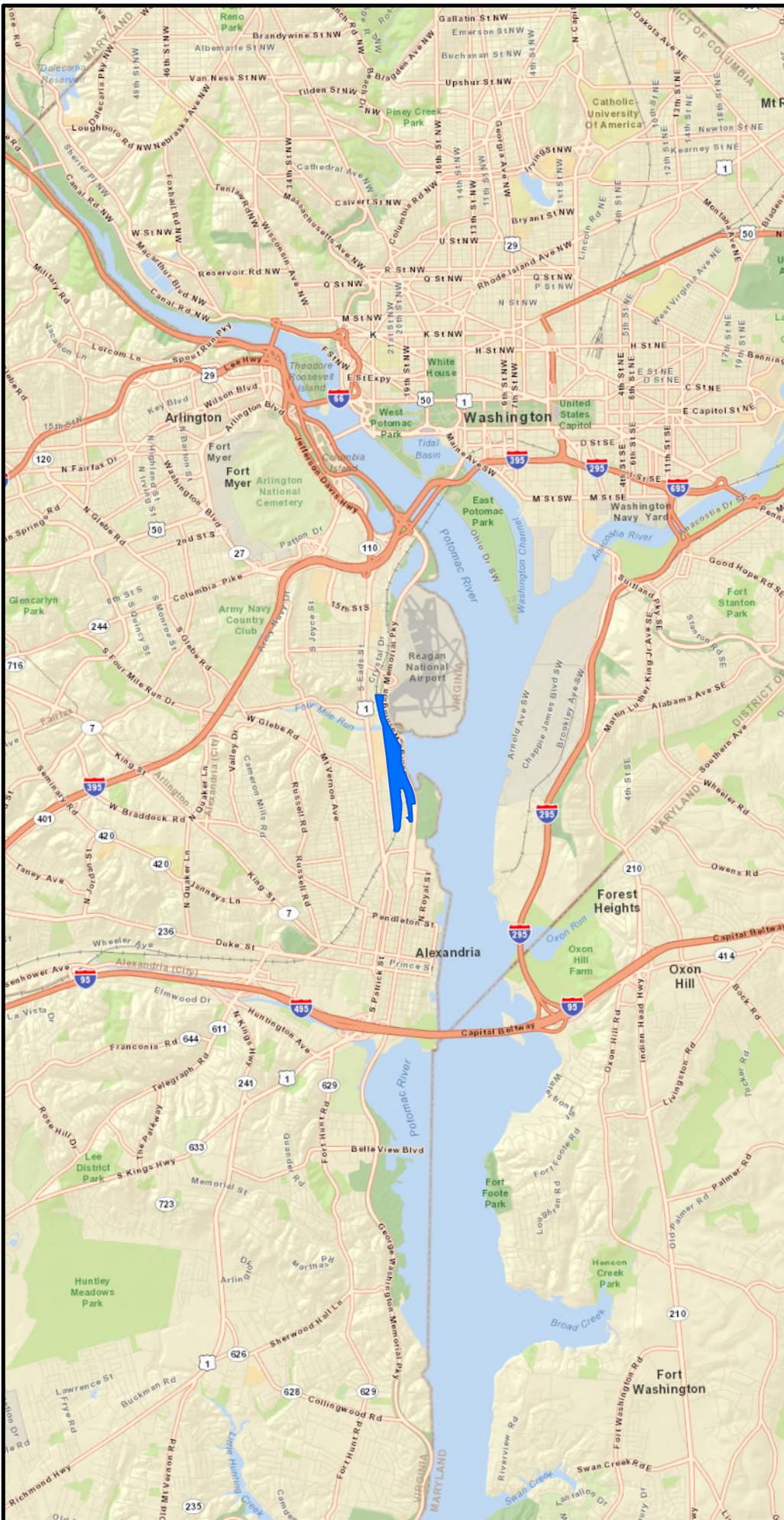
## FIGURES



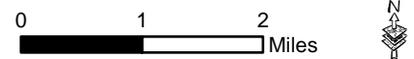
**Figure 1  
Regional Vicinity**

**LEGEND**

- Study Area
- ★ Project Location



Source: ESRI Data & Maps, DeLorme 2009

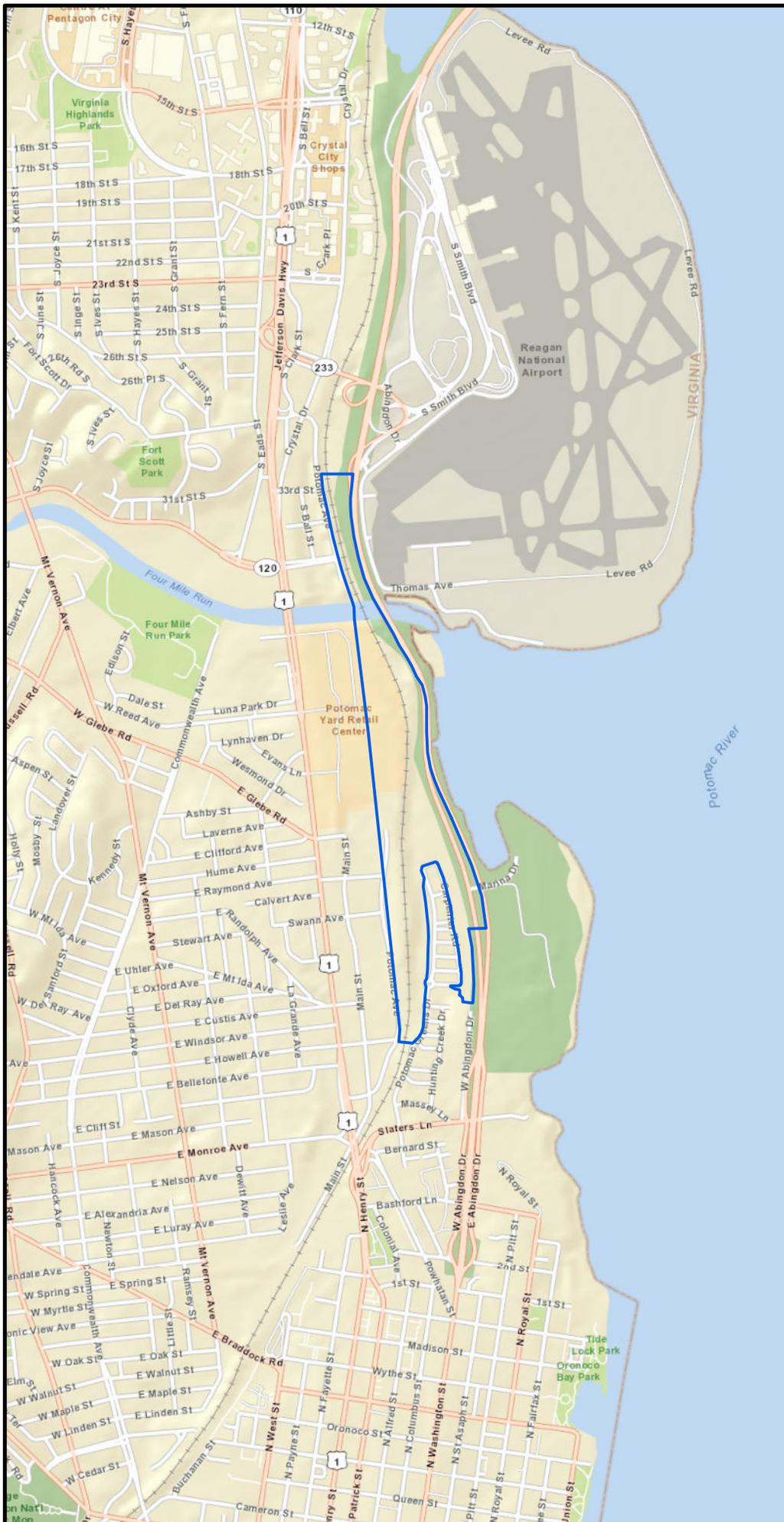


**POTOMAC YARD  
METRORAIL STATION EIS**

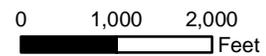
**Figure 2  
Local Vicinity**

**LEGEND**

 Study Area

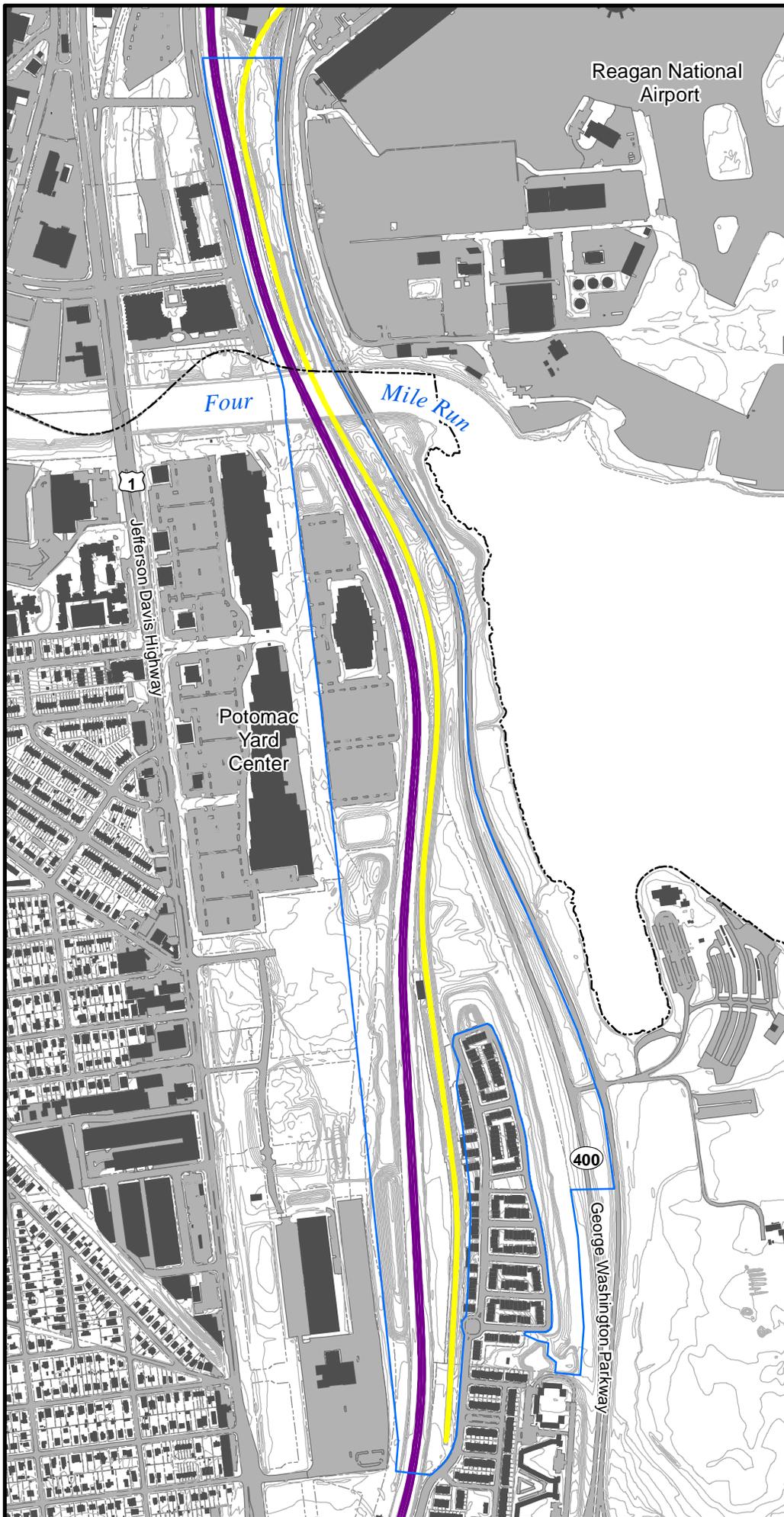


Source: ESRI Data & Maps, DeLorme 2009



**POTOMAC YARD  
METRORAIL STATION EIS**

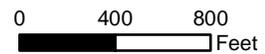
**Figure 3  
Existing Features**



**LEGEND**

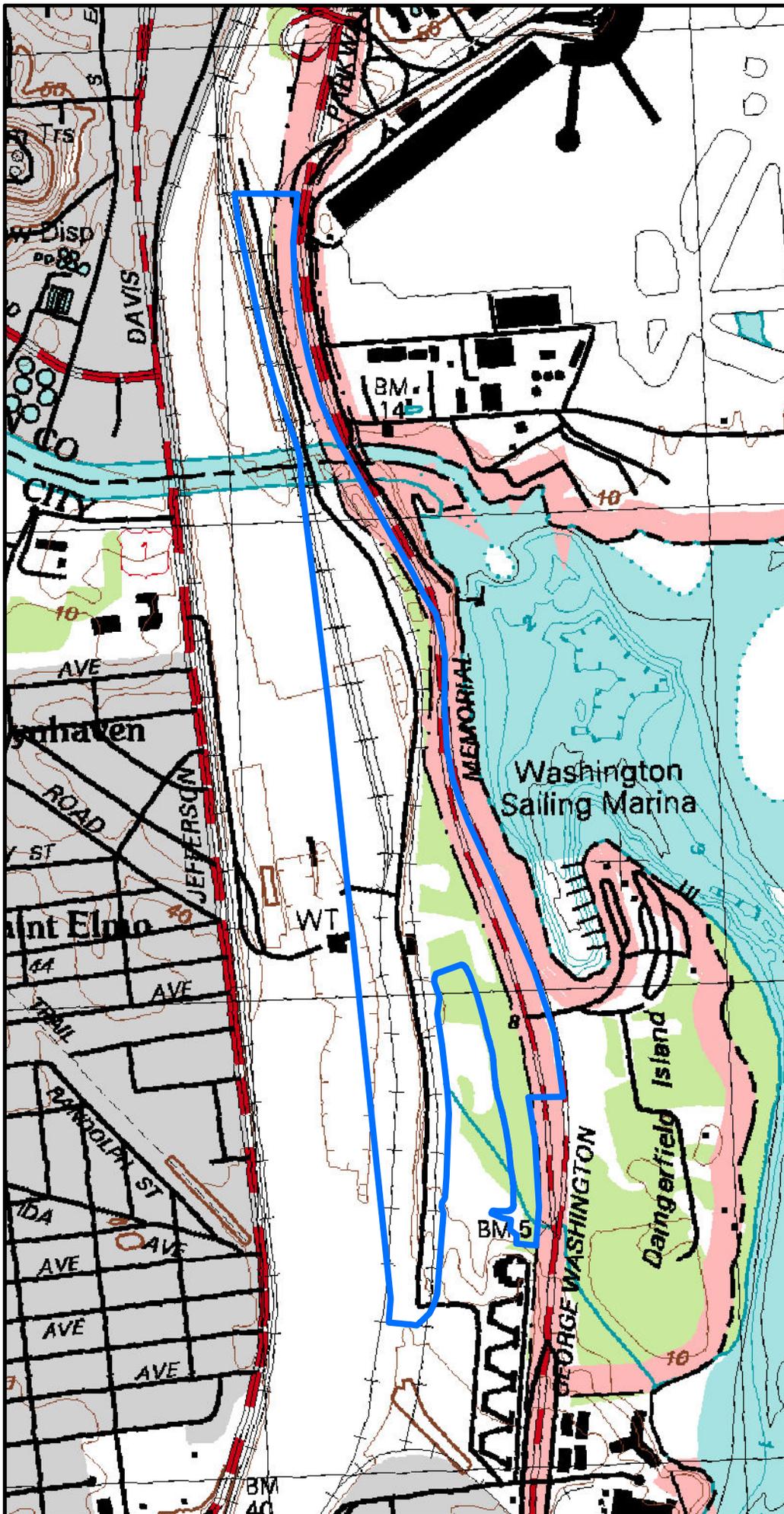
- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Building/Structures
- 2 ft Contour
- Paved Surface
- Parcels

Source: City of Alexandria, 2010  
Arlington County 2011  
WMATA 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

Figure 4  
USGS Topography



LEGEND

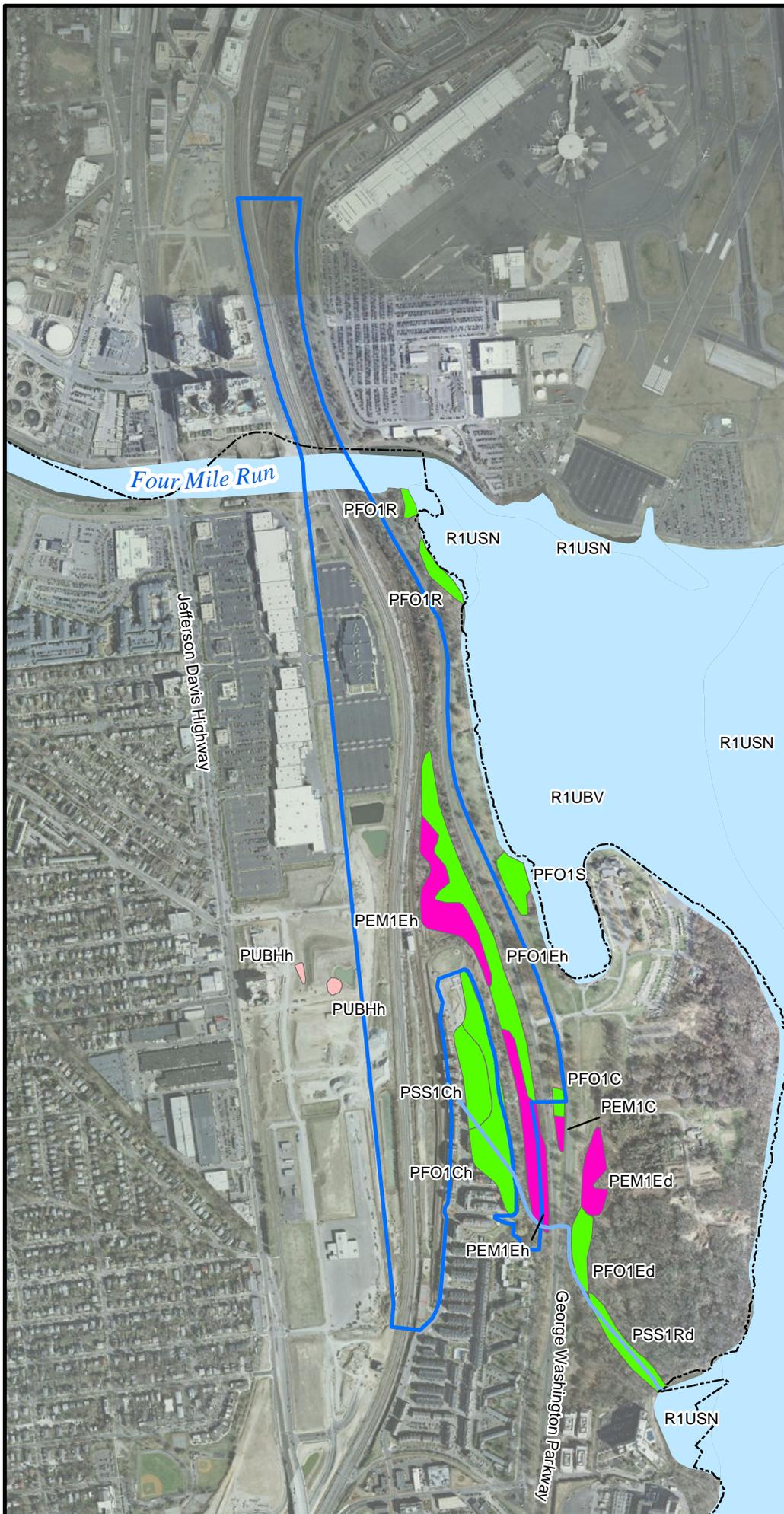
- Study Area
- 10ft Contour

Source: ESRI Data & Maps 2009  
USGS QUADRANGLE  
38077G1, ALEXANDRIA, 1994



POTOMAC YARD  
METRORAIL STATION EIS

**Figure 5**  
**National Wetland Inventory**  
**and Local Hydrology**



**LEGEND**

- Study Area
- City Boundary
- ~ Stream/Creek
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

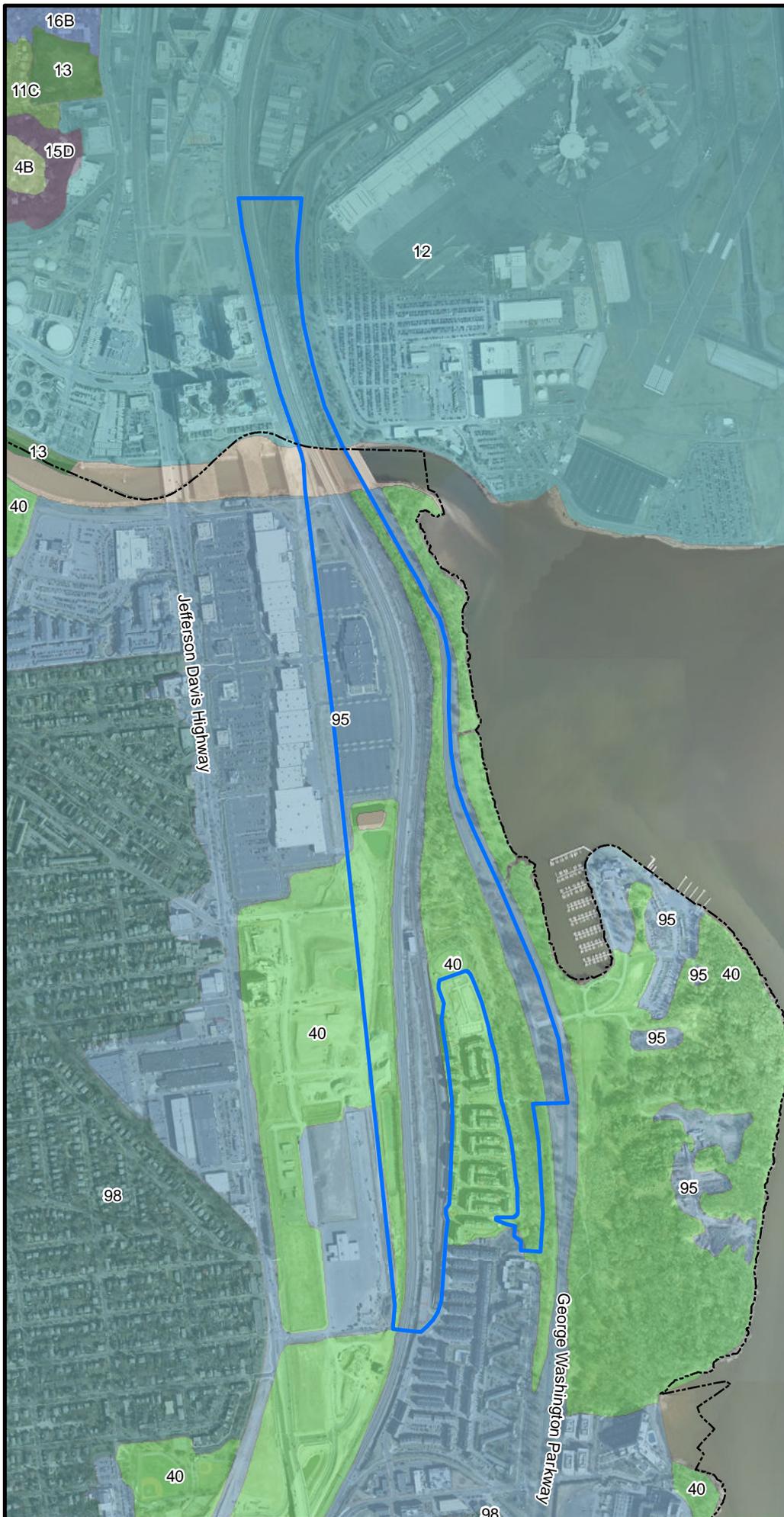
Source: ESRI Data & Maps 2009  
 USFWS National Wetland  
 Inventory (NWI) 2011  
 USGS National Hydrography  
 Dataset (NHD) 2011

0 400 800  
 Feet



**POTOMAC YARD**  
**METRORAIL STATION EIS**

**Figure 6  
NRCS SSURGO Soils**



**LEGEND**

- Study Area
- City Boundary

**Soils found within the Study Area**

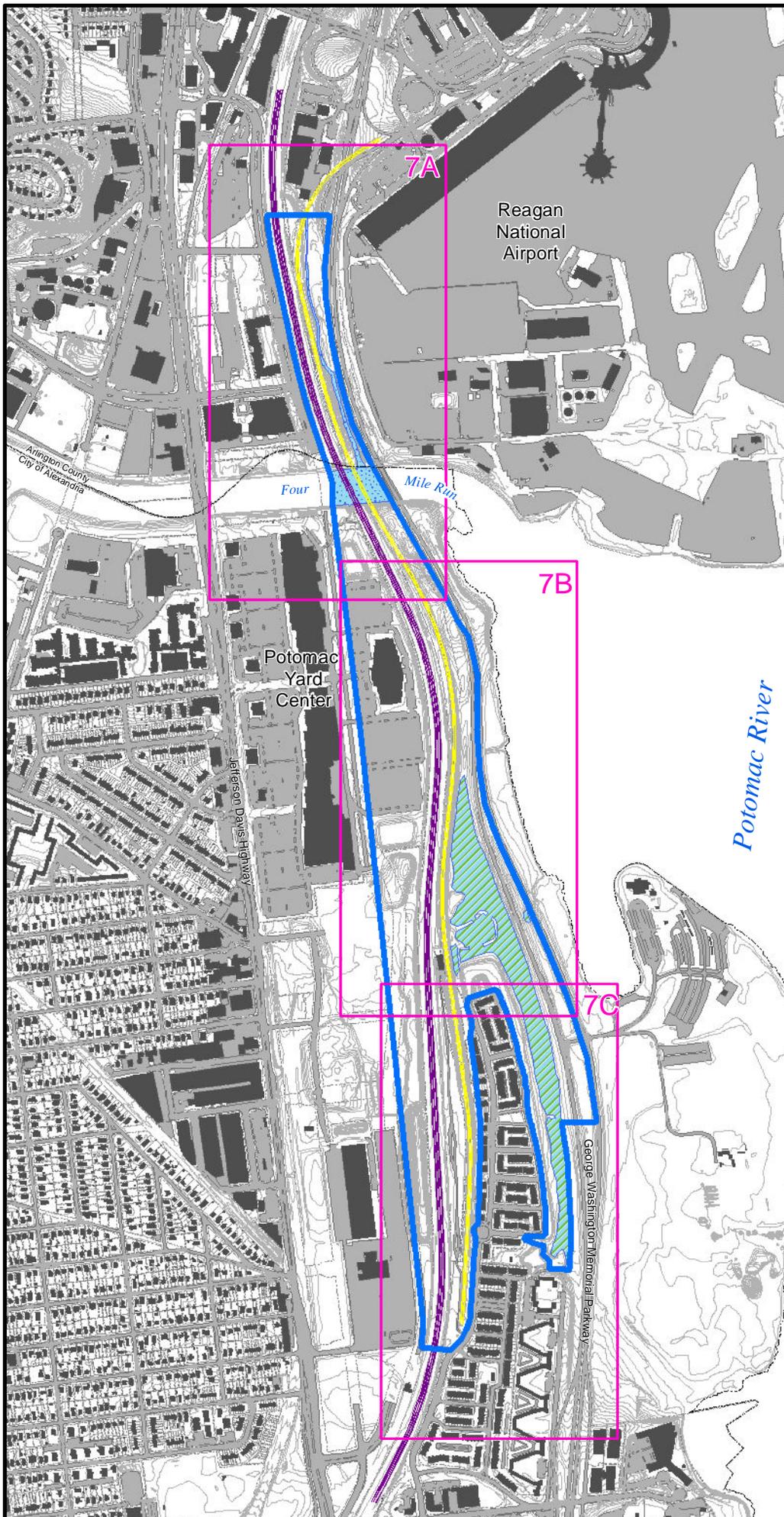
- 12 - Urban land-Udorthents Complex
- 40 - Grist Mill Sandy Loam
- 95 - Urban Land

Source: ESRI Data & Maps 2009  
NRCS SSURGO, 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 7**  
**Wetland Delineation**  
**with Topography - Overall**



**LEGEND**

-  Study Area
-  Waters of the U.S.
-  USACE/Section 404 Wetland
-  Tracks - CSXT
-  Tracks - WMATA
-  Building/Structures
-  2 ft Contour
-  Paved Surfaces
-  Parcels
-  City Boundary
-  Index Grid

Source: City of Alexandria 2010  
 Arlington County 2011  
 WMATA 2011



**POTOMAC YARD**  
**METRORAIL STATION EIS**

**Figure 7A  
Wetland Delineation  
with Topography - North**



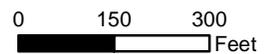
**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Waters of the U.S.
- Building/Structures
- Paved Surfaces
- 2 ft Contour
- Parcels

Wetland ID	Square Feet	Acres	Linear Feet
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>

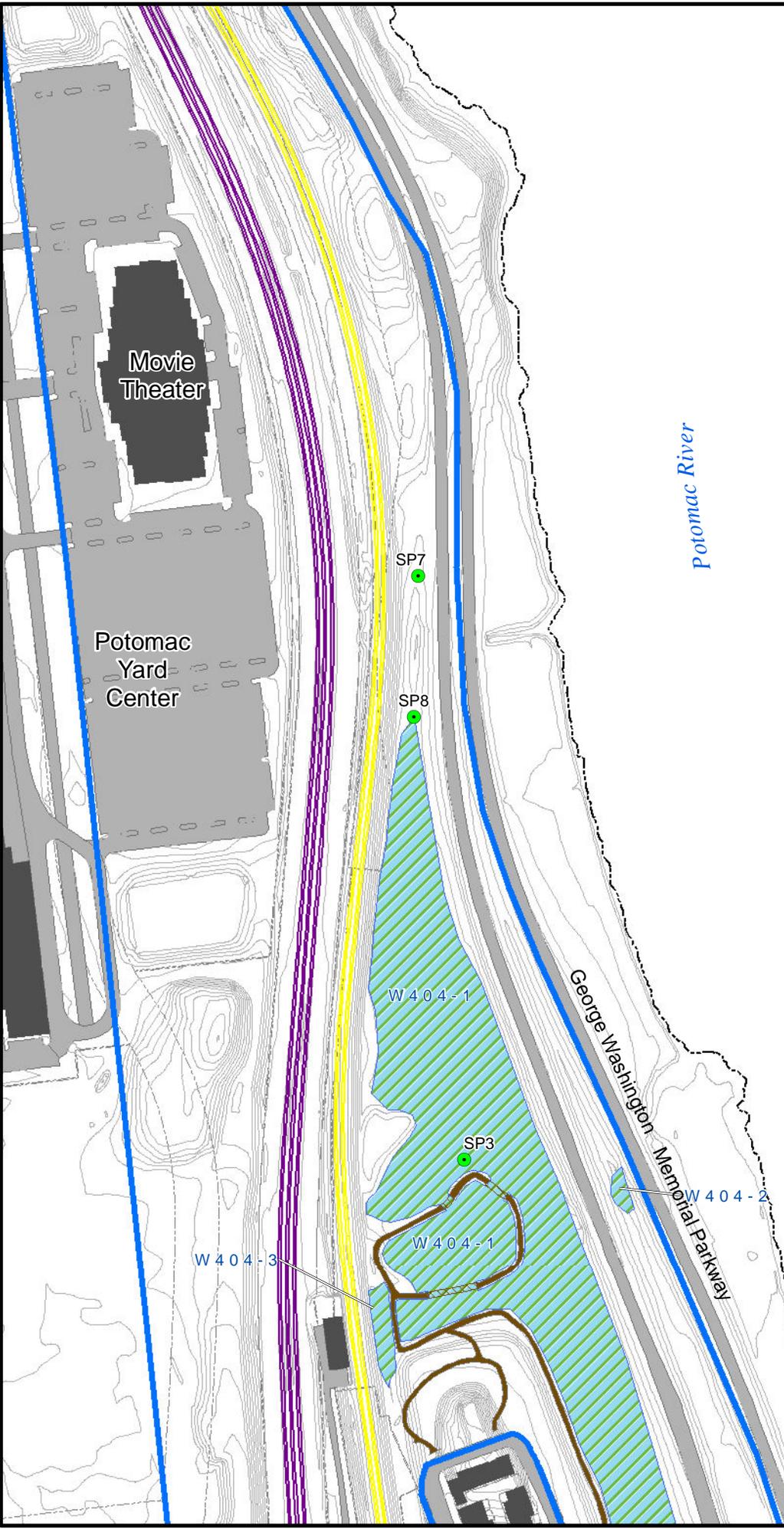
Note:  
Measurements apply to entire study area.

Source: City of Alexandria 2010, WMATA 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 7B  
Wetland Delineation  
with Topography - Central**

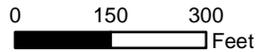


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Wetland Sample Points
- Boardwalk
- Recreational Trail
- USACE/Section 404 Wetland
- Building/Structures
- Paved Surfaces
- 2 ft Contour
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	
<b>Note:</b>			
Measurements apply to entire study area.			

Source: City of Alexandria 2010, WMATA 2011



**Figure 7C  
Wetland Delineation  
with Topography - South**

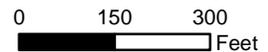


**LEGEND**

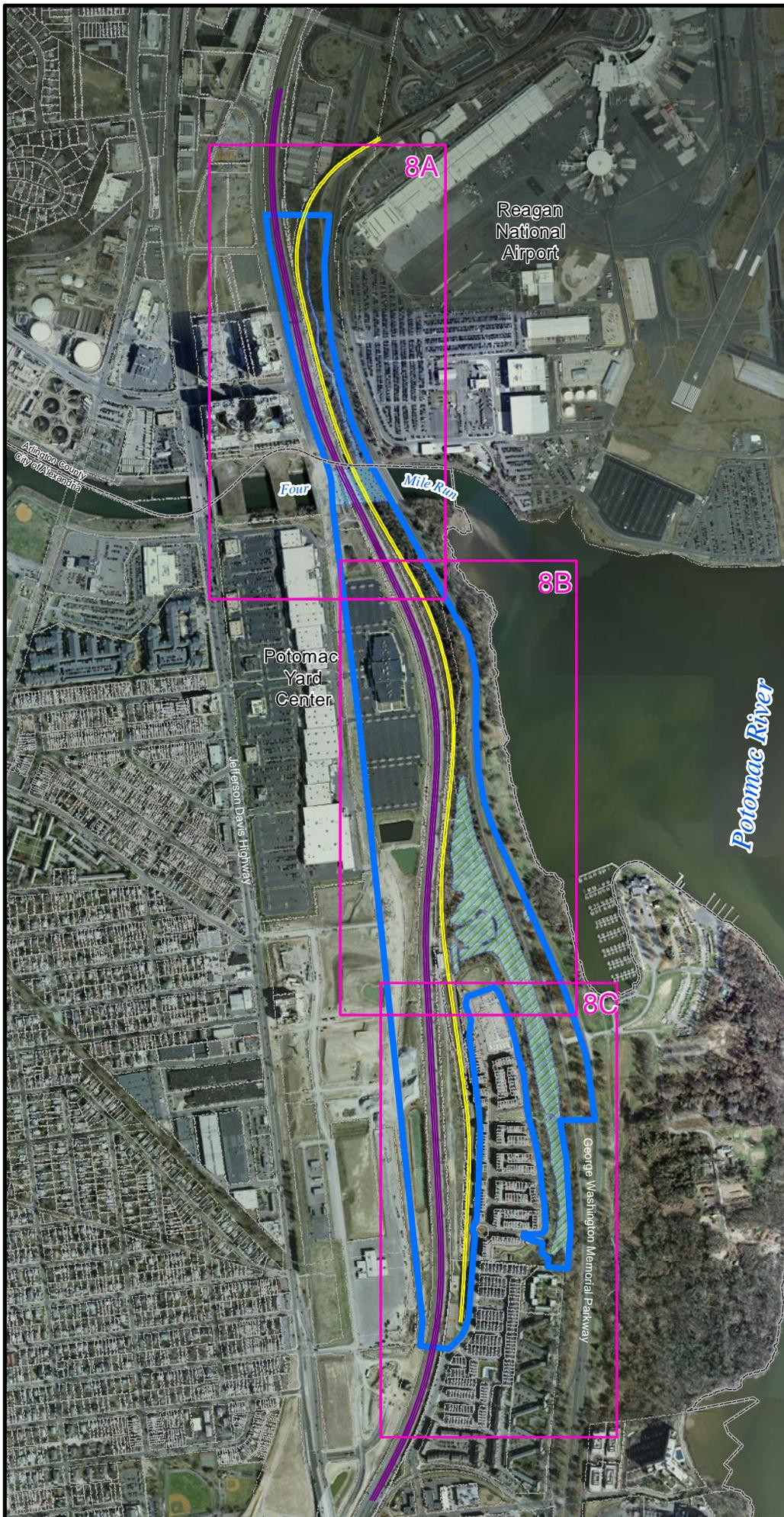
- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Wetland Sample Points
- Recreational Trail
- USACE/Section 404 Wetland
- Building/Structures
- Paved Surfaces
- 2 ft Contour
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
total	540,653	12.42	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
total	115,923	2.66	2191
<b>Study Area</b>	5,129,028	117.75	-
Note: Measurements apply to entire study area.			

Source: City of Alexandria 2010, WMATA 2011



**Figure 8  
Wetland Delineation  
with Aerial Photography -  
Overall**



**LEGEND**

-  Study Area
-  Tracks - WMATA
-  Tracks - CSXT
-  Waters of the U.S.
-  USACE/Section 404 Wetland
-  Parcels
-  City Boundary
-  Index Grid

Source: City of Alexandria 2010  
Arlington County 2011  
WMATA 2011  
ESRI 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 8A  
Wetland Delineation  
with Aerial Photography -  
North**

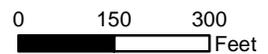


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Waters of the U.S.
- Parcels

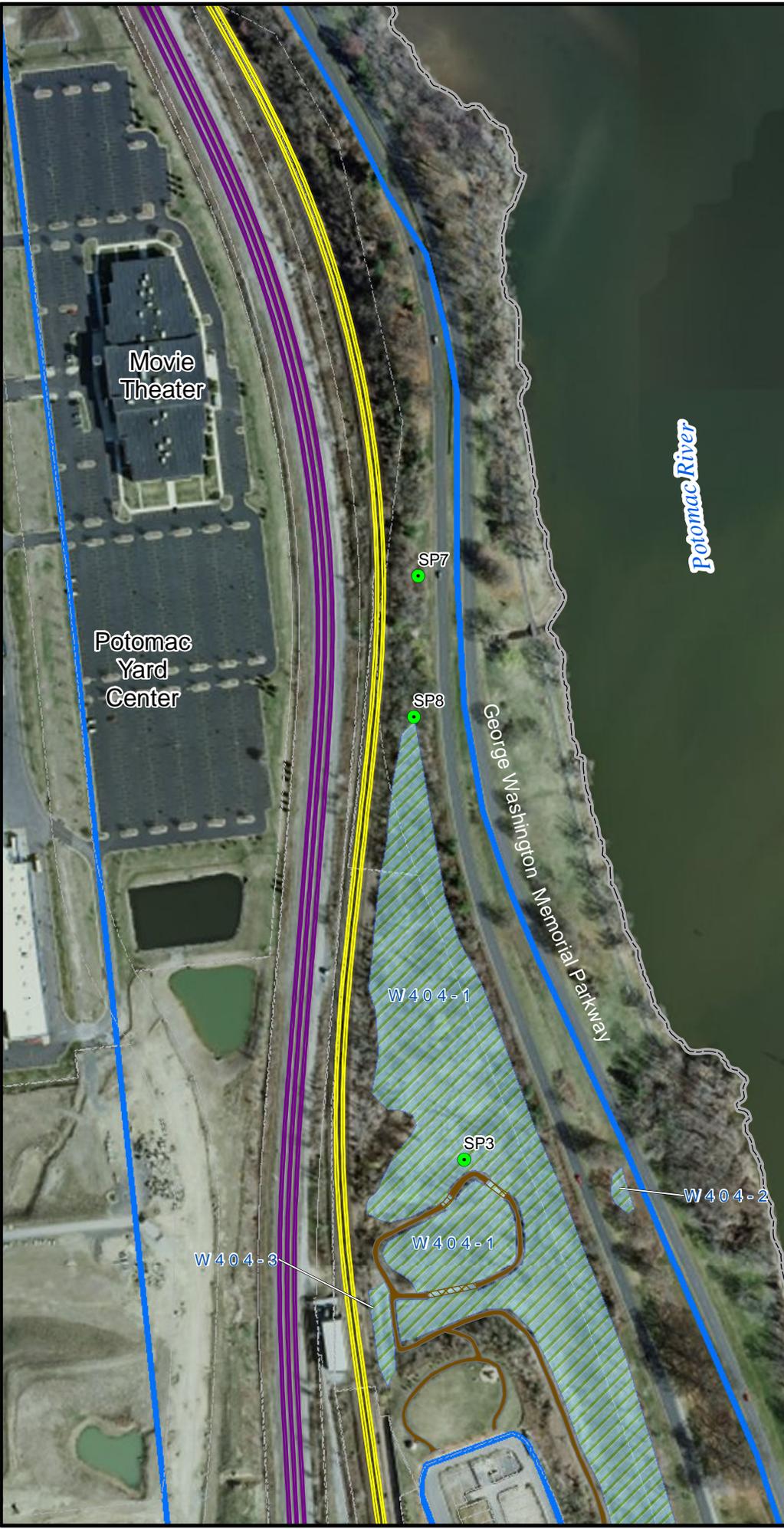
	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>	Measurements apply to entire study area.		

Source: City of Alexandria 2010, WMATA 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 8B  
Wetland Delineation  
with Aerial Photography -  
Central**

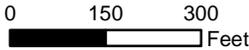


**LEGEND**

- Study Area
- City Boundary
- Tracks - WMATA
- Tracks - CSXT
- Wetland Sample Points
- USACE/Section 404 Wetland
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>			
Measurements apply to entire study area.			

Source: City of Alexandria 2010,  
WMATA 2011, ESRI 2011



**POTOMAC YARD  
METRORAIL STATION EIS**

**Figure 8C  
Wetland Delineation  
with Aerial Photography -  
South**

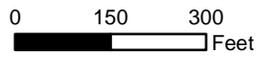


**LEGEND**

- Study Area
- City Boundary
- Tracks - WMATA
- Tracks - CSXT
- Wetland Sample Points
- USACE/Section 404 Wetland
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>	Measurements apply to entire study area.		

Source: City of Alexandria 2010, WMATA 2011



## **JURISDICTIONAL DETERMINATION EAST PACKAGE**



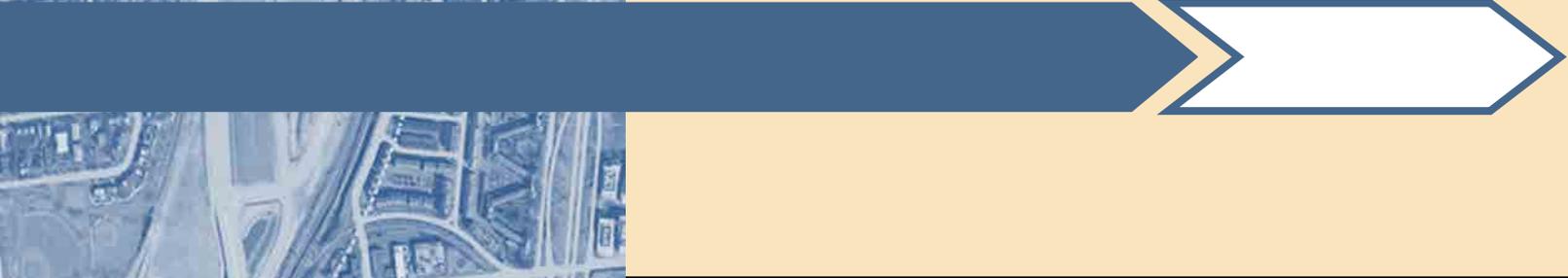


# POTOMAC YARD METRORAIL STATION ENVIRONMENTAL IMPACT STATEMENT



## **Waters of the U.S. (Including Wetlands) Delineation Report**

Revised April 2012





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APPENDIX B	NRCS SOILS REPORT
APPENDIX C	FEMA FLOOD INSURANCE RATE MAPS
APPENDIX D	NATIONAL PARK SERVICE METHODS AND DATA

## 1.0 INTRODUCTION

The City of Alexandria is proposing the construction of a new Metrorail station located along the existing Blue and Yellow Lines between the Ronald Reagan Washington National Airport and the Braddock Road Metrorail stations within the Potomac Yard mixed-use development site in Alexandria, Virginia (see Figures 1 and 2). The project management team consists of the Federal Transit Administration (FTA), the City of Alexandria, the National Park Service (NPS), and the Washington Metropolitan Area Transit Authority (WMATA). As part of the planning process, the project management team wishes to determine the extent, if any, of Waters of the United States (WOUS), including wetlands, located in the areas being considered for the proposed Metrorail station.

### 1.1 Purpose

The purpose of this report is to document the methodology and results of the delineation of WOUS, including wetlands, within the 117.8-acre investigation study area (see Figures 1 and 2). Field investigations for WOUS, including wetlands, were conducted from October 2011 to December 2011.

This report does not constitute a jurisdictional determination of Waters of the United States. All WOUS and wetland boundaries presented in this report are preliminary and subject to verification by the U.S. Army Corps of Engineers (USACE), Norfolk District, and the Virginia Department of Environmental Quality (VDEQ). Portions of these WOUS and wetlands, which are tidal, would also be regulated by the Virginia Marine Resources Commission (VMRC). Findings in this report are subject to review by the U.S. Environmental Protection Agency (EPA). This report does not constitute a stream characterization determination, since such determinations must be verified by VDEQ, nor does it constitute a resource protection area determination, which must be verified by the City of Alexandria.

### 1.2 Regulatory Requirements

#### 1.2.1 Federal Regulations

Under Section 404 of the Clean Water Act (CWA)(33 U.S.C. § 1251. et seq.), the deposition of dredge or fill materials into federally jurisdictional wetlands or WOUS is regulated by the USACE. Mitigation may be required if impacts to wetlands are expected to occur. Before a permit can be approved, reasonable proof that avoidance or minimization of wetland impacts will be attempted must be provided to the USACE.

Any future projects associated with wetlands or WOUS that fall under the jurisdiction of the USACE must be reviewed in accordance with Section 404 of the Clean Water Act. If any proposed project would potentially impact WOUS, a Section 404 (b)(1) analysis would be conducted. If the wetlands would be avoided and erosion near a wetland would be controlled, a permit is generally not required.

#### 1.2.2 State Regulations

Since 1992, the Virginia Water Protection Permit Program has served as the Commonwealth's Section 401 Certification process for both tidal and nontidal impacts permitted under Section 404 of the Clean Water Act. In 2000, the General Assembly removed the dependence of the State nontidal wetlands program on the issuance of a Federal permit, thus enabling VDEQ to use the Virginia Water Protection Permit Program to regulate activities in wetlands. Such activities as certain types of excavation in wetlands and fill in isolated wetlands (which may not be under Federal jurisdiction) were added to the activities already regulated through the Section 401 Certification process.

VDEQ can provide Section 401 Certification through issuing a Virginia Water Protection individual or general permit or by certifying USACE nationwide or regional permits. Some USACE permit certifications contain conditions which must be met for the certification to apply. Some USACE permits are not Section 401 certified, and, thus, impacts under these USACE permits would also require a Virginia Water Protection permit to ensure State natural resources are protected.

## 1.3 Organization

The report is organized into the following sections:

- Section 2.0: Site Description, provides an overview of the study area, including a description of historical uses of the site, as well as existing topography, hydrology, soils, wetlands as identified in the National Wetland Inventory, and floodplains.
- Section 3.0: Methodology, describes the process followed to identify WOUS, including wetlands, in the study area. The section describes the process for both the in-office review and the field investigation.
- Section 4.0: Results, describes the water features and wetlands that were identified within the investigation study area.
- Section 5.0: References, includes citations of documents referenced in report.

## 2.0 SITE DESCRIPTION

The study area investigated for WOUS, including wetlands, is approximately bounded by Potomac Avenue on the west, George Washington Memorial Parkway on the east, Slaters Lane on the south, and the Ronald Reagan Washington National Airport Access Road on the north (see Figure 2). The existing residential neighborhood between the George Washington Memorial Parkway and the WMATA right-of-way (Potomac Greens) is excluded from the study area. The study area is 117.8 acres in size and is located partly within the City of Alexandria and partly within Arlington County, Virginia.

Potomac Yard served as a railroad switching and maintenance yard until 1990, and was used by Norfolk Southern Corporation, Delaware and Hudson Railway, Consolidated Rail Corporation, the Richmond, Fredericksburg, and Potomac Railroad (RF&P), and CSX Transportation (CSXT). Locomotive engines were fueled at the site from four 25,000-gallon above ground storage tanks (ASTs). Diesel fuel from these tanks was pumped through underground piping to a dispensing system in the fueling area of Potomac Yard. Since 1990, Potomac Yard has undergone extensive dismantling, including the removal of most of the switching track, locomotive maintenance facilities and associated buildings. Most of the former railroad yard has been redeveloped (e.g., the Potomac Greens neighborhood and the Potomac Yard Shopping Center).

EPA designated Potomac Yard as a “Superfund” site in 1992 (EPA, 2011). Investigations identified hazardous chemicals of concern such as: metals (specifically, arsenic, antimony, cadmium, lead, mercury, and thallium), pesticides (chlordane), and petroleum hydrocarbons. An underground plume of free product (diesel fuel and oil) was identified and remediated under the supervision of VDEQ.

Due to extensive remediation, EPA removed the Superfund designation in 2004 (EPA, 2011). EPA considers Potomac Yard, including the study area, safe for people and the environment. According to the conditions of a 2004 removal order, many of the existing outfalls were closed or regraded, and stormwater drains were re-routed into Four Mile Run. According to EPA, these actions decreased the threat to humans and the environment, as well as long-term ecological threats (EPA, 2011).

During the field investigation for the WOUS and wetlands delineation, field investigators noted likely petrochemical contamination in some of the soil samples. Proper safety procedures will need to be followed during any subsequent field work.

The following sections describe features of the site based on U.S. Geological Survey (USGS) topographic mapping and aerial imagery, Federal Emergency Management Agency (FEMA) flood maps, National Wetlands Inventory (NWI) data, and Natural Resources Conservation Service (NRCS) soils data. These data sources were used for preliminary investigation and informational purposes only. Section 3.2 describes the methodology used for the field investigation, which yielded the results described in Section 4.0.

## 2.1 Topography

Figure 3 shows the site topography and existing features. The study area is generally a flat, low-lying area with an average topographic elevation change less than a range of 30 to 50 feet. USGS topographic data is shown in Figure 4. The ground surface slopes to the north toward Four Mile Run and east toward the Potomac River.

## 2.2 Hydrology

Figure 5 depicts local hydrology. The study area is situated within the Middle Potomac-Anacostia-Occoquan watershed (HUC 02070010). Surface water bodies within, or adjacent to, the study area include Four Mile Run and the Potomac River. Network intermittent streams, ditches, and stormwater management features connect to the Potomac River or Four Mile Run. Four Mile Run flows into the Potomac River; each is considered a Traditional Navigable Body of Water (TNW) by the USACE.

## 2.3 Natural Resources Conservation Service (NRCS) Soil Survey

According to the NRCS Soil Survey, three types of soil occur in the study area: Grist Mill Sandy Loam, Urban Land, and Urban Land-Udorthents Complex soils (see Figure 6). None of these soil types meets the hydric criteria. For additional details on each soil type, see Appendix B. Relevant soil information is summarized in Table 1 below.

**Table 1: NRCS Soil Survey Data, Study Area, City of Alexandria and Arlington County, Virginia**

Soil	Symbol	Hydric	Erosion Factor (Kf)
Grist Mill Sandy Loam	40	No	0.24
Urban Land	95	No	-*
Urban Land-Udorthents Complex	12	No	-*

Source: NRCS, 2011

\* NRCS does not indicate an erosion factor for Urban Land or Urban Land-Udorthents Complex soils.

## 2.4 National Wetlands Inventory

The NWI map for the project area (U.S. Fish and Wildlife Service [USFWS], 2011) shows several WOUS, including wetlands, within the study area (see Figure 5). The NWI data depict three main types of wetlands within the study area:

- Freshwater Emergent Wetlands (PEM, PUB)
- Freshwater Forested/Shrub Wetlands (PFO)
- Palustrine Scrub-Shrub (PSS)

Four Mile Run and the Potomac River are both identified in the NWS database and, as noted above, are located within, or adjacent to, the study area.

## 2.5 Federal Emergency Management Agency Floodplain Profile

According to the FEMA Flood Insurance Rate Maps (51013C0083C and 5155190033E), portions of the study area are within the 100-year and 500-year floodplains (see Appendix C).

## 3.0 METHODOLOGY

The identification of WOUS, including wetlands, in the study area followed a two-step process: an in-office review of available resource information, followed by a site walk and field investigation.

While most of the study area was included in the field investigation (i.e., full delineation), a portion of the study area only received an in-office review and site walk, but not a full delineation. Based on the in-office review and the site walk, it was presumed that a full delineation was not necessary for the portion of land between the CSXT railroad tracks and the WMATA railroad tracks.

### 3.1 In-Office Review

Available resource information was reviewed to evaluate the potential of jurisdictional waters of the U.S., including wetlands, that may occur in the study area. These data included USGS topographic mapping and aerial imagery, FEMA flood maps (Section 2.5), NWI data (Section 2.4), and NRCS soils data (Section 2.3). The in-office review is used for preliminary investigation and informational purposes only. It is not used to make a wetlands determination.

### 3.2 Field Investigation

Following the in-office review of resource documentation, a site walk and field investigation for WOUS, including wetlands, were performed on several dates from October to December 2011.

#### 3.2.1 Applicable Procedures

The field investigation was performed in accordance with the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and, where applicable, in accordance with methods identified in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Coastal Plain Region* (USACE, 2010).

The George Washington Memorial Parkway, administered by NPS, is located on the east side of the study area. Therefore, in addition to using the USACE methodology, WOUS and wetland boundaries on NPS property were also delineated using the methods described in the *National Park Service Procedural Manual #77-1: Wetland Protection* (April 2011 edition). The NPS method essentially requires one wetland characteristic to be identified, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.*, 1979), for a wetland boundary to be determined. All data pertaining to WOUS, including wetlands that were identified on NPS property using the NPS method, including maps and *National Park Service Procedural Manual #77-1: Wetland Protection*, can be found in Appendix D.

#### 3.2.2 Sampling Points

For purposes of USACE review, all WOUS, including wetland boundaries, that are presented in Figures 7, 7A, 7B, 7C and Figures 8, 8A, 8B, and 8C were determined using the methodology as described in the 1987 *Delineation Manual* and the 2010 *Atlantic and Coastal Plain Regional Supplement*. This methodology requires the investigation of the following three wetland parameters at selected sampling points within a study area:

- Hydrophytic vegetation
- Hydric soils
- Hydrological characteristics

For an area to be classified as a wetland, positive indicators of each of the three parameters must be present, with the exception of problem areas. The sampling points are positioned to ascertain upland/wetland boundaries and to record significant spatial changes in wetland plant communities. Data for all sample points are listed on the data sheets provided in Appendix A.

#### 3.2.3 Hydrophytic Vegetation

Using the 1987 Manual and Regional Supplement methodology, dominant species of vegetation at any wetland, including associated upland control sampling points were identified and recorded. Vegetative data were interpreted and individual plant species were checked against the *Official National List of Plant Species that Occur in Wetlands: 1988 – Region 1* (Reed, 1988) to determine their appropriate regional wetland indicator status.

#### 3.2.4 Hydric Soils

Under the 1987 Manual and Regional Supplement methodology, soil pits or borings may be required at wetland and upland control sampling points to reveal soil profiles and to investigate positive indicators of hydric (wetland) soils. Where possible, soil pits should be dug to at least 16 inches in depth. This process

was followed, and mapped soils were compared to field-examined profiles and matched with data found on the NRCS's Web Soil Survey website.

Field indicators of hydric soils were determined using the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Coastal Plain Region* (based on Version 7.0 of the *Field Indicators of Hydric Soils in the United States*). Hydric soils are defined as those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Hydric soil indicators relate to color, structure, organic content, and the presence of reducing conditions.

If present, the abundance, contrast, and size of the redoximorphic features of each sample point were described on the data sheets (see Appendix A). Under this methodology, color characteristics (hue, value, and chroma) are recorded using Munsell® charts (GretagMacbeth, 2000), and observations are typically focused on the area immediately below the "A" horizon or 10 inches, whichever is shallower. All soil colors were determined from moist undisturbed peds using Munsell soil color charts based on samples using a soil auger.

### 3.2.5 Hydrological Characteristics

At each sampling point, hydrology was assessed according to the indicators found in the Regional Supplement. Observations were made on the presence of surface water, water table, and soil saturation. A checklist of primary and secondary indicators was followed to determine if wetland hydrology was present. At least one primary indicator or two secondary indicators are required for positive wetland hydrology identification.

### 3.2.6 Extent of WOUS, including Wetlands

Data collected to determine the extent of WOUS, including wetlands, within the study area can be found in Appendix A. WOUS and wetland features identified during this investigation are presented in Figures 7 and subsequent Figures 7A, 7B, and 7C, which illustrate associated topographic features, and in Figures 8, 8A, 8B, and 8C, which present all WOUS and wetland features on aerial imagery.

Sample points and boundaries on the associated figures indicate areas where vegetation, soils, and hydrology were assessed on the USACE data forms. Locations were marked using Global Positioning System (GPS) equipment and then flagged. A Trimble® Geo XH GPS unit (GeoExplorer® Series), typically accurate to less than one horizontal meter, was used to record the locations of jurisdictional boundaries, data points, and other pertinent features. Aerial photography was used to supplement the GPS data to determine the true extent of the WOUS and wetland boundaries. The GPS data were downloaded, differentially corrected, and superimposed onto existing aerial photographs and topography to create the figures presented in this report. Arcview GIS software was used to calculate all proposed jurisdictional boundaries and other pertinent features.

GPS data were collected in the thalweg of each stream/river, as well as at the Ordinary High Water Mark (OHWM) near the top of each stream bank. The thalweg is the deepest part of the stream/river bed and was interpreted from a combination of aerial imagery and subsequent visual determination in the field. The OHWM was distinguished by drift marks, bent foliage, and stained leaves or high water marks.

## 4.0 RESULTS

A total of two water features and three wetlands were identified. Table 2 provides a summary of the WOUS, including wetlands, that were identified within the study area.

WOUS and wetland features identified during this investigation are presented in Figure 7 and subsequent Figures 7A, 7B, and 7C, which illustrate associated topographic features, and Figures 8, 8A, 8B, and 8C, which present all WOUS and wetland features on aerial imagery.

The observed upland area surrounding the wetlands is dominated by broadleaf deciduous trees, including Red Maple (*Acer rubrum*) and Sweetgum (*Liquidambar styraciflua*). Also present are the evergreen trees

species American Holly (*Ilex opaca*) and Eastern Redcedar (*Juniperus virginiana*). Understory species that are common across the study area include American Holly (*Ilex opaca*), Greenbriar (*Smilax rotundifolia*), and Japanese Stiltgrass (*Microstegium vimineum*). Species common to the wetland area are Black Willow (*Salix nigra*), Broadleaf Cattail (*Typha latifolia*), and the Common Reed (*Phragmites australis*).

**Table 2: Waters of the U.S. (WOUS), including Wetlands, located within the Study Area, City of Alexandria and Arlington County, Virginia**

ID	Square Feet	Acres	Linear Feet
<i>Wetlands</i>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>TOTAL</b>	540,653	12.42	-
<i>Waters of the U.S.</i>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1,795
<b>TOTAL</b>	115,923	2.66	2,191

The features listed in Table 2 and described and mapped in this report are likely Jurisdictional WOUS and are therefore subject to Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. Wetland boundaries presented in this report are preliminary and subject to verification by USACE, Norfolk District and VDEQ.

## 5.0 REFERENCES

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## FIGURES

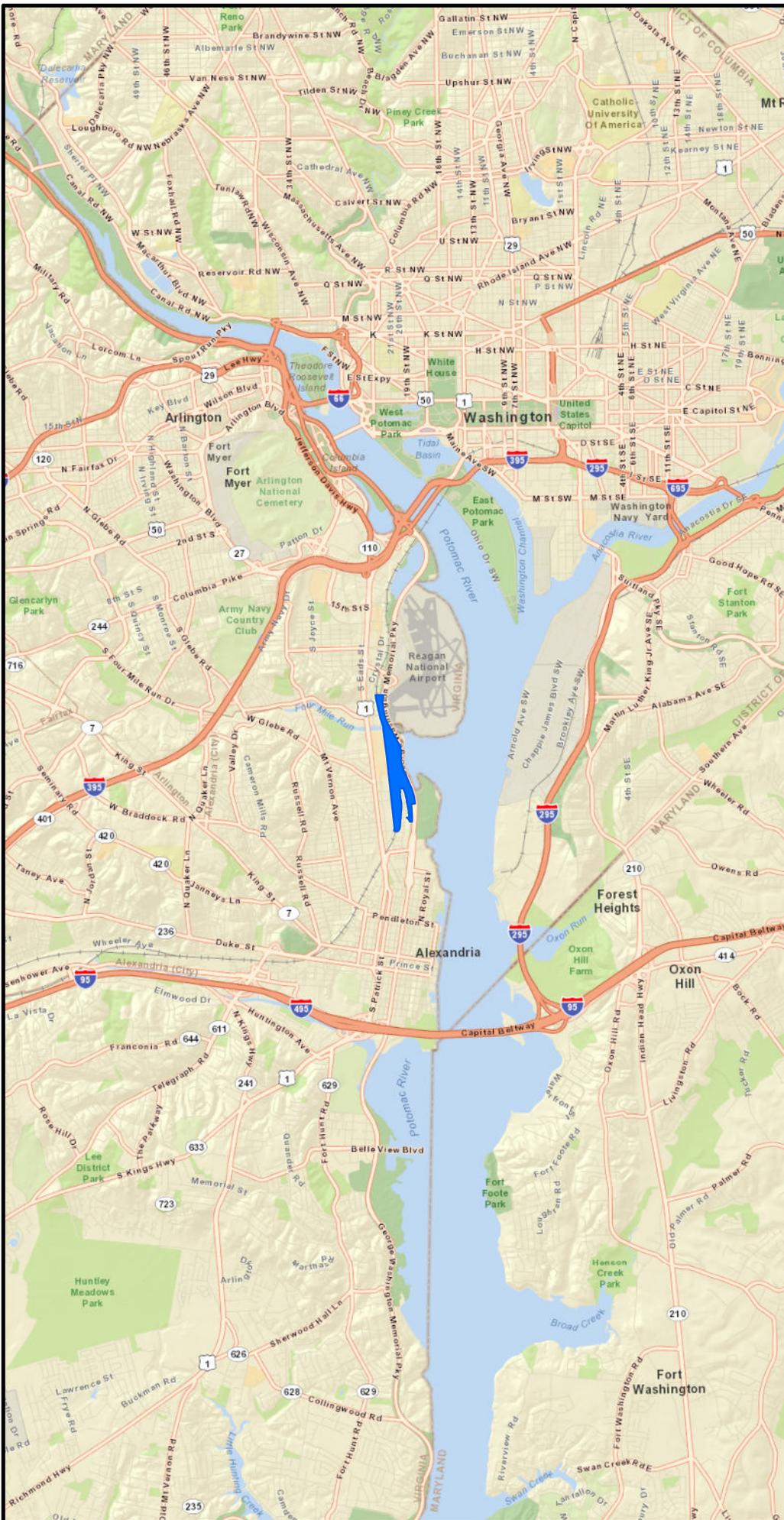




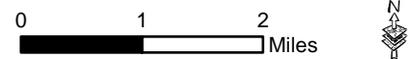
**Figure 1  
Regional Vicinity**

**LEGEND**

- Study Area
- ★ Project Location



Source: ESRI Data & Maps, DeLorme 2009



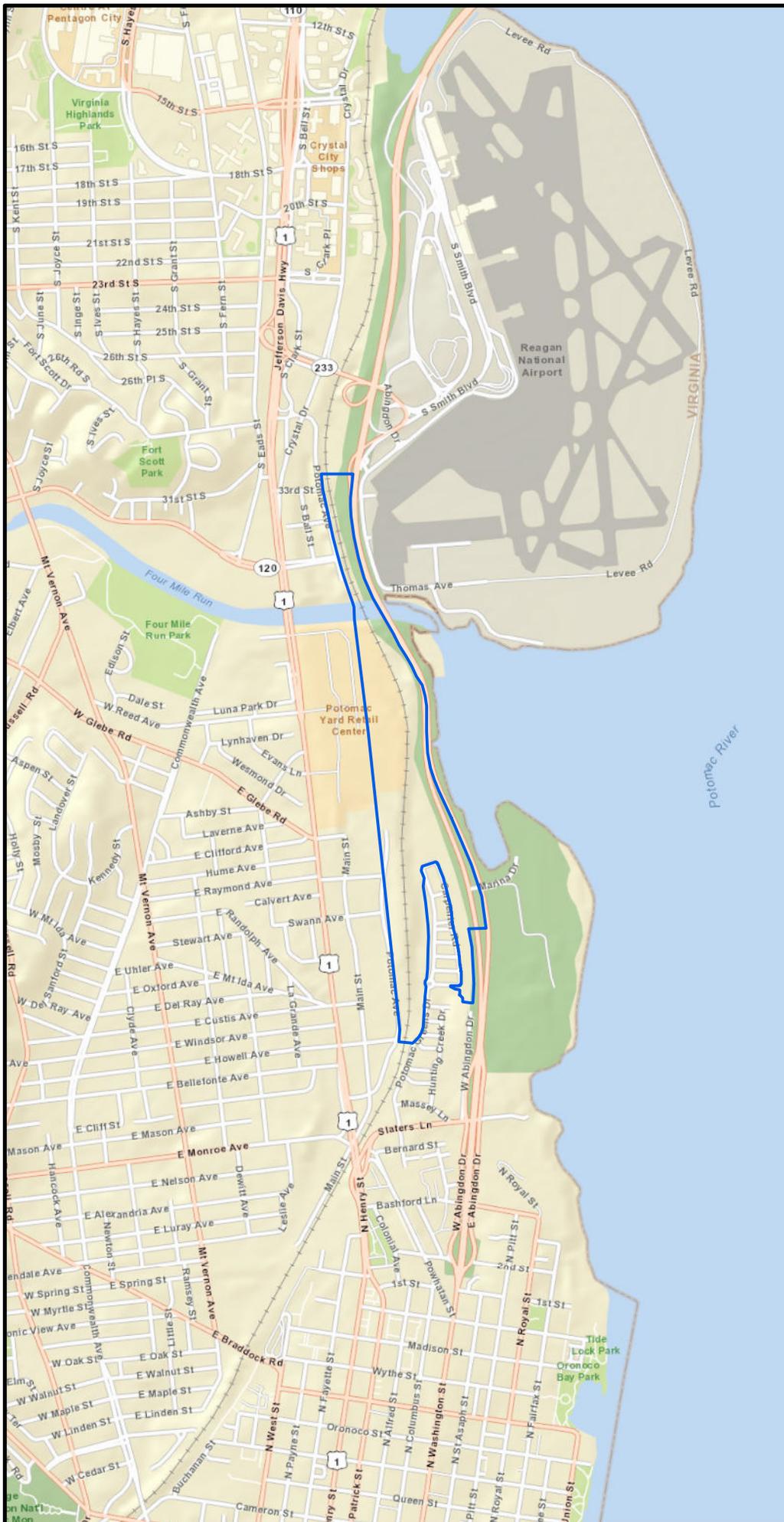
**POTOMAC YARD  
METRORAIL STATION EIS**



**Figure 2  
Local Vicinity**

**LEGEND**

 Study Area



Source: ESRI Data & Maps, DeLorme 2009

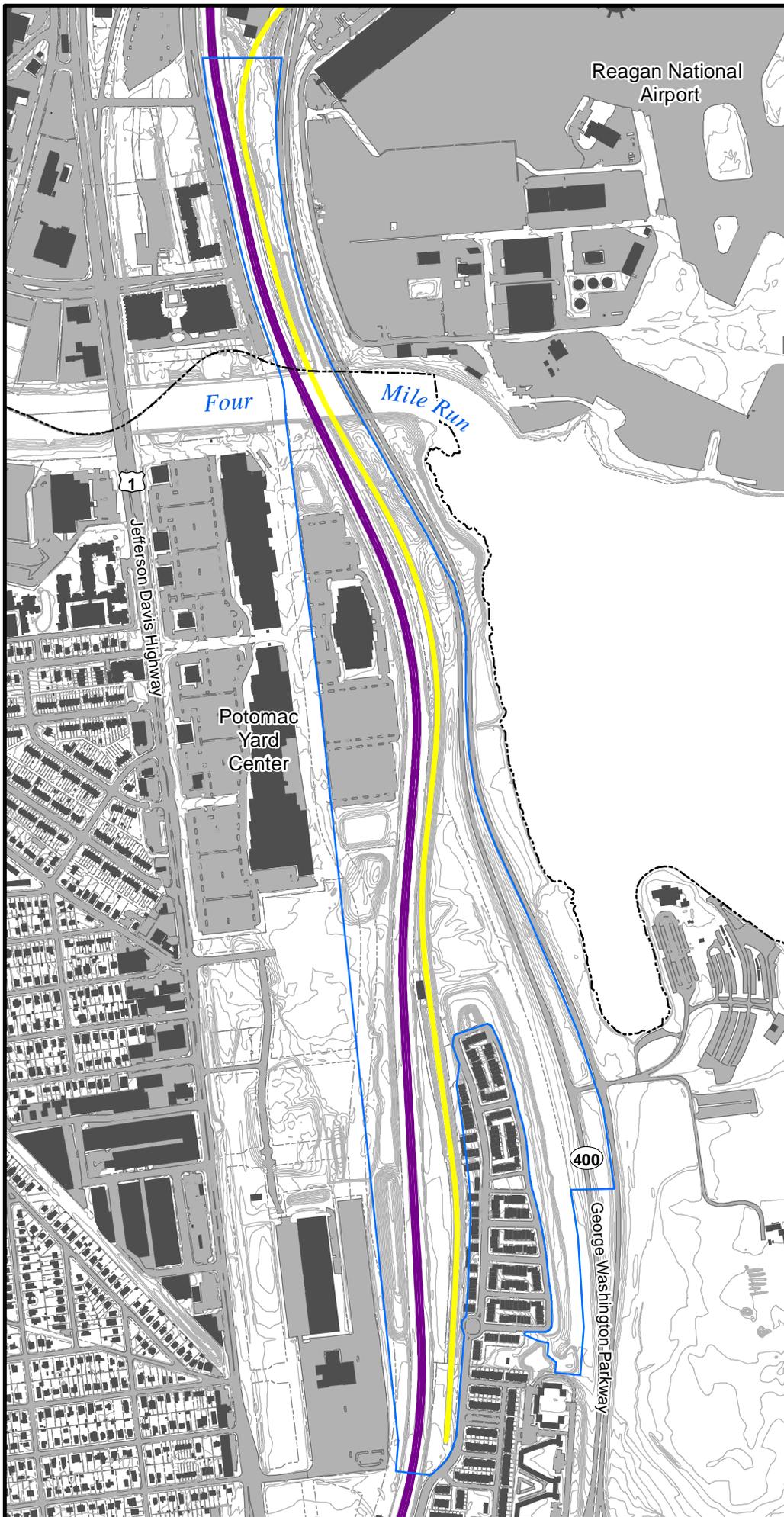
0 1,000 2,000  
Feet



**POTOMAC YARD  
METRORAIL STATION EIS**



**Figure 3  
Existing Features**



**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Building/Structures
- 2 ft Contour
- Paved Surface
- Parcels

Source: City of Alexandria, 2010  
Arlington County 2011  
WMATA 2011

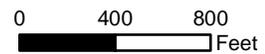
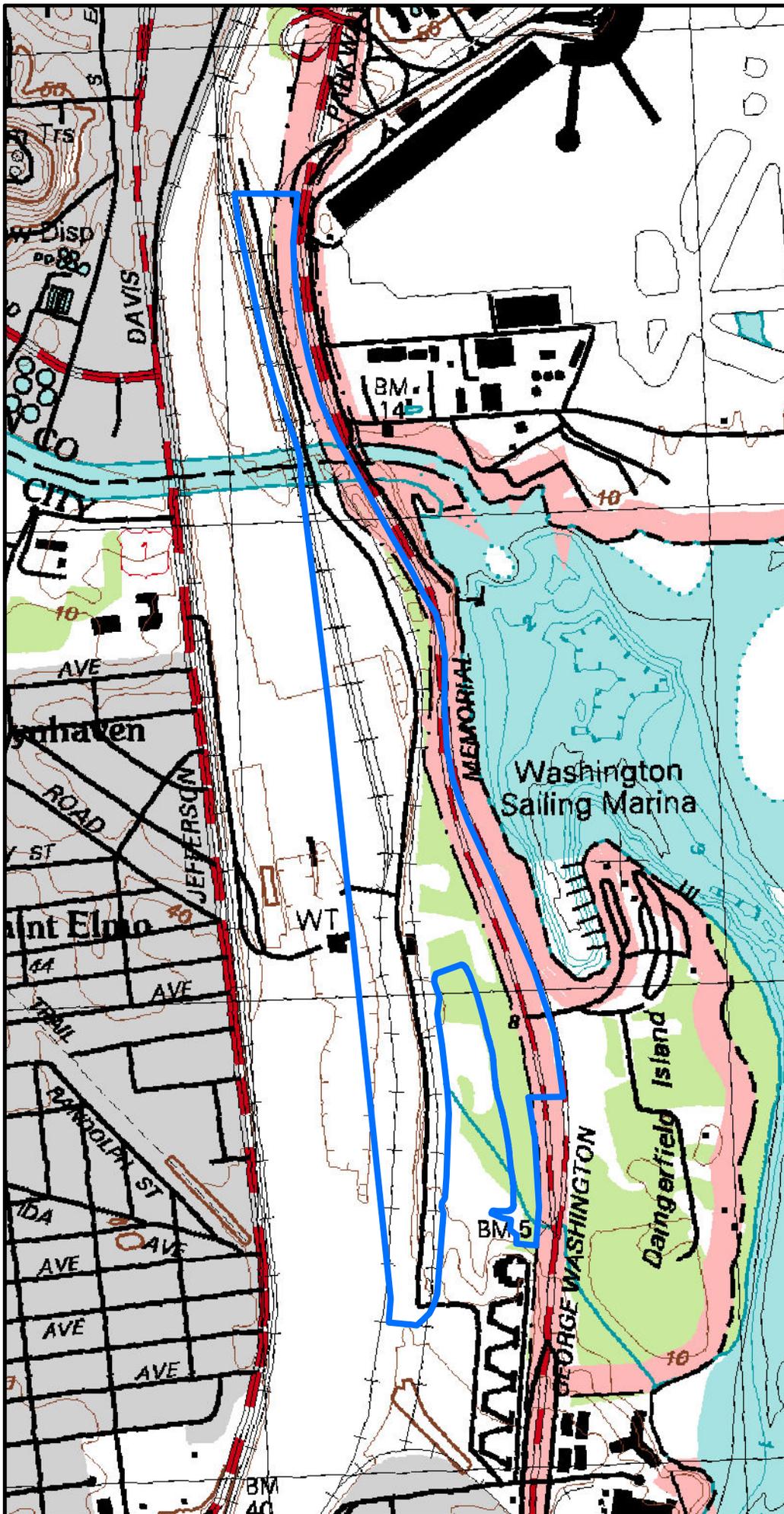




Figure 4  
USGS Topography



LEGEND

- Study Area
- 10ft Contour

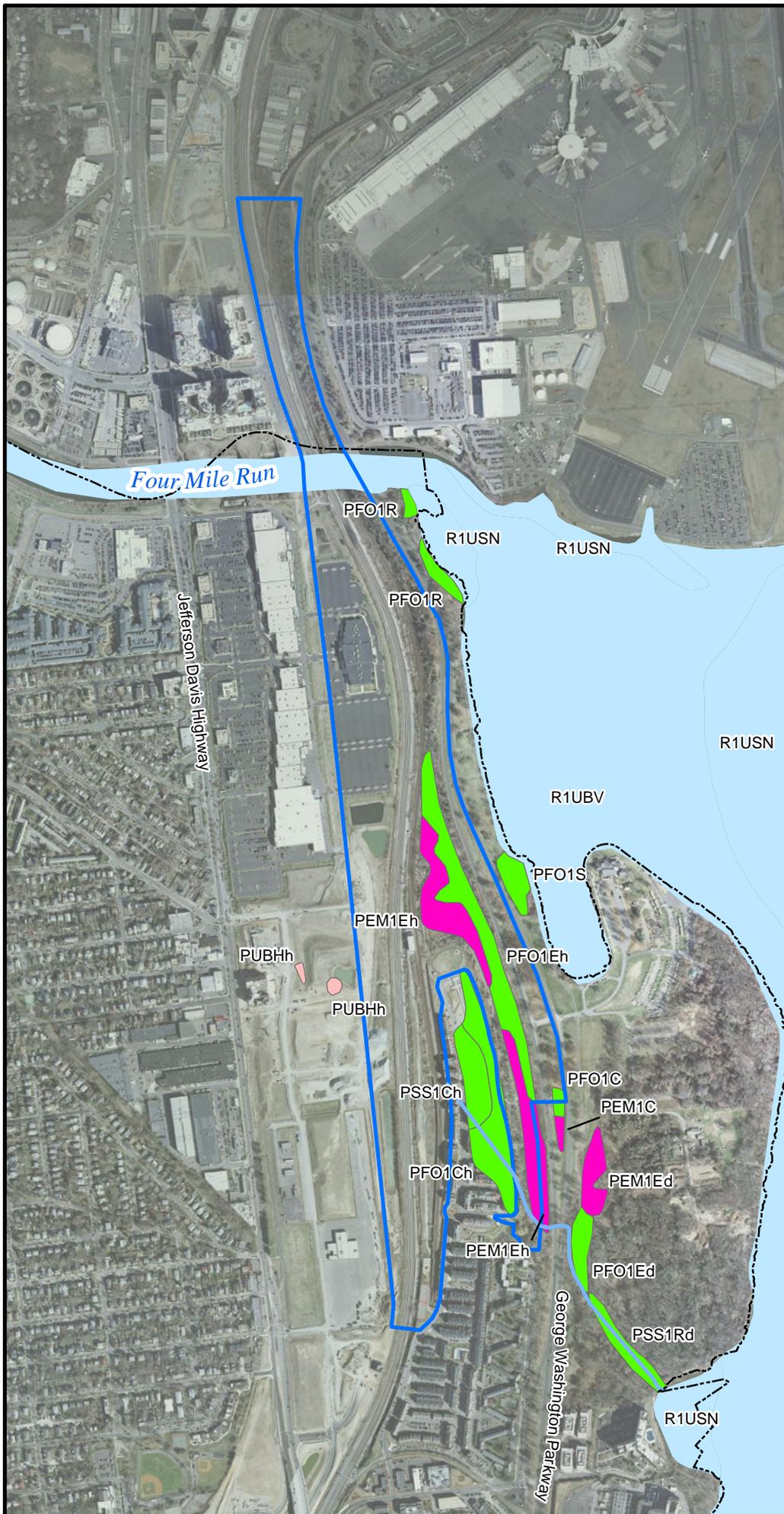
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USGS QUADRANGLE  
38077G1, ALEXANDRIA, 1994



POTOMAC YARD  
METRORAIL STATION EIS



**Figure 5**  
**National Wetland Inventory**  
**and Local Hydrology**



**LEGEND**

- Study Area
- City Boundary
- ~ Stream/Creek
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Source: ESRI Data & Maps 2009  
 USFWS National Wetland  
 Inventory (NWI) 2011  
 USGS National Hydrography  
 Dataset (NHD) 2011

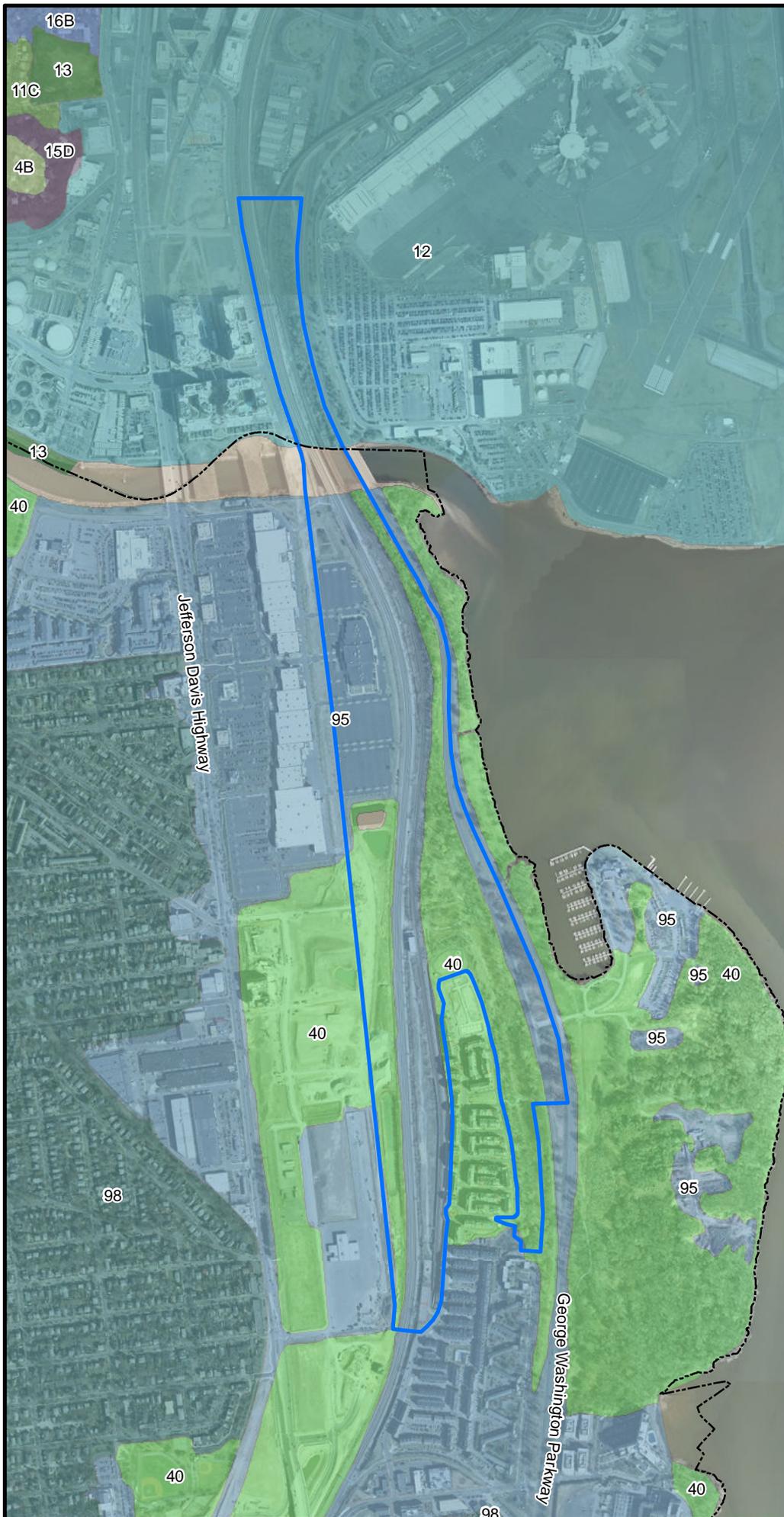
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 Feet



**POTOMAC YARD**  
**METRORAIL STATION EIS**



**Figure 6**  
**NRCS SSURGO Soils**



**LEGEND**

- Study Area
- City Boundary

**Soils found within the Study Area**

- 12 - Urban land-Udorthents Complex
- 40 - Grist Mill Sandy Loam
- 95 - Urban Land

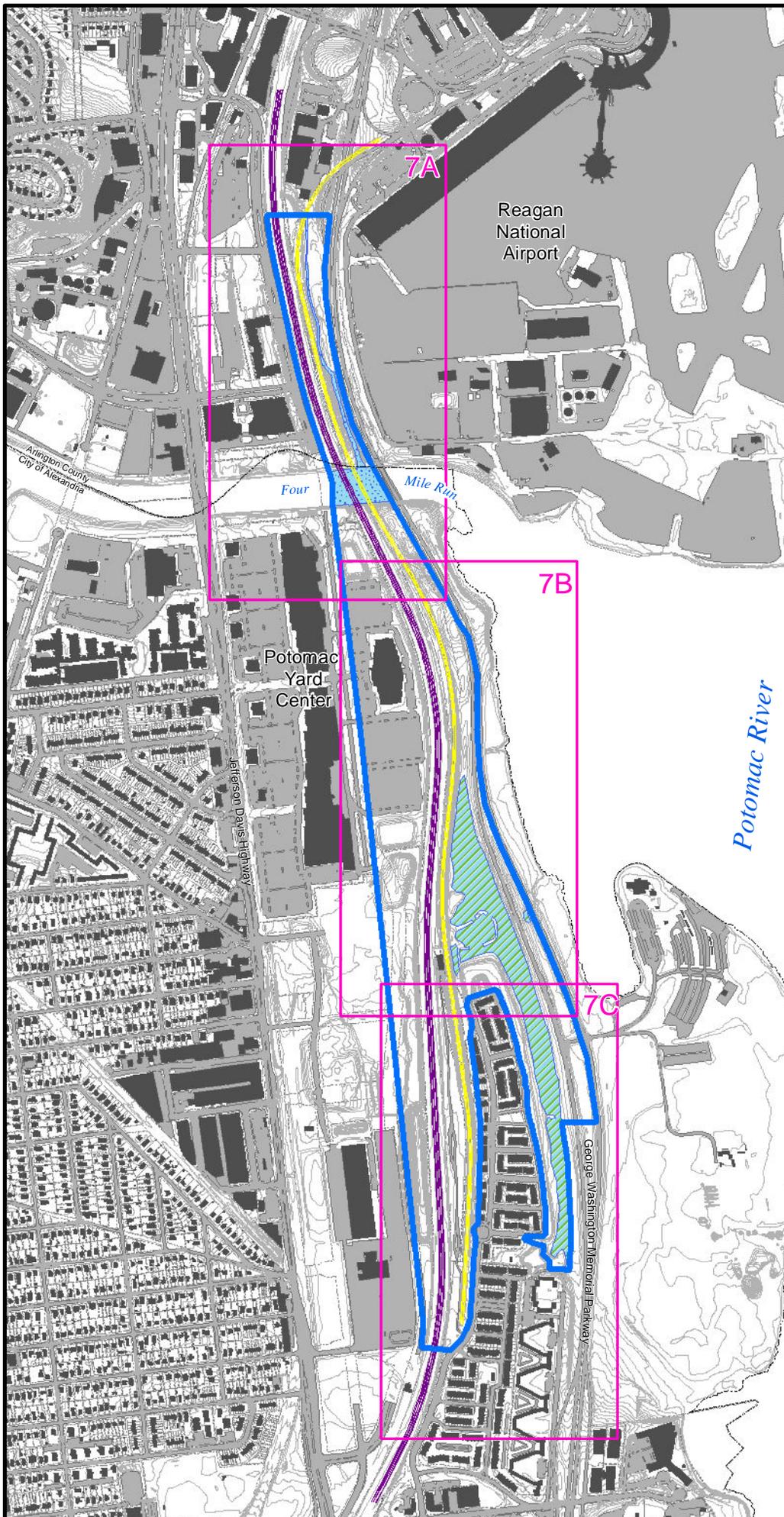
Source: ESRI Data & Maps 2009  
NRCS SSURGO, 2011



**POTOMAC YARD**  
**METRORAIL STATION EIS**



**Figure 7**  
**Wetland Delineation**  
**with Topography - Overall**



**LEGEND**

-  Study Area
-  Waters of the U.S.
-  USACE/Section 404 Wetland
-  Tracks - CSXT
-  Tracks - WMATA
-  Building/Structures
-  2 ft Contour
-  Paved Surfaces
-  Parcels
-  City Boundary
-  Index Grid

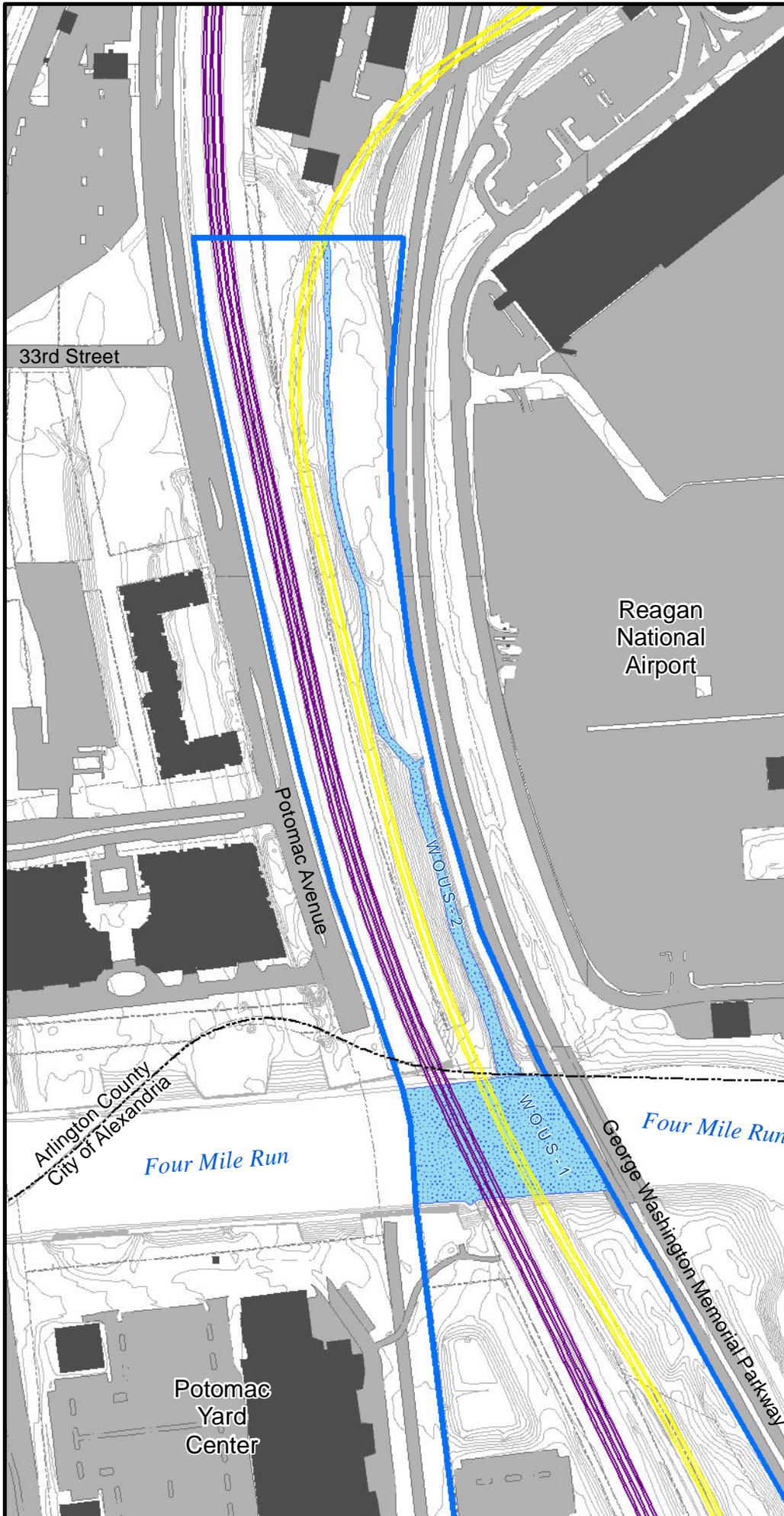
Source: City of Alexandria 2010  
 Arlington County 2011  
 WMATA 2011



**POTOMAC YARD**  
**METRORAIL STATION EIS**



**Figure 7A  
Wetland Delineation  
with Topography - North**



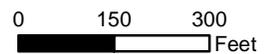
**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Waters of the U.S.
- Building/Structures
- Paved Surfaces
- 2 ft Contour
- Parcels

Wetland ID	Square Feet	Acres	Linear Feet
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>

Note:  
Measurements apply to entire study area.

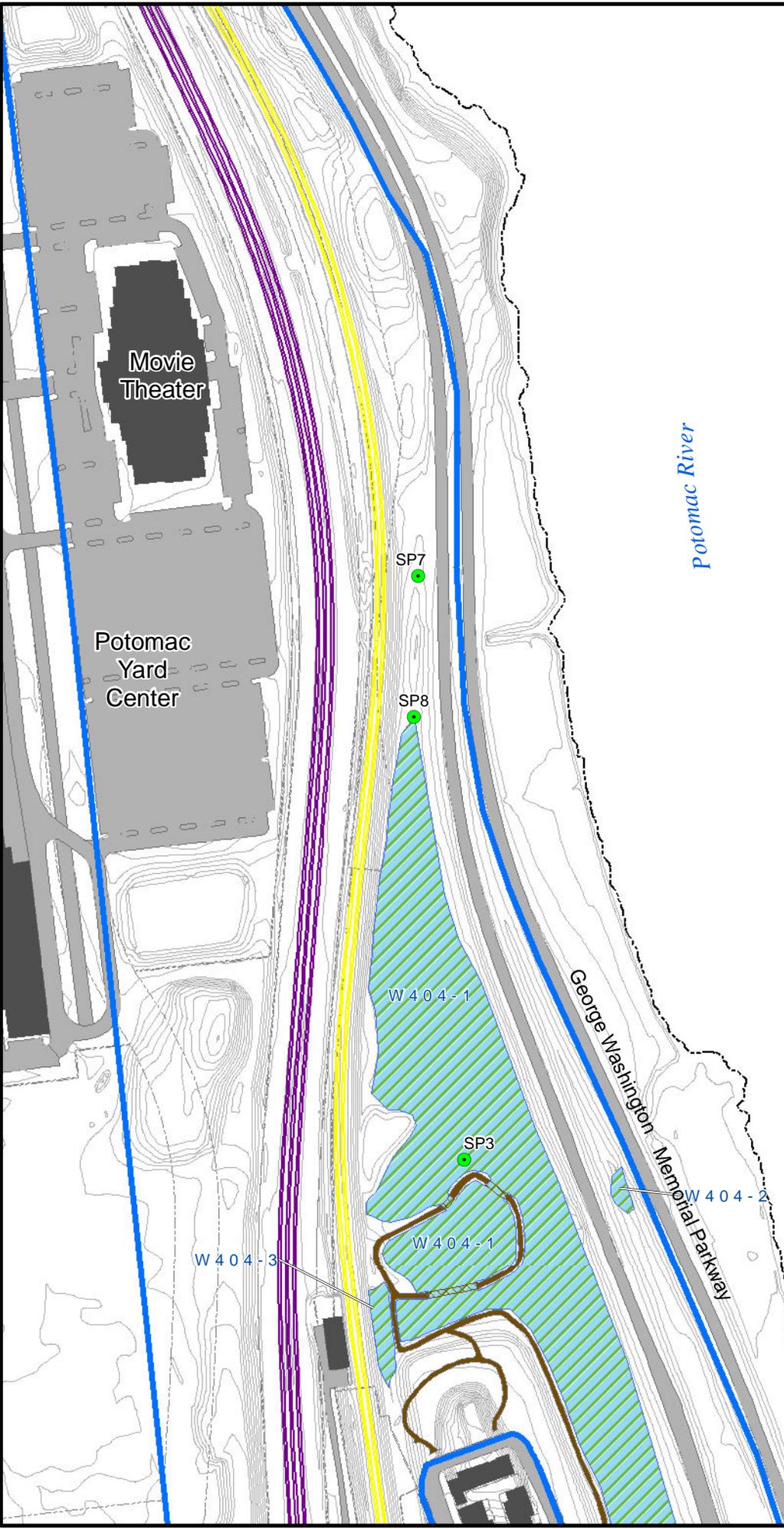
Source: City of Alexandria 2010, WMATA 2011



**POTOMAC YARD  
METRORAIL STATION EIS**



**Figure 7B  
Wetland Delineation  
with Topography - Central**

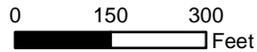


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Wetland Sample Points
- Boardwalk
- Recreational Trail
- USACE/Section 404 Wetland
- Building/Structures
- Paved Surfaces
- 2 ft Contour
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	
<b>Note:</b>			
Measurements apply to entire study area.			

Source: City of Alexandria 2010, WMATA 2011





**Figure 7C  
Wetland Delineation  
with Topography - South**

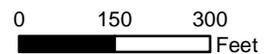


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Wetland Sample Points
- Recreational Trail
- USACE/Section 404 Wetland
- Building/Structures
- Paved Surfaces
- 2 ft Contour
- Parcels

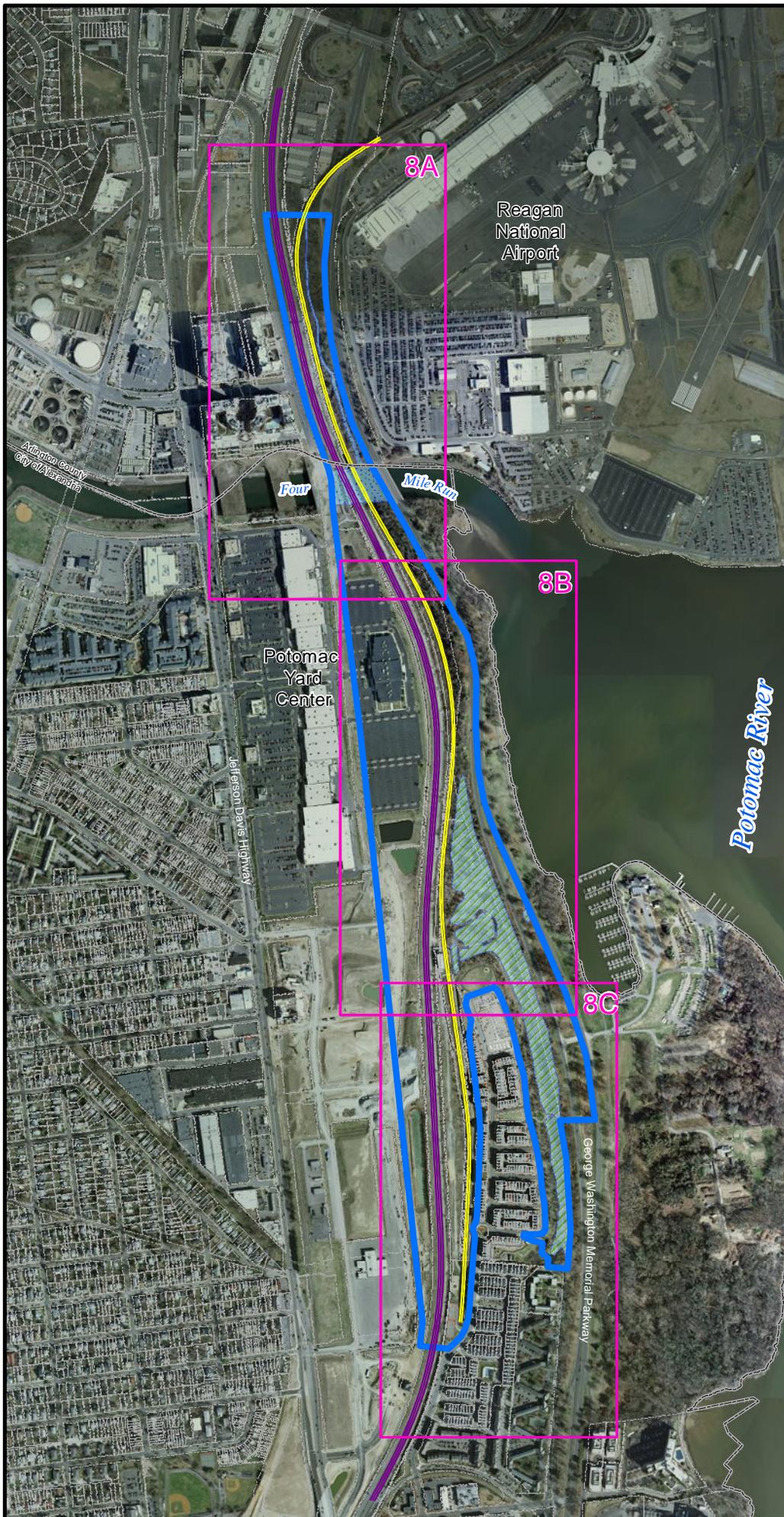
	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
total	540,653	12.42	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
total	115,923	2.66	2191
<b>Study Area</b>	5,129,028	117.75	-
Note: Measurements apply to entire study area.			

Source: City of Alexandria 2010, WMATA 2011





**Figure 8  
Wetland Delineation  
with Aerial Photography -  
Overall**



**LEGEND**

-  Study Area
-  Tracks - WMATA
-  Tracks - CSXT
-  Waters of the U.S.
-  USACE/Section 404 Wetland
-  Parcels
-  City Boundary
-  Index Grid

Source: City of Alexandria 2010  
Arlington County 2011  
WMATA 2011  
ESRI 2011

0 500 1,000  
Feet



**POTOMAC YARD  
METRORAIL STATION EIS**

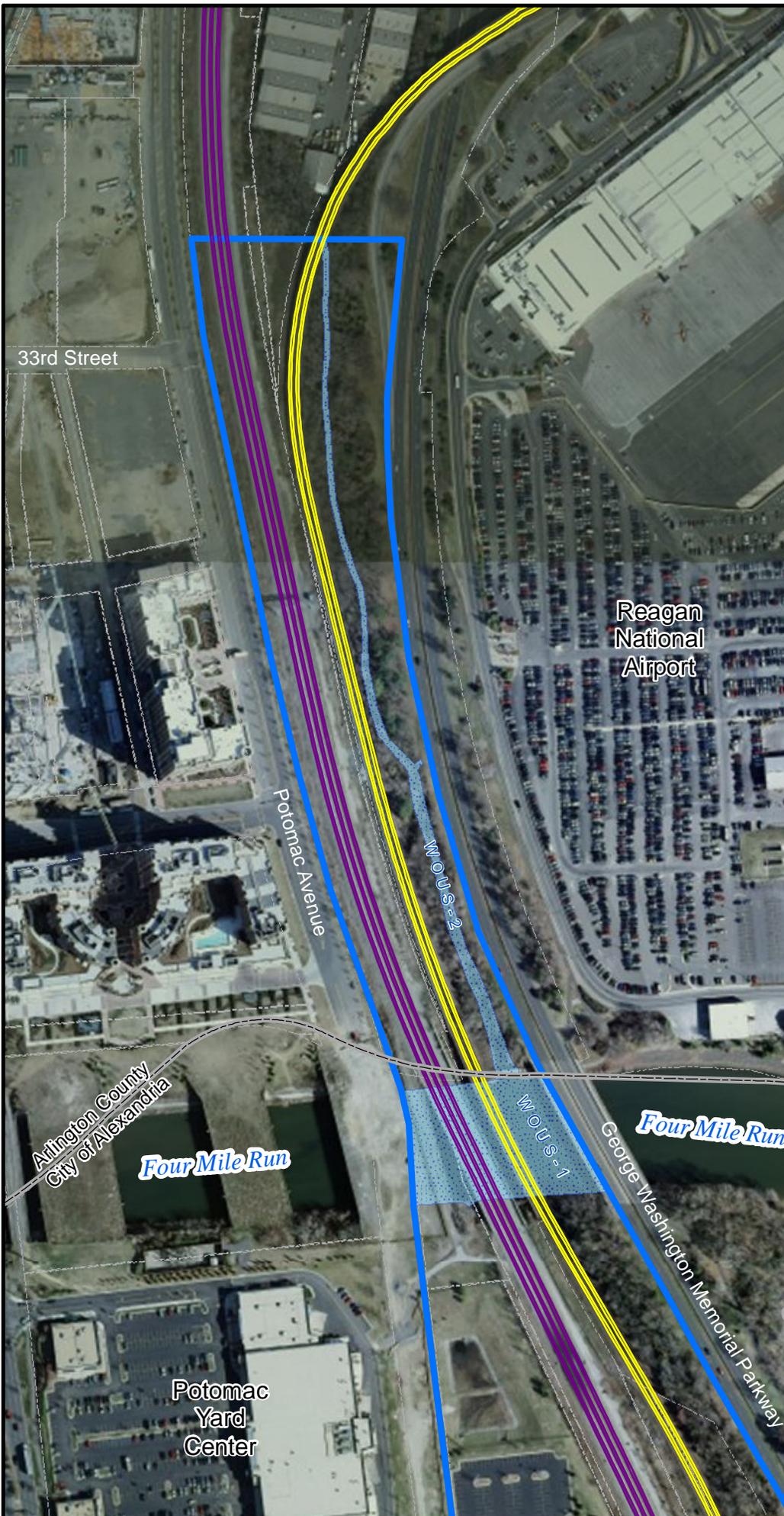


**Figure 8A  
Wetland Delineation  
with Aerial Photography -  
North**

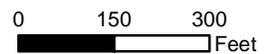
**LEGEND**

-  Study Area
-  City Boundary
-  Tracks - CSXT
-  Tracks - WMATA
-  Waters of the U.S.
-  Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
total	540,653	12.42	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
total	115,923	2.66	2191
<b>Study Area</b>	5,129,028	117.75	-
<b>Note:</b>	Measurements apply to entire study area.		



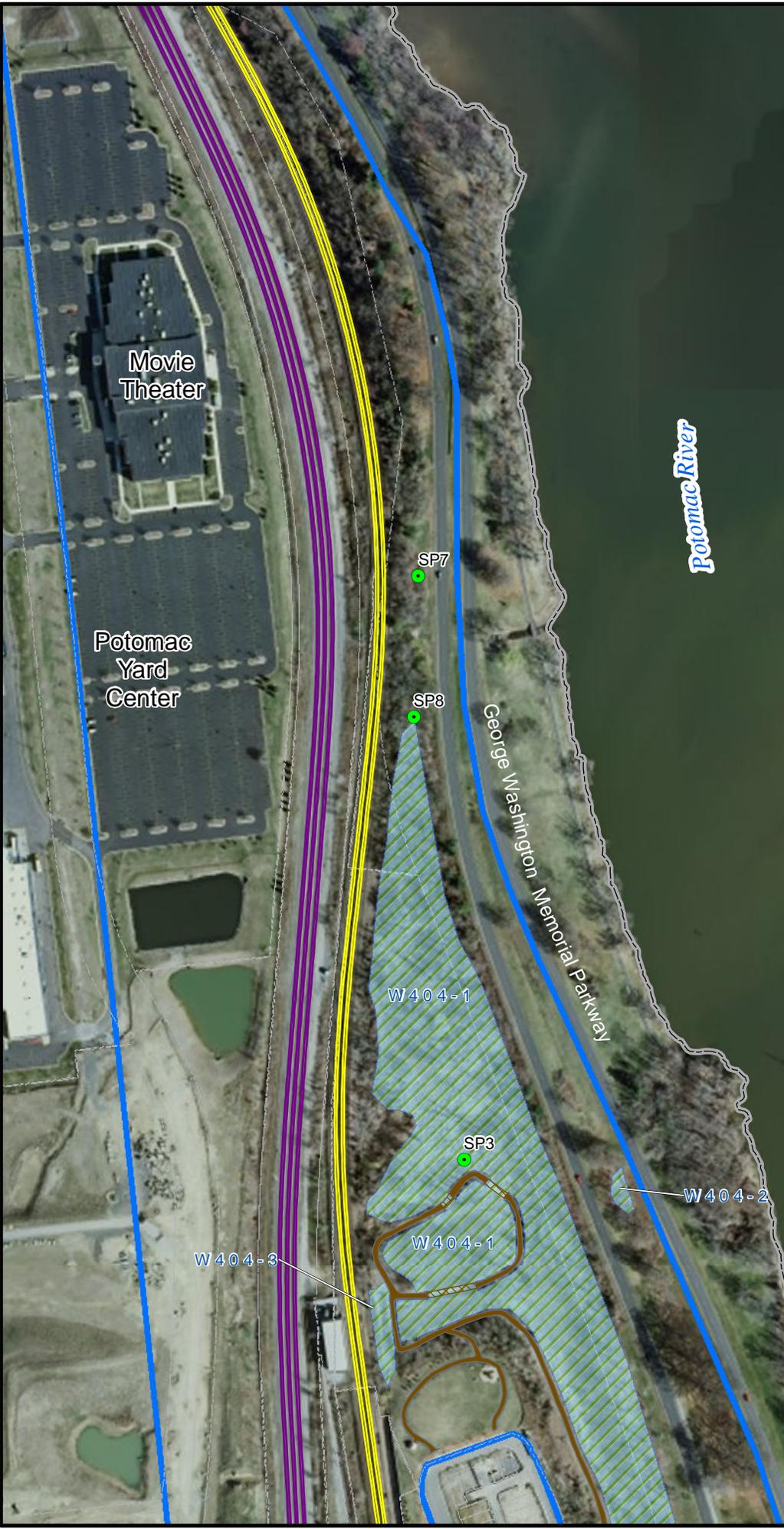
Source: City of Alexandria 2010, WMATA 2011



**POTOMAC YARD  
METRORAIL STATION EIS**



**Figure 8B  
Wetland Delineation  
with Aerial Photography -  
Central**

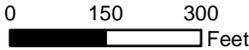


**LEGEND**

- Study Area
- City Boundary
- Tracks - WMATA
- Tracks - CSXT
- Wetland Sample Points
- USACE/Section 404 Wetland
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>			
Measurements apply to entire study area.			

Source: City of Alexandria 2010,  
WMATA 2011, ESRI 2011



**POTOMAC YARD  
METRORAIL STATION EIS**



**Figure 8C  
Wetland Delineation  
with Aerial Photography -  
South**

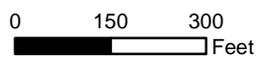


**LEGEND**

- Study Area
- City Boundary
- Tracks - WMATA
- Tracks - CSXT
- Wetland Sample Points
- USACE/Section 404 Wetland
- Parcels

	Square Feet	Acres	Linear Feet
<b>Wetland ID</b>			
W404-1	530,927	12.19	-
W404-2	2,530	0.06	-
W404-3	7,196	0.17	-
<b>total</b>	<b>540,653</b>	<b>12.42</b>	
<b>Waters ID</b>			
WOUS-1	84,106	1.93	396
WOUS-2	31,817	0.73	1795
<b>total</b>	<b>115,923</b>	<b>2.66</b>	<b>2191</b>
<b>Study Area</b>	<b>5,129,028</b>	<b>117.75</b>	<b>-</b>
<b>Note:</b>	Measurements apply to entire study area.		

Source: City of Alexandria 2010, WMATA 2011





**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA PYMS City/County: ALEXANDRIA Sampling Date: 10/28/2011  
 Applicant/Owner: WMATA State: VA Sampling Point: SPI  
 Investigator(s): DF/BK Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): CONCAVE Slope (%): 3%  
 Subregion (LRR or MLRA): LRRP Lat: 38.8270 4725 Long: -77.04399693 Datum: \_\_\_\_\_  
 Soil Map Unit Name: 40-GRIST Mill SANDY LOAM NWI classification: PEM1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N 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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ High Water Table (A2) ___ Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) ___ Marl Deposits (B15) (LRR U) ___ Water Marks (B1) ___ Hydrogen Sulfide Odor (C1) ___ Sediment Deposits (B2) ___ Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Drift Deposits (B3) ___ Presence of Reduced Iron (C4) ___ Algal Mat or Crust (B4) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Iron Deposits (B5) ___ Thin Muck Surface (C7) ___ Inundation Visible on Aerial Imagery (B7) ___ Other (Explain in Remarks)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>10"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>6"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

VEGETATION – Use scientific names of plants.

Sampling Point: SPI

Tree Stratum (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: <u>3</u>	(A)
2. _____				Total Number of Dominant Species Across All Strata: <u>6</u>	(B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.5</u>	(A/B)
4. _____				<b>Prevalence Index worksheet:</b>	
5. _____				Total % Cover of:	Multiply by:
6. _____				OBL species <u>0</u>	x 1 = _____
7. _____				FACW species <u>3</u>	x 2 = <u>6</u>
<u>0</u> = Total Cover				FAC species <u>0</u>	x 3 = _____
<u>0</u> = Total Cover				FACU species <u>0</u>	x 4 = _____
<u>0</u> = Total Cover				UPL species <u>0</u>	x 5 = _____
<u>0</u> = Total Cover				Column Totals: <u>3</u> (A)	<u>6</u> (B)
<u>0</u> = Total Cover				Prevalence Index = B/A = <u>2</u>	
<u>0</u> = Total Cover				<b>Hydrophytic Vegetation Indicators:</b>	
<u>0</u> = Total Cover				<input checked="" type="checkbox"/> Dominance Test is >50%	
<u>0</u> = Total Cover				<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>	
<u>0</u> = Total Cover				<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
<u>0</u> = Total Cover				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
<u>0</u> = Total Cover				<b>Definitions of Vegetation Strata:</b>	
<u>0</u> = Total Cover				<b>Tree</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).	
<u>0</u> = Total Cover				<b>Sapling</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.	
<u>0</u> = Total Cover				<b>Shrub</b> – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.	
<u>0</u> = Total Cover				<b>Herb</b> – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.	
<u>0</u> = Total Cover				<b>Woody vine</b> – All woody vines, regardless of height.	
<u>0</u> = Total Cover				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
<u>0</u> = Total Cover				Remarks: (If observed, list morphological adaptations below).	

SOIL

Sampling Point: SPI

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

Depth (inches)	Matrix		Redox Features			Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>			
0-12"	10YR 4/1	80	10YR 3/4	20	C	M	Clay	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- 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<sup>3</sup>:

- 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)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:

Low chroma

**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA PYMS City/County: ALEXANDRIA Sampling Date: 10/28/2011  
 Applicant/Owner: WMATA State: VA Sampling Point: SP2  
 Investigator(s): DF/BK Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): CONVEX Slope (%): -  
 Subregion (LRR or MLRA): LRRP Lat: 38.82704952 Long: -77.044106404 Datum: -  
 Soil Map Unit Name: 40 - Grist Mill SANDY LOAM NWI classification: NONE  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks:	

**HYDROLOGY**

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

VEGETATION – Use scientific names of plants.

Sampling Point: SP2

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Pinus sylvestris</u>	<u>10</u>	<u>N</u>	<u>N/A</u>	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>3</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.33</u> (A/B)
2.				
3.				
4.				
5.				
6.				
7.				
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = _____ FACW species <u>0</u> x 2 = _____ FAC species <u>2</u> x 3 = <u>6</u> FACU species <u>1</u> x 4 = <u>4</u> UPL species <u>2</u> x 5 = <u>10</u> Column Totals: <u>5</u> (A) <u>20</u> (B)  Prevalence Index = B/A = <u>4</u>
_____ = Total Cover				
1.				
2.				
3.				
4.				
5.				
_____ = Total Cover				<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
_____ = Total Cover				
1.				
2.				
3.				
4.				
5.				
_____ = Total Cover				<b>Definitions of Vegetation Strata:</b>  <b>Tree</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).  <b>Sapling</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.  <b>Shrub</b> – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.  <b>Herb</b> – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.  <b>Woody vine</b> – All woody vines, regardless of height.
_____ = Total Cover				
1. <u>Oxalis stricta</u>	<u>30</u>	<u>Y</u>	<u>UPL</u>	
2. <u>Demotnera biennis</u>	<u>20</u>	<u>N</u>	<u>UPL</u>	
3. <u>Poa pratensis</u>	<u>50</u>	<u>Y</u>	<u>FACU</u>	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
_____ = Total Cover				
_____ = Total Cover				<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
_____ = Total Cover				
1. <u>Toxicodendron radicans</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Lonicera japonica</u>	<u>10</u>	<u>N</u>	<u>FAC-</u>	
3.				
4.				
5.				
_____ = Total Cover				

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

SOIL

Sampling Point: SP2

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 <sup>1</sup>	Loc <sup>2</sup>		
0-10"	10YR 4/3	90					Loamy clay	
10" +	10YR 6/6	100					Sandy loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<b>Hydric Soil Indicators:</b>		<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)	<input type="checkbox"/> 2 cm Muck (A10) (LRR S)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)	<input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20)	
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> (MLRA 153B)	
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Very Shallow Dark Surface (TF12) (LRR T, U)	
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Marl (F10) (LRR U)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)		
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)			

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks:

**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA PYMS City/County: ALEXANDRIA Sampling Date: SP3  
 Applicant/Owner: WMATA State: VA Sampling Point: \_\_\_\_\_  
 Investigator(s): BK/DE Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): none Slope (%): -  
 Subregion (LRR or MLRA): LRRP Lat: 38.83293656 Long: -77.04581236 Datum: \_\_\_\_\_  
 Soil Map Unit Name: 40-First Mill Sandy Loam NWI classification: Pem  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil Y, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No ?  
 Are Vegetation N, Soil Y, or Hydrology N 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 <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Remarks: <p style="font-size: 1.2em; margin: 0;"><i>INVASIVE SPECIES ARE EXTREMELY ABUNDANT = NORMAL?</i></p> <p style="font-size: 1.2em; margin: 0;"><i>SITE WAS FORMERLY LISTED BY EPA AS A SUPERFUND SITE - VOCs</i></p>	

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators:</b></p> <p><u>Primary Indicators (minimum of one is required; check all that apply)</u></p> ___ Surface Water (A1)      ___ Water-Stained Leaves (B9) ___ High Water Table (A2)      ___ Aquatic Fauna (B13) <u>X</u> Saturation (A3)      ___ Marl Deposits (B15) (LRR U) ___ Water Marks (B1)      ___ Hydrogen Sulfide Odor (C1) ___ Sediment Deposits (B2)      ___ Oxidized Rhizospheres on Living Roots (C3) ___ Drift Deposits (B3)      ___ Presence of Reduced Iron (C4) ___ Algal Mat or Crust (B4)      ___ Recent Iron Reduction in Tilled Soils (C6) ___ Iron Deposits (B5)      ___ Thin Muck Surface (C7) ___ Inundation Visible on Aerial Imagery (B7)      ___ Other (Explain in Remarks)	<p><u>Secondary Indicators (minimum of two required)</u></p> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ FAC-Neutral Test (D5)
<p><b>Field Observations:</b></p> Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes _____ No _____ Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>4-8"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION – Use scientific names of plants.

Sampling Point: SP3

	Absolute % Cover	Dominant Species?	Indicator Status	
<b>Tree Stratum</b> (Plot size: _____ )				<b>Dominance Test worksheet:</b>
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.66</u> (A/B)
4. _____				
5. _____				
6. _____				
7. _____				
_____ = Total Cover				<b>Prevalence Index worksheet:</b>
<b>Sapling Stratum</b> (Plot size: _____ )				Total % Cover of: _____ Multiply by: _____
1. _____				OBL species _____ x 1 = _____
2. _____				FACW species <u>2</u> x 2 = <u>4</u>
3. _____				FAC species _____ x 3 = _____
4. _____				FACU species _____ x 4 = _____
5. _____				UPL species _____ x 5 = _____
6. _____				Column Totals: <u>2</u> (A) <u>4</u> (B)
7. _____				Prevalence Index = B/A = <u>2</u>
_____ = Total Cover				<b>Hydrophytic Vegetation Indicators:</b>
<b>Shrub Stratum</b> (Plot size: <u>0.10 ac</u> )				<input checked="" type="checkbox"/> Dominance Test is >50%
1. <u>Paulownia tomentosa</u>	<u>10</u>	<u>N</u>	<u>N/A</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>
2. _____				<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
_____ = Total Cover				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<b>Herb Stratum</b> (Plot size: <u>.10 ac</u> )				<b>Definitions of Vegetation Strata:</b>
1. <u>Phragmites australis</u>	<u>75</u>	<u>Y</u>	<u>FACW</u>	<b>Tree</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).
2. <u>Impatiens capensis</u>	<u>25</u>	<u>Y</u>	<u>FACW</u>	<b>Sapling</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
3. _____				<b>Shrub</b> – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
4. _____				<b>Herb</b> – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.
5. _____				<b>Woody vine</b> – All woody vines, regardless of height.
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
<u>10</u> = Total Cover				
<b>Woody Vine Stratum</b> (Plot size: <u>.10 ac</u> )				
1. <u>Ampelopsis brevipedunculata</u>	<u>100</u>	<u>Y</u>	<u>N/A</u>	
2. _____				
3. _____				
4. _____				
5. _____				
<u>100</u> = Total Cover				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

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

SOIL

Sampling Point: SP3

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 <sup>1</sup>	Loc <sup>2</sup>		
0-16"	GY S10Y	100	10YR 3/4	10	C	M	Loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Marl (F10) (LRR U)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	

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)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_  
 Hydric Soil Present? Yes  No

Remarks:

- Soil is heavily impacted from former Railyard
- EPA listed several metals present in soils
- Heavy diesel smell in soils.



VEGETATION – Use scientific names of plants.

Sampling Point: SP4

Tree Stratum (Plot size: <u>.10 ac</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>FRAXINUS pennsylvanica</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>10</u> = Total Cover			
Sapling Stratum (Plot size: <u>.10 ac</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>FRAXINUS pennsylvanica</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>
2. <u>ACER rubrum</u>	<u>10</u>	<u>N</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>25</u> = Total Cover			
Shrub Stratum (Plot size: <u>.10 ac</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
<u>25</u> = Total Cover			
Herb Stratum (Plot size: <u>.10 ac</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Poa pratensis</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>
2. <u>Lespedeza cuneata</u>	<u>30</u>	<u>Y</u>	<u>NI</u>
3. <u>Andropogon virginicus</u>	<u>10</u>	<u>N</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
<u>70</u> = Total Cover			
Woody Vine Stratum (Plot size: <u>.10 ac</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Hedra helix</u>	<u>10</u>	<u>N</u>	<u>N/A</u>
2. <u>Lonicera japonica</u>	<u>10</u>	<u>N</u>	<u>N/A</u>
3. <u>Ampelopsis brevipedunculata</u>	<u>10</u>	<u>N</u>	<u>N/A</u>
4. <u>Vitis riparia</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>
5. _____	_____	_____	_____
<u>60</u> = Total Cover			

**Dominance Test worksheet:**

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.6 (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species <u>3</u>	x 2 = <u>6</u>
FAC species _____	x 3 = _____
FACU species <u>2</u>	x 4 = <u>8</u>
UPL species _____	x 5 = _____
Column Totals: <u>5</u> (A)	<u>14</u> (B)

Prevalence Index = B/A = 2.8

**Hydrophytic Vegetation Indicators:**

Dominance Test is >50%

Prevalence Index is ≤3.0<sup>1</sup>

Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

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

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes  No

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



**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA P/MS City/County: Alexandria Sampling Date: 12/6/2011  
 Applicant/Owner: WMATA State: VA Sampling Point: SP5  
 Investigator(s): DF/BSK Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): - Local relief (concave, convex, none): - Slope (%): 21  
 Subregion (LRR or MLRA): LRRP Lat: 38.83055193490 Long: -77.0441918679 Datum: \_\_\_\_\_  
 Soil Map Unit Name: 40-Grist Mill Sandy loam NWI classification: none  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Remarks:	

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b> Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<b>Secondary Indicators (minimum of two required)</b> <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)
<b>Field Observations:</b> Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	



SOIL

Sampling Point: SP3

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 <sup>1</sup>	Loc <sup>2</sup>		
1-12"	10YR 7/2						Sand Loam	Black line ca. 10"

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

- |  |   |
|--|---|
| <b>Hydric Soil Indicators:</b>                                 | <b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>                         |
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)                 |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)                       |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)                           |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                                   |
| <input type="checkbox"/> Stratified Layers (A5)                | <input type="checkbox"/> Depleted Matrix (F3)                                       |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                                    |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                                 |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                                     |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)   |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)                           |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)                  |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)                         |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)   | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)                              |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)                     |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)                |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D) |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |   |
- <sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks:

Around 10" depth. A black line appears in soil profile. Smells like "diesel"? Possible VOC contamination from previous Y&ED use.

**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA PYMS City/County: Alexandria Sampling Date: 12/6/2001  
 Applicant/Owner: WMATA State: VA Sampling Point: SP6  
 Investigator(s): BK/DF Section, Township, Range: -  
 Landform (hillslope, terrace, etc.): - Local relief (concave, convex, none): - Slope (%): 3  
 Subregion (LRR or MLRA): LRR P Lat: 38.83055585 Long: -77.0441789 Datum: -  
 Soil Map Unit Name: 40-Guest Mill Sandy loam NWI classification: NONE  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No - (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No -  
 Are Vegetation N, Soil N, or Hydrology N 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 <u>-</u> No <u>X</u> Hydric Soil Present? Yes <u>-</u> No <u>X</u> Wetland Hydrology Present? Yes <u>X</u> No <u>-</u>	Is the Sampled Area within a Wetland? Yes <u>-</u> No <u>X</u>
Remarks:	

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1)      ___ Water-Stained Leaves (B9) ___ High Water Table (A2)      ___ Aquatic Fauna (B13) <u>X</u> Saturation (A3)      ___ Marl Deposits (B15) (LRR U) ___ Water Marks (B1)      ___ Hydrogen Sulfide Odor (C1) ___ Sediment Deposits (B2)      ___ Oxidized Rhizospheres on Living Roots (C3) ___ Drift Deposits (B3)      ___ Presence of Reduced Iron (C4) ___ Algal Mat or Crust (B4)      ___ Recent Iron Reduction in Tilled Soils (C6) ___ Iron Deposits (B5)      ___ Thin Muck Surface (C7) ___ Inundation Visible on Aerial Imagery (B7)      ___ Other (Explain in Remarks)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ FAC-Neutral Test (D5)
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<b>Field Observations:</b> Surface Water Present? Yes <u>-</u> No <u>-</u> Depth (inches): <u>-</u> Water Table Present? Yes <u>X</u> No <u>-</u> Depth (inches): <u>18"</u> Saturation Present? (includes capillary fringe) Yes <u>X</u> No <u>-</u> Depth (inches): <u>10"</u>	Wetland Hydrology Present? Yes <u>X</u> No <u>-</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
*High water table & saturation could be due to recent rain event - approx. 2-3" of rain fell during last 24-48 hrs.*

**VEGETATION** – Use scientific names of plants.

Sampling Point: SP6

Tree Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b>	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)	
2. _____				Total Number of Dominant Species Across All Strata: <u>2</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)	
4. _____				<b>Prevalence Index worksheet:</b>	
5. _____				Total % Cover of:	Multiply by:
6. _____				OBL species _____ x 1 = _____	
7. _____				FACW species _____ x 2 = _____	
				FAC species _____ x 3 = _____	
				FACU species <u>2</u> x 4 = <u>8</u>	
				UPL species _____ x 5 = _____	
				Column Totals: <u>2</u> (A) <u>8</u> (B)	
				Prevalence Index = B/A = <u>4</u>	
				<b>Hydrophytic Vegetation Indicators:</b>	
				<input type="checkbox"/> Dominance Test is >50%	
				<input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>	
				<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
				<b>Definitions of Vegetation Strata:</b>	
				<b>Tree</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).	
				<b>Sapling</b> – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.	
				<b>Shrub</b> – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.	
				<b>Herb</b> – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.	
				<b>Woody vine</b> – All woody vines, regardless of height.	
				<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>	
<b>Herb Stratum</b> (Plot size: _____ ) _____ = Total Cover 1. <u>Poa pratensis</u> <u>100</u> <u>Y</u> <u>FACU</u> 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____					
<b>Woody Vine Stratum</b> (Plot size: _____ ) _____ = Total Cover 1. <u>Lonicera japonica</u> <u>20</u> <u>N</u> <u>N/A</u> 2. <u>Allium schoenoprasum</u> <u>30</u> <u>Y</u> <u>FACU</u> 3. _____ 4. _____ 5. _____					
_____ = Total Cover _____ = Total Cover					

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

*Area is Regularly mowed*

SOIL

Sampling Point: SP6

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 <sup>1</sup>	Loc <sup>2</sup>		
1-4"	10YR	4/3					Sandy loam	
4"-12"	10YR	4/2					Sandy clay loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Marl (F10) (LRR U)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	

- 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)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if observed):</b> Type: _____ Depth (inches): _____	Hydric Soil Present? Yes _____ No <u>X</u>
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Remarks:

**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA PYms City/County: Alexandria Sampling Date: 12/6/2011  
 Applicant/Owner: WMATA State: VA Sampling Point: SP7  
 Investigator(s): DF/BK Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): - Local relief (concave, convex, none): - Slope (%): -  
 Subregion (LRR or MLRA): LRRP Lat: 38.8362242838 Long: -77.0460778221 Datum: -  
 Soil Map Unit Name: 40-GRST Mill Sandy Loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N 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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:   	

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks)	<u>Secondary Indicators (minimum of two required)</u> <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)
<b>Field Observations:</b> Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes _____ No _____ Depth (inches): _____ Saturation Present? Yes _____ No _____ Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  	
Remarks:   	

VEGETATION – Use scientific names of plants.

Sampling Point: SP7

Tree Stratum (Plot size: <u>.10 ac</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Betula nigra</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A)
2. <u>Acer rubrum</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	Total Number of Dominant Species Across All Strata: <u>7</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.85</u> (A/B)
4. _____				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species <u>3</u> x 2 = <u>6</u> FAC species <u>3</u> x 3 = <u>9</u> FACU species <u>3</u> x 4 = <u>12</u> UPL species _____ x 5 = _____ Column Totals: <u>9</u> (A) <u>27</u> (B)  Prevalence Index = B/A = <u>3</u>
5. _____				
6. _____				
7. _____				
<u>60</u> = Total Cover				
<b>Sapling Stratum (Plot size: <u>.10 ac</u>)</b>				
1. <u>Salix nigra</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
<u>20</u> = Total Cover				
<b>Shrub Stratum (Plot size: <u>.10 ac</u>)</b>				
1. <u>Lonicera japonica</u>	<u>30</u>	<u>Y</u>	<u>FAC-</u>	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
<u>30</u> = Total Cover				
<b>Herb Stratum (Plot size: <u>.10 ac</u>)</b>				
1. <u>Alliaria petiolata</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	
2. <u>Ilex decidua</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
3. <u>Andropogon virginicus</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
4. <u>Solidago altissima</u>	<u>10</u>	<u>N</u>	<u>FACU-</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
<u>80</u> = Total Cover				
<b>Woody Vine Stratum (Plot size: <u>.10 ac</u>)</b>				
1. <u>Hedera helix</u>	<u>10</u>	<u>N</u>	<u>N/A</u>	
2. <u>Smilax rotundifolia</u>	<u>90</u>	<u>Y</u>	<u>FAC</u>	
3. _____				
4. _____				
5. _____				
<u>50</u> = Total Cover				
<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Remarks: (If observed, list morphological adaptations below).				

SOIL

Sampling Point: SP7

**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 <sup>1</sup>	Loc <sup>2</sup>		
1-4"	10YR 4/2						Sandy Loam Clay	
4-12"	10YR 4/3						Sand Clay Loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.      <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)	<input type="checkbox"/> 1 cm Muck (A9) (LRR O)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)	<input type="checkbox"/> 2 cm Muck (A10) (LRR S)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)	<input type="checkbox"/> Reduced Vertic (F18) (outside MLRA 150A,B)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (LRR P, S, T)
<input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 153B)
<input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Muck Presence (A8) (LRR U)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12) (LRR T, U)
<input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Marl (F10) (LRR U)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)	
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR O, S)	<input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Delta Ochric (F17) (MLRA 151)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A)	
<input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)	<input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)	

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks:

**WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: WMATA PYMS City/County: Alexandria Sampling Date: 12/6/2011  
 Applicant/Owner: WMATA State: VA Sampling Point: SP8  
 Investigator(s): DF/BK Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 2  
 Subregion (LRR or MLRA): LRR-P Lat: 38.83543025630 Long: -97.096122707 Datum: \_\_\_\_\_  
 Soil Map Unit Name: 4p-Grist Sandy Loam mill NWI classification: PFO  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N 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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: _____ _____ _____	

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b> Primary Indicators (minimum of one is required; check all that apply) ___ Surface Water (A1)      ___ Water-Stained Leaves (B9) ___ High Water Table (A2)      ___ Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3)      ___ Marl Deposits (B15) (LRR U) ___ Water Marks (B1)      ___ Hydrogen Sulfide Odor (C1) ___ Sediment Deposits (B2)      ___ Oxidized Rhizospheres on Living Roots (C3) ___ Drift Deposits (B3)      ___ Presence of Reduced Iron (C4) ___ Algal Mat or Crust (B4)      ___ Recent Iron Reduction in Tilled Soils (C6) ___ Iron Deposits (B5)      ___ Thin Muck Surface (C7) ___ Inundation Visible on Aerial Imagery (B7)      ___ Other (Explain in Remarks)	<b>Secondary Indicators (minimum of two required)</b> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ FAC-Neutral Test (D5)
<b>Field Observations:</b> Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes _____ No _____ Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>10"</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: _____ _____	
Remarks: _____ _____ _____	

**VEGETATION** – Use scientific names of plants.

Sampling Point: \_\_\_\_\_

Tree Stratum (Plot size: .10 ac )	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Fraxinus pennsylvanica</i>	15	N	FACW
2. <i>Ulmus americana</i>	10	N	FACW
3.			
4.			
5.			
6.			
7.			

**Dominance Test worksheet:**

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.85 (A/B)

= Total Cover

Sapling Stratum (Plot size: .10 ac )	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Salix nigra</i>	10	N	FACW
2. <i>Betula nigra</i>	10	N	FACW
3.			
4.			
5.			
6.			
7.			

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species <u>7</u>	x 2 = <u>14</u>
FAC species <u>3</u>	x 3 = <u>9</u>
FACU species <u>2</u>	x 4 = <u>8</u>
UPL species	x 5 =
Column Totals: <u>12</u> (A)	<u>31</u> (B)

Prevalence Index = B/A = 2.58

= Total Cover

Shrub Stratum (Plot size: .10 ac )	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Cornus amomum</i>	20	Y	FACW
2. <i>Morus rubra</i>	10	N	FACU
3. <i>Lonicera japonica</i>	20	Y	FAC-
4.			
5.			
6.			
7.			

**Hydrophytic Vegetation Indicators:**

Dominance Test is >50%

Prevalence Index is ≤3.0<sup>1</sup>

Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

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

= Total Cover

Herb Stratum (Plot size: .10 ac )	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Solidago altissima</i>	20	Y	FACU
2. <i>Solidago gracillima</i>	10	N	NE
3. <i>Phragmites australis</i>	20	Y	FACW
4. <i>Ilex decidua</i>	20	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

= Total Cover

Woody Vine Stratum (Plot size: .10 ac )	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Toxicodendron radicans</i>	25	Y	FAC
2. <i>Smilax rotundifolia</i>	25	Y	FAC
3.			
4.			
5.			

= Total Cover

**Hydrophytic Vegetation Present?** Yes  No

Remarks: (If observed, list morphological adaptations below)

SOIL

Sampling Point: SP8

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 <sup>1</sup>	Loc <sup>2</sup>		
1-10"	2.5Y 2/1	100	10Y2 5/4	20	C	M		Muck Brown Clay Loam
10+"	Gley 4/10Y	100					Clay	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- 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<sup>3</sup>:

- 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)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:



United States  
Department of  
Agriculture



**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for Alexandria City, Virginia, and Arlington County, Virginia



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrsc>) or your NRCS State Soil Scientist ([http://soils.usda.gov/contact/state\\_offices/](http://soils.usda.gov/contact/state_offices/)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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# **How Soil Surveys Are Made**

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

## Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Map Scale: 1:12,800 if printed on A size (8.5" x 11") sheet.



# Custom Soil Resource Report

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot

 Wet Spot

 Other

### Special Line Features

-  Gully
-  Short Steep Slope
-  Other

### Political Features

 Cities

### Water Features

 Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

## MAP INFORMATION

Map Scale: 1:12,800 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Alexandria City, Virginia  
 Survey Area Data: Version 5, Dec 14, 2009

Soil Survey Area: Arlington County, Virginia  
 Survey Area Data: Version 12, Aug 9, 2010

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/25/2003; 6/21/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Alexandria City, Virginia (VA510)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
40	Grist Mill sandy loam, 0 to 25 percent slopes	41.5	35.3%
95	Urban land	60.9	51.7%
W	Water	3.1	2.6%
<b>Subtotals for Soil Survey Area</b>		<b>105.5</b>	<b>89.6%</b>
<b>Totals for Area of Interest</b>		<b>117.7</b>	<b>100.0%</b>

Arlington County, Virginia (VA013)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Urban land-Udorthents complex, 2 to 15 percent slopes	12.3	10.4%
<b>Subtotals for Soil Survey Area</b>		<b>12.3</b>	<b>10.4%</b>
<b>Totals for Area of Interest</b>		<b>117.7</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been

## Custom Soil Resource Report

observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Alexandria City, Virginia

### 40—Grist Mill sandy loam, 0 to 25 percent slopes

#### Map Unit Setting

*Mean annual precipitation:* 37 to 49 inches

*Mean annual air temperature:* 45 to 67 degrees F

*Frost-free period:* 185 to 212 days

#### Map Unit Composition

*Grist mill and similar soils:* 100 percent

#### Description of Grist Mill

##### Setting

*Landform:* Marine terraces

*Landform position (two-dimensional):* Summit, backslope, shoulder

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Earthy fill of fluviomarine deposits

##### Properties and qualities

*Slope:* 0 to 25 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)

*Depth to water table:* About 24 to 79 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.8 inches)

##### Interpretive groups

*Land capability (nonirrigated):* 2e

##### Typical profile

*0 to 6 inches:* Sandy loam

*6 to 60 inches:* Sandy clay loam

### 95—Urban land

#### Map Unit Setting

*Mean annual precipitation:* 28 to 58 inches

*Mean annual air temperature:* 87 to 89 degrees F

*Frost-free period:* 175 to 200 days

#### Map Unit Composition

*Urban land:* 95 percent

**Description of Urban Land**

**Interpretive groups**

*Land capability (nonirrigated): 8s*

**W—Water**

**Map Unit Composition**

*Water: 100 percent*

## Arlington County, Virginia

### 12—Urban land-Udorthents complex, 2 to 15 percent slopes

#### Map Unit Setting

*Mean annual precipitation:* 36 to 46 inches

*Mean annual air temperature:* 54 to 57 degrees F

*Frost-free period:* 140 to 200 days

#### Map Unit Composition

*Urban land:* 85 percent

*Udorthents and similar soils:* 15 percent

#### Description of Urban Land

##### Interpretive groups

*Land capability (nonirrigated):* 8s

#### Description of Udorthents

##### Properties and qualities

*Slope:* 2 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

##### Interpretive groups

*Land capability (nonirrigated):* 6s

# **Soil Information for All Uses**

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## **Soil Properties and Qualities**

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## **Soil Erosion Factors**

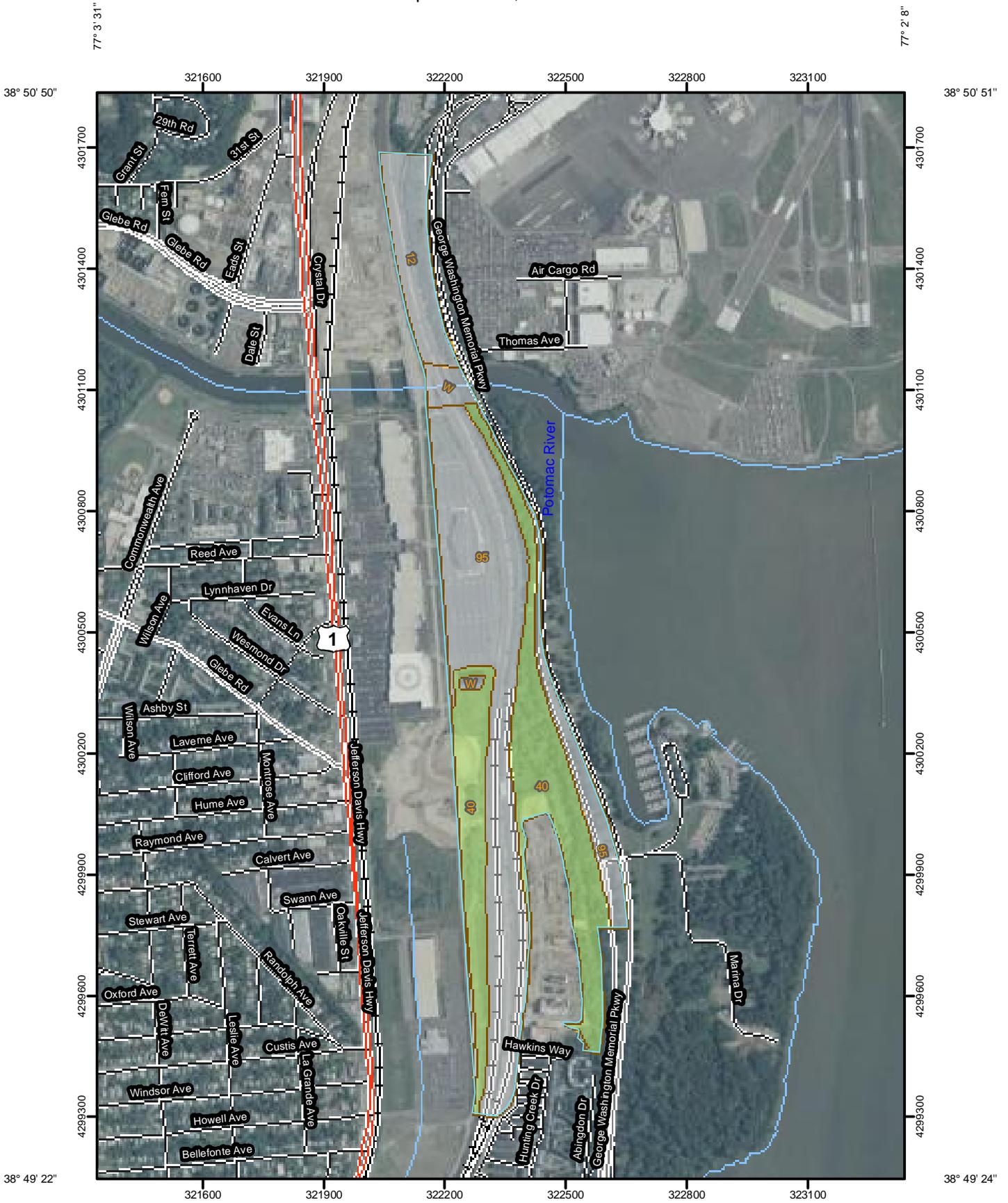
Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### **K Factor, Whole Soil**

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

# Custom Soil Resource Report Map—K Factor, Whole Soil



Map Scale: 1:12,800 if printed on A size (8.5" x 11") sheet.

0 100 200 400 600 Meters

0 450 900 1,800 2,700 Feet

77° 3' 28"

38° 49' 24"

# Custom Soil Resource Report

## MAP LEGEND

<b>Area of Interest (AOI)</b>			Interstate Highways
	Area of Interest (AOI)		US Routes
<b>Soils</b>			Major Roads
	Soil Map Units		Local Roads
<b>Soil Ratings</b>			
	.02		
	.05		
	.10		
	.15		
	.17		
	.20		
	.24		
	.28		
	.32		
	.37		
	.43		
	.49		
	.55		
	.64		
	Not rated or not available		
<b>Political Features</b>			
	Cities		
<b>Water Features</b>			
	Streams and Canals		
<b>Transportation</b>			
	Rails		

## MAP INFORMATION

Map Scale: 1:12,800 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Alexandria City, Virginia  
Survey Area Data: Version 5, Dec 14, 2009

Soil Survey Area: Arlington County, Virginia  
Survey Area Data: Version 12, Aug 9, 2010

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/25/2003; 6/21/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

**Table—K Factor, Whole Soil**

K Factor, Whole Soil— Summary by Map Unit — Alexandria City, Virginia (VA510)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
40	Grist Mill sandy loam, 0 to 25 percent slopes	.24	41.5	35.3%
95	Urban land		60.9	51.7%
W	Water		3.1	2.6%
<b>Subtotals for Soil Survey Area</b>			<b>105.5</b>	<b>89.6%</b>
<b>Totals for Area of Interest</b>			<b>117.7</b>	<b>100.0%</b>

K Factor, Whole Soil— Summary by Map Unit — Arlington County, Virginia (VA013)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
12	Urban land-Udorthents complex, 2 to 15 percent slopes		12.3	10.4%
<b>Subtotals for Soil Survey Area</b>			<b>12.3</b>	<b>10.4%</b>
<b>Totals for Area of Interest</b>			<b>117.7</b>	<b>100.0%</b>

### Rating Options—K Factor, Whole Soil

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

*Layer Options:* Surface Layer

### Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

### Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

## Custom Soil Resource Report

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

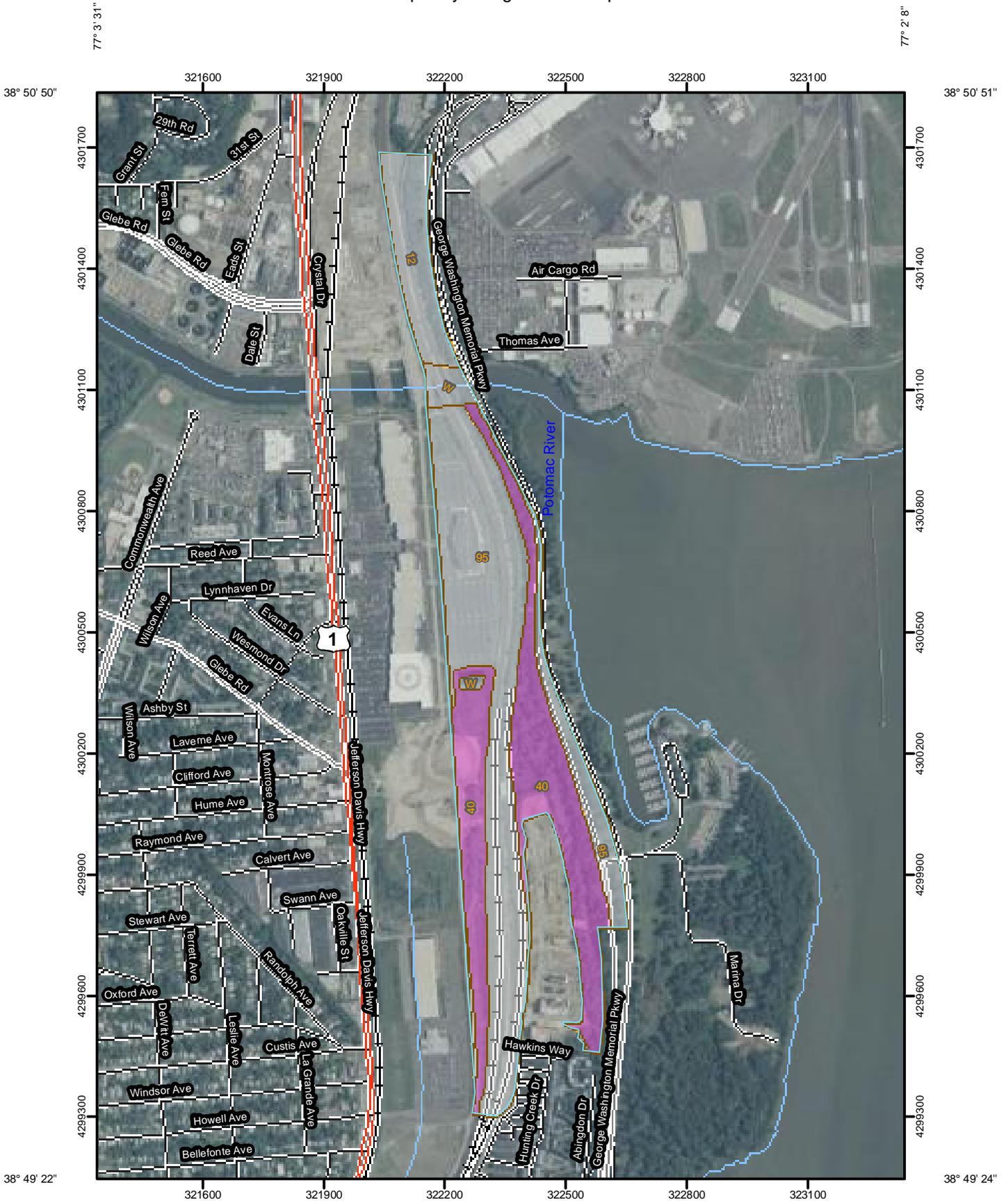
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

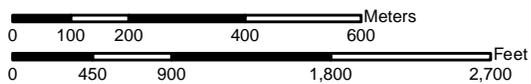
Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

# Custom Soil Resource Report Map—Hydrologic Soil Group



Map Scale: 1:12,800 if printed on A size (8.5" x 11") sheet.



77° 3' 28"

38° 49' 24"

# Custom Soil Resource Report

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### Soil Ratings

 A

 A/D

 B

 B/D

 C

 C/D

 D

 Not rated or not available

### Political Features

 Cities

### Water Features

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

## MAP INFORMATION

Map Scale: 1:12,800 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Alexandria City, Virginia  
Survey Area Data: Version 5, Dec 14, 2009

Soil Survey Area: Arlington County, Virginia  
Survey Area Data: Version 12, Aug 9, 2010

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/25/2003; 6/21/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

**Table—Hydrologic Soil Group**

Hydrologic Soil Group— Summary by Map Unit — Alexandria City, Virginia (VA510)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
40	Grist Mill sandy loam, 0 to 25 percent slopes	D	41.5	35.3%
95	Urban land		60.9	51.7%
W	Water		3.1	2.6%
<b>Subtotals for Soil Survey Area</b>			<b>105.5</b>	<b>89.6%</b>
<b>Totals for Area of Interest</b>			<b>117.7</b>	<b>100.0%</b>

Hydrologic Soil Group— Summary by Map Unit — Arlington County, Virginia (VA013)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
12	Urban land-Udorthents complex, 2 to 15 percent slopes		12.3	10.4%
<b>Subtotals for Soil Survey Area</b>			<b>12.3</b>	<b>10.4%</b>
<b>Totals for Area of Interest</b>			<b>117.7</b>	<b>100.0%</b>

**Rating Options—Hydrologic Soil Group**

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

## Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

## Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

## RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factors Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the surface horizon.

### Report—RUSLE2 Related Attributes

RUSLE2 Related Attributes— Alexandria City, Virginia								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
40—Grist Mill sandy loam, 0 to 25 percent slopes								
Grist mill	100	—	D	.24	5	55.6	28.5	15.9
95—Urban land								
Urban land	95	—	—	—	—	—	—	—
W—Water								
Water	100	—	—	—	—	—	—	—

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RUSLE2 Related Attributes– Arlington County, Virginia								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
12—Urban land-Udorthents complex, 2 to 15 percent slopes								
Urban land	85	—	—	—	—	—	—	—
Udorthents	15	—	—	—	—	—	—	—

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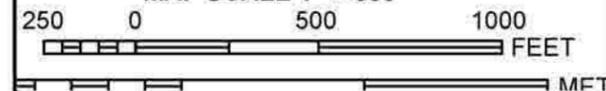
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MAP SCALE 1" = 500'



11900000 FT

77°01'52.5"

38°50'37.5"

43°01'00.0"E

# LEGEND

 SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

 FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

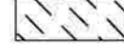
 OTHER FLOOD AREAS

**ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

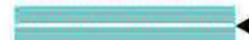
 OTHER AREAS

**ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.  
**ZONE D** Areas in which flood hazards are undetermined, but possible.

 COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

 OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

-  1% annual chance floodplain boundary
-  0.2% annual chance floodplain boundary
-  Floodway boundary
-  Zone D boundary
-  CBRS and OPA boundary
-  Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
-  Base Flood Elevation line and value; elevation in feet\*

(EL 987)

Base Flood Elevation value where uniform within zone; elevation in feet\*

PANEL 0033E

**FIRM**  
FLOOD INSURANCE RATE MAP  
CITY OF ALEXANDRIA,  
VIRGINIA  
INDEPENDENT CITY

PANEL 33 OF 45  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALEXANDRIA CITY OF (INDEPENDENT CITY)	515519	0033	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

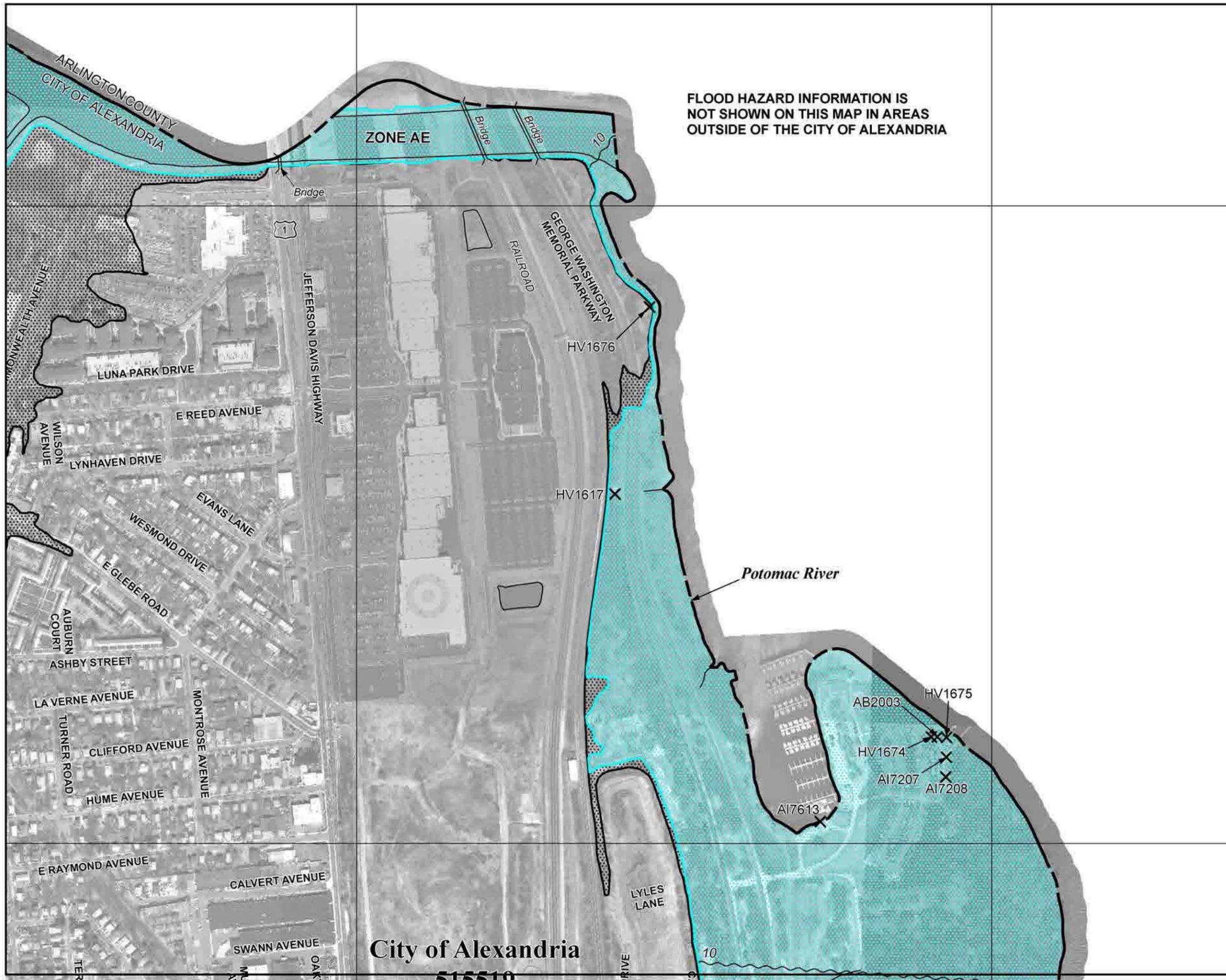


**MAP NUMBER**  
5155190033E

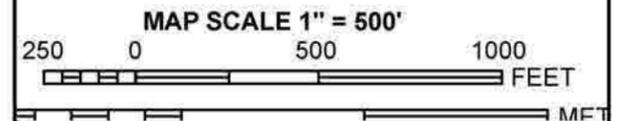
**MAP REVISED**  
JUNE 16, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



FLOOD HAZARD INFORMATION IS NOT SHOWN ON THIS MAP IN AREAS OUTSIDE OF THE CITY OF ALEXANDRIA



PANEL 0033E

**NFIP**

**FIRM**  
FLOOD INSURANCE RATE MAP  
CITY OF ALEXANDRIA,  
VIRGINIA  
INDEPENDENT CITY

PANEL 33 OF 45  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALEXANDRIA CITY OF (INDEPENDENT CITY)	515519	0033	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

 **MAP NUMBER**  
5155190033E

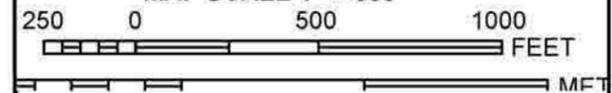
**MAP REVISED**  
JUNE 16, 2011

Federal Emergency Management Agency

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MAP SCALE 1" = 500'



NFIP

PANEL 0033E

**FIRM**

FLOOD INSURANCE RATE MAP

CITY OF ALEXANDRIA,  
VIRGINIA  
INDEPENDENT CITY

PANEL 33 OF 45

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALEXANDRIA CITY OF (INDEPENDENT CITY)	515519	0033	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
5155190033E

MAP REVISED  
JUNE 16, 2011

Federal Emergency Management Agency

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**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 18. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA, NINGS12, National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, Maryland 20910-3282  
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

**Base map** information shown on this FIRM was provided in digital format by the Arlington County's GIS Mapping Center. This information was photogrammetrically compiled at a scale of 1"=50' from aerial photography dated September 2003. Digital orthophotographs, published in 2003, were also provided by the Arlington County's GIS Mapping Center. Adjustments were made to specific base map features to align them to 1":120' digital orthophotographs.

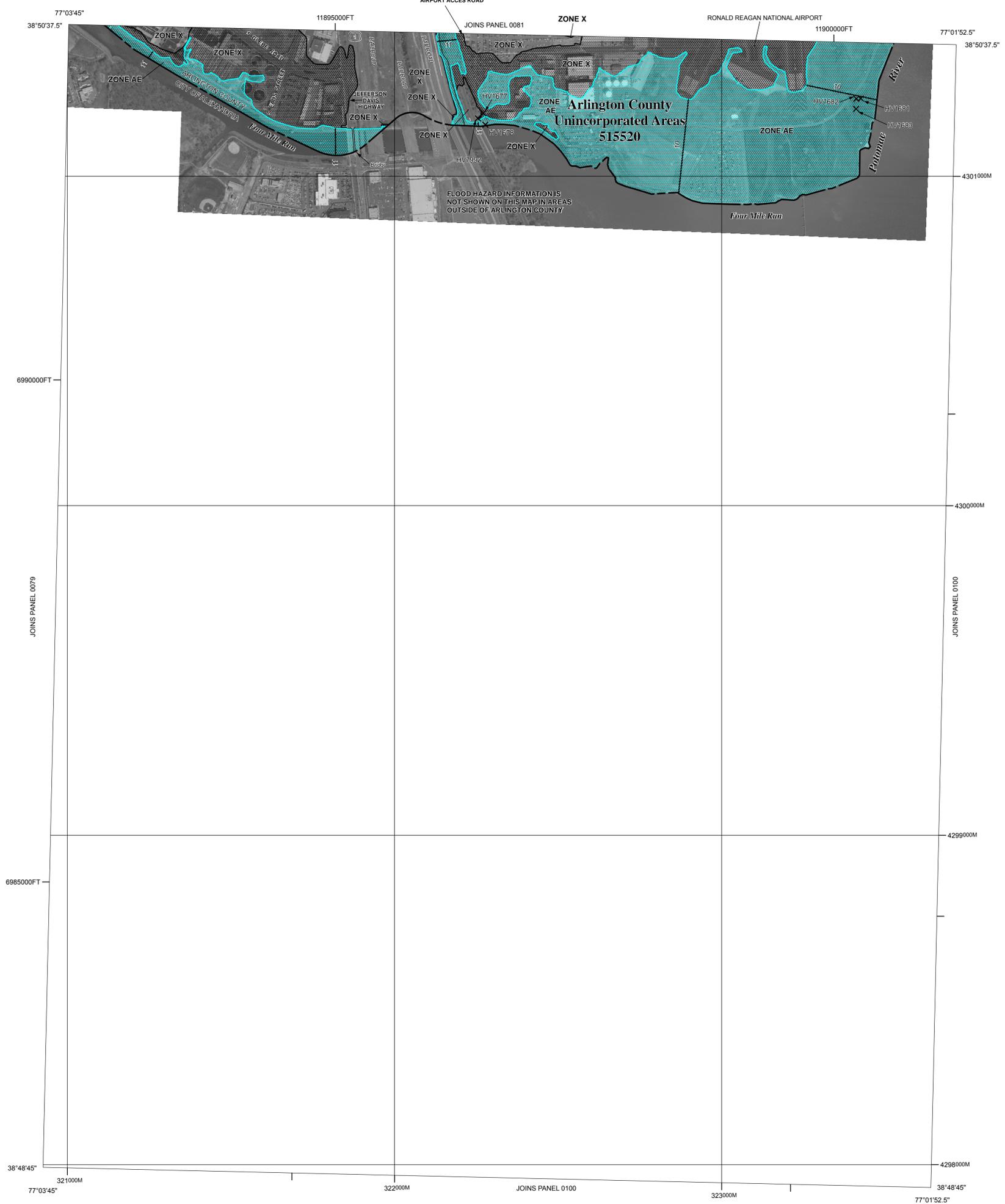
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unvisited streams may differ from what is shown on previous maps.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfip>.



**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD  
The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, AV, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently deidentified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE  
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS  
**ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS  
**ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.  
**ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS  
 OTHERWISE PROTECTED AREAS (OPAs)  
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet\*
- Base Flood Elevation value where uniform within zone; elevation in feet\* (EL 987)
- \* Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 18
- 5000-foot grid ticks; Virginia State Plane coordinate system (FIPSZONE 4501), Lambert Conformal Conic projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

**MAP REPOSITORY**  
Refer to listing of Map Repositories on Map Index

**EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

**MAP SCALE 1" = 500'**

250 0 500 1000 FEET  
150 0 150 300 METERS

**PANEL 0083C**

**FIRM**  
FLOOD INSURANCE RATE MAP  
**ARLINGTON COUNTY, VIRGINIA**  
AND INCORPORATED AREAS

PANEL 83 OF 100  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

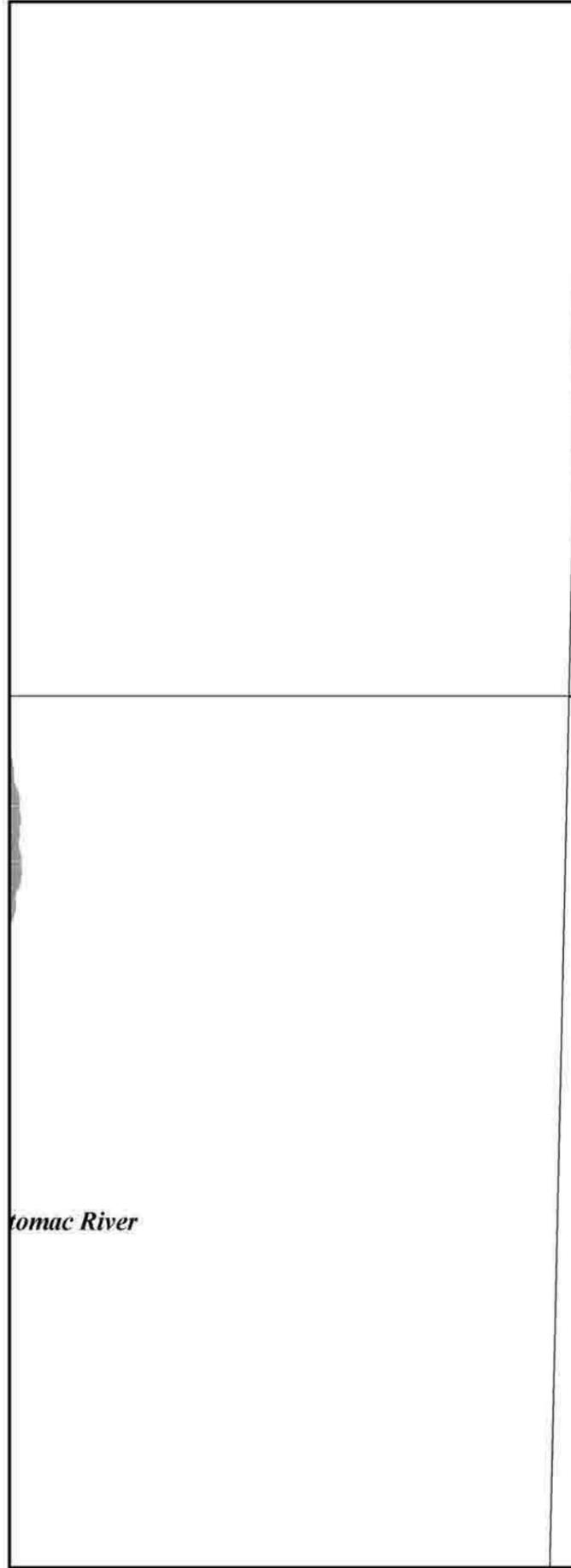
CONTAINS:  
COMMUNITY NUMBER PANEL SUFFIX  
ARLINGTON COUNTY 515520 0083 C

**PRELIMINARY 9/23/2009**

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
51013C0083C  
**EFFECTIVE DATE**

**Federal Emergency Management Agency**



JOINS PANEL 0035

**OTHER AREAS**

**ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.

**ZONE D** Areas in which flood hazards are undetermined, but possible.

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAS)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Base Flood Elevation line and value; elevation in feet\*  
(EL 987)

Base Flood Elevation value where uniform within zone; elevation in feet\*

\* Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid values, zone 18

5000-foot grid ticks: Virginia State Plane coordinate system (FIPZONE 4501), Lambert Conformal Conic projection

Bench mark (see explanation in Notes to Users section of this FIRM panel)

River Mile

**MAP REPOSITORY**  
City Hall, 301 King Street, Alexandria, VA 22314 (Maps available for reference only, not for distribution).

**INITIAL IDENTIFICATION**  
AUGUST 22, 1969

**FLOOD HAZARD BOUNDARY MAP REVISIONS**  
NONE

**FLOOD INSURANCE RATE MAP EFFECTIVE**  
AUGUST 22, 1969

**FLOOD INSURANCE RATE MAP REVISIONS**

May 2, 1970 - to add special flood hazard area.

May 28, 1971 - to add special flood hazard area.

July 1, 1974 - to change zone designations.

October 22, 1976 - to reflect curvilinear flood boundary and to add special flood hazard area.

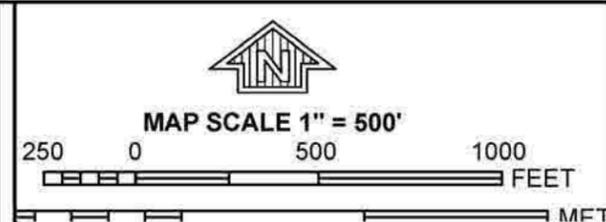
April 30, 1982 - to change special flood hazard area, to change base flood elevations, to change zone designations, to add streets, to re-align streams, to convert to Z-fold format, and to change to FEMA title block.

October 18, 1988 - to change base flood elevations, and to change special flood hazard areas.

May 15, 1991 - to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to update map format, and to add roads and road names.

June 16, 2011 - To change base flood elevations, to add base flood elevations, to add special flood hazard areas, and to reflect updated topographic information.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



**NFIP** PANEL 0033E

**FIRM**  
FLOOD INSURANCE RATE MAP  
CITY OF ALEXANDRIA,  
VIRGINIA  
INDEPENDENT CITY

**PANEL 33 OF 45**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

COMMUNITY	NUMBER	PANEL	SUFFIX
ALEXANDRIA CITY OF (INDEPENDENT CITY)	515519	0033	E

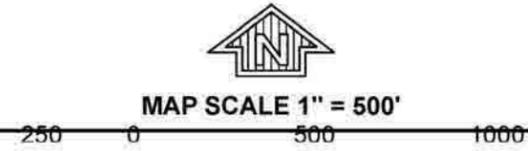
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**MAP NUMBER**  
5155190033E

**MAP REVISED**  
JUNE 16, 2011

Federal Emergency Management Agency

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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NGS Information Services  
NOAA, NINGS12, National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, Maryland 20910-3282  
(301) 713-3242

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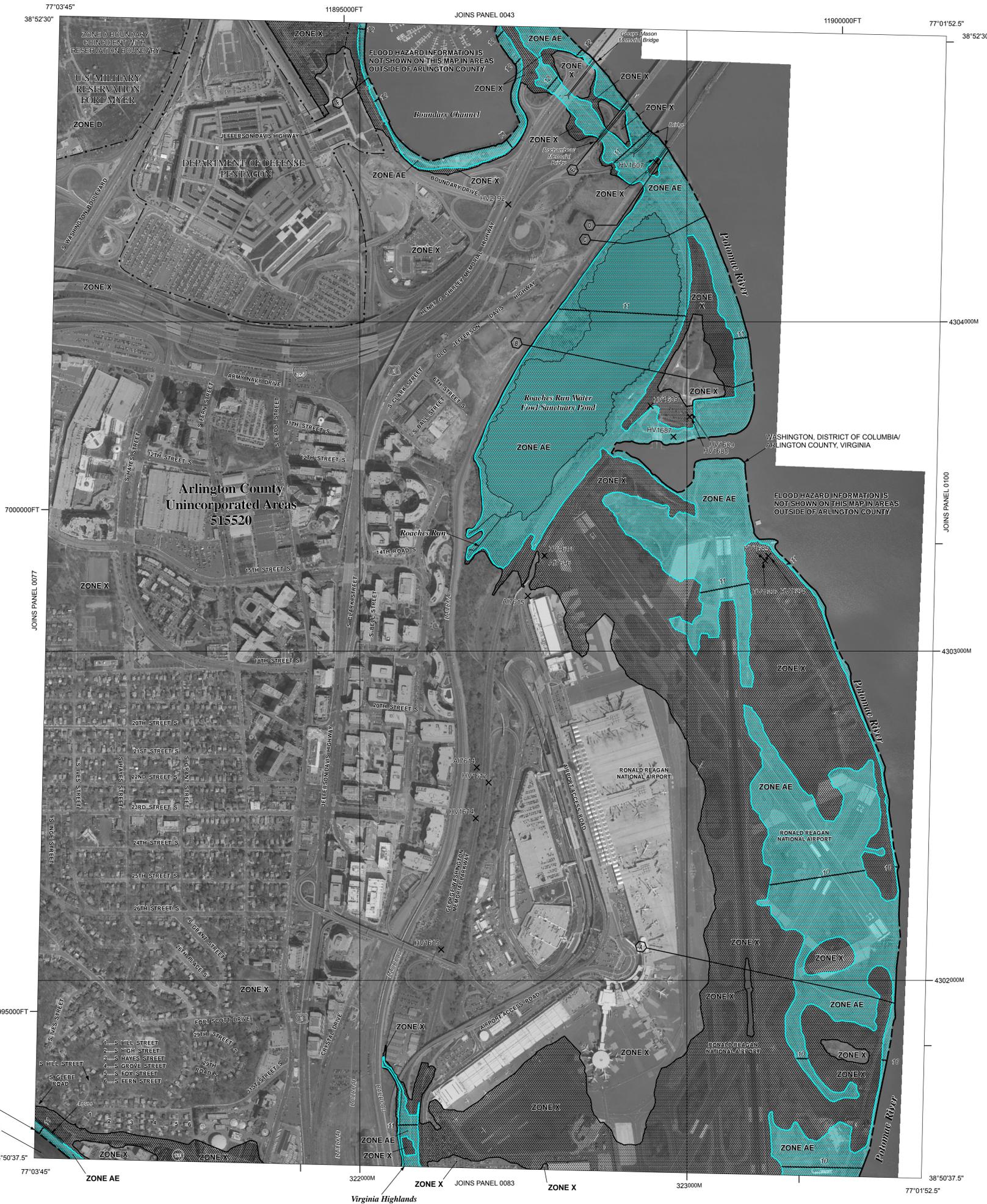
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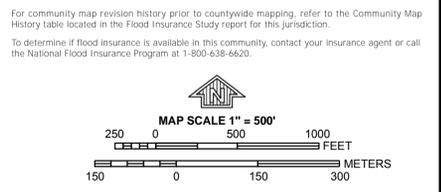
**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**  
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- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding). Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
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- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**  
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
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- OTHER AREAS**  
**ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.  
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CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value: elevation in feet\*
- Base Flood Elevation value where uniform within zone: elevation in feet\*
- \* Referenced to the North American Vertical Datum of 1988
- A — A — Cross section line
- (2) — (2) — Transect line
- 87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000 M 1000-meter Universal Transverse Mercator grid values, zone 18
- 600000 FT 5000-foot grid ticks: Virginia State Plane coordinate system (SPSZONE 4501), Lambert Conformal Conic projection
- DX5510 x Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M 1.5 River Mile

**MAP REPOSITORY**  
Refer to listing of Map Repositories on Map Index

**EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**

**EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL**



**Four Mile Run**  
FLOOD HAZARD INFORMATION IS NOT SHOWN ON THIS MAP IN AREAS OUTSIDE OF ARLINGTON COUNTY

**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0081C**

**FIRM FLOOD INSURANCE RATE MAP**

**ARLINGTON COUNTY, VIRGINIA AND INCORPORATED AREAS**

PANEL 81 OF 100  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ARLINGTON COUNTY	515520	0081	C

**PRELIMINARY 9/23/2009**

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER 51013C0081C**

**EFFECTIVE DATE**

**Federal Emergency Management Agency**

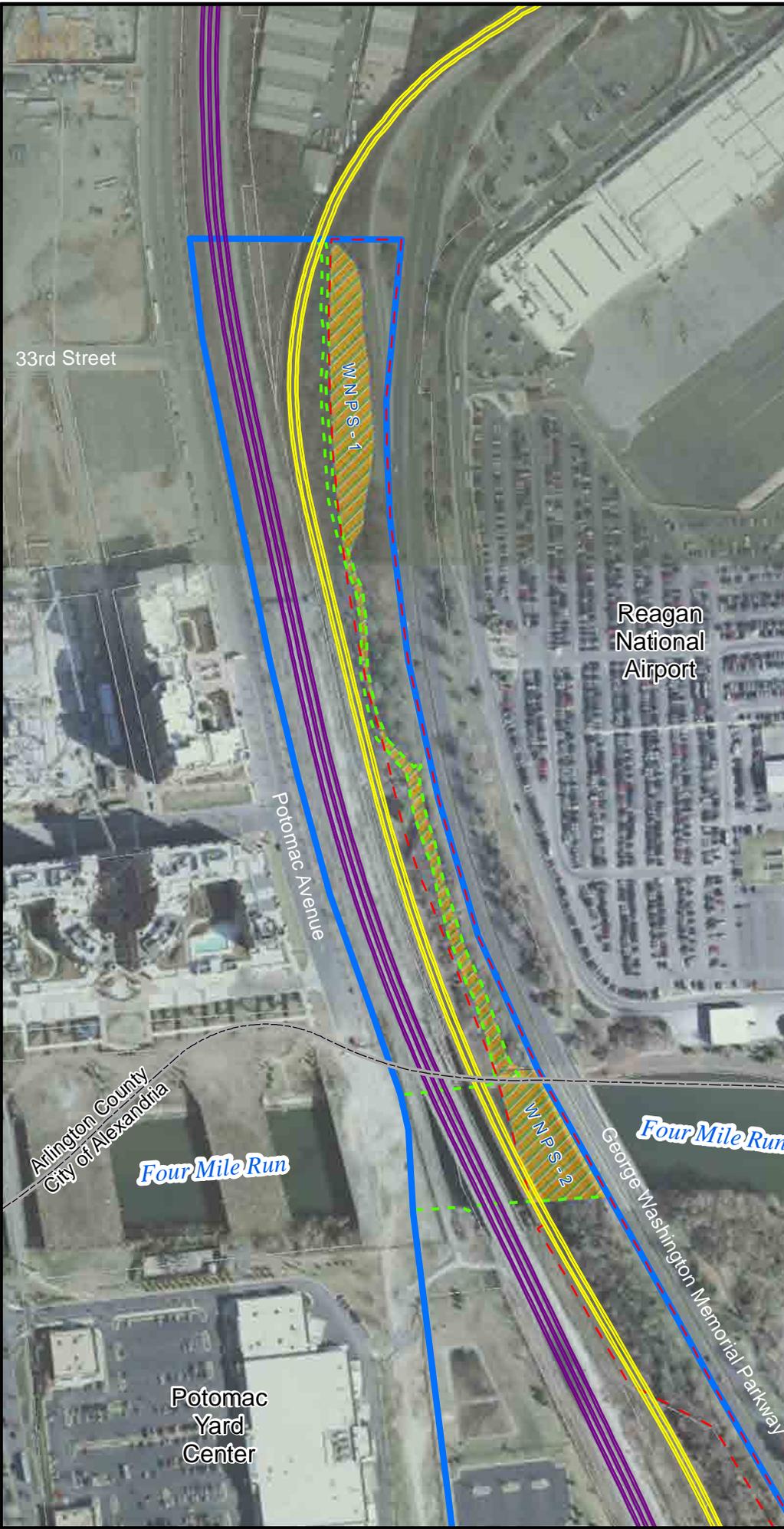
## 1.0 NATIONAL PARK SERVICE – FINDINGS

The following figures illustrate the boundary limits of the Waters of the US (WOUS), including wetlands, that were identified during the field investigation using the methods described in the *National Park Service Procedural Manual #77-1: Wetland Protection*, which is in the next section of this appendix (April 2001 edition). The boundaries depicted in the figures are based on a fall field investigation. The project team anticipates a spring field investigation to update these findings.

The NPS property line was estimated using GIS-based tax maps from the City of Alexandria and Arlington County. Parcels administered by NPS are not listed in the jurisdictions' tax databases. Therefore, the boundaries of parcels abutting the George Washington Memorial Parkway were assumed to be the NPS property line.



**Figure D1  
Wetland Delineation to  
NPS/Cowardin Standards -  
North**

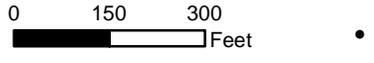


**LEGEND**

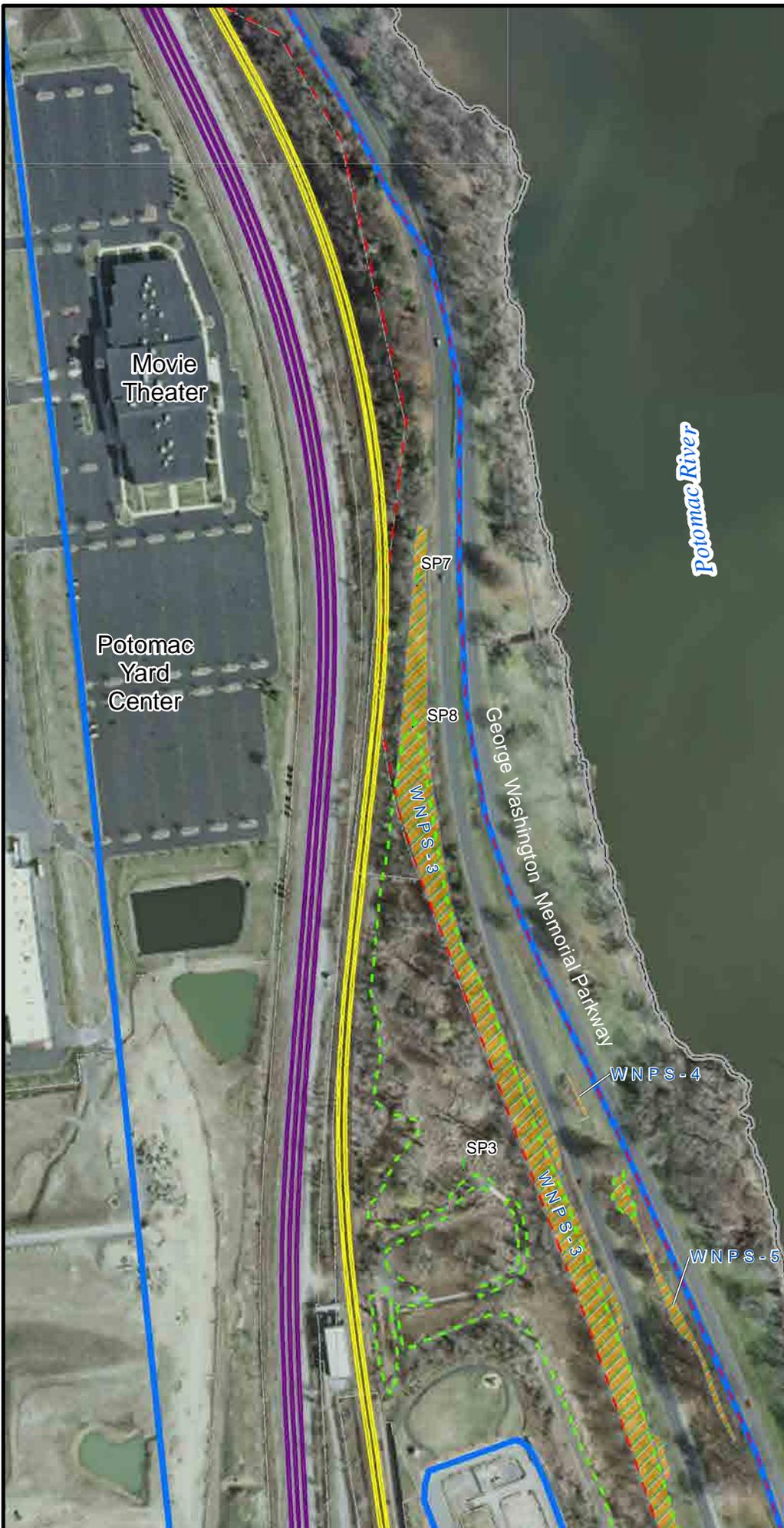
- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- Estimated NPS Property
- USACE Regulated Line
- NPS/Cowardin Wetland
- Parcels

Wetland ID	Square Feet	Acres
WNPS-1	68,825	1.58
WNPS-2	33,903	0.78
WNPS-3	132,986	3.05
WNPS-4	955	0.02
WNPS-5	10,135	0.23
WNPS-6	2,362	0.05
WNPS-7	9,149	0.21
<b>total</b>	<b>258,315</b>	<b>5.92</b>
NPS Property	968,964	22.24
Study Area	5,129,028	117.75
Note: Measurements apply to entire study area.		

Source: City of Alexandria 2010,  
WMATA 2011, ESRI 2011



**Figure D2  
Wetland Delineation to  
NPS/Cowardin Standards -  
Central**

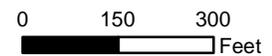


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- ! Wetland Sample Points
- Estimated NPS Property
- USACE Regulated Line
- NPS/Cowardin Wetland
- Parcels

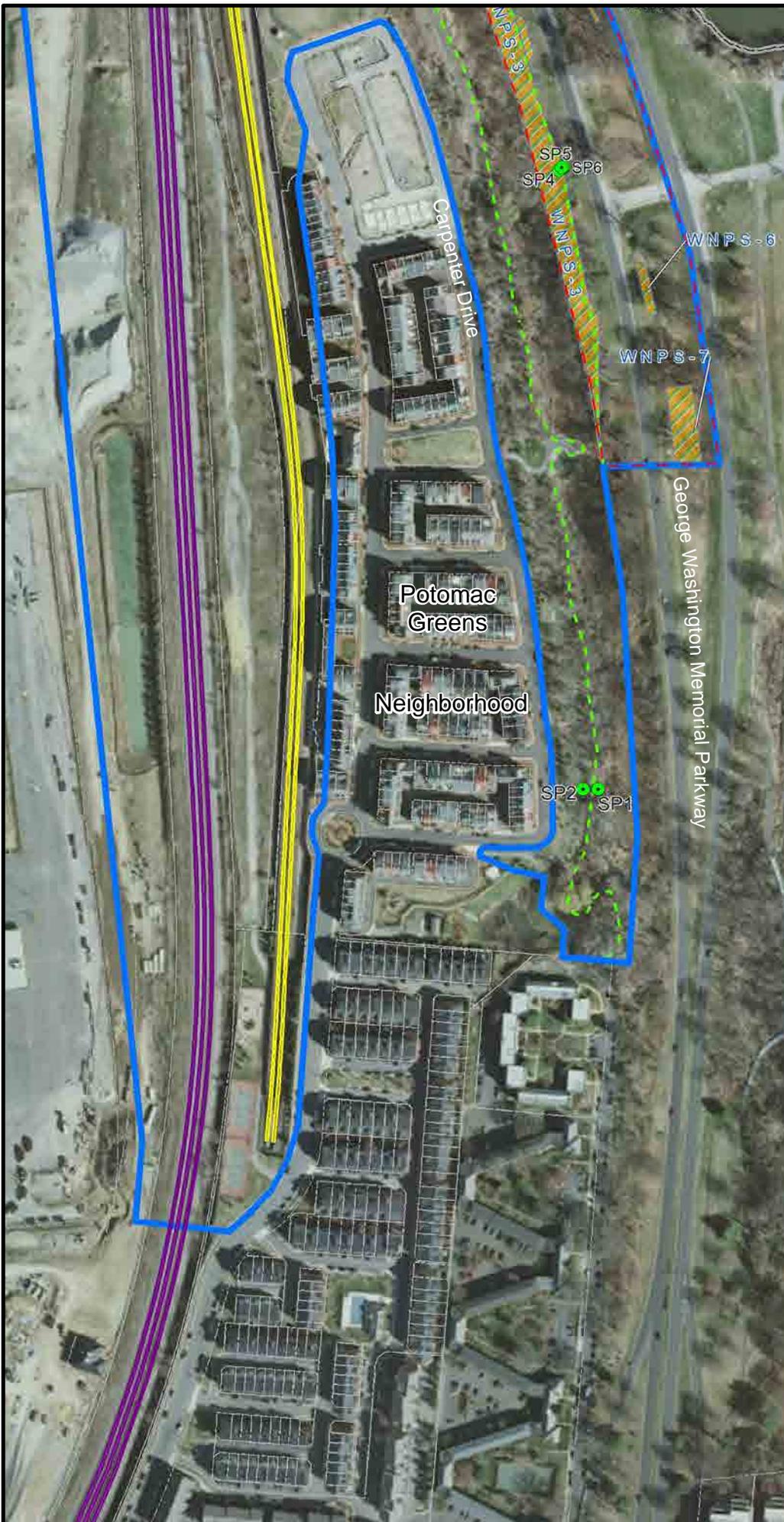
Wetland ID	Square Feet	Acres
WNPS-1	68,825	1.58
WNPS-2	33,903	0.78
WNPS-3	132,986	3.05
WNPS-4	955	0.02
WNPS-5	10,135	0.23
WNPS-6	2,362	0.05
WNPS-7	9,149	0.21
<b>total</b>	<b>258,315</b>	<b>5.92</b>
NPS Property	968,964	22.24
Study Area	5,129,028	117.75
Note:		
Measurements apply to entire study area.		

Source: City of Alexandria 2010,  
WMATA 2011, ESRI 2011





**Figure D3  
Wetland Delineation to  
NPS/Cowardin Standards -  
South**

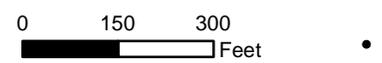


**LEGEND**

- Study Area
- City Boundary
- Tracks - CSXT
- Tracks - WMATA
- ! Wetland Sample Points
- Estimated NPS Property
- USACE Regulated Line
- NPS/Cowardin Wetland
- Parcels

Wetland ID	Square Feet	Acres
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WNPS-5	10,135	0.23
WNPS-6	2,362	0.05
WNPS-7	9,149	0.21
total	258,315	5.92
NPS Property	968,964	22.24
Study Area	5,129,028	117.75
Note: Measurements apply to entire study area.		

Source: City of Alexandria 2010, WMATA 2011







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

Reissued April 2011  
(Replaces all previous versions)



**ON THE COVER:** Camas in bloom at Weippe Prairie, Nez Perce National Historical Park (photo by Jannis Jocius, Nez Perce National Historical Park, 2008)

# National Park Service

## Procedural Manual #77-1: Wetland Protection

Reissued April 2011  
(Replaces all previous versions)

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Natural Resources Stewardship and Science  
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Fort Collins, Colorado

This manual may be downloaded at <http://www.nature.nps.gov/water/wetlands.cfm>, or a hard copy may be obtained by sending a request to the address on the back cover.

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# PROCEDURAL MANUAL #77-1: WETLAND PROTECTION

## ***1.0 Introduction***

This Procedural Manual was developed for use by the National Park Service (NPS) in carrying out its responsibilities under Executive Order (E.O.) 11990 to protect wetlands. It contains two main elements: 1) the text of Director's Order (D.O.) #77-1:Wetland Protection (last issued in 2002) in Section 2.0 below; and 2) detailed procedures (in Sections 3–5) by which the NPS will implement D.O. #77-1. Figure 1 provides a brief summary of NPS wetland compliance procedures. *The previous version of NPS Procedural Manual #77-1 (issued in 2008) is obsolete and is replaced by this revised manual.*

## ***2.0 Director's Order #77-1: Wetland Protection***

D.O. #77-1 (2002) is incorporated in its entirety into this section of the Procedural Manual. This Director's Order establishes the policies, requirements, and standards through which the NPS will meet its responsibilities to protect and preserve wetlands. D.O. #77-1 also requires the Associate Director, Natural Resource Stewardship and Science, to develop and issue this Procedural Manual.

### DIRECTOR'S ORDER #77-1: WETLAND PROTECTION

Approved: /s/ Fran P. Mainella  
Director, National Park Service

Effective Date: October 30, 2002

#### ***1.0 Background and Purpose of this Director's Order***

The purpose of this Director's Order is to establish National Park Service (NPS) policies, requirements, and standards for implementing Executive Order (E.O.) 11990: "Protection of Wetlands" (42 Fed. Reg. 26961). E.O. 11990 was issued by President Carter in 1977 in order "...to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative...."

Section 6 of E.O. 11990 directed federal agencies to issue procedures to implement the Executive Order. NPS wetland protection procedures were originally adopted together with E.O. 11988 (Floodplain Management) procedures in the 1980 "NPS Floodplain Management and Wetland Protection Guidelines" (45 Fed. Reg. 35916, minor revisions in 47 Fed. Reg. 36718). Experience with implementing the wetland procedures, and changes in wetland management concepts since they were first published, necessitated updating, streamlining, and clarifying NPS wetland policies and procedures in Director's Order #77-1: Wetland Protection (issued October 22, 1998). The 1998 Director's Order and the accompanying Procedural Manual #77-1 superseded and replaced the 1980 NPS wetland guidance. Included in Director's Order #77-1 were: 1) adoption of a "no net loss of wetlands" goal, which was first proclaimed in 1989 by President George Bush and has been sustained by subsequent Administrations; and 2) adoption of the Cowardin et al. (1979) wetland classification system as the NPS standard for defining, classifying, and inventorying wetlands.

The four-year sunset provision for NPS Director's Orders now requires that Director's Order #77-1 be re-issued. The NPS has operated under the 1998 version of Director's Order #77-1 for the last four years with excellent success. Therefore, the following sections of that document are re-issued without substantive change.

In addition to the requirements of this Director's Order, NPS activities that involve the discharge of dredged or fill material into wetlands or other "waters of the United States" must also comply with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (regulations and permit process are described in 33 CFR 320-331).

## ***2.0 Policies, Requirements, and Standards***

Executive Order 11990 directs the NPS: 1) to provide leadership and to take action to minimize the destruction, loss, or degradation of wetlands; 2) to preserve and enhance the natural and beneficial values of wetlands; and 3) to avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands.

In carrying out the NPS's responsibilities related to:

- acquiring, managing, and disposing of NPS lands and facilities;
- construction and related development activities;
- permitting activities as provided for under NPS regulatory authorities; and
- conducting activities, programs, or planning efforts affecting use of NPS lands,

in a manner consistent with E.O. 11990 and with the "no net loss of wetlands" goal, the NPS will take the following actions:

- 2.1 The NPS adopts a goal of "no net loss of wetlands." In addition, the NPS will strive to achieve a longer-term goal of net gain of wetlands Servicewide.
- 2.2 NPS units will conduct parkwide wetland inventories (or will obtain such inventories from appropriate sources such as the National Wetlands Inventory) to help assure proper planning with respect to management and protection of wetland resources. Additional large-scale (more detailed) wetland inventories will be conducted in areas that are proposed for development or are otherwise susceptible to degradation or loss due to human activities.
- 2.3 For purposes of compliance with Executive Order 11990, the NPS will use "Classification of Wetlands and Deepwater Habitats of the United States" (FWS/OBS-79/31; Cowardin et al. 1979) as the standard for defining, classifying, and inventorying wetlands.
- 2.4 For proposed new development or other new activities, plans, or programs that are either located in or otherwise have the potential for direct or indirect adverse impacts on wetlands, the NPS will employ a sequence of:
  - a) avoiding adverse wetland impacts to the extent practicable,
  - b) minimizing impacts that could not be avoided, and
  - c) compensating for remaining unavoidable adverse wetland impacts via restoration of degraded wetlands.

Consistent with 2.1 above, compensation for wetland degradation or loss will be at a minimum 1:1 ratio. Actions that may be excepted from the compensation requirement are identified in Procedural Manual #77-1, which was developed by the Associate Director, Natural Resource Stewardship and Science to implement this Director's Order.

- 2.5 Actions proposed by the NPS that have the potential to have adverse impacts on wetlands will be addressed in an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). If the preferred alternative in an EA or EIS will result in adverse impacts on wetlands, a "Statement of Findings" documenting compliance with this Director's Order and Procedural Manual #77-1 will be completed. Actions that may be excepted from the Statement of Findings requirement are identified in the Procedural Manual.

- 2.6 Superintendents will oversee preparation of Statements of Findings and will recommend their approval to Regional Directors. The Chief of the NPS Water Resources Division or, alternatively, a certified Professional Wetland Scientist (Society of Wetland Scientists Certification Program, Inc.) from within the NPS with working knowledge of this Director's Order and Procedural Manual #77-1, will certify: 1) the adequacy of wetland-related technical analyses; and 2) consistency with Servicewide implementation of this Director's Order and Procedural Manual #77-1. Regional Directors have final approval authority for Statements of Findings.
- 2.7 Where natural wetland characteristics or functions have been degraded or lost due to previous or ongoing human activities, the NPS will, to the extent appropriate and practicable, restore them to pre-disturbance conditions.
- 2.8 Where appropriate and practicable, the NPS will not simply protect, but will seek to enhance natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt natural wetland functions.

### **3.0 Responsibilities**

**The Director** is responsible for ensuring NPS compliance with E.O. 11990 in accordance with provisions of 520 DM 1. In performing this duty, the Director approves NPS policies and directives for complying with the Executive Order.

**The Deputy Directors and Associate Directors** are responsible for general supervision of the Divisions and Offices under their jurisdictions to ensure compliance with E.O. 11990 as outlined in this Director's Order and Procedural Manual #77-1.

**The Associate Director, Natural Resource Stewardship and Science** is responsible for: 1) issuing and updating NPS procedures for implementing this Director's Order; and 2) revising relevant portions of the NPS *Management Policies* and NPS natural resources management and NEPA procedures to ensure compliance with E.O. 11990 as outlined in this Director's Order and Procedural Manual #77-1.

**The Associate Director, Professional Services** is responsible for revising NPS planning procedures as necessary to satisfy the requirements of E.O. 11990 as outlined in this Director's Order and Procedural Manual #77-1.

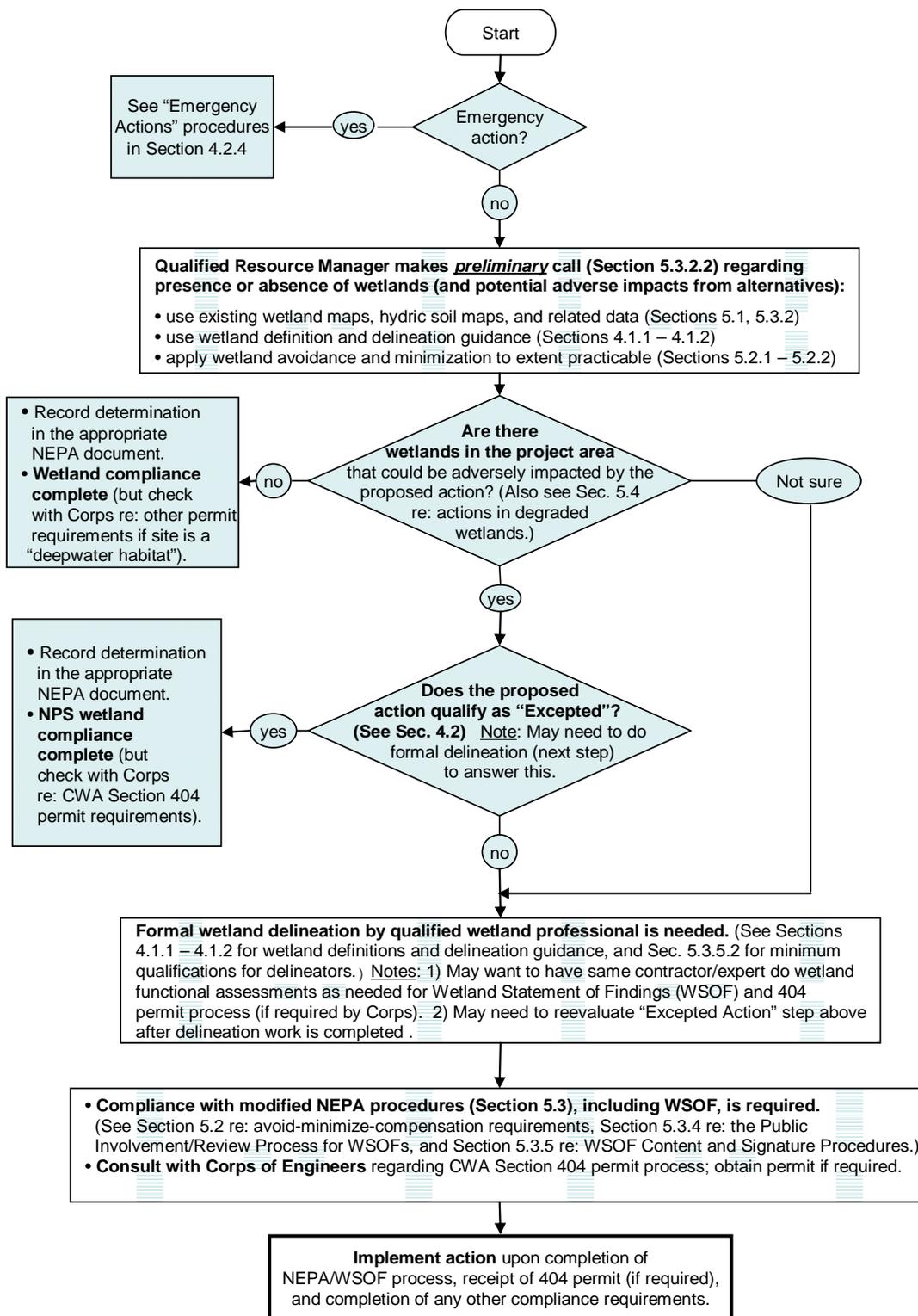
**The Superintendents** oversee the planning/NEPA process, identify preferred alternatives, assure that appropriate wetland permits have been obtained (e.g., Section 404 of the Clean Water Act), and oversee preparation of Statements of Findings as outlined in this Director's Order and Procedural Manual #77-1, utilizing the wetland technical information developed during the planning process. Superintendents sign the "Recommended" line on Statement of Findings cover sheets.

**The Chief, Water Resources Division** (or a certified Professional Wetland Scientist from within the NPS as described in this Director's Order and Procedural Manual #77-1) signs the "Certification of Technical Adequacy and Servicewide Consistency" line on Statement of Findings cover sheets, assuring both technical adequacy of wetland analyses and Servicewide consistency in implementation of this Director's Order and Procedural Manual #77-1.

**The Regional Directors** are responsible for ensuring compliance with E.O. 11990 within their respective Regions as outlined in this Director's Order and Procedural Manual #77-1. They are responsible for final approval of Statements of Findings after recommendation by Superintendents and certification of technical adequacy and Servicewide consistency as described in Section 2.6.

-----End of Director's Order-----

Figure 1: Summary of the NPS wetlands compliance process for activities subject to D.O. #77-1 and these procedures (see Section 4.1.3 regarding applicability)



### ***3.0 Relationships to Other Requirements***

#### ***3.1 Relationships to DOI and CEQ Policies and Procedures for Implementing E.O. 11990 and the National Environmental Policy Act***

E.O. 11990 was issued "in furtherance of the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 *et seq.*), in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands." The policies, requirements, and standards in D.O. #77-1, as implemented under these procedures, supplement and must be used in conjunction with the Department of the Interior procedures and policies for implementing E.O. 11990 (520 DM 1); the Council on Environmental Quality (CEQ) Implementing Regulations for NEPA (40 CFR Part 1500); the Department of the Interior policies and procedures for complying with NEPA (516 DM 1-7, 12); and NPS NEPA procedures (D.O. #12 and the D.O. #12 Handbook).

According to Sections 3.5.B and 3.5.I (Exceptions to Categorical Exclusions) of the D.O. #12 Handbook, actions proposed by the NPS that may cause adverse effects on wetlands cannot be categorically excluded from NEPA. (Sections 4.1, 5.3.2, and 5.3.3 of these procedures provide guidance for determining if a proposed action has the potential to have adverse impacts on wetlands.) If such potential is found to exist, then an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) must be prepared, and the supplemental NEPA requirements described in Section 5.3 of these procedures apply. However, some requirements (Statement of Findings, wetland compensation) may be waived for certain "excepted actions" as described in Section 4.2 of these procedures.

#### ***3.2 Relationship to Compliance with Section 404 of the Clean Water Act***

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers issues permits for activities that result in the discharge of dredged or fill material into waters of the United States, including wetlands. Regulated activities range from depositing fill for building pads or roads to discharges associated with mechanized landclearing.

Although portions of the Corps of Engineers 404 permit procedures (33 CFR 320-330) are similar to some of the requirements found in D.O. #77-1 and these implementing procedures, there are significant differences in scope that warrant a separate NPS wetland protection process. First, the 404 permit program regulates only the discharge of dredged or fill material, while Executive Order 11990 covers a much broader range of actions that can have adverse impacts on wetlands, including ground water withdrawals, water diversions, nutrient enrichment, and other examples listed in Section 4.1.2 of these procedures. Second, the wetland definition used for the 404 permit program (33 CFR 328.3) is narrower than the Cowardin et al. (1979) wetland definition used for NPS compliance with E.O. 11990 (see Section 4.1.1 of these procedures). Therefore, a broader range of aquatic habitat types fall under these procedures than under the wetland procedures of the 404 permit program. Third, the Corps of Engineers has "general permit" provisions that allow many projects affecting wetlands to proceed with minimal review.

Thus, in many cases, the 404 permit program does not meet the wetland protection directives of E.O. 11990 for resources managed by the NPS.

*For these reasons, all NPS actions with the potential to have adverse impacts on wetlands (as defined in Section 4.1.1) must comply with D.O. #77-1 and these procedures, and those actions that involve placing dredged or fill material in wetlands or other “waters of the U.S.” (as defined in 33 CFR 320-330) must comply with Section 404 of the Clean Water Act as well. In cases where both NPS and Corps of Engineers procedures apply, it is important to avoid duplication of effort by coordinating with the appropriate Corps of Engineers office early in the process of developing alternatives to assure that they are workable under both these procedures and Section 404 regulations. Also, if wetland compensation is necessary (Section 5.2.3 of these procedures), every effort should be made to assure that the same wetland restoration proposal meets the compensation requirements of both processes.*

### **3.3 Relationship to Executive Order 11988 (Floodplain Management)**

Executive Order 11988 (Floodplain Management) directs federal agencies to avoid adverse impacts upon floodplains and their occupants if there is a practicable alternative. The NPS is further directed to take action to reduce the risk of flood loss, to minimize impacts of flooding on human safety, health, and welfare, and to restore and preserve the natural and beneficial values of floodplains.

NPS D.O. #77-2: Floodplain Management and Procedural Manual #77-2: Floodplain Management established NPS procedures for implementing E.O. 11988. The floodplain procedures require that a floodplain Statement of Findings documenting consistency with E.O. 11988 be prepared for proposed activities that would result in occupation or modification of floodplains or that would result in impacts to floodplain values. Since wetlands are often located within floodplains, such proposed activities may require compliance with both E.O. 11988 and E.O. 11990. In such cases, *the floodplain Statement of Findings discussed in Section VII of Procedural Manual #77-2 and the wetland Statement of Findings discussed in Sections 5.3.4 and 5.3.5 of these procedures may be combined into one Statement of Findings* as long as the requirements for both documents, including all specified signatures, are met.

### **3.4 Compliance with Other Federal Laws and Regulations**

In addition to the above, the NPS must also assure compliance with: 1) the Coastal Zone Management Act, which requires that NPS actions be consistent, to the maximum extent practicable, with approved state coastal zone management programs; 2) Section 10 of the Rivers and Harbors Act, which requires Department of the Army permits for work in navigable waters; 3) the Fish and Wildlife Coordination Act; 4) the Wild and Scenic Rivers Act; 5) the Endangered Species Act; 6) the National Historic Preservation Act; and other relevant laws and regulations governing actions in wetlands and other aquatic environments.

## 4.0 Scope

### 4.1 Applicability

#### 4.1.1 Wetlands Subject to Executive Order 11990 and These Procedures

For the purpose of implementing E.O. 11990, any area that is classified as a *wetland* according to the U.S. Fish and Wildlife Service's "Classification of Wetlands and Deepwater Habitats of the United States" (Report FWS/OBS-79/31); Cowardin et al. 1979) is subject to D.O. #77-1 and these implementation procedures. This publication can be downloaded at <http://www.fws.gov/wetlands>. (Note: The Cowardin classification system forms the basis for the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) mapping program. Section 5.1 of these procedures discusses the applicability of NWI maps to compliance with E.O. 11990.)

Under the Cowardin definition, a wetland must have one<sup>1</sup> or more of the following three attributes:

1. at least periodically, the land supports predominantly hydrophytes (wetland vegetation);
2. the substrate is predominantly undrained hydric soil; or
3. the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

These three attributes encompass wetland areas that fall into five categories:

1. areas with hydrophytes and hydric soils, such as those commonly known as marshes, swamps, and bogs;
2. areas without hydrophytes but with hydric soils - for example, flats where drastic fluctuations in water level, wave action, turbidity, or high concentration of salts may prevent the growth of hydrophytes;
3. areas with hydrophytes but non-hydric soils, such as margins of impoundments or excavations where hydrophytes have become established but hydric soils have not yet developed;
4. areas without soils but with hydrophytes such as the seaweed-covered portion of rocky shores; and
5. wetlands without soil and without hydrophytes, such as gravel beaches or rocky shores without vegetation.

---

<sup>1</sup> This should not be interpreted as advocating a simple "one-parameter approach" to delineating all wetlands. Please see the rest of this section and the following Section 4.1.2 for further guidance on delineating wetlands under the Cowardin definition.

The Cowardin wetland definition encompasses more aquatic habitat types than the definition (33 CFR 328.3) and delineation manual used by the Corps of Engineers for identifying wetlands subject to Section 404 of the Clean Water Act. The 1987 “Corps of Engineers Wetlands Delineation Manual” requires that *all three* of the parameters listed above (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for an area to be considered a wetland (with some exceptions for “atypical situations” and “problem areas”). The Cowardin wetland definition includes such wetlands, but also adds some areas that, though lacking vegetation and/or soils *due to natural physical or chemical factors* such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life (e.g., unvegetated stream shallows, mudflats, rocky shores). Most of these additional shallow aquatic environments, as well as most deepwater habitats, are still regulated as “waters of the U.S.” under the 404 permit program. The following section provides guidance for delineating and mapping wetlands on NPS-managed lands so that both Clean Water Act and NPS-regulated wetlands are included.

#### ***4.1.2 Guidance for Delineating and Mapping Wetlands to Meet Corps of Engineers and NPS Requirements***

U.S. Supreme Court decisions periodically change the types of wetlands that fall under Clean Water Act jurisdiction. The Corps of Engineers responds to these decisions by updating the Section 404 permit regulations and guidance accordingly. The NPS also makes periodic minor changes to its wetland procedures. Therefore, if a proposed NPS action has the potential to have adverse impacts on wetlands, the first step for the NPS or its contractors is to delineate *all natural and artificial wetlands* in the project area according to the following guidance without regard to regulatory jurisdiction. Once this is done, determinations must be made (in consultation with the Corps and the NPS Water Resources Division) regarding how each wetland affected by the proposed actions is treated under *current* Section 404 regulations and NPS wetland protection procedures.

Most wetlands on NPS lands will have all three parameters required by the 1987 Corps Manual. However, NPS adoption of the Cowardin wetland definition requires modified procedures to assure that all wetlands subject to D.O. #77-1 are identified. The following procedures should be used so that wetland delineation and mapping projects on NPS lands will satisfy both the Clean Water Act wetland definition (1987 Corps Manual) and the NPS standard for identifying wetlands (Cowardin et al. 1979):

- For sites with vegetation and soils, use the most recent version (and any approved regional supplements) of the 1987 Corps Manual, including “problem area” and “atypical situation” procedures.
- For naturally unvegetated or non-soil sites, such as many stream channels, tidal mudflats, playas, wave-active shorelines, and so on, use the “limits” of these systems as described in Cowardin et al. (1979) and briefly summarized below. In some cases, modification of the 1987 Corps Manual procedures may be necessary to delineate boundaries for these wetland types. In such cases, *clear evidence of wetland hydrology is always required*. However, the absence of vegetation or hydric soil characteristics due to

natural physical or chemical conditions such as fluvial processes, wave action, or high salinity may make it appropriate to waive the hydrophytic vegetation and/or hydric soil requirements. Such modifications must be explained on data sheets and in wetland delineation/mapping reports.

- Wetland delineation reports should identify which sites qualify as wetlands according to the 1987 Corps Manual and which additional waters qualify as wetlands under the Cowardin system and these procedures. Other “waters of the U.S.” that are subject to Corps regulation, such as deepwater habitats, should also be identified.
- At drained sites that no longer meet wetland hydrology criteria, relic hydric soils or relic hydrophytic vegetation are not indicative of current wetlands. However, if such sites are encountered and the hydrologic alterations are likely human-induced, then they should be identified as potential wetland restoration opportunities.

Following is a summary of the limits (boundaries) of Cowardin wetland types:

Riverine wetlands: The landward limits of riverine wetlands are defined on page 7, 2<sup>nd</sup> column of Cowardin et al. (1979). The wetland/deepwater habitat boundary is described on page 4 (1st paragraph) as a depth of 2 meters at low water, or at the limits of emergent or woody vegetation extending beyond this depth. Dry washes are considered to be wetlands if the substrate is saturated or flooded at some time during the growing season of each year (see part 3 of the wetland definition on p. 3 of Cowardin et al. 1979).

Marine/Estuarine wetlands: The upper limits of these systems are described on pp. 4-5 of Cowardin et al. (1979). The lower limits (boundaries between wetland and deepwater habitats in these systems) are described as the elevation of extreme low water of spring tides (p. 4, 1st paragraph in Cowardin et al. 1979). In other words, if a marine or estuarine area remains flooded during the extreme low spring tide, it is considered subtidal and is therefore a deepwater habitat, not a wetland. Intertidal areas that are exposed by the extreme low spring tide are considered wetlands. (Note: These systems include the splash zones from breaking waves, and may also include areas where wind-enhanced tides periodically trap enough water above the intertidal zone to maintain saline wetland conditions.)

Palustrine wetlands: These wetlands are bounded by upland or by any of the other four systems (p. 10, Cowardin et al. 1979). The transitions between palustrine wetlands and uplands are usually vegetated, so the 1987 Corps Manual can be used to delineate those boundaries. In some cases, such as where high salinity prohibits vegetation establishment, the 1987 Corps Manual may have to be adapted such that only the wetland hydrology and hydric soil parameters are used to determine the upland/wetland boundaries.

Lacustrine wetlands: The limits of lacustrine wetlands are described on p. 9 of Cowardin et al. (1979). The upper limits are either uplands or vegetated wetlands that can be delineated using the 1987 Corps Manual. The lower limits, or boundaries between the lacustrine littoral (wetland) and lacustrine limnetic (deepwater habitat) zones, are where the water depth reaches

2 meters at low water. For reservoirs, it may be necessary to use design or mean high pool elevation data for the upper limit, as appropriate.

#### ***4.1.3 Activities Subject to Executive Order 11990 and These Procedures***

NPS activities that have the potential to have adverse impacts on wetlands are subject to the provisions of E.O. 11990 as implemented through D.O. #77-1 and these procedures. Such activities may include: 1) acquiring, managing, and disposing of NPS lands and facilities; 2) construction and related development activities; 3) permitting activities as provided for under NPS regulatory authorities; and 4) activities, programs, or planning efforts affecting use of NPS lands.

NPS activities with the potential to have adverse impacts on wetlands must follow the procedures in Sections 5.2, 5.3, and 5.4 of this document (unless such procedures may be waived under Section 4.2 "Excepted Actions"). The basic test for determining if a proposed action will have adverse impacts on wetlands is if the activity has the potential to degrade any of the natural and beneficial ecological, social/cultural, or other functions and values of wetlands (see Sections 5.3.2 and 5.3.3 of these procedures regarding evaluating adverse impacts). Such activities may require compliance due to direct impacts (e.g., placement of fill in a wetland) or due to indirect impacts (e.g., secondary or offsite impacts that reach into wetlands). Examples of activities with the potential to have adverse impacts on wetlands include drainage, water diversion, pumping, flooding, dredging, channelizing, filling, nutrient enrichment, diking, impounding, placing of structures or other facilities, livestock grazing, and other activities that degrade natural wetland processes, functions, or values.

Examples of wetland degradation include modifying flow, circulation, hydroperiod, or other aspects of the hydrologic regime; degrading natural biotic communities and processes including native plant and animal communities, habitat quality, floral and faunal productivity, and natural biodiversity; and degrading social/cultural values such as aesthetics, education, historical values, archeological resources, recreation, and scientific research (see Section 5.3.3).

Section 5.1 (Wetland Inventories), Section 5.5 (Restoring Wetlands Degraded by Human Activities), Section 5.6 (Retaining or Removing Structures and Facilities in Existence Prior to May 28, 1980), and Section 5.10 (Proposals to Lease, Create Easements or Rights-of-Way on, Exchange or Dispose of NPS Lands Containing Wetlands) address procedures applicable to wetland inventories and land use decisions that are not necessarily associated with new adverse impacts on wetlands.

#### ***4.1.4 Land Acquisition for Administrative Purposes***

Land acquisition primarily for administrative purposes (e.g., future development of housing, administrative facilities, transportation systems, etc.) is subject to the policies and requirements of D.O. #77-1 and these procedures if there is a potential for adverse impacts on wetlands. Requirements to avoid or minimize wetland impacts described in Section 5.2 must be addressed in the land acquisition (for administrative purposes) planning process. The Statement of Findings (Sections 5.3.4 and 5.3.5) for the acquisition process should focus on justifying why no sites with

fewer potential wetland impacts were practicable; however, the wetland compensation requirement (Section 5.2.3) may be delayed until the NEPA compliance documents for the actual facility plans are prepared. If compensation is delayed in this manner, an amended Statement of Findings must be prepared and issued for the specific development plan according to the procedures in Sections 5.3.4 and 5.3.5. This amendment can tier off the acquisition Statement of Findings as much as possible, but must address the specifics of minimizing wetland impacts and required wetland compensation (Section 5.2.3).

## ***4.2 Excepted Actions***

This subsection identifies certain types of activities that require modified approaches to achieve the objectives of E.O. 11990 while reducing delay and paperwork. "Excepted actions" described in this subsection are those actions that may be excepted from the Statement of Findings requirements described in Sections 5.3.4 and 5.3.5 and the compensation requirements discussed in Section 5.2.3 of these procedures. *If actions are "excepted" from these two requirements under this subsection, requirements to avoid wetlands and minimize unavoidable wetland impacts, to the extent practicable (Sections 5.2.1 and 5.2.2), still apply and should be discussed in the appropriate NEPA document.*

Exceptions described in the following subsections do not imply exemption from the Clean Water Act (including Section 404 permits for discharge of dredged or fill material in waters of the U.S.), Section 7(a) of the Wild and Scenic Rivers Act, Section 10 of the Rivers and Harbors Act (Corps of Engineers permits for projects in navigable waters), the Endangered Species Act, or other laws, regulations or procedures governing NPS activities.

### ***4.2.1 Potential Exceptions for Certain "Water Dependent" and Maintenance Activities***

Certain types of activities cannot accomplish their intended purposes unless they are located in or are carried out in close proximity to aquatic environments (i.e., they are "water dependent"). Following is a list of such actions that may be excepted from the Statement of Findings procedures outlined in Sections 5.3.4 and 5.3.5 and the compensation requirement discussed in Section 5.2.3 of these procedures. This list also includes a limited exception (g., below) for maintenance, repair, or renovation (but not reconstruction or expansion) of currently serviceable facilities or structures.

*For an action to be excepted from the Statement of Findings and compensation requirements, the conditions and best management practices referred to in Section 4.2.2 below and listed in Appendix 2 must be satisfied. If one or more of these conditions/BMPs are not met, the action reverts to full compliance with D.O. #77-1 and these procedures. The NPS Water Resources Division is available for consultation to help determine if an action should be excepted.*

Acreage limits in the excepted actions below apply to "single and complete projects." Single and complete projects are located on discrete sites and have "independent utility" (are fully functional units by themselves). For example, a park proposes to construct two small canoe ramps on a lake at separate locations 1.5 miles apart, and each ramp is fully functional by itself (not dependent on the other ramp or on later project phases to perform its intended function). In this case, the 0.1

acre threshold in exception “b.” below may be applied separately at each canoe ramp because each is a single and complete project.

In a contrasting example, a park proposes to construct a new sewer line that would be buried under three stream channels. In this case, the single and complete project is the entire sewer line, so the threshold in exception “e.” below is the cumulative limit of wetland disturbance for the three stream crossings, and not applicable to each individual crossing. This is because each crossing doesn’t have independent utility (i.e., isn’t functional by itself without being part of the entire sewer line).

Actions that may be excepted from the Statement of Findings (Sections 5.3.4 and 5.3.5) and compensation (Section 5.2.3) requirements:

- a. **Scenic overlooks and foot/bike trails or boardwalks**, including signs, where primary purposes include public education, interpretation, or enjoyment of wetland resources and where total wetland impacts from fill placement are 0.1 acre or less (Parking lots, access roads, borrow sites, and other associated facilities can not be excepted.)
- b. **Small boat ramps/launches, piers, or docks** with total long-term wetland impact for the entire project (both onsite and offsite) of 0.1 acre or less.
- c. **Use and maintenance of unimproved backcountry vehicle stream crossings** (use of stream channels as road *corridors* can not be excepted).
- d. **Minor stream crossings** using bridges or other structures that completely span the channel and associated wetland habitat (i.e., no pilings, fill, or other support structures in the wetland/stream habitat).
- e. **Minor stream crossings for underground utility lines**, including electrical lines, telecommunications cables, or water, sewer, gas or other pipelines, if the cumulative wetland disturbance (stream channel plus non-riverine wetlands immediately adjacent to the channel) totals 0.1 acre (4,356 ft<sup>2</sup>) or less. This exception requires that: 1) directional drilling under the stream channel and adjacent wetlands has been evaluated during the NEPA process and determined not to be practicable; 2) restoration of pre-construction contours and elevations, soil/substrate characteristics, and wetland/riparian vegetation is accomplished as part of the project; 3) the project will not result in adverse impacts on surface or ground water hydrology (e.g., no wetland drainage); and 4) best management practices for protection of aquatic life (e.g., siltation controls, measures to protect fish migration and spawning) are implemented throughout the construction and restoration processes.
- f. **Installation of scientific measuring devices** such as water level recorders, water quality monitoring stations, small weirs or flumes, or similar devices necessary for monitoring of or research on wetland resources.

- g. **Maintenance, repair, or renovation** (but not full reconstruction<sup>1</sup> or expansion) of currently serviceable<sup>2</sup> facilities or structures:
- that were under construction or were completed *prior to* May 28, 1980 (date when original "NPS Floodplain Management and Wetland Protection Guidelines" were published) but whose retention has been reviewed and justified according to Section 5.6 of these procedures, or
  - that were completed *after* publication of the May 28, 1980 guidelines (or subsequent revisions, including this Procedural Manual) and for which compliance with them is on record.

This exception allows for *minor* (0.1 acre or less) deviations in the structure's configuration or fill footprint in wetlands due to changes in construction codes, methods, or safety standards (e.g., handicap accessibility), but does not apply to other types of reconstruction/expansion (e.g., road widening to increase capacity, road re-routing) or conversion to other uses that cause new adverse impacts on wetlands.

- h. **Actions designed to restore degraded (or completely lost) wetland, stream, riparian, or other aquatic habitats or ecological processes.** For this exception, "restoration" refers to reestablishing environments in which natural ecological processes can, to the extent practicable, function as they did prior to disturbance.
- Short-term wetland disturbances that are directly associated with and necessary for implementing the restoration may be allowed under this exception.
  - Conditions 1 and 2 in Appendix 2 may be waived for this excepted action if adverse impacts on hydrology and fauna exceed "minor" but are necessary to achieve restoration objectives. Justification for this waiver must be included in the NEPA document.
  - Actions causing a cumulative total of up to 0.25 acres of new, long-term adverse impacts on natural wetlands may be allowed under this exception if they are directly associated with and necessary for the restoration (e.g., small structures).
  - Some "artificial wetlands" (see definitions in Section 4.2.3 below) may have been constructed on sites which were originally 100% upland habitat (e.g., wetlands sustained by water pumps or other means). Restoration of such sites to upland habitat may also be considered under this exception.

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<sup>1</sup> Full reconstruction of instream diversions, water intake or outfall structures, or similar, legal and permitted instream structures that are damaged or destroyed by storms, floods or similar events may be allowed under this exception.

<sup>2</sup> "Currently serviceable" means usable as is or with maintenance or renovation, but not so degraded as to essentially require full reconstruction.

#### ***4.2.2 Conditions and Best Management Practices for Actions Listed in 4.2.1 to Qualify as Excepted***

Appendix 2 presents a set of conditions that must be satisfied and best management practices (BMPs) that must be implemented for a proposed action to qualify for the exceptions in this subsection. *If one or more of the conditions or BMPs cannot be met, then the action reverts to full compliance with these procedures.*

#### ***4.2.3 Activities with Adverse Impacts on "Artificial" Wetlands***

"Artificial" wetlands are those that have been created on previously dry land (upland) as a result of human activities. Such wetlands may be *incidental* (e.g., formed due to leakage from irrigation systems or in artificial impoundments created by inadequate road drainage) or may be *intentional* (e.g., associated with constructed ponds or reservoirs). *For this subsection, constructed "ponds" and other small intentional artificial wetlands are defined as less than five acres in size, while larger intentional artificial wetlands or "reservoirs" are five acres or larger.*

Proposed actions in *incidental* wetlands or small *intentional* wetlands can have significant adverse impacts on NPS resources and purposes even though the habitats are artificial. Decisions on these actions must include consideration of the potential loss of aquatic resource functions and values, including those described in Section 5.3.3 of these procedures. These decisions must also take into account NPS management policies allowing preservation of such resources under a number of special circumstances, including:

1. when needed to "maintain the closest approximation of the natural condition when a truly natural system is no longer attainable" (*NPS Management Policies 2006, Chapter 4.1*),
2. for the benefit of threatened or endangered species (*NPS Management Policies 2006, Chapter 4.4.2.3*),
3. for cultural resources management purposes (*NPS Management Policies 2006, Chapter 5*), or
4. when directed by Congress (*NPS Management Policies 2006, Chapter 4.1*).

Proposed actions in incidental artificial wetlands or small intentional artificial wetlands are subject to NPS NEPA compliance procedures. However, actions impacting these types of artificial wetlands *may be excepted* from the Statement of Findings requirements of Sections 5.3.4 and 5.3.5 and the compensation requirements of Section 5.2.3 of these procedures if, after evaluation of impacts on wetland functions and values, the anticipated wetland loss or degradation is determined to be minor (including no adverse impacts on state or federally listed or candidate species or their critical habitats). The NPS Water Resources Division is available for consultation to help determine if an action should be excepted. *Note: This NPS exception does not imply exception from compliance with Section 404 of the Clean Water Act (which does regulate many artificial wetlands) or any other relevant laws, regulations, or procedures.*

Construction, deposition of fill material, and other activities with adverse impacts on larger intentional wetlands/reservoirs are also subject to NPS NEPA compliance procedures and must comply fully with D.O. #77-1 and these procedures (though other exceptions in Section 4.2 may apply).

Artificial ponds, channels, or similar features that are used for the sole purpose of active stormwater, wastewater, or drinking water treatment are not considered wetlands for purposes of these procedures. However, if such systems retain wetland characteristics as defined in Section 4.1.1 of these procedures after they have been abandoned, they revert to the procedures for artificial wetlands discussed previously in this Section.

#### **4.2.4 Emergency Actions**

When the NPS performs emergency actions essential to protect property and public health and safety from an immediate threat, modified procedures for compliance with D.O. #77-1 and this manual are necessary. Taking into consideration the need for rapid action in emergency situations, practicable steps to avoid and minimize potential adverse impacts on wetlands must be taken. However, the other procedures described in this document for compliance with D.O. # 77-1 (e.g., Statement of Findings) are not required prior to implementing emergency actions.

After such emergency actions have been completed, restoration actions for wetlands damaged by the emergency action should be implemented as soon as possible. During the next revision of the park General Management Plan or other relevant park planning document, actions that would lessen the frequency of such emergencies or eliminate them entirely should be evaluated and implemented, where practicable.

*Note: This exception does not imply exception from the requirements of Section 404 of the Clean Water Act. In order to allow emergency work without delays, each NPS unit should contact the local Corps of Engineers District Office regarding emergency authorization procedures.*

### **5.0 Procedures**

D.O. #77-1 (reproduced in Section 2 of these procedures) states the NPS goal to achieve "no net loss of wetlands" in the course of managing NPS resources and developing park management and visitor use facilities and programs. In addition, the Director's Order establishes a longer-term goal to achieve "net gain" of wetland habitat through efforts to restore natural wetlands that have been degraded or lost due to past human activities. These and related policies established in D.O. #77-1 will be met through the following procedures.

#### **5.1 Wetland Inventories**

For general park planning and resource management purposes, NPS units should obtain parkwide wetland inventories based on "Classification of Wetlands and Deepwater Habitats of the United States" (FWS/OBS-79/31; Cowardin et al. 1979). In many cases, National Wetlands Inventory (NWI) maps and digital data meeting current standards (based on 1:58,000 scale color infrared aerial photography for most of the country, somewhat smaller scale in Alaska) can serve this

purpose and should be obtained, if available. (NWI maps based on black-and-white, smaller scale photography can be used temporarily in the absence of better products, but should be considered substandard.) Because the NWI uses relatively small scale aerial photography and is based on limited ground truthing, these maps may have significant omissions or misclassifications and should be considered initial tools for avoiding wetland impacts in park planning. Field verifications of NWI maps, enhanced wetland inventories, or site-specific wetland delineation studies will be necessary for more detailed planning and compliance, as explained below.

If it is determined that NWI maps are not adequate for general park planning or wetland management purposes, more detailed "enhanced inventories" employing larger scale imagery and more extensive ground truthing may be necessary. As part of the enhanced wetland inventory process, observable degradation of wetlands and the likely causes (e.g., drainage, filling, mining, nutrient enrichment) should be recorded for use in resource protection and wetland restoration planning. *Enhanced inventories should either use the Cowardin et al. (1979) classification system or be cross-referenced to that system.*

Regardless of the type of wetland inventory data used in general park planning or resource management, site-specific wetland evaluations must be conducted as part of the more detailed project planning process to accurately delineate wetland boundaries, locate any unmapped wetlands, and otherwise assure that projects will not impact wetlands (see Section 5.3.2). *It is critical for this onsite investigation to be conducted in advance of project design to assure that the avoidance and minimization requirements outlined in Section 5.2 of these procedures can be met.*

## ***5.2 Sequence of Avoiding, Minimizing, and Compensating for Wetland Impacts***

For proposed development or other activities either located in or otherwise with the potential to have adverse impacts on wetlands (as defined in Sections 4.1.2, 5.3.2, and 5.3.3 of these procedures), the NPS is required to use the following sequence of avoiding, minimizing, and compensating for wetland impacts.

### ***5.2.1 Avoiding Adverse Impacts on Wetlands***

In the course of developing project alternatives and implementing actions, the NPS must seek to *avoid* direct or indirect adverse impacts on wetlands and avoid support of activities that would result in such impacts, wherever practicable. (See Section 5.3.1.2 of these procedures for examples of factors to be considered in determining if an alternative is "practicable.")

### ***5.2.2 Minimizing Unavoidable Wetland Impacts***

If a proposed action will still have adverse impacts on wetlands even after avoidance measures have been incorporated, the NPS must *minimize* such impacts by designing or modifying the action to reduce wetland degradation or loss and by using the BMPs listed in Appendix 2. Every practicable effort must be made during this process to maintain the integrity of the affected wetlands and their attendant organisms and physical/biological processes.

### 5.2.3 *Compensating for Wetland Impacts*

After *avoidance* and *minimization* have been applied to the maximum practicable extent, remaining new wetland degradation or loss must be offset through wetland *compensation*. For the NPS, compensation refers primarily to restoring natural wetland functions in degraded or former natural wetland habitats on NPS lands. It does not refer to creating wetlands where they did not exist previously, except as may be allowed under Chapter 4 of *NPS Management Policies 2006*.

NPS wetland compensation is required as follows:

1. If the adverse impact on wetlands (direct plus indirect impacts as described in Section 5.3.2 of these procedures) from the entire project totals less than 0.1 acres, then wetland compensation is strongly encouraged, but may be waived if the loss of wetland functions is considered by the park/Region and the NPS Water Resources Division to be minor. *A Wetland Statement of Findings is still required for all new adverse impacts on wetlands, regardless of size, unless the action qualifies as "excepted" as defined in Section 4.2 of this manual.* The Wetland Statement of Findings must provide a justification for the proposed compensation waiver, and the waiver must be approved by the NPS Water Resources Division as part of the certification process described in Section 5.3.5.
2. If the adverse impacts on wetlands from the entire project total 0.1 acres or more, then wetland compensation in the form of restoration of degraded or former wetland habitats is required.

For the purpose of wetland compensation, wetland restoration proposals must, *at a minimum*, provide one-for-one (1:1) *wetland function replacement* (i.e., focus on no net loss of wetland functions, not just wetland acreage). Section 5.3.3 of these procedures discusses evaluation of wetland functions for this purpose. In the absence of definitive information needed to specifically address 1:1 wetland *function* replacement, a minimum of 1:1 wetland *acreage* replacement may be used as a surrogate. In the latter case, the focus should be on replacing wetlands of equivalent type and function, to the extent practicable.

Final compensation ratios may need to be greater than 1:1 in cases where: (1) the functional values of the site being impacted are determined to be high and the restored wetlands will be of lower functional value; (2) it will take a number of years for the restored site to become fully functional (e.g., reestablishment of forested wetlands); or (3) the likelihood of full restoration success is unclear. Conversely, the replacement ratio may simply be 1:1 for areas where the functional values associated with the area being impacted are determined to be low relative to the restoration site and the likelihood of fully successful, timely replacement of functions at the restoration site is high. Consultation with Regional Aquatic Professionals and the NPS Water Resources Division regarding compensation proposals and methods for assessing wetland functions is strongly encouraged prior to preparing Statements of Findings, as discussed in Sections 5.3.4 and 5.3.5 of these procedures.

*Wetland compensation sites must be on lands managed by the NPS*, with the following recommended priority order: 1) within the same wetland system as the impacted wetland; 2)

within the same watershed; or 3) in another watershed within the same NPS unit. If no practicable restoration sites can be found within this location sequence, then sites in other NPS units within the Region may be considered. Practicability factors such as those discussed in Section 5.3.1.2 should be considered in determining appropriate compensation sites. For example, lack of opportunities may make local restoration impossible in some cases, and the decision to expand the area of consideration for compensation sites is clear. However, there may be other cases where local restoration sites exist, but factors such as the opportunity to restore a rare or critical wetland type in another watershed may outweigh the value of restoring a more local wetland.

To help achieve the long-term "net-gain" of wetlands goal within the NPS, the costs of wetland compensation are considered project costs. That is, *compensation costs should be factored into project budgets rather than being accomplished using NPS natural resources funding sources.* For example, funding sources for compensatory wetland projects may include Federal Lands Highway Program (FLHP) funds, other construction funds, ONPS funds, Federal Lands Recreation Enhancement Act funds (fee money), or Regional funding sources that are not designated for natural resources management. *Funding sources that are considered unacceptable for compensatory wetland work include Servicewide or Regional natural resource programs such as NRPP, WRD-Competitive, Exotic Plant Management Team projects, and Biological Resource Management Division-Competitive funds.*

In keeping with the NPS no-net-loss of wetlands policy, the NPS Water Resources Division may conduct periodic surveys to verify that compensation projects have been successfully completed.

### ***5.3 The NEPA Process as Modified by Director's Order #77-1 and These Procedures***

All NPS proposed actions that have the potential to have adverse impacts on wetlands must be treated in the appropriate NEPA document (EA or EIS) according to NPS NEPA procedures (D.O. #12 and the D.O. #12 Handbook), *as supplemented by these procedures.*

#### ***5.3.1. Identifying and Evaluating Alternatives for Proposed Actions***

1. Alternatives presented in EAs and EISs must include:
  - a. A "no action" alternative; and
  - b. Any *practicable alternatives* for carrying out desired actions such that adverse impacts on wetlands are avoided or minimized in accordance with these NPS wetland protection procedures (Section 5.2).

2. In determining an alternative's "practicability" with respect to E.O. 11990, the NPS must analyze and take into account the following and any other relevant factors:
  - a. Effects on natural wetland functions (e.g., fish and wildlife productivity and habitat, threatened and endangered species, vegetation impacts, water purification, streamflow maintenance, and other functions listed in Section 5.3.3 of these procedures) Note: Significance or abundance of the wetland functions in that park unit should be considered, e.g., importance of desert springs and seeps for sustaining wildlife compared to such features in parks with more abundant water resources.
  - b. Effects on wetland social values (e.g., aesthetics, historic and cultural values, land use patterns, and other social/cultural values listed in Section 5.3.3)
  - c. Economic factors (e.g., costs of space, construction, services, relocation, transportation, and other factors listed in Section 5.3.3)
  - d. Existing technology (e.g., available construction methods, equipment, and materials)
  - e. Legal/regulatory constraints
3. The "Affected Environment" section of the EA or draft EIS identifies wetlands that would be impacted by the various alternatives and describes their sizes, locations, types, characteristics, functions, and values. The "Environmental Consequences" section documents the consequences of implementing these alternatives, analyzing the full range of the direct or indirect adverse impacts of the various alternatives on wetlands. The impact analyses must include both impacts associated with *direct occupation of wetlands* (e.g., habitat displacement due to placement of fill) *and offsite impacts* (e.g., wetland water tables lowered by ground water pumps or drainage systems, even if those facilities are constructed on uplands). The level of detail needed in these analyses may vary according to the planning stage for the project or action being proposed. For example, standard National Wetlands Inventory maps could provide much of the information needed for park General Management Plans (GMPs) that are programmatic or strategic in nature, whereas enhanced mapping and/or onsite wetland investigations would be needed for GMPs or subsequent plans that identify specific project locations or detailed plans for facilities.

In cases where the alternatives are associated with existing facilities or activities, the cumulative impact analyses in the EA or EIS must address the impacts that the alternatives would have in concert with these existing developments or activities. For example, the decision to expand an existing facility in a wetland rather than building the facility elsewhere could preclude opportunities to restore wetland functions at the existing site. The analysis should also include the potential for support of future development in wetlands that could result from the alternatives.

### 5.3.2 *Determining if Alternatives are Located in or Could Otherwise Have Adverse Impacts on Wetlands*

#### 1. Existing Data Sources for Preliminary Wetland Determinations

Several sources of data and information (a. - e. below) are available to help determine, at an early planning stage, if a proposed activity might be located in or near wetlands. (Note: onsite investigations, as explained in 2. below, are necessary for detailed planning and compliance.)

- a. NWI Data: Project planners should consult park databases and files to determine if NWI data or enhanced wetland inventory data (see b. below) are available for a site. The NWI website ([www.fws.gov/nwi](http://www.fws.gov/nwi)) has information on the status of NWI mapping for the nation, and can be accessed to download available digital data. USFWS or NPS Water Resources Division Wetlands Program staff can also help determine the status and availability of NWI data.

As discussed in Section 5.1 of this manual, the NWI uses relatively small scale aerial photography and is based on limited ground truthing. These maps may have significant omissions or misclassifications and should be considered as initial tools for avoiding wetland impacts in park planning. Field verifications of NWI maps, enhanced wetland inventories, or site-specific wetland delineation studies will be necessary for more detailed planning and compliance.

- b. Enhanced Inventories: Many parks have conducted enhanced wetland inventories utilizing relatively large-scale imagery and/or intensive ground truthing. The resulting maps or digital data layers may be enhancements of existing NWI maps or they may be entirely independent products. Project planners should consult park and I&M network databases and files to see if enhanced inventories are available for project areas.
- c. NPS I&M Vegetation Maps: The I&M Vegetation Mapping Program is a potential source of wetland spatial data for park planning. I&M Program staff may be able to create a crosswalk between the vegetation classification system and the Cowardin classification system for use in determining wetland locations.
- d. Natural Resources Conservation Service (NRCS): NRCS soil surveys can be good sources of general information for determining the presence of wetlands. NRCS state or local offices can provide available soil maps and lists of soils that they have determined to be hydric (wetland) soils. This information may also be available at <http://soils.usda.gov/>. If an area is mapped as hydric or as having hydric "inclusions," the area most likely contains wetlands. However, because of scale limitations, limited ground truthing, and the fact that these maps were not developed for purposes of wetland identification, there may be significant omissions. They should, therefore, be used primarily as supplemental information.

- e. Other Mapping Programs: Project planners can consult agencies such as the U.S. Army Corps of Engineers (e.g., regarding areas delineated for past 404 permits), the Environmental Protection Agency (e.g., 404 "Advanced Identification" mapping), the National Oceanic and Atmospheric Administration (e.g., National Institute of Marine Fisheries coastal wetland maps), the Natural Resources Conservation Service (e.g., wetland maps for agricultural lands), the state, the county, or comparable sources regarding availability of wetland maps.

## 2. Determining Wetland Locations and Boundaries for Detailed Planning and Compliance

Regardless of the quality of the above data and mapping sources, when a project enters more detailed planning and compliance stages it is always necessary to conduct onsite investigations to confirm wetland boundaries, correct any misclassifications, and locate any unmapped wetlands. Most NPS natural resource professionals should be able to make the *preliminary* onsite determination that: 1) there clearly are no wetlands in the project area (no potential for direct or indirect adverse impacts on wetlands); 2) wetlands clearly exist in the project area that could be adversely impacted by the proposed activity; or 3) it is unclear if wetlands are present. If 1) is the case, and there is no potential for adverse impacts on wetlands, including secondary or offsite impacts as described in Section 5.3.2.3 below, then this should be documented in the NEPA process, but no further compliance with D.O. #77-1 and these procedures is necessary.

If the preliminary onsite investigation indicates that any part of a proposed activity might cause adverse impacts on wetlands, or the presence of wetlands is not clear, then trained, qualified wetland professionals must delineate wetlands (and other waters that may be regulated by the Corps of Engineers) based on the definitions, classification system, and methods discussed in Section 4.1.1 and 4.1.2 of these procedures. These investigations should be conducted in advance of the project design phase to assure that requirements to avoid and minimize wetland impacts can be met. (Please see recommended minimum qualifications for wetland delineators in Section 5.3.5.2 of this manual.)

It is also important to consult with the Corps of Engineers early on regarding the potential need for a Clean Water Act Section 404 permit for the project. Project planners should contact both the NPS Water Resources Division Wetlands Program staff and the Corps of Engineers for guidance on appropriate wetland delineation methods so that a single delineation study provides the data and information needed to satisfy both procedures. Corps of Engineers regulatory offices can be located via the internet at <http://www.usace.army.mil>.

### 3. Determining if an Alternative Could *Otherwise* Have Adverse Impacts on Wetlands

Even if the information gathered as described under Sections 5.3.2.1 and 5.3.2.2 shows that an alternative is not located in a wetland, it must also be determined if the alternative holds the potential for indirect adverse impacts on wetlands. An alternative has such impacts on offsite wetlands if it:

- a. Supports, encourages, or otherwise facilitates additional development in wetlands; or
- b. Has secondary or offsite effects (e.g., drainage, flooding, pollutant discharge, wildlife disturbance, etc.) that extend into wetlands and have adverse impacts on them.

#### **5.3.3 Evaluating Adverse Impacts on Wetland Functions and Values**

##### 1. Examples of wetland functions and values to be considered in this analysis include:

- a. Biotic Functions (e.g., fish and wildlife habitat, floral and faunal productivity, native species and habitat diversity, threatened and endangered species)
- b. Hydrologic Functions (e.g., flood attenuation, streamflow maintenance, ground water recharge and discharge, water supply, erosion and sediment control, water purification, detrital export to downstream systems)
- c. Cultural Values (e.g., aesthetics, education, historical values, archeological values, recreation, interpretation)
- d. Research/Scientific Values (e.g., "reference sites" for research on unimpacted ecosystems)
- e. Economic Values (e.g., flood protection, fisheries, tourism)

If an alternative is determined to have no direct or indirect adverse impacts on wetlands, this should be documented in the impact analysis for the alternative.

##### 2. Methods for Evaluating Wetland Functions and Values

Several methods are available (or are being developed) to assess wetland functions and values for a site and to predict which will be degraded or lost (and, therefore, need to be compensated for) if a project is implemented. The NPS Water Resources Division can provide information on current methods.

### **5.3.4 Public Involvement/Review and Wetland Statements of Findings**

#### **1. Distribution of Public Notice Information for EAs or EISs**

Notice regarding public meetings/hearings and EA/EIS review opportunities for projects with the potential to have adverse impacts on wetlands must be targeted to reach individuals and groups affected by or with an interest in the proposal. Public involvement should provide an opportunity to assist in developing and evaluating alternatives, to review and indicate a preference among alternatives, to provide ideas on avoiding, minimizing, and compensating for wetland impacts, and to comment on proposed actions prior to implementation.

EAs or EISs disclosing adverse impacts on wetlands must be circulated to the appropriate reviewing agencies as outlined in 520 DM 1.8C(4), including but not limited to:

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Natural Resources Conservation Service
- U.S. Geological Survey
- Federal Emergency Management Agency
- Bureau of Reclamation
- Appropriate state review agencies as determined by E.O. 12372, OMB Circular A-95 (Revised), and other requirements, including coastal or river basin commissions, state coastal zone management administrators, and state agencies with responsibility for maintaining water quality in accordance with the Clean Water Act.

#### **2. Environmental Assessments for Proposed Actions with Adverse Impacts on Wetlands**

EAs that reveal adverse impacts on wetlands from proposed actions or their alternatives must be made available for broad public and agency review, consistent with the requirements of D.O. #12 and the D.O. #12 Handbook. An EA that identifies a preferred alternative that will have adverse impacts on wetlands must be accompanied by a separately identifiable draft "Wetland Statement of Findings" (WSOF) that explains why an alternative with such impacts was chosen and that meets the other requirements identified in Section 5.3.5 of these procedures. EA/draft WSOF distribution must include all affected parties, other interested parties or organizations, and the agencies listed in Section 5.3.4.1 of these procedures. The review period is the same as that established in D.O. #12 and the D.O. #12 Handbook for EAs.

Following this review, the NPS must reevaluate the preferred alternative and its impacts, revise the WSOF as necessary, and issue either a FONSI or a Notice of Intent to prepare an EIS consistent with NPS NEPA procedures. If the final preferred alternative still results in adverse impacts on wetlands and a FONSI is to be issued, a final WSOF meeting the requirements identified in Section 5.3.5 must be attached to the FONSI as a

separately identifiable document. Public notice requirements for the FONSI/WSOF are the same as those established by D.O. #12 and the D.O. #12 Handbook. This notice should indicate that a WSOF documenting compliance with E.O. 11990, D.O. #77-1, and these procedures is included with the FONSI.

If an EA is released without a preferred alternative, then preparation of a WSOF may be delayed until a preferred alternative is identified.

### 3. Environmental Impact Statements for Proposed Actions with Adverse Impacts on Wetlands

Draft EISs revealing that proposed actions or their alternatives will have adverse impacts on wetlands must be made available for broad public and agency review under procedures established in NPS NEPA guidance. A draft EIS that identifies a preferred alternative that will have adverse impacts on wetlands must be accompanied by a separately identifiable draft WSOF that explains why an alternative with such impacts was chosen and that meets the other requirements identified in Section 5.3.5 of these procedures. Draft EIS/draft WSOF distribution must include all affected parties, other interested parties and organizations, and the agencies listed in Section 5.3.4.1 of this document.

Following public and agency review of the draft EIS/draft WSOF and any public meetings/hearings as provided for in D.O. #12, the NPS must reevaluate the alternatives and impacts and revise the documents as necessary. If the preferred alternative in the final EIS still results in adverse impacts on wetlands, a final WSOF must be completed according to the requirements in Section 5.3.5 of these procedures. The final signed WSOF must be attached to the Record of Decision (ROD) as a separately identifiable document.

#### ***5.3.5 Content and Signature Procedures for Wetland Statements of Findings***

When an alternative is to be selected for implementation that will result in adverse impacts on wetlands, the FONSI or ROD must be coupled with a *separately identifiable* WSOF as described in Section 5.3.4. (WSOFs may be combined with floodplain SOFs as explained in Section 3.3 of these procedures.) The WSOF, which in most cases can be less than 10 pages, documents the rationale for identifying a preferred alternative that has adverse impacts on wetlands, explains why no alternatives with less wetland impacts were practicable, and otherwise documents compliance with the policies and requirements of D.O. #77-1 and these procedures. The relatively short length of the text implies that the bulk of the wetland descriptions and impact analyses for more complicated situations can occur in the body of the EA or EIS. The WSOF can then summarize these analyses (referring back to specific portions of the EA or EIS, as needed) and focus more on explaining the rationale for choosing an alternative that has adverse impacts on wetlands, explaining how that choice is consistent with D.O. #77-1 and these procedures, and explaining plans for wetland compensation as described in Section 5.2.3 and in 8. below.

*The Statement of Findings for wetlands must contain:*

1. A map at sufficiently large scale to show the locations, boundaries, and types of wetlands at the project site and the aspects of the preferred alternative that would have adverse impacts on them. Wetland mapping must be consistent with wetland definitions and delineation instructions in Sections 4.1.1 and 4.1.2 of this manual.
2. Verification that wetland delineation/mapping work has been performed by a qualified wetland professional. This must include the qualifications of the wetland delineators, their affiliations, and a citation for the wetland delineation product or report. The NPS Water Resources Division strongly recommends the following minimum delineator qualifications: 1) has current “Professional Wetland Scientist” certification through the Society of Wetland Scientists Certification Program, Inc.; or 2) has a certificate of training from a recognized wetland delineation training provider and at least 5 years of experience in wetland delineation. Upon request, Water Resources Division staff can review scopes of work for wetland delineation contracts, help evaluate proposals, and review draft products/reports to confirm technical adequacy.
3. Detailed descriptions of the affected wetlands (i.e., plant species and communities, hydrologic characteristics, wetland classifications, and so on). *Abundance of these wetland types in the NPS unit/area/region must be included in this analysis.*
4. Detailed functional assessments of the affected wetlands, including evaluation of the biological, chemical, hydrologic, geomorphological, recreational, cultural, aesthetic, and other functions and values listed in Section 5.3.3 of these procedures.
5. Full disclosure of the adverse impacts on the wetland habitats, processes, functions, and values at the site (see examples to be considered in Section 5.3.3), and acreages affected, by wetland type.
6. A description of alternatives considered in addition to the preferred alternative.
7. The reasons why the preferred alternative must be located and designed such that it has adverse impacts on wetlands, *and why no non-wetland alternatives or those with fewer wetland impacts were chosen.* A discussion of the various factors and trade-offs considered in arriving at this decision *must* be included.
8. A description of how the preferred alternative was designed to minimize wetland impacts to the greatest extent practicable.
9. A description of the proposed wetland compensation. What wetland area(s) will be restored to compensate for this loss or degradation and maintain consistency with the NPS “no net loss of wetlands” goal found in D.O. #77-1? The first paragraph of this section should state the total acreage of wetland impact, by type, and the total acreage of restored

wetlands, by type, proposed as compensation.

This portion of the WSOF must include:

- a. a large scale map that clearly identifies the location and boundaries of the compensation site
- b. a description of wetland types and wetland functions to be restored at the compensation site, and the degree to which they replace the types and functions lost at the project site
- c. a description of the restoration process (e.g., hydrologic restoration, excavation, grading, structure removal, plantings, etc.)
- d. the anticipated schedule for project completion
- e. the anticipated time-frame for full functioning of the compensation wetlands
- f. monitoring and maintenance requirements and schedule
- g. the funding source for the project consistent with the funding source restrictions listed in Section 5.2.3 of these procedures.

As described in the D.O. #77-1 "Responsibilities" section, the Superintendent chooses the preferred alternative, oversees preparation of the WSOF utilizing the wetland technical information developed during the planning process, and signs the "Recommended" line on the final WSOF cover sheet<sup>1</sup>. The Chief of the NPS Water Resources Division then certifies: 1) the adequacy of wetland technical analyses; and 2) consistency with Servicewide implementation of E.O. 11990 and these procedures. This certification is accomplished by signing a "Certification of Technical Adequacy and Servicewide Consistency" line on the WSOF cover sheet. Signature by the Regional Director indicates final approval of the WSOF.

Example WSOFs can be obtained by contacting NPS Water Resources Division Wetlands Program staff or at <http://www1.nrintra.nps.gov/wrd/wetlands/wetlanddocuments.cfm>.

#### ***5.4 Development in Degraded Wetland Sites***

Development activities proposed for wetland sites that have been modified or degraded as a result of human activities (but still meet the wetland definition) are considered "new actions" subject to the sequence identified in Section 5.2 of this document and the other policies and requirements of D.O. #77-1 and these procedures. In other words, degraded wetlands should not be treated as preferred development sites simply because they are already in an impacted condition. In cases where there are no practicable alternatives to using such sites for development, actions must be included in the proposals to restore natural wetland processes and functions at the site, to the extent practicable.

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<sup>1</sup> Some Regions may establish additional procedures for Regional Aquatic Professionals or Compliance Specialists to provide guidance and review on draft WSOFs prior to signature by the Superintendent and submission to the NPS Water Resources Division. Please check with the Regional Office regarding any such procedures.

### ***5.5 Restoring Wetlands Degraded by Human Activities***

Where natural wetland functions have been degraded or lost due to previous or ongoing human activities (e.g., drainage facilities, structures, agriculture), NPS General Management Plans, Resource Stewardship Plans, or other planning documents should outline actions to reestablish environments in which wetland ecological processes can function as they did prior to disturbance, to the extent practicable. Highest priority should be placed on removing such damaging facilities, structures, or activities and restoring pre-existing wetland habitats and processes. Where removing such facilities or activities is not practicable, the NPS should seek ways to minimize and, to the extent possible, reverse the adverse impacts. (See Sections 5.6 and 5.9 regarding procedures for implementing this directive.)

### ***5.6 Retaining or Removing Structures and Facilities in Existence Prior to May 28, 1980***

General Management Plans (GMPs) or subsequent planning documents for NPS units should include inventories of structures or facilities in existence prior to May 28, 1980 (original publication date of the NPS Floodplain Management and Wetland Protection Guidelines) that are located in or otherwise have the potential to have adverse impacts on wetlands. These documents should justify and record decisions on the retention or removal of these facilities (see Section 5.9 of these procedures regarding cultural resources). Decisions to retain such facilities should be supported by a discussion of why relocation to a site less damaging to wetlands is not practicable, but do not require WSOFs. Expansion or full reconstruction of such facilities require full compliance with D.O. #77-1 and these procedures, although reconstruction involving no new wetland impacts does not require the wetland compensation described in Section 5.2.3 of these procedures.

### ***5.7 Compliance With the Executive Order 11990 Directive to "Enhance the Natural and Beneficial Values of Wetlands"***

Under most circumstances, *NPS Management Policies 2006* do not support "enhancement" of wetland resources beyond natural levels. Therefore, for purposes of implementing E.O. 11990, the term "enhancement" refers to enhancing wetland *values*, where appropriate and practicable, by using wetlands for educational, recreational, scientific, and similar purposes *that do not disrupt natural ecological functions*. The NPS should seek to further enhance wetlands by improving, supporting, and coordinating wetland planning, research, inventory and monitoring efforts, resource management activities, and interpretation in such a manner that the widest range of natural wetland functions and values may be attained.

### ***5.8 Wetland Mitigation Banks***

In some cases, such as when authorized inholder access routes or long-term road renovation programs in parks are expected to generate a series of relatively small wetland impacts over time, it may be appropriate to establish wetland "mitigation banks" *on NPS lands* for compliance with these procedures. Mitigation banks are accounting systems in which "credits" for wetland restoration at a site or sites are "banked" and used at a later date as compensation for actions that adversely impact wetlands. Establishing mitigation banks can have significant advantages,

including: 1) compensation sites can be identified and restoration can be accomplished in advance, thereby preventing temporal loss of wetland functions and smoothing project planning and compliance; 2) compensation for a series of small wetland losses can be achieved more efficiently at larger restoration sites where planning, design, implementation, and monitoring can be consolidated; and 3) such larger restoration projects often tend to have increased biodiversity and habitat value compared to smaller, fragmented compensation projects. *The Chief of the NPS Water Resources Division must certify all NPS wetland mitigation banks for use in compliance with these procedures.*

NPS mitigation banks will not satisfy wetland compensation requirements under Section 404 of the Clean Water Act unless they are also certified by the Corps of Engineers. Complications in obtaining such certification often arise because multiple agencies must agree on acceptable mitigation ratios and other administrative details. The NPS Water Resources Division can advise and assist in creating NPS mitigation banks and in obtaining Corps certification, as appropriate.

Consistent with Servicewide policy regarding no-net-loss of wetlands, and with prohibitions against expending NPS funds on non-NPS lands, *only mitigation banks on NPS lands can be used to satisfy the wetland compensation requirements of these procedures.*

### ***5.9 Cultural Resources and Wetland Protection***

The NPS preserves, manages, and interprets cultural resources including objects possessing historical, archeological, and architectural significance, some of which may occur in or adjacent to wetlands. Many of these cultural resources are included in, or eligible for inclusion in, the National Register of Historic Places. *NPS Management Policies 2006*, NPS cultural resources Director's Orders and procedures, and specific park management plans give direction for the management of these resources. In addition, NPS actions affecting cultural resources included in, or eligible for inclusion in, the National Register are subject to the provisions of Section 106 of the National Historic Preservation Act of 1966 and the implementing regulations found in 36 CFR Part 800, "Protection of Historic Properties."

In some cases, wetland and cultural resource management objectives may conflict. For example, a park may wish to reconstruct a historic facility or restore a cultural landscape in a wetland area, or may wish to remove historic structures that interfere with wetland management objectives. Rather than dictating a result for wetland/cultural resource management conflicts, this document outlines procedures for documenting the decisionmaking process in accordance with other NPS management policies. For example, these procedures and policies do not say that the NPS must preserve each and every wetland or that the NPS must restore every wetland that has been impacted in the past at the expense of cultural resources. Rather, procedures are established whereby alternatives are developed in accordance with Section 5.2, practicability factors such as those listed in Section 5.3.1.2 are weighed, and decisions that have unavoidable, adverse impacts on wetlands are justified.

### ***5.10 Proposals to Lease, Create Easements or Rights-of-Way on, Exchange or Dispose of NPS Lands Containing Wetlands***

When the NPS proposes, at its own discretion, to lease, create easements or rights-of-way on, exchange, or dispose of NPS-managed wetlands to non-federal public or private parties, the NPS must determine if the proposal constitutes a net loss of wetland acreage or functions on NPS lands. If so, then the proposed action is subject to the wetland protection procedures and requirements described in this Procedural Manual, including the Wetland Statement of Findings and wetland compensation requirements.

There are occasional circumstances when actions like these are not proposed by the NPS but instead are non-discretionary, such as when Congress directs the NPS to carry out certain actions through enactment of a specific law. When the NPS complies with that specific law, the applicability of E.O. 11990 and this Procedural Manual to these Congressionally-directed actions depends on the terms of that law. This is generally determined by considering the level of discretion granted to the NPS in the law to carry out the action, and whether its terms are broad enough to provide for a practicable alternative, which is the premise of E.O. 11990. This determination is made on a case by case basis in consultation with the NPS Water Resources Division and the Solicitor's Office.

For either type of transaction (discretionary or directed by Congress), the NPS must: 1) reference in the conveyance those uses that are restricted under identified federal, state, or local wetland regulations; b) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successor, except where prohibited by law.

***Appendix 1: Executive Order 11990 - Protection of Wetlands (42 Fed. Reg. 26961)***

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative, it is hereby ordered as follows:

Section 1. (a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

(b) This Order does not apply to the issuance by Federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property.

Sec. 2. (a) In furtherance of Section 101(b)(3) of the National Environmental Policy Act of 1969 (42 U.S.C. 4331(b)(3)) to improve and coordinate Federal plans, functions, programs and resources to the end that the Nation may attain the widest range of beneficial uses of the environment without degradation and risk to health or safety, each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors.

(b) Each agency shall also provide opportunity for early public review of any plans or proposals for new construction in wetlands, in accordance with Section 2(b) of Executive Order No. 11514, as amended, including the development of procedures to accomplish this objective for Federal actions whose impact is not significant enough to require the preparation of an environmental impact statement under Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended [42 U.S.C. 4332(2)(C)].

Sec. 3. Any requests for new authorizations or appropriations transmitted to the Office of Management and Budget shall indicate, if an action to be proposed will be located in wetlands, whether the proposed action is in accord with this Order.

Sec. 4. When Federally-owned wetlands or portions of wetlands are proposed for lease, easement, right-of-way or disposal to non-Federal public or private parties, the Federal agency shall (a) reference in the conveyance those uses that are restricted under identified Federal, State or local wetlands regulations; and (b) attach other appropriate restrictions to the uses of

properties by the grantee or purchaser and any successor, except where prohibited by law; or (c) withhold such properties from disposal.

Sec. 5. In carrying out the activities described in Section 1 of this Order, each agency shall consider factors relevant to a proposal's effect on the survival and quality of the wetlands. Among these factors are:

(a) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion;

(b) maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and

(c) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses.

Sec. 6. As allowed by law, agencies shall issue or amend their existing procedures in order to comply with this Order. To the extent possible, existing processes, such as those of the Council on Environmental Quality, shall be utilized to fulfill the requirements of this Order. [Sec. 6 amended by EO 12608 of Sept. 9, 1987, 52 F.R. 34617, 3 CFR, 1987 Comp., p. 245]

Sec. 7. As used in this Order:

(a) The term "agency" shall have the same meaning as the term "Executive agency" in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in this Order, however, are meant to apply only to those agencies which perform the activities described in Section 1 which are located in or affecting wetlands.

(b) The term "new construction" shall include draining, dredging, channelizing, filling, diking, impounding, and related activities and any structures or facilities begun or authorized after the effective date of this Order.

(c) The term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

Sec. 8. This Order does not apply to projects presently under construction or to projects for which all of the funds have been appropriated through Fiscal Year 1977, or to projects and programs for which a draft or final environmental impact statement will be filed prior to October 1, 1977. The provisions of Section 2 of this Order shall be implemented by each agency not later than October 1, 1977.

Sec. 9. Nothing in this Order shall apply to assistance provided for emergency work, essential to save lives and protect property and public health and safety, performed pursuant to Sections 305 and 306 of the Disaster Relief Act of 1974 (88 Stat. 148, 42 U.S.C. 5145 and 5146).

Sec. 10. To the extent the provisions of Sections 2 and 5 of this Order are applicable to projects covered by Section 104(h) of the Housing and Community Development Act of 1974, as amended (88 Stat. 640, 42 U.S.C. 5304(h)), the responsibilities under those provisions may be assumed by the appropriate applicant, if the applicant has also assumed, with respect to such projects, all of the responsibilities for environmental review, decisionmaking, and action pursuant to the National Environmental Policy Act of 1969, as amended [42 U.S.C. 4321 *et seq.*].

Jimmy Carter

***Appendix 2: Best Management Practices and Conditions for Proposed Actions with the Potential to Have Adverse Impacts on Wetlands***

The following serve as Best Management Practices (BMPs) for NPS actions that may have adverse impacts on wetlands. Additional BMPs may be appropriate depending on local conditions or special circumstances. These also serve as "conditions" that must be met for the actions listed in Section 4.2.1 of these procedures to qualify as "excepted."

1. **Effects on hydrology and fluvial processes:** Action must have only negligible to minor, new adverse effects on site hydrology and fluvial processes, including flow, circulation, velocities, hydroperiods, water level fluctuations, sediment transport, channel morphology, and so on. Care must be taken to avoid any rutting caused by vehicles or equipment.
2. **Effects on fauna:** Action must have only negligible to minor, new adverse effects on normal movement, migration, reproduction, or health of aquatic or terrestrial fauna, including at low flow conditions.
3. **Water quality protection and certification:** Action is conducted so as to avoid degrading water quality to the maximum extent practicable. Measures must be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering the waterway or wetland. Action is consistent with state water quality standards and Clean Water Act Section 401 certification requirements (check with appropriate state agency).
4. **Erosion and siltation controls:** Appropriate erosion and siltation controls must be maintained during construction, and all exposed soil or fill material must be permanently stabilized at the earliest practicable date.
5. **Proper maintenance:** Structure or fill must be properly maintained so as to avoid adverse impacts on aquatic environments or public safety.
6. **Heavy equipment use:** Heavy equipment use in wetlands must be avoided if at all possible. Heavy equipment used in wetlands must be placed on mats, or other measures must be taken to minimize soil and plant root disturbance and to preserve preconstruction elevations.
7. **Stockpiling material:** Whenever possible, excavated material must be placed on an upland site. However, when this is not feasible, temporary stockpiling of excavated material in wetlands must be placed on filter cloth, mats, or some other semipermeable surface, or comparable measures must be taken to ensure that underlying wetland habitat is protected. The material must be stabilized with straw bales, filter cloth, or other appropriate means to prevent reentry into the waterway or wetland.

8. **Removal of stockpiles and other temporary disturbances during construction:** Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable. Wetland areas temporarily disturbed by stockpiling or other activities during construction must be returned to their pre-existing elevations, and soil, hydrology, and native vegetation communities must be restored as soon as practicable.
9. **Topsoil storage and reuse:** Revegetation of disturbed soil areas should be facilitated by salvaging and storing existing topsoil and reusing it in restoration efforts in accordance with NPS policies and guidance. Topsoil storage must be for as short a time as possible to prevent loss of seed and root viability, loss of organic matter, and degradation of the soil microbial community.
10. **Native plants:** Where plantings or seeding are required, native plant material must be obtained and used in accordance with NPS policies and guidance. Management techniques must be implemented to foster rapid development of target native plant communities and to eliminate invasion by exotic or other undesirable species.
11. **Boardwalk elevations:** Minimizing shade impacts, to the extent practicable, should be a consideration in designing boardwalks and similar structures. (Placing a boardwalk at an elevation above the vegetation surface at least equal to the width of the boardwalk is one way to minimize shading.)
12. **Wild and Scenic Rivers:** If the action qualifies as a water resources project pursuant to Section 7(a) of the Wild and Scenic Rivers Act, then appropriate project review and documentation requirements under Section 7(a) are required.
13. **Coastal zone management:** Action must be consistent, to the maximum extent practicable, with state coastal zone management programs.
14. **Endangered species:** Action must not jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, including degradation of critical habitat (see *NPS Management Policies 2006* and guidance on threatened and endangered species).
15. **Historic properties:** Action must not have adverse effects on historic properties listed or eligible for listing in the National Register of Historic Places.

**National Park Service**  
**U.S. Department of the Interior**



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**APPENDIX C:**  
**COASTAL ZONE CONSISTENCY DETERMINATION**



July X, 2012

Ms. Ellie Irons  
Programs Manager  
Office of Environmental Impact Review  
Virginia Department of Environmental Quality  
629 East Main Street  
Richmond, VA 23219

**Re: Coastal Zone Consistency Determination Request  
Potomac Yard Metrorail Station Environmental Impact Statement**

Dear Ms. Irons:

The Federal Transit Administration (FTA) is requesting VDEQ provide Coastal Zone Consistency Determination for the proposed Potomac Yard Metrorail Station project in accordance with the Coastal Zone Management Act. The proposed federal action is located in the City of Alexandria and Arlington County, both jurisdictions in Virginia's designated Coastal Zone.

The project proposes the construction of a new Metrorail station located at Potomac Yard within the City of Alexandria, along the existing Metrorail Blue and Yellow line. The station would be located between the Ronald Reagan Washington National Airport and the Braddock Road Metrorail Stations.

The Federal Transit Administration (FTA), as the federal lead agency and City of Alexandria (project sponsor) are preparing an Environmental Impact Statement (EIS) for the project in accordance National Environmental Policy Act. The EIS is being prepared in cooperation with the Washington Metropolitan Area Transit Authority (WMATA) and National Park Service (NPS). The Draft EIS is analyzing three alternative station locations which are described in further detail in the project overview.

Attached following background materials to assist in your review of the project:

- Attachment 1: Project Overview
- Attachment 2: Coastal Zone Consistency Determination
- Attachment 3: Resource Protection Area Encroachment

Should you have any questions or comments, please contact me at (703) 340-3065 or by email at [bill.pugh@aecom.com](mailto:bill.pugh@aecom.com) for more information.

Sincerely,

Bill Pugh  
Environmental and Transportation Planner

## Attachments

cc: Dan Koenig, FTA  
Ben Helwig, NPS/GWMP  
Susan Gygi, City of Alexandria  
Jim Ashe, WMATA

## **Coastal Zone Management Act (CZMA) Consistency Determination Potomac Yard Metrorail Station Environmental Impact Statement**

This document provides the Commonwealth of Virginia with the Federal Transit Administration's Consistency Determination under CZMA section 307(c)(1) and 15 CFR Part 930, subpart C for the proposed Potomac Yard Metrorail Station Project. The study area is located in the City of Alexandria and Arlington County. Both jurisdictions are located in Virginia's designated coastal zone. The information in this Consistency Determination is provided pursuant to 15 CFR 930.39.

### **Project Description**

The project proposes the construction of a new Metrorail station located at Potomac Yard within the City of Alexandria, along the existing Metrorail Blue and Yellow line. The study area is located at the border of the City of Alexandria and Arlington County, and includes portions of the George Washington Memorial Parkway which is managed by the National Park Service. The station would be located between the Ronald Reagan Washington National Airport and the Braddock Road Metrorail Stations. A project overview is provided in **Attachment 1**.

### **Virginia Coastal Zone Management Program Policies**

The Virginia Coastal Zone Management Program (VCP) encompasses nine enforceable policies for the coastal area pertaining to:

- Fisheries management.
- Subaqueous lands management.
- Wetlands management.
- Dunes management.
- Non-point source pollution control.
- Point source pollution control.
- Shoreline sanitation.
- Air pollution control.
- Coastal lands management.

The project is not anticipated to impact the following certain coastal resources, and therefore is in compliance with the following enforceable policies:

- Fisheries management.
- Dunes management.
- Point source pollution control.
- Shoreline sanitation.

The Federal Transit Administration has determined that the Potomac Yard Metrorail Station affects the land or water uses or natural resources of Commonwealth of Virginia's coastal zone in the following manner:

- a. Subaqueous Lands Management:** No activity associated with the proposed project will occur within subaqueous lands if Alternatives A or B are constructed.

Alternative D would require bridge above a waterway (Four Mile Run), and it is anticipated that piers for the bridge's substructure would be constructed within the waterway. The new bridge for

Alternative D would replace the existing Metrorail bridge over Four Mile Run approximately 75-feet east of its existing location. The existing bridge would be removed from the waterway.

- b. Wetlands Management:** A delineation for wetlands and Waters of the U.S. (WOUS) in the project study area was completed in the fall of 2011. Wetlands and Waters of the U.S. are shown in Figure 2 of Attachment 1. Coordination with the U.S. Army Corps of Engineers-Norfolk District (USACE) is on-going to receive a Jurisdictional Determination (JD) for USACE delineated wetlands and WOUS. In addition to using the USACE methodology, WOUS and wetland boundaries on NPS property were delineated using NPS procedures. The NPS method requires one wetland characteristic to be identified for a wetland boundary to be determined rather than two or three parameters as required by the USACE method. **Table 1** provides an estimate of temporary and permanent impacts to WOUS for the three Build Alternatives being analyzed in the Draft EIS. **Tables 2 and 3** provide an estimate of permanent and temporary impacts to both USACE and NPS delineated wetlands for the three Build Alternatives being analyzed in the Draft EIS.

**Table 1: Permanent Impacts to Waters of the U.S.**

Alternative	Waters of the U.S. (acres)	
	Temporary	Permanent
A	0.00	0.00
B	0.00	0.00
D	0.75	0.14

**Table 2: Permanent Impacts to USACE and NPS Regulated Wetlands**

Alternative	USACE Wetlands (acres)	NPS Wetlands (acres)	Wetlands Delineated by both USACE and NPS (acres)	Total (acres)
A	0.01	0.00	0.00	0.01
B	1.13	0.01	0.00	1.14
D	0.03	0.02	0.11	0.16

**Table 3: Temporary Construction Impacts to USACE and NPS Regulated Wetlands**

Alternative	USACE Wetlands (acres)	NPS Wetlands (acres)	Wetlands Delineated by both USACE and NPS (acres)	Total (acres)
A	0.01	0.00	0.00	0.01
B	3.14	0.04	0.55	3.73
D	0.08	0.07	0.60	0.75

Estimates of wetland and stream impact are preliminary and subject to revision through the Joint Permit Application (JPA) process in accordance with Section 401 Water Quality and Section 404 of the Clean Water Act. The project sponsors will obtain a permit prior to starting any work that would impact wetlands or WOUS. To compensate for unavoidable wetland and stream impacts, the project sponsors will develop a mitigation plan in consultation with the USACE and the Virginia Department of Environmental Quality (VDEQ).

- c. **Non-point Source Pollution Control:** The proposed action will increase the amount of impervious surface and resulting stormwater runoff at the site beyond the existing conditions depending on which Build Alternative is selected as the Preferred Alternative. The net increase of impervious surface for each Build Alternative is provided in **Table 4**. As the project progresses into final design, impervious surface calculations are expected to decrease from the initial estimates.

**Table 4: Net Impervious Surface Increase**

Alternative	Impervious Area (acres)
A	1.82
B	1.66
D	9.24

Construction methods will be selected to minimize the potential for non-point source pollution impacts (primarily erosion and sedimentation). During construction, site stability will be maintained and runoff from the work area will be controlled to avoid the migration of pollutants from the various construction areas to nearby surface water resources. If the selected alternative is expected to disturb over 2,500 square feet of land (0.57 acres), the project will develop a Stormwater Pollution Prevention Plan (SPPP) and obtain a General Permit for Discharges from Construction Activities from Virginia Department of Conservation and Recreation (DCR). The SPPP will describe the practices that will be used to manage on-site waste, such as building materials, garbage and debris, and to implement controls to minimize the exposure of these materials to stormwater.

The project will be designed to ensure that stormwater impacts during construction are avoided or minimized to the maximum extent practicable. Erosion and Sediment Control Plans for construction activities would be developed for the project in accordance with Sec. 5-4 of the City of Alexandria Code and Chapter 57 of the Arlington County Code.

- e. **Air Pollution Control:** The proposed project site is located within the National Capital Interstate Air Quality Control Region (AQCR 47). The region is designated as a non-attainment area for ground-level ozone (O<sub>3</sub>) and particulate matter (PM<sub>2.5</sub>). The project has demonstrated air quality conformity and is included in the region's approved *National Capital Region's Financially Constrained Long-Range Transportation Plan (CLRP)* and *2013-2018 Transportation Improvement Program (TIP)*. The project is anticipated to generate 288 automobile trips in the AM peak hour, and 99 automobile trips in the PM peak hour that would be directly attributable to the station. The Metrorail station is being designed as an urban station with no park and ride facilities. The project is not anticipated to affect the region's air quality conformity goals or attainment status.
- f. **Coastal Lands Management:** Both the City of Alexandria and Arlington County are located in Virginia's designated coastal zone and have established Chesapeake Bay Preservation Ordinances (CBPO). CBPOs are defined in Article XIII of the City of Alexandria Zoning Ordinance and Chapter 61 of the Arlington County Code. The City of Alexandria and Arlington County have defined Resource Protection Areas (RPA) to include tidal and non-tidal wetlands, shores, and 100-foot buffers around those water bodies.

RPA within the study are shown in Figure 3 of Attachment 1. Wetlands identified in the USACE Jurisdictional Determination (JD) review process are assumed to have 100-foot RPAs consistent with Sec. 13-105 of the City Alexandria’s Zoning Ordinance and Subsection 61-5.B.1.d of the Arlington County Code. These areas are referred to as “preliminary” RPAs and are illustrated in Figure 3 as well. The wetland delineation, however, has yet to be confirmed and adopted by the City of Alexandria and Arlington County.

Based on these defined areas, the three Alternatives will all encroach upon RPAs. Alternatives A and B would affect preliminary RPAs around the proposed platform areas, while Alternative D affects existing RPAs buffering Four Mile Run with a new bridge crossing the waterway. **Table 5** provides a summary of impacts to existing and preliminary RPAs. To comply with each jurisdiction’s CBPO, the project will disturb no more land than is necessary, preserve indigenous vegetation as much as possible, and minimize impervious cover. To minimize the impacts to RPAs, the project will be designed and constructed with stormwater management facilities to meet the performance criteria of Alexandria, Arlington, and the CBPA.

Any development within an RPA, or development exceeding 2,500 square feet of land disturbance (0.57 acres) within a Resource Management Area is subject to the development review processes of the City of Alexandria and Arlington County. Development review approvals must be obtained prior to any site clearing or issuance of any development permit for the project.

City and County development reviews a project specific site plan; environmental site assessment; water quality impact assessment, landscape plan; stormwater management plan and an erosion and sediment control plan. As a transportation facility, the project may be exempted from the development review process for impacts to RPA based on Section 13-119 (A-1) of the City of Alexandria Zoning Ordinance and Section 61-15 (A) of the Arlington County Code.

**Table 5: Resource Protection Area Encroachment**

Alternative	Existing RPA (acres)		Preliminary RPA (acres)	
	Temporary	Permanent	Temporary	Permanent
<b>A</b>	<b>0.00</b>	<b>0.00</b>	<b>0.53</b>	<b>0.37</b>
<b>B</b>	<b>0.00</b>	<b>0.00</b>	<b>5.91</b>	<b>3.41</b>
<b>D</b>	<b>1.40</b>	<b>1.14</b>	<b>1.69</b>	<b>0.21</b>

Based upon the following information, data, and analysis, the Federal Transit Administration finds that the Potomac Yard Metrorail Station is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Zone Management Program.

Pursuant to 15 CFR Section 930.41, the Virginia Department of Environmental Quality has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Virginia’s concurrence will be presumed if its response is not received by the Federal Transit Administration on the 60th day from receipt of this determination. The State’s response should be sent to:

Daniel Koenig  
Environmental Protection Specialist  
Federal Transit Administration  
1990 K Street NW, Suite 510  
Washington, DC 20006-1178

and

James A. Ashe, PE, CPG  
Manager, Environmental Planning and Compliance  
Office of Chief Engineer, Infrastructure  
Transit Infrastructure and Engineering Services  
Washington Metropolitan Area Transit Authority  
600 5th Street, NW  
Washington, DC 20001

#### Attachments

1. Project Overview



# Project Overview

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## 1.0 INTRODUCTION

The Federal Transit Administration (FTA), as the lead federal agency, and the City of Alexandria, as the project sponsor and joint lead agency, in cooperation with the Washington Metropolitan Area Transit Authority (WMATA), and the National Park Service (NPS), are preparing a Draft Environmental Impact Statement (Draft EIS), under the National Environmental Policy Act (NEPA), for the proposed Potomac Yard Metrorail Station (or “the project”).

The project consists of construction of a new Metrorail station located at Potomac Yard within the City of Alexandria, along the existing Metrorail Blue and Yellow Lines between the Ronald Reagan Washington National Airport station and the Braddock Road station. The project would serve existing neighborhoods and retail centers as well as high-density, transit-oriented development planned by the City of Alexandria. The project would provide access to the regional Metrorail system for the U.S. Route 1 corridor of north Alexandria. The Potomac Yard area is currently without direct access to the Metrorail system.

The Draft EIS will analyze a No Build and three Build Alternatives.

## 2.0 PROJECT AREA

The project area for the proposed Potomac Yard Metrorail Station is in the City of Alexandria and Arlington County, Virginia, located in the Northern Virginia portion of the Washington metropolitan region. The project area, as shown in the Location Map (**Figure 1**), is generally bounded by U.S. Route 1 on the west, George Washington Memorial Parkway and Potomac Greens Drive on the east, Slater’s Lane on the south, and the Ronald Reagan Washington National Airport Access Road on the north. Wetlands and Waters of the U.S. within the study area are shown in Figure 2. Resource Protection Areas (RPAs) are shown in Figure 3.

## 3.0 ALTERNATIVES

### 3.1 No Build Alternative

The No Build Alternative includes the existing transportation network, plus all of the committed projects within the study area. The No Build Alternative includes the build-out of an internal street network within Potomac Yard, generally from Four Mile Run to Braddock Road, in addition to investments in transit and bicycle/pedestrian facilities. Transit investments include the Crystal City/Potomac Yard (CCPY) Transitway, as well as expansion of local transit service. The No Build Alternative also includes an off-street trail through the planned linear park between Potomac Avenue and the CSXT right-of-way, enhancing access to the major regional trail network, which serves recreational users and commuters.



Figure 2: Waters of the United States Including Wetlands

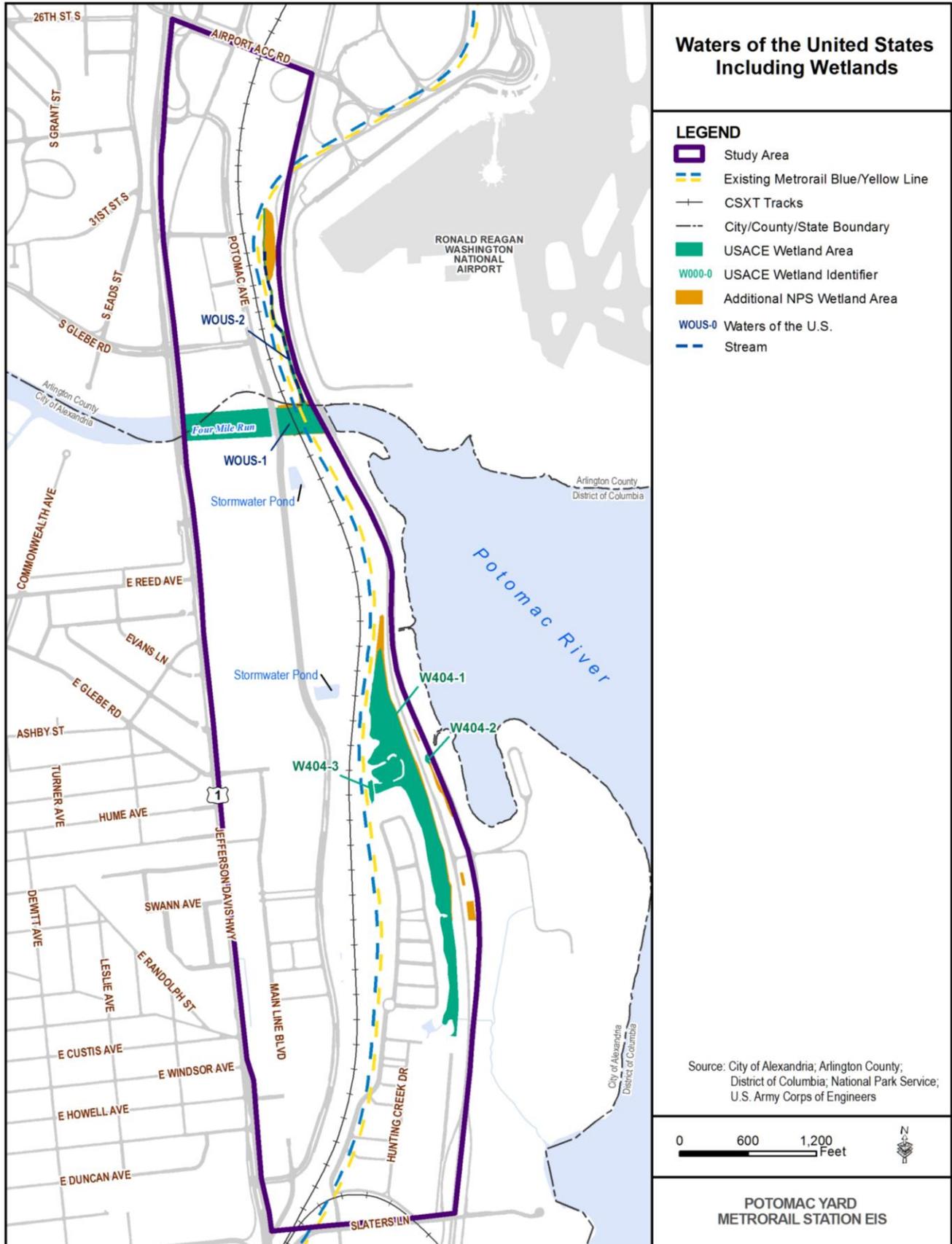
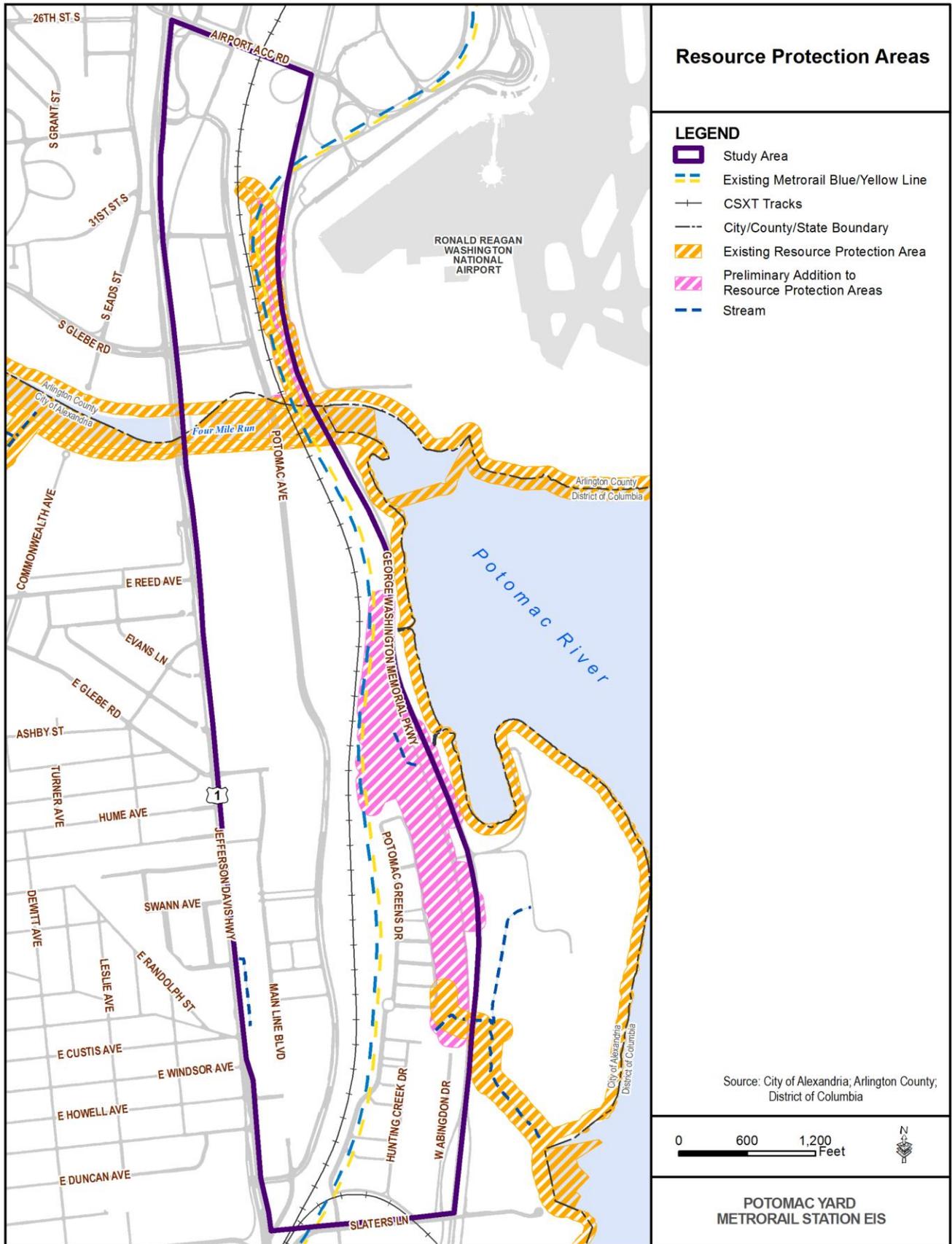


Figure 3: Resource Protection Areas



## 3.2 Build Alternatives

Each Build alternative consists of the construction and operation of a Metrorail station. The Build alternatives are described below and illustrated in **Figure 4**.

### 3.2.1 Alternative A

Alternative A would be located between the CSXT Railroad tracks and the north end of the Potomac Greens neighborhood, in the “Metrorail Reservation” identified during earlier planning efforts for Potomac Yard. The station would be at-grade, with a side platform layout. Additional station facilities would include two pedestrian bridges from the station over the CSXT right-of-way to the planned development in Potomac Yard, and pedestrian access to the Potomac Greens and Old Town Greens neighborhoods.

Alternative A would include minimal track realignment within the station area and in special track work areas, including construction of a double crossover, located approximately 900 feet south of the station.

### 3.2.2 Alternative B

Alternative B would be located between the George Washington Memorial Parkway and the CSXT Railroad, north of the Potomac Greens neighborhood, and east of the existing Potomac Yard Retail Center and the CSXT right-of-way. The station would be at-grade, with a side platform layout. Additional station facilities would include two pedestrian bridges from the station over the CSXT right-of-way to the planned development in Potomac Yard, and a pedestrian bridge over the proposed Metrorail alignment to provide access to the Potomac Greens and Old Town Greens neighborhoods.

Alternative B would include the realignment of approximately 500 to 1,000 feet of existing track (double track), as well as the installation of approximately 1,300 feet of new track (double track). Special track work (to include construction of a double crossover) would be required approximately 100 feet north of the station.

The new track and station would be built on retained fill, and a new retaining wall would be constructed on the east side of the track and station to support the structures.

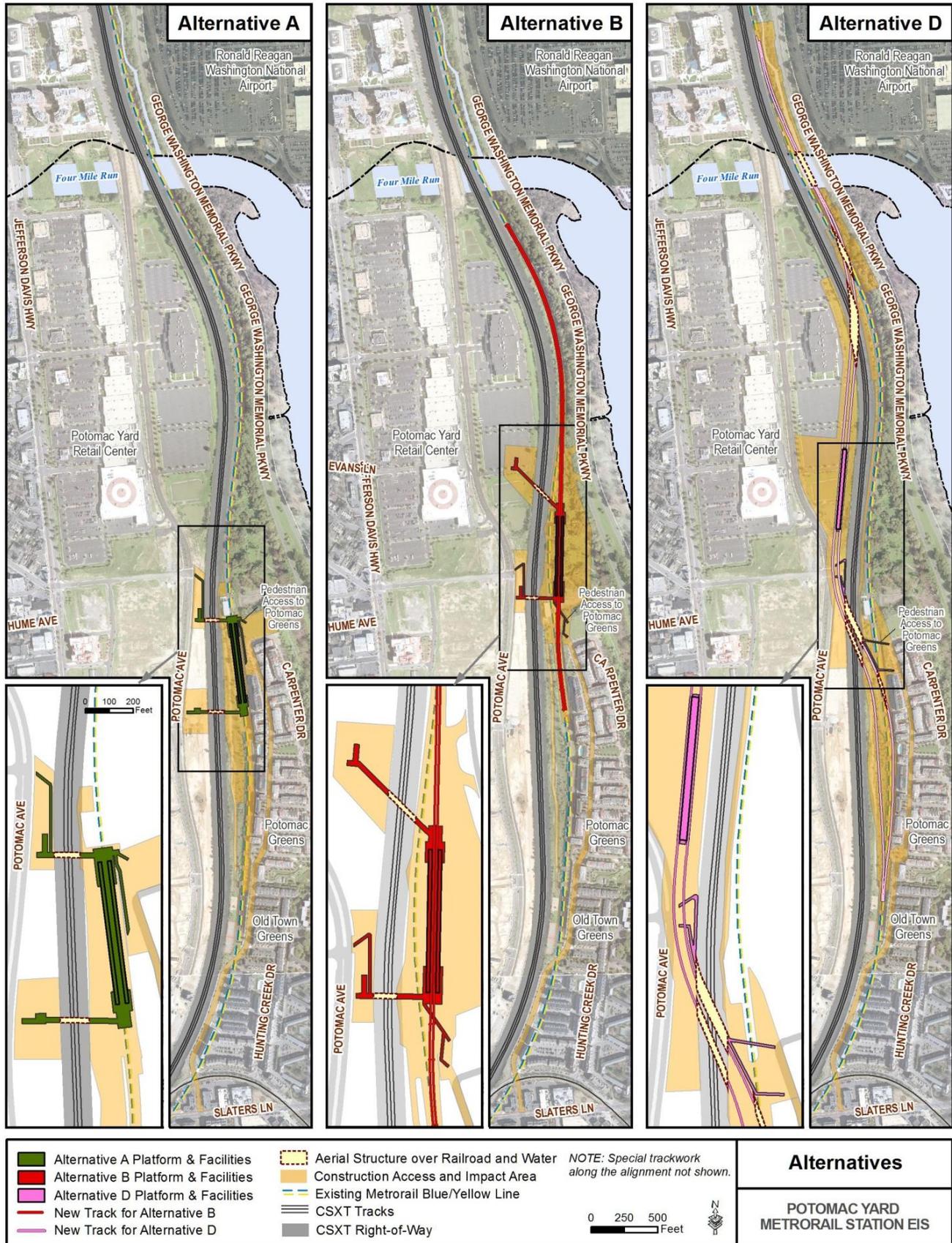
### 3.2.3 Alternative D

Alternative D would be located just west of the CSXT right-of-way, in the vicinity of the existing Potomac Yard Retail Center. The station would be aerial, with a center platform layout. One pedestrian bridge over the CSXT right-of-way, to be constructed separately from the station, would connect the neighborhoods of Potomac Greens and Old Town Greens to Potomac Avenue at East Glebe Road. The pedestrian bridge would parallel the adjacent, yet separate, Metrorail aerial structure.

Alternative D would include the realignment of approximately 1,000 feet of existing track (double track), as well as the installation of approximately 5,600 feet of new track (double track). Most of the new track would be elevated. Alternative D would also include construction of two Metrorail aerial bridges crossing the CSXT right-of-way to the north and south of the station, and a new, single span, aerial structure over Four Mile Run. Special track work (to include construction of a double crossover) would be required approximately 100 feet north of the station.

Additional structural improvements would include the removal and replacement of the existing retaining wall at Potomac Greens and the removal of an additional retaining wall on the west side of the existing Metrorail tracks, north of the portal at the southern end of the neighborhood.

Figure 4: Alternatives





**APPENDIX D:**  
**COASTAL ZONE CONSISTENCY DETERMINATION**



December 4, 2012

Ms. Ellie Irons, Program Manager  
Office of Environmental Impact Review  
Virginia Department of Environmental Quality  
P.O. Box 1105  
Richmond, VA 23218

**Re: Coastal Zone Consistency Determination Request  
Potomac Yard Metrorail Station Environmental Impact Statement**

Ms. Irons:

The Federal Transit Administration (FTA), as the federal lead agency, and City of Alexandria, as project sponsor, are preparing an Environmental Impact Statement (EIS) for the proposed Potomac Yard Metrorail Station project in accordance National Environmental Policy Act (NEPA). The EIS is being prepared in cooperation with the Washington Metropolitan Area Transit Authority (WMATA) and National Park Service (NPS). The Draft EIS is analyzing three alternative station locations which are described in further detail in the project overview, which is provided as an attachment to the enclosed Coastal Zone Consistency Determination. Additional information on the project is also available on the project web site at <http://potomacyardmetro.com/>.

The project proposes the construction of a new Metrorail station located at Potomac Yard within the City of Alexandria, along the existing Metrorail Blue and Yellow line. The station would be located between the Ronald Reagan Washington National Airport and the Braddock Road Metrorail Stations.

In accordance with the Coastal Zone Management Act (15 CFR Part 930, Subpart C), the project team is requesting VDEQ review and provide comment for the Coastal Zone Consistency Determination of the project (submitted Dec. 4, 2012 via PDF file email attachment and enclosed 3 hard copies via U.S. mail). As described, the proposed federal action is located in the City of Alexandria and Arlington County, both jurisdictions in Virginia's designated Coastal Zone.

Should you have any questions or comments, please contact me at (703) 340-3065 or by email at [bill.pugh@aecom.com](mailto:bill.pugh@aecom.com) for more information.

Sincerely,



Bill Pugh  
AECOM

Enclosure: Coastal Zone Consistency Determination (3 copies)

cc: Dan Koenig, FTA  
Ben Helwig, NPS/GWMP  
Susan Gygi, City of Alexandria  
Jim Ashe, WMATA

## Coastal Zone Management Act (CZMA) Consistency Determination Potomac Yard Metrorail Station Environmental Impact Statement

This document provides the Commonwealth of Virginia with the Federal Transit Administration's Consistency Determination under CZMA section 307(c)(1) and 15 CFR Part 930, subpart C for the proposed Potomac Yard Metrorail Station project. The study area is located in the City of Alexandria and Arlington County. Both jurisdictions are located in Virginia's designated coastal zone. The information in this Consistency Determination is provided pursuant to 15 CFR 930.39.

### Project Description

A project overview is provided in **Attachment 1**. As described, the project proposes the construction of a new Metrorail station located at Potomac Yard within the City of Alexandria, along the existing Metrorail Blue and Yellow line. The study area is located at the border of the City of Alexandria and Arlington County, and includes portions of the George Washington Memorial Parkway which is managed by the National Park Service. The station would be located between the Ronald Reagan Washington National Airport and the Braddock Road Metrorail Stations.

### Virginia Coastal Zone Management Program Policies

The Virginia Coastal Zone Management Program (VCP) encompasses nine enforceable policies for the coastal area pertaining to:

- Fisheries management
- Subaqueous lands management
- Wetlands management
- Dunes management
- Non-point source pollution control
- Point source pollution control.
- Shoreline sanitation
- Air pollution control
- Coastal lands management

The project is not anticipated to impact the following certain coastal resources, and therefore assumed to be in compliance with the following enforceable policies:

- Fisheries management
- Dunes management
- Point source pollution control
- Shoreline sanitation

The Federal Transit Administration has determined that the proposed Potomac Yard Metrorail Station would affect the land or water uses or natural resources of the Commonwealth of Virginia's coastal zone in the following manner:

- a. Subaqueous Lands Management:** No activity associated with the proposed project would occur within subaqueous lands if Alternatives A or B are constructed.

Alternative D would require a new bridge above a waterway (Four Mile Run), and it is anticipated that piers for the bridge's substructure would be constructed within the waterway. The new bridge for Alternative D would be located approximately 75-feet east of the existing Metrorail

bridge over Four Mile Run. The existing bridge would be abandoned. A Joint Permit Application (JPA) would be prepared for the construction of the new bridge in accordance with Section 401 and 404 of the Clean Water Act.

- b. Wetlands Management:** A delineation of wetlands and Waters of the U.S. (WOUS) in the project study area was completed between October and December 2011. The results of the wetlands and WOUS delineation are shown in **Figure 2 of Attachment 1**. The U.S. Army Corps of Engineers-Norfolk District (USACE) verified the Jurisdictional Determination (JD) for USACE delineated wetlands and WOUS in September 2012. USACE correspondence verifying the Jurisdictional Determination for the project is provided as **Attachment 2** to this review package.

In addition to using the USACE methodology, WOUS and wetland boundaries on National Park Service (NPS) property were delineated using NPS procedures. The NPS method requires one wetland characteristic to be identified for a wetland boundary to be determined rather than two or three parameters as required by the USACE method.

**Table 1** provides an estimate of permanent impacts to wetlands and WOUS for the three Build Alternatives being analyzed in the Draft EIS. **Table 2** provides an estimate of the temporary construction impacts to both USACE and NPS delineated wetlands for the three Build Alternatives.

**Table 1: Permanent Impacts to NPS and USACE Regulated Wetlands**

Alternative	USACE-only Wetlands (acres)	NPS-only Wetlands (acres)	Wetlands Delineated by both USACE and NPS (acres)	Total (acres)
<b>A</b>	0.01	0.00	0.00	<b>0.01</b>
<b>B</b>	1.13	0.00	0.01	<b>1.14</b>
<b>D</b>	0.01	0.04	0.34	<b>0.39</b>

**Table 2: Temporary Construction Impacts to USACE and NPS Regulated Wetlands**

Alternative	USACE-only Wetlands (acres)	NPS-only Wetlands (acres)	Wetlands Delineated by both USACE and NPS (acres)	Total (acres)
<b>A</b>	0.01	0.00	0.00	<b>0.01</b>
<b>B</b>	3.12	0.04	0.57	<b>3.73</b>
<b>D</b>	0.07	0.07	0.39	<b>0.52</b>

Estimates of wetland and stream impact are preliminary and subject to revision through the Joint Permit Application (JPA) process in accordance with Section 401 and 404 of the Clean Water Act. The project sponsors will obtain a permit prior to starting any work that would impact wetlands or WOUS. To compensate for unavoidable wetland and stream impacts, the project sponsors will develop a mitigation plan in consultation with the USACE, the Virginia Department of Environmental Quality (VDEQ), and NPS as appropriate.

- c. Non-point Source Pollution Control:** The proposed action would increase the amount of impervious surface and resulting stormwater runoff at the site beyond the existing conditions. The net increase of impervious surface for each Build Alternative is provided in **Table 3**. As the

project progresses into final design, impervious surface calculations are expected to decrease from the initial estimates as the project design is refined.

**Table 3: Net Impervious Surface Increase**

Alternative	Impervious Area (acres)
A	1.82
B	1.66
D	9.24

Construction methods will be selected to minimize the potential for non-point source pollution impacts (primarily erosion and sedimentation). During construction, site stability will be maintained and runoff from the work area will be controlled to avoid the migration of pollutants from the various construction areas to nearby surface water resources. If the selected alternative is expected to disturb over 2,500 square feet of land (0.057 acres), the project will develop a Stormwater Pollution Prevention Plan (SPPP) and obtain a General Permit for Discharges from Construction Activities from the Virginia Department of Conservation and Recreation (VDNR). The SPPP will describe the practices that will be used to manage on-site waste, such as building materials, garbage and debris, and to implement controls to minimize the exposure of these materials to stormwater. VDNR approvals will be prepared separately from local construction approvals required by the City of Alexandria or Arlington County described in the next paragraph.

The project will be designed to ensure that stormwater impacts during construction are avoided or minimized to the maximum extent practicable. Erosion and Sediment Control Plans for construction activities would be developed for the project in accordance with Sec. 5-4 of the City of Alexandria Code and Chapter 57 of the Arlington County Code.

- e. **Air Pollution Control:** The proposed project site is located within the National Capital Interstate Air Quality Control Region (AQCR 47). The region is designated as a non-attainment area for ground-level ozone (O<sub>3</sub>) and particulate matter (PM<sub>2.5</sub>). The project has demonstrated air quality conformity and is included in the region’s approved *National Capital Region’s Financially Constrained Long-Range Transportation Plan (CLRP)*. The project will not be a point source of air pollution, therefore no air quality permits are anticipated. In addition, the project is not anticipated to generate a net increase in automobile trips or vehicle miles traveled. The Metrorail station is being designed as an urban station with no park and ride facilities. The project is not anticipated to affect the region’s air quality conformity goals or attainment status.
- f. **Coastal Lands Management:** Both the City of Alexandria and Arlington County are located in Virginia’s designated coastal zone and have established Chesapeake Bay Preservation Ordinances (CBPO). CBPOs are defined in Article XIII of the City of Alexandria Zoning Ordinance and Chapter 61 of the Arlington County Code. The City of Alexandria and Arlington County have defined Resource Protection Areas (RPAs) to include USACE-regulated tidal and non-tidal wetlands, shores, and 100-foot buffers around those water bodies.

RPAs in the study area include areas identified on the adopted RPA maps of the City of Alexandria and Arlington County, USACE-regulated wetlands delineated for the project, and 100-foot buffers around the delineated wetlands consistent with Sec. 13-105(B) of the City zoning ordinance and Subsection 61-5.B.1.d of the Arlington County Code.

Based on these defined areas, the three Build Alternatives would all encroach upon RPAs. Build Alternatives A and B would affect RPAs around the proposed platform areas, while Build Alternative D would affect RPAs buffering Four Mile Run due to the new bridge crossing the waterway. **Table 4** provides a summary of potential impacts to identified RPAs. To comply with each jurisdiction's CBPO, the project will disturb no more land than is necessary, preserve indigenous vegetation as much as possible, and minimize impervious cover. To minimize the impacts to RPAs, the project will be designed and constructed with stormwater management facilities to meet the performance criteria of Alexandria and Arlington CBPOs.

Any development within an RPA or development exceeding 2,500 square feet of land disturbance (0.057 acres) within a Resource Management Area is subject to the development review processes of the City of Alexandria and Arlington County. Development review approvals must be obtained prior to any site clearing or issuance of any development permit for the project.

City and County development require a project-specific site plan, environmental site assessment, water quality impact assessment, landscape plan, stormwater management plan, and an erosion and sediment control plan. As a transportation facility, the project may be exempt from the development review process for impacts to RPAs based on Section 13-119 (A-1) of the City of Alexandria Zoning Ordinance and Section 61-15 (A) of the Arlington County Code.

**Table 4: Resource Protection Area Encroachment**

Alternative	Impact (acres)	
	Temporary	Permanent
A	0.52	0.38
B	5.74	3.07
D	1.80	1.48

Mitigation will be developed in accordance with the VDCR Chesapeake Bay Local Assistance Department (CBLAD) *Riparian Buffers Modification & Mitigation Manual* and with planting recommendations or other mitigation deemed appropriate to the satisfaction of the City of Alexandria's Director of Transportation and Environmental Services. In lieu of mitigation, contribution to the City of Alexandria Water Quality Improvement Fund may be acceptable, or a combination of strategies involving mitigation and contribution to the Water Quality Improvement Fund (for RPA impact within the City of Alexandria).

Based upon the following information, data, and analysis, the Federal Transit Administration finds that the Potomac Yard Metrorail Station is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Zone Management Program.

Pursuant to 15 CFR Section 930.41, the Virginia Department of Environmental Quality has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Virginia's concurrence will be presumed if its response is not received by the Federal Transit Administration on the 60th day from receipt of this determination. The State's response should be sent to:

Daniel Koenig  
Environmental Protection Specialist  
Federal Transit Administration  
1990 K Street NW, Suite 510  
Washington, DC 20006-1178

and

James A. Ashe, PE, CPG  
Manager, Environmental Planning and Compliance  
Office of Chief Engineer, Infrastructure  
Transit Infrastructure and Engineering Services  
Washington Metropolitan Area Transit Authority  
600 5th Street, NW  
Washington, DC 20001

**ATTACHMENT 1**  
**PROJECT OVERVIEW**



# Project Overview

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## 1.0 INTRODUCTION

The Federal Transit Administration (FTA), as the lead federal agency, and the City of Alexandria, as the project sponsor and joint lead agency, in cooperation with the Washington Metropolitan Area Transit Authority (WMATA), and the National Park Service (NPS), are preparing an Environmental Impact Statement (Draft EIS), under the National Environmental Policy Act (NEPA), for the proposed Potomac Yard Metrorail Station (or “the project”).

The project consists of construction of a new Metrorail station located at Potomac Yard within the City of Alexandria, along the existing Metrorail Blue and Yellow Lines between the Ronald Reagan Washington National Airport station and the Braddock Road station. The project would serve existing neighborhoods and retail centers as well as the high-density, transit-oriented development planned by the City of Alexandria. The project would provide access to the regional Metrorail system for the U.S. Route 1 corridor of north Alexandria. The Potomac Yard area is currently without direct access to the Metrorail system.

The Draft EIS is analyzing a No Build and three Build Alternatives.

## 2.0 PROJECT AREA

The project area for the proposed Potomac Yard Metrorail Station is in the City of Alexandria and Arlington County, Virginia, located in the Northern Virginia portion of the Washington metropolitan region. The project area, as shown in the Location Map (**Figure 1**), is generally bounded by U.S. Route 1 on the west, George Washington Memorial Parkway and Potomac Greens Drive on the east, Slaters Lane on the south, and the Ronald Reagan Washington National Airport Access Road on the north. Wetlands and Waters of the U.S. within the study area are shown in **Figure 2**. Resource Protection Areas (RPAs) are shown in **Figure 3**.

## 3.0 ALTERNATIVES

### 3.1 No Build Alternative

The No Build Alternative is defined as the existing highway and transit network and committed transportation improvements from the National Capital Region Transportation Planning Board's Financially Constrained Long Range Plan (CLRP). The Draft EIS will assume that any improvements that are anticipated to be implemented by the project horizon year of 2040, whether physical or operational, are part of the No Build Alternative, with the exception of the new Metrorail Station at Potomac Yard.

The No Build Alternative includes the build-out of an internal street network within Potomac Yard (roughly from Four Mile Run to Braddock Road) and additional investments in transit and bicycle/pedestrian facilities. Anticipated transit investments include the Crystal City/Potomac Yard (CCPY) Transitway and an expansion of local transit service.

Figure 1: USGS Quadrangle Map (Location Map)



Figure 2: Waters of the United States Including Wetlands

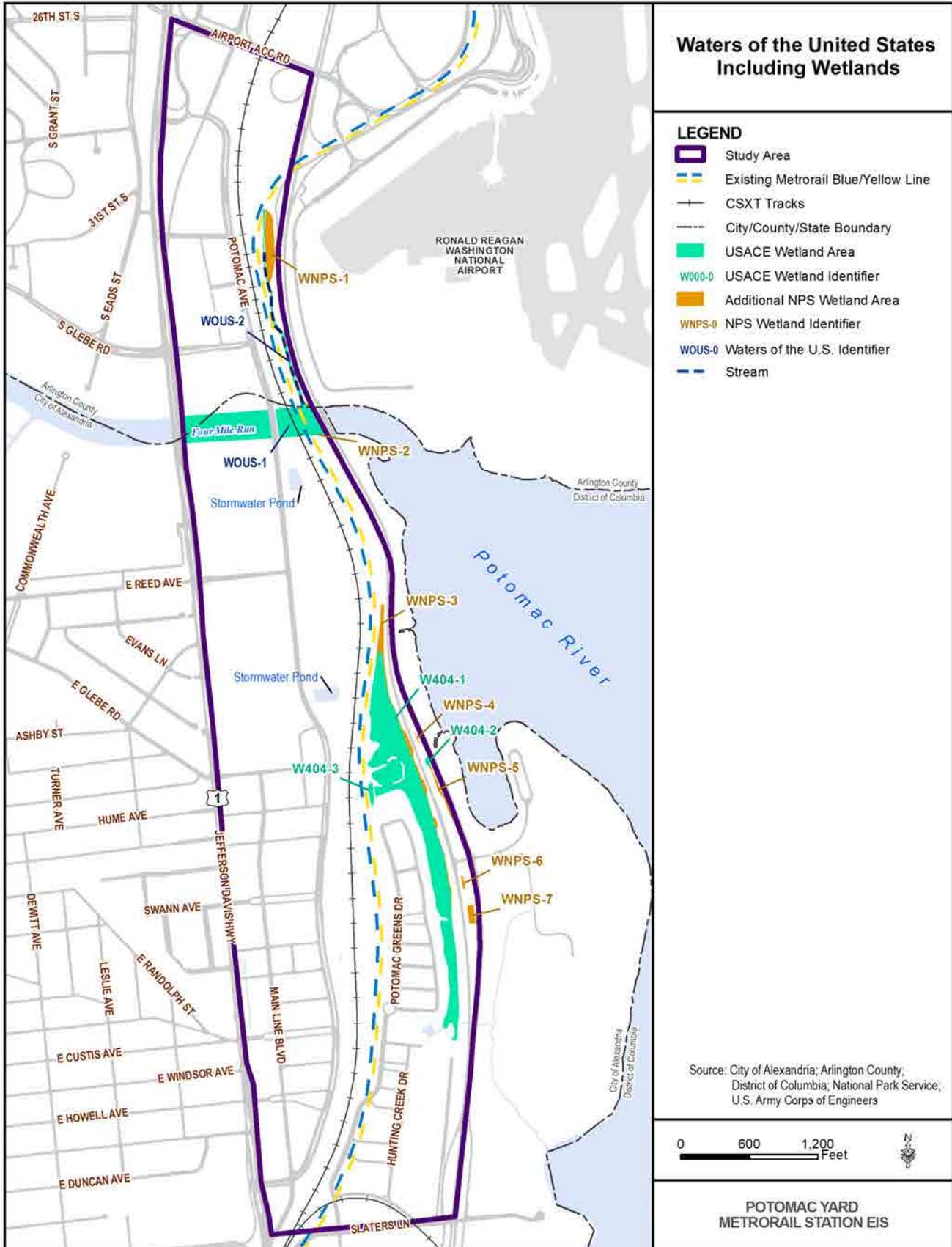
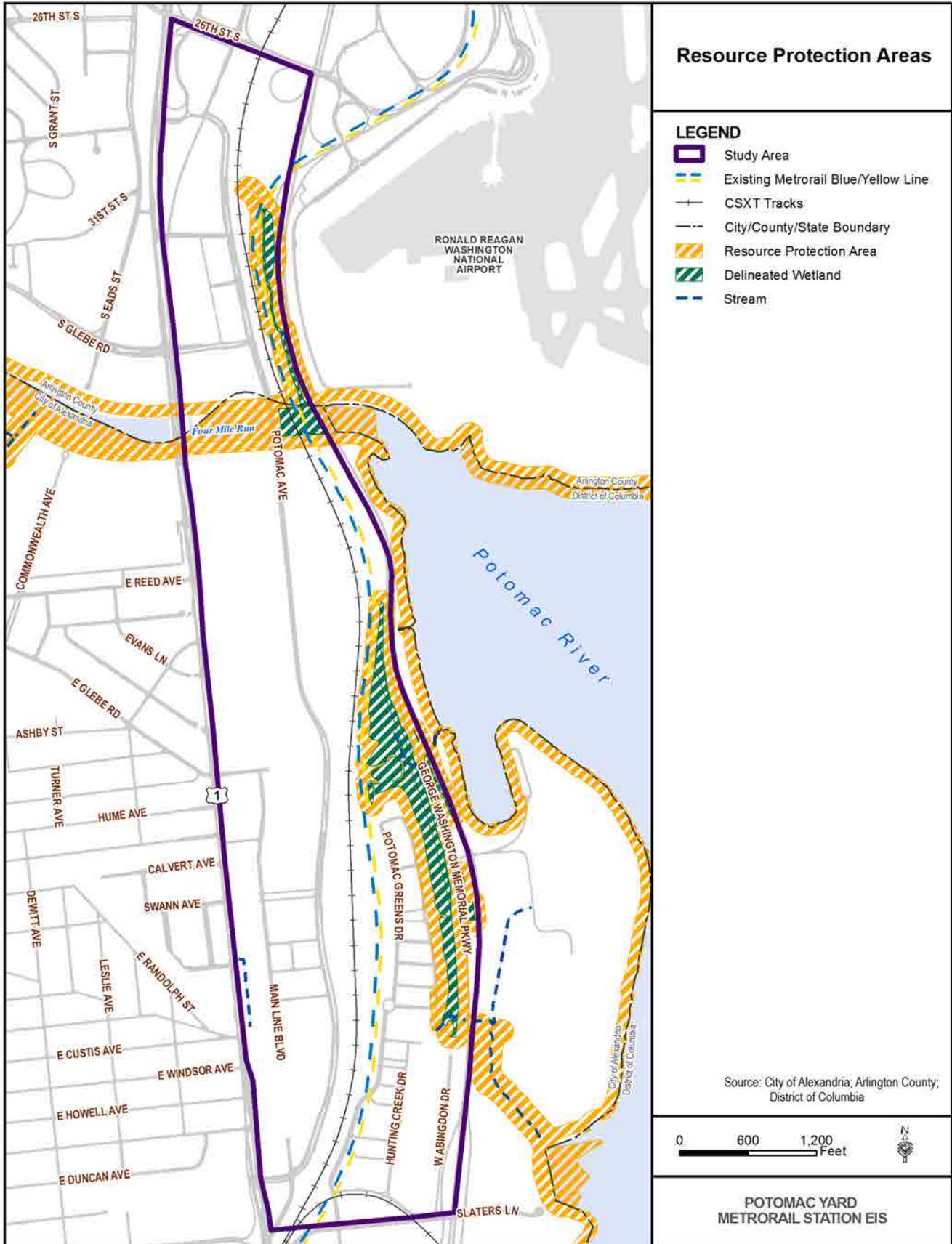


Figure 3: Resource Protection Areas



## 3.2 Build Alternatives

Each Build alternative consists of the construction and operation of a Metrorail station. The Build alternatives are described below and illustrated in **Figure 4**.

### 3.2.1 Build Alternative A

Build Alternative A would be located on the existing Metrorail tracks between the CSX Transportation Railroad (CSXT) tracks and the north end of the Potomac Greens neighborhood, generally within the existing Metrorail Reservation easement designated during earlier planning efforts for the Potomac Yard area. The station would be at-grade with a side platform layout. Additional station facilities would include two pedestrian bridges from the station over the CSXT right-of-way to the planned development in Potomac Yard, as well as pedestrian access to the Potomac Greens and Old Town Greens neighborhoods.

Build Alternative A would include construction of a double crossover located approximately 900 feet south of the station.

### 3.2.2 Build Alternative B

Build Alternative B would be located between the George Washington Memorial Parkway and the CSXT Railroad, north of the Potomac Greens neighborhood and east of the south end of the existing Potomac Yard Shopping Center in North Potomac Yard. The station would be located within the Greens Scenic Area easement managed by NPS. The station would be at-grade. Additional station facilities would include two pedestrian bridges from the station over the CSXT right-of-way to the planned development in Potomac Yard and a pedestrian bridge over the proposed Metrorail alignment to provide access to the Potomac Greens and Old Town Greens neighborhoods.

Build Alternative B would require the realignment of approximately 650 feet of existing track, as well as the installation of approximately 1,450 feet of new track. Special track work – a double crossover – would be required approximately 100 feet north of the station.

The new track and station would be built on retained fill, and a new retaining wall would be constructed on the east side of the track and station to support the structures.

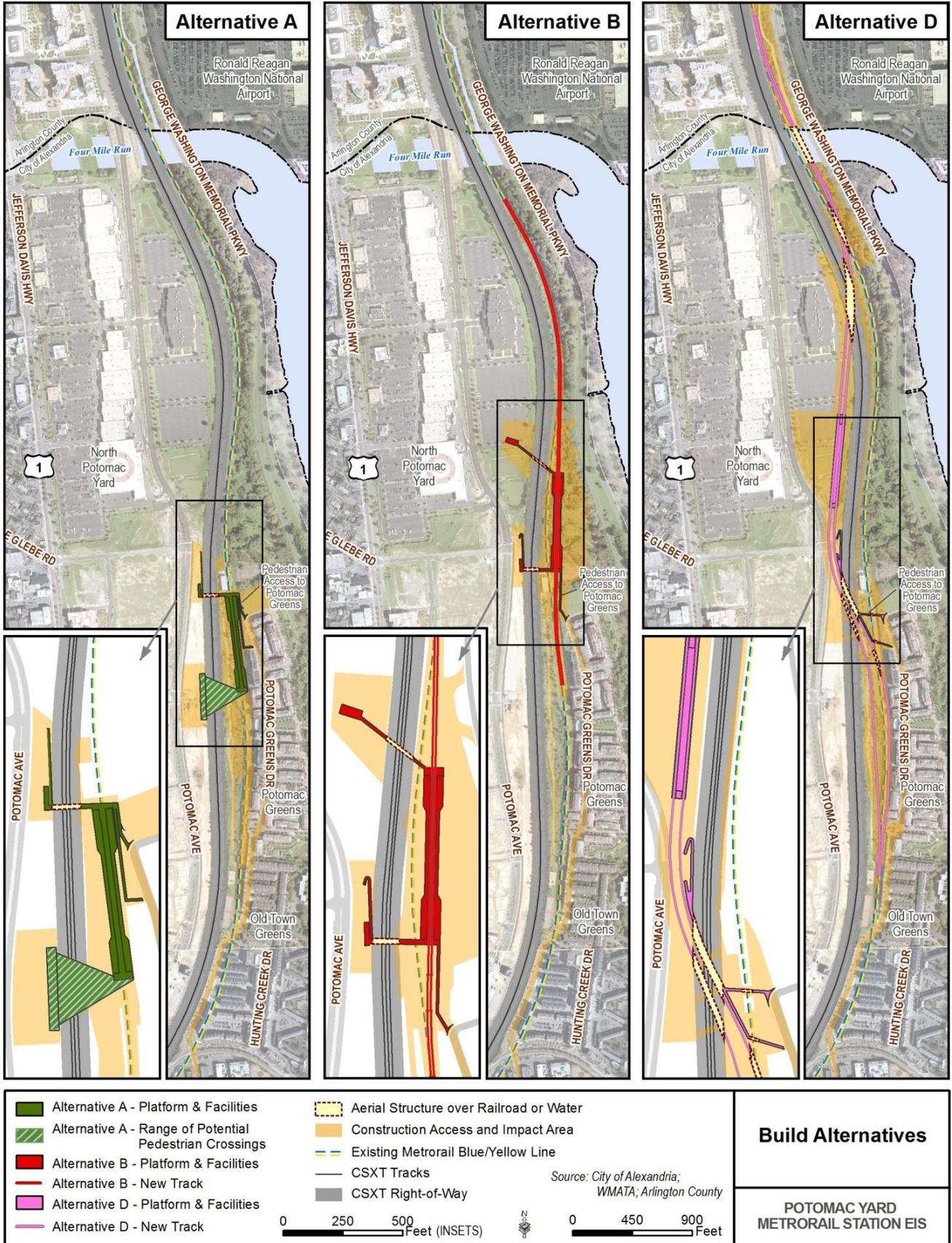
### 3.2.3 Build Alternative D

Build Alternative D would be located west of the CSXT right-of-way near the existing Potomac Yard Retail Center in North Potomac Yard. The station would be aerial with a center platform layout. One pedestrian bridge over the CSXT right-of-way would be constructed, connecting the neighborhoods of Potomac Greens and Old Town Greens to Potomac Avenue at East Glebe Road. The pedestrian bridge would be parallel to the new Metrorail bridge over the CSXT right-of-way.

Build Alternative D would require the realignment of approximately 550 feet of existing track, as well as the installation of approximately 5,800 feet of new track. The majority of new track would be elevated. Build Alternative D would also include construction of two Metrorail aerial bridges crossing the CSXT right-of-way to the north and south of the station and a new Metrorail bridge over Four Mile Run. Construction of a double crossover would be required in a location approximately 100 feet north of the station. Following completion of construction, the old Metrorail tracks would be removed from service.

Additional structural improvements would include the removal and replacement of the existing retaining wall near the Potomac Greens neighborhood and the removal of an additional retaining wall west of the existing Metrorail tracks, north of the portal at the southern end of the neighborhood.

Figure 4: Build Alternatives



**ATTACHMENT 2**  
**U.S. ARMY CORPS OF ENGINEERS**  
**JURISDICTIONAL DETERMINATION VERIFICATION LETTER**  
**SEPTEMBER 28, 2012**





**DEPARTMENT OF THE ARMY**  
NORFOLK DISTRICT, CORPS OF ENGINEERS  
FORT NORFOLK, 803 FRONT STREET  
NORFOLK, VIRGINIA 23510-1096

REPLY TO  
ATTENTION OF:

September 28, 2012

Northern Virginia Regulatory Section  
NAO-2012-02012 (Potomac Yard Metrorail)

James A. Ashe, PE, CPG  
Manager, Environmental Planning and Compliance  
Office of Chief Engineer, Infrastructure  
Transit Infrastructure and Engineering Services  
Washington Metropolitan Area Transit Authority  
600 5th Street, NW  
Washington, DC 20001

Dear Mr. Ashe:

This letter is in regard to your request for verification of an approved jurisdictional determination for waters of the U.S. (including wetlands) on property known as the Potomac Yard Metrorail Station, located on an approximately 117.0 acre parcel in Alexandria and Arlington County, Virginia.

An on-site jurisdictional determination has found waters and/or wetlands regulated under Section 10 of the Rivers and Harbors Act (33 U.S.C. 403) and/or Section 404 of the Clean Water Act (33 U.S.C. 1344) on property listed above. Nontidal wetlands and/or waters have been identified on the site. This letter shall serve to confirm the wetlands delineation by AECOM, Inc. as surveyed and shown on the maps titled, "Potomac Yard Metrorail Station" dated April 2012 (on file at the Corps).

Our basis for this determination is the application of the Corps' 1987 Wetland Delineation Manual and the positive indicators of wetland hydrology, hydric soils, and hydrophytic vegetation. The wetland is a water of the United States and is part of a tributary system to interstate waters (33 CFR 328.3(a)). These waters meet the Corps' definition of waters of the United States, are part of a tributary system to interstate waters (33 CFR 328.3 (a)) and have an ordinary high water mark.

Discharges of dredged or fill material, including those associated with mechanized landclearing, into jurisdictional waters and/or wetlands on this site will require a Department of the Army permit and may require authorization by state and local authorities, including a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC) and/or a permit from your local wetlands board. This letter is a confirmation of the Corps jurisdiction for the waters and/or wetlands on the subject property and does not authorize any work in these jurisdictional areas. Please obtain all required permits before starting work in the delineated waters/wetland areas.

This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the North Atlantic Division Office at the following address:

Mr. Michael Vissichelli  
Regulatory Appeals Review Officer  
U.S. Army Corps of Engineers  
Fort Hamilton Military Community  
301 General Lee Avenue  
Brooklyn, NY 11252-6700

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 C.F.R. part 33 1.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **\*\*November 28, 2012.\*\*** It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

This jurisdictional determination is valid for a period of five years from the date of this letter unless new information warrants revision prior to the expiration date. If you have any questions, please contact Ms. Theresita Crockett-Augustine in the Northern Virginia Field Office at 18139 Triangle Plaza, Suite 213, Dumfries, Virginia 22026, (703) 221-9736 or [theresita.m.crockett-augustine@usace.army.mil](mailto:theresita.m.crockett-augustine@usace.army.mil).

Sincerely,



for Nicholas L. Konchuba  
Chief, Northern Virginia  
Regulatory Section

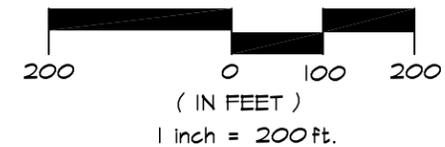
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**LEGEND**

- WETLANDS
- PERENNIAL STREAM
- - - INTERMITTENT STREAM
- HABITAT (MARGINAL)
- NOT SUITABLE HABITAT
- ADDITIONAL STUDY AREA
- APPROXIMATE MEAN HIGHWATER ELEVATION (3FT MSL)
- 1 PHOTOGRAPH LOCATION AND ORIENTATION



**FIGURE 6**  
**POTOMAC YARD METRORAIL STATION**  
**SENSITIVE JOINT VETCH SURVEY**  
**CITY OF ARLINGTON AND**  
**ALEXANDRIA COUNTY, VIRGINIA**  
**SEPTEMBER 7, 2012**

NOTE: ALL LOCATIONS ARE APPROXIMATE.

**RESOURCE**  
**INTERNATIONAL, LTD.**

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