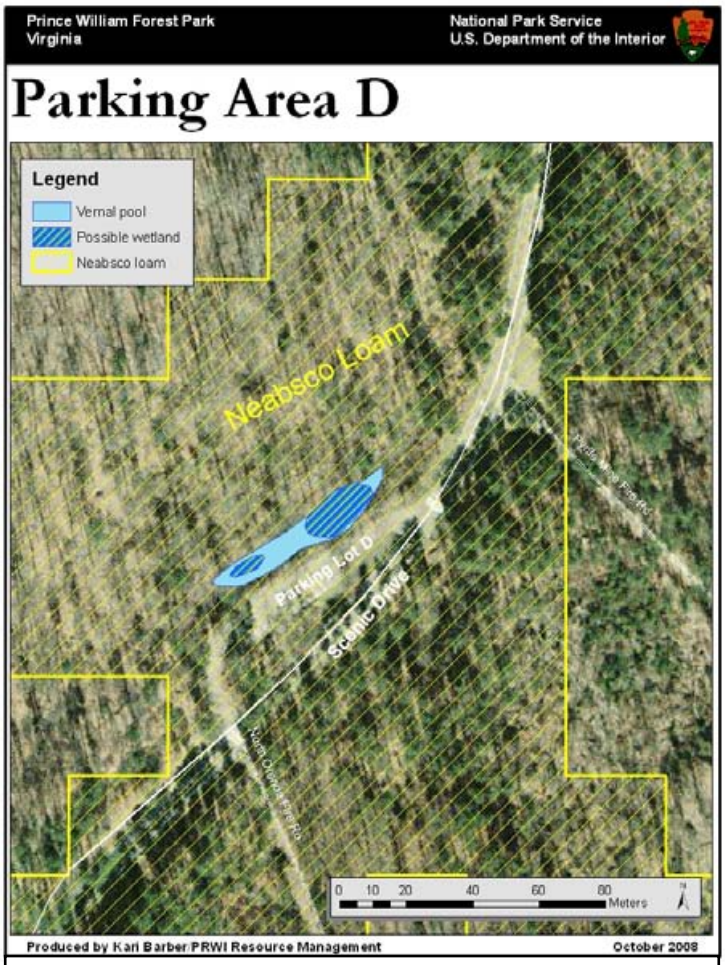
APPENDIX C
Wetland Delineation Report

Wetland Survey: Parking Lot D Vernal Pool
Prince William Forest Park
10/21/2008

Purpose

The purpose of this report is to review the alignment of a proposed parking lot adjacent to a potential jurisdictional wetland area, define any wetland boundaries, and make recommendations to avoid and minimize the impacts of the parking lot on wetland resources,



Parking Area D, DSC/November 2008/860-20013

Site

The site in question is Parking Area D, along the Scenic Drive, in Prince William Forest Park. The park is proposing to repave the lot and add an expansion of the lot to include 20 more parking spaces. Parking Area D is located adjacent to the Scenic Drive to the northwest, directly across from the junction with North Orenda Road, at the beginning of a one-way designation. Lying directly northwest, just inside of the forest edge from Lot D is a vernal pool approximately 10 meters wide and 50 meters long. The vernal pool lies within what seems to be the historic road trace for the Scenic Drive. Evidence of the pool origin comes from field observations which note that the road trace passes a cemetery and continues to traverse parallel with the parking area and eventually merges with the current Scenic Drive footprint.

Delineation

Tools: Shovel, Camera, Routine Wetland Determination Data For (1987 COE Wetlands Delineation Manual), Munsell Soil Color Charts, and Vascular Plants of Virginia plant identification book.

Soils

Prior to the field visit, research was conducted on the soil types found in the area. A digital soil survey data set provided by the U.S. Department of Agriculture, Natural Resrouces Conservation Survey, with a temporal reference of 08/01/00 to 10/06/04. The data stated that the site in question contains soils consistent with the Neabsco Series, particularly Neabsco Loam. These soils are typically finely loamy, semiactive, mesic soils found in mixed pine and oak woodlands.

Two soil pits were dug, one within the area delineated in the map as a possible wetland, and the other in an area located as a typical vernal pool. Both pits were approximately 20 inches deep. Analysis was conducted on soils from both pits at 0-9 inches and 9-18 inches. The analysis concluded that the soils were consistent with a Neabsco Loam, however, the soil color was inconsistent with wetland soils. Actual values from the soil color charts can be seen on data forms 1 & 2.

Hydrology

Hydrologic activity is obvously evident on site due to the water-stained leaves and prior reports of standing water in the area. Although no recorded data is available for historic evidence, prior park biologists have observed standing water and faunal activies of a typical vernal pool at this site. During the soil analysis, oxidized root channels were observed in the upper 12 inches of the soil profile, indicating potential wetland hydrology.

Vegetation

A vegetative survey was conducted within the two areas identified on the map as Possible Wetland and Vernal Pool. Within the area labeled potential wetland, species were limitted possibly because of the time of year. However, the site contained 100% Facultative and Facultative Wet overstory species including *Acer rubra, Betula nigra, and Carpinus caroliniana,* while the understory contained *Smilax rotundifolia* and a *Carex sp*., the later of which could not be identified to species, however is likely a Facultative Wet or possibly Obligate species.

In the area marekd as 'vernal pool' on the map, the species range was much broader. The overstory species included *Carpinus caroliniana, Acer rubra, Quercus falcata, Betula nigra, Fagus grandifolia, Ilex opaca, and Carya glabra*. Sixty-five percent of the canopy in this area is either Facultative or Facultative Wet. The understory includes *Smilax rotundiforia, Lonicera japonica, Polystichum acrostichoides, Vitis vulpina, and parthenocissus quinquefolia*; some of which are Facultative yet just as common in non-wetlands.

Again, the complete data set can be seen on data forms 1 & 2.

Conclusions:

In accordance with National Park Service Director's Order 77-1: Wetland Protection, the location and classification of wetlands is based on the following references:

- Jurisdictional wetland determination in accordance with the guidelines of the Army Corps of Engineers' (ACOE) *Wetlands Delineation Manual* (1987).

- *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

For the purposes of compliance with Executive Order 11990, the National Park Service uses *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) as the standard for defining, classifying, and inventorying wetlands. Using this standard, a wetland is defined as the predominance of hydrophytic vegetation, predominantly undrained hydric soil, and/or non-soil substrate which is saturated with water or covered by shallow water at some time during the growing season of each year.

The 1987 Corps of Engineers Manual on wetland delineation uses a three-parameter approach methodology. Jurisdictional wetlands regulated by the ACOE under Section 404 of the Clean Water Act must exhibit all three parameters of hydrology, hydrophytic vegetation, and hydric soils to be considered a wetland. This methodology does not consider unvegetated aquatic sites such as mudflats or vegetated shallow water to be wetland areas, whereas the Cowardin classification does. Per NPS DO-77-1 the National Park Service follows Cowardin in requiring that only one parameter need be present not all.

Both map delineated sites, vernal pool and possible wetland, are determined to be positive for the presence of hydrophytic vegetation and wetland hydrology. Following National Park Service procedures, both sites are considered wetlands.

Recommendations include limiting the amount of surface flow from the parking lot to the northwestern edge of Lot D. This could be accomplished by constructing a curb around the parking lot and designing it to drain towards the southwest and east away from the wetlands.

Data Form 1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Outer 4

Project/Site: Parking Lot D Expansion Project - Proposed
Applicant/Owner: DOI - NPS - PRWI
Investigator: P. Pedersen - Biologist - NPS

Date: 10/20/06
County: Prince William
State: VA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID:

VEGETATION Overstory Understory

Dominant Plant Species	Stratum	Indicator
1. Carpinus caroliniana	I 20%	FAC
2. Ac. ev. rubra	CD 25%	FAC
3. Quercus falcata	D 10%	FACU-
4. Betula nigra	CD 20%	FACW
5. Fagus grandifolia	I 5%	FACU
6. Ilex opaca	I 5%	FACU*
7. Carya glabra	CD 15%	FACU-
8.		

Dominant Plant Species	Stratum	Indicator
9. Smilax rotundifolia	60%	FAC
10. Lonicera japonica	5%	FACU-
11. Polystichum acrostichoides	25%	FACU-
12. Vitis vulpina	5%	FAC
13. Botharesissus quinquefolia	5%	FACU
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 65%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations:
Depth of Surface Water: _____(in.)
Depth to Free Water in Pit: _____(in.)
Depth to Saturated Soil: _____(in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 Inches
X Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Neabsco

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-9		5/3 10yr			
9-18		6/6 10yr			

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

Approved by HQUSACE 3/92

Data Form 2

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Inner

Project/Site: Parking Lot D Expansion Project-Proposed
Applicant/Owner: DOI-NPS-PRWI
Investigator: P. Peterson - Biologist - NPS

Date: 10/26/08
County: Prince William
State: VA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes No
Is the area a potential Problem Area? Yes No
(If needed, explain on reverse.)

Community ID: _____
Transect ID: _____
Plot ID: _____

VEGETATION Overstory Understory

Dominant Plant Species	Stratum	Indicator
1. Acer Rubra	D 50%	FAC
2. Betula nigra	CD 25%	FACW
3. Carpinus caroliniana	CD 25%	FAC
4.		
5.		
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9. Smilax rotundifolia	35%	FAC
10. Carex sp.	65%	UNK
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): ~~75%~~ 100%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations:
Depth of Surface Water: _____ (in.)
Depth to Free Water in Pit: _____ (in.)
Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 Inches
X Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Site has staining and is a lowland (dip) which acts as a vernal pool after rain events

SOILS

Map Unit Name (Series and Phase): Neabsco

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-9		5/4 10yr	—	—	
9-18		6/6 10yr	—	—	

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

Approved by HQUSACE 3/92

LOCATION NEABSCO VA
Established Series
Rev. DLK-JHE-DDR
03/1999

NEABSCO SERIES

Soils of the Neabsco series are very deep and moderately well drained with very slow permeability. They formed in stratified marine and fluvial sediments of the Coastal Plain. Slopes range from 0 to 15 percent. Mean annual precipitation is about 40 inches and mean annual temperature is about 54 degrees F.

TAXONOMIC CLASS: Fine-loamy, siliceous, semi active, mesic Typic Fragiudults

TYPICAL PEDON: Neabsco loam on a 2 percent slope in a mixed pine and oak woodland. (Colors are for moist soil)

Oi--1 to 0 inches; partially decomposed oak leaves, pine needles and twigs.

A--0 to 2 inches; dark brown (10YR 4/3) loam; moderate fine and very fine granular structure; very friable; many fine, medium and coarse roots; 3 percent rounded quartz gravel; very strongly acid; clear smooth boundary. (0 to 3 inches thick)

E--2 to 8 inches; light yellowish brown (10YR 6/4) loam; moderate fine and very fine granular structure; very friable; many fine, medium and coarse roots; 2 percent rounded quartz gravel; very strongly acid; clear smooth boundary. (0 to 12 inches thick)

Bt--8 to 17 inches; yellowish brown (10YR 5/8) clay loam; moderate fine sub-angular blocky structure; friable, slightly sticky; common fine, medium and coarse roots; 2 percent rounded quartz gravel; few faint films of clay on faces of peds and clay bridging between sand grains; very strongly acid; clear smooth boundary. (6 to 18 inches thick)

Bx--17 to 36 inches; yellowish brown (10YR 5/8) loam; many fine, medium and coarse pale brown (10YR 6/3) and many fine distinct light gray (10YR 7/2) mottles; strong, medium and coarse platy structure, coarse polygonal structure 12 to 18 inches in diameter with gray (10YR 6/1) clay in 1/4 inch cracks; very firm and brittle; 10 percent rounded quartz gravel; common fine and medium vesicular pores; very strongly acid; gradual smooth boundary. (8 to 36 inches thick)

2Bt--36 to 52 inches; brownish yellow (10YR 6/8) clay loam; common, fine and medium distinct pale brown (10YR 6/3) and yellowish red.
(5YR 5/6) mottles; weak medium and coarse sub-angular blocky structure; friable, slightly plastic, slightly stick; common faint and distinct dark brown (10YR 3/3) films of

clay on vertical faces of peds; 5 percent rounded quartz gravel; strongly acid; abrupt smooth boundary. (0 to 24 inches thick)

3C--5 to 72 inches; mottled in shades of brown, gray and yellow; very gravelly sandy loam; massive; very friable; 45 percent rounded quartz gravel; strongly acid.

TYPE LOCATION: Prince William County, Virginia; in Prince William Forest Park, about 100 feet southwest of Park Central Road and about 20 feet south of Trail No. 11.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 4o to 60 inches deep. Depth to fragipan ranges from 14 to 30 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded quartz gravel range from 0 to 10 percent in the A and upper B horizons and from 1 to 35 percent in the fragipan and lower B horizon. The C horizon ranges from 1 to more than 50 percent quartz gravel. The substratum is commonly stratified Coastal Plain sediments but ranges to loamy residuum from the Piedmont schist and gneiss. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 7, and chroma of 2 through 4. The A and E is sandy loam, loam or silt loam.

The E Horizon has hue of 10YR or 2.5YR, value of 5 or 6 and chroma of 3 or 4. It is sandy loam, loam or silt loam.

The Bt horizon has hue of 7.5YR, 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is loam, sandy clay loam or clay loam.

The Bx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 through 6, and chroma of 3 through 6. The Bx is commonly variegated and includes low chroma mottles. It is sandy loam, loam or sandy clay loam.

The C horizon is commonly mottled in shades of brown, yellow, red and gray. They range from gravelly sand through clay in individual strata.

COMPETING SERIES: The Tarklin series is the only soil in the same family. The Tarklin soils form in colluvium or alluvium from limestone and have fragments of chert throughout the soil.

GEOGRAPHIC SETTING: Neabsco soils are on broad drainage divides of the older Northern Coastal Plain terraces. Elevations generally range from 150 to 300 feet. Slope gradients range from 0 to 15 percent but most areas are from 0 to 7 percent. The soil developed in stratified fluvio-marine sediments. On areas where the sediments are thin,

these soils are underlain by residuum from Piedmont schist and gneiss. Mean annual precipitation range from 36 to 44 inches and mean annual temperature ranges from 52 degrees to 59 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Buckhall, Chester, Fairfax, Lunt and Quantico soils. All these associated soils do not have a fragipan. In addition the Buckhall and Chester soils are developed in residuum from gneiss and schist. The Fairfax soil is developed partly in Coastal Plain sediments and partly in Piedmont residuum. The Quantico and Lunt soils have higher clay content in their sub-soils.

DRAINAGE AND PERMEABILITY: Moderately well drained. Runoff is slow on nearly level areas to moderate on the sloping areas. Permeability is slow or very slow. Perched water table is commonly above the fragipan in winter and spring months.

USE AND VEGETATION: Largest acreage is in hardwood and pine forest. Many areas are in residential and commercial developments. Smaller acreage is used for the general crops, corn, soybeans, small grains, pasture and hay. Native vegetation includes northern red oak, yellow-poplar, red maple, sweet gum and Virginia pine.

DISTRIBUTION AND EXTENT: Northern Virginia and Maryland. Moderate extent 6,500 acres in Prince William County.

MLRA OFFICE RESPONSIBLE: Morgantown, West Virginia

SERIES PROPOSED: Prince William County, Virginia; 1981. The name is from Neabsco Magisterial District in Prince William County.

REMARKS: This soil has previously been included in the Beltsville and Bourne soils. Both of these soils have mixed mineralogy. Also the Bourne is classified as thermic and the Beltsville is high in silt content.

Diagnostic Horizon:
a. Argillic between 8 and 17 inches.
b. Fragipan between 17 and 36 inches.

As the nation's principal conservation agency, the Department of the interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protection our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

NPS D-49, June, 2009