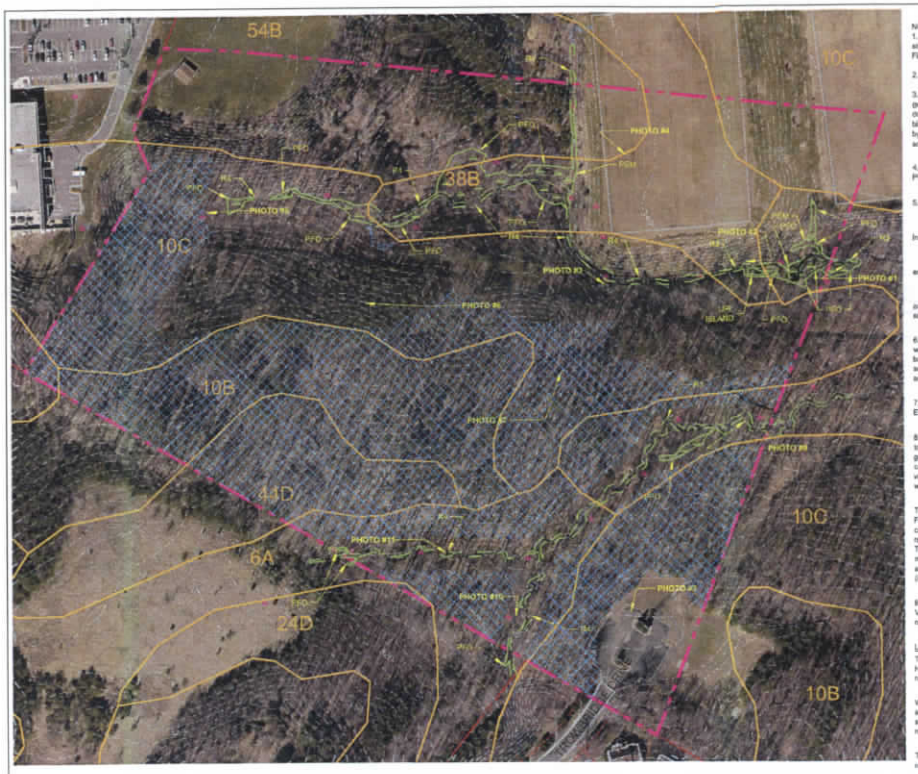

NOTES:

1. Wetland Studies and Solutions, Inc. (WSSI) conducted a habitat evaluation for Endangered and Threatened Species (ETS), defined as those species formally listed as endangered or threatened at the state or federal level, within the PW Parkway ES study area. Additionally, a search for non-listed species and natural communities that are considered rare and whose occurrences are tracked by the Virginia Department of Conservation and Recreation (DCR), Division of Natural Heritage was performed. Field work was conducted by Jessica M. Campo, PWS, CT and Grace McCroskey on October 7 and October 8, 2015.

2. A 2013 natural color Image from Pictometry ®, along with mapped soils information, topography and boundary information from Prince William County Digital Data were used as the base for this attachment.

3. The PW Parkway ES is situated on approximately 25-acres, located southeast of the intersection of Prince William Parkway (Route 3000) and Old Bridge Road at the terminus of Trowbridge Drive in Prince William County, Virginia. The study area is gently sloping and drains to two unnamed tributaries to the Occoquan River located in the northern and southern portions of the study area. The study area is comprised of a few maintained areas, a parking lot, and four forested communities. A forest stand dominated by yellow poplar (*L. tulipifera*), northern red oak (*Q. rubra*), southern red oak (*Q. falcata*), and chestnut oak (*Q. montana*) is located in the central and southern portions of the study area. A forest stand dominated by red maple (*A. rubrum*) and black willow (*S. nigra*) is located in the northern and northeastern portions of the study area. A forest stand dominated by Virginia pine (*P. virginiana*) is located in the central and northern portions of the study area. Additionally, a disturbed area dominated by a young stand of black locust (*R. pseudoacacia*) is located on the northeastern portion of the study area. See WSSI's Existing Vegetation Evaluation Map, dated October 2015, for more information on the vegetated areas on-site. Jurisdictional wetlands and Waters of the U.S. (WOUS) include palustrine forested (PFO) and palustrine emergent (PEM) wetlands, as well as perennial and intermittent streams.

4. The boundaries of jurisdictional wetlands and WOUS located within the PW Parkway ES were delineated by WSSI, as described in a report entitled, "Waters of the U.S. (including Wetlands) Delineation and Resource Protection Area (RPA) Evaluation: PW Parkway ES (±23 acres)," dated October 23, 2015. Confirmation of the waters of the U.S. delineation from the COE is pending.

5. Prior to conducting field work, WSSI consulted with a number of references to determine what ETS could potentially occur on or within the immediate vicinity of the study area (as provided by the client). These references included the following:

A). The Information Planning and Conservation (IPaC) system report from the U.S. Fish and Wildlife Service (USFWS) states that three federally listed species may be present within the vicinity of the PW Parkway ES study area. These three species include harperella, small whorled pogonia, and the northern long-eared bat. Please see Sheet 2 for the results of this database search.

B). A search of the Virginia Department of Game and Inland Fisheries (VDGIF)'s Fish and Wildlife Information Service (FWIS) online database states that no ETS have been confirmed within a 2-mile radius of the study area, but 14 species that are endangered, threatened, or are a federal species of concern are known or likely to occur within a 2-mile radius of the study area, and are discussed on Sheet 3.

C). An October 23, 2015 letter from the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR) indicates the presence of natural heritage resources, defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations, in the project area. The DCR letter states that the small whorled pogonia and the northern long-eared bat have the potential to occur within the study area if suitable habitat is present. Please see Sheet 4 for the DCR letter.

6. The study area was inspected for suitable habitat for the ETS determined by the literature and database searches to potentially occur in the vicinity of the study area, as well as for non-listed species and natural communities that are considered rare and whose occurrences are tracked by DCR. The small whorled pogonia and the northern long-eared bat have the potential to occur within the study area because suitable habitat is present. It is WSSI's opinion that suitable habitat for the northern long-eared bat is present throughout the study area in the forested communities, and the potential habitat for the small whorled pogonia is shown on this sheet. Because the habitat evaluation field work was conducted outside of the survey window for both species, no search was conducted (survey windows: April 15-September 15 for the northern long-eared bat; June 1-July 20 for the small-whorled pogonia). Photographs of potential ETS habitats and characteristic on-site conditions were taken during WSSI's fieldwork and are provided on Sheet 5.

7. In summary, this study area has the potential to contain suitable habitat for the northern long-eared bat and the small whorled pogonia. Please refer to the Endangered and Threatened Species Summary Table (Table 1) for an explanation of the potential ETS habitat within the PW Parkway ES study area.

8. WSSI also evaluated plant communities on the site to determine if any of the communities meet the descriptions of Northern Hardpan Basic Oak-Hickory Forest or Upland Depression Swamp, both of which are considered rare and of conservation concern to DCR. The Northern Hardpan Basic Oak-Hickory forest is a plant community composed of a relatively specific assemblage of plants and underlain by basic rocks such as diabase, gabbro, amphibolite, and metabasalt. This plant community has a limited geographical distribution and therefore, it is considered rare and of conservation concern to DCR. The composition of the overstory trees varies regionally, but is generally characterized by mixtures of oaks (such as white oak (Quercus alba), northern red oak (Quercus rubra), and black oak (Quercus velutina)) and hickories (such as pignut hickory (Carya glabra), red hickory (Carya ovalis), and mockernut hickory (Carya tomentosa)). Eastern redcud (Cercis canadensis), eastern red cedar (Juniperus virginiana), slippery elm (Ulmus rubra), hackberry (Celtis occidentalis), eastern hophornbeam (Ostrya virginiana), and flowering dogwood (Cornus florida) are common understory species in Northern Hardpan Basic Oak-Hickory Forests. No communities within the study area would meet DCR's description of the Northern Hardpan Basic Oak-Hickory Forest.

The Upland Depression Swamp is a forested wetland community composed of a relatively specific assemblage of plants that occur on nearly level Piedmont uplands with clay hardpans or shallow bedrock. Like the Northern Hardpan Basic Oak-Hickory Forest community, no federally or state-listed endangered or threatened plant or animal species are typically associated with this plant community; however, the Upland Depression Swamp community has a limited geographic distribution, and therefore is considered rare and of conservation concern to the DCR. According to DCR, canopy cover within Upland Depression Swamps ranges from complete to very open. In northern Virginia, pin oak (*Quercus palustris*), swamp white oak (*Q. bicolor*), green ash, red maple, and to a lesser extent, willow oak (*Q. phellos*) and American elm (*Ulmus americana*) are characteristic. Shrub composition is variable but usually includes climbing common greenbrier (*Smilax rotundifolia*) and blackhaw (*Viburnum prunifolium*). The herb layer is usually open and consists of diverse graminoids. Locally common species include meadow sedge (*Carex granularis*), wooly sedge (*Carex pellita*), squarrose sedge (*Carex squarrosa*), slender spikerush (*Eleocharis tenuis* var. *tenuis*), fowl manna-grass (*Glyceria striata*), Virginia cut-grass (*Leersia virginica*), and green bulrush (*Scirpus atrovirens*). Jack-in-the-pulpit (*Arisaema triphyllum*) and spotted jewelweed (*Impatiens capensis*) are often the most abundant forbs and may dominate some areas. Other minor but characteristic herbs include slender sedge (*Carex gracillascens*), fox sedge (*Carex vulpinoidea*), tapered panic grass (*Dichanthelium acuminatum* var. *fruhlmorii*), blunttleaf bedstraw (*Galium obtusum*), narrow-leaved mountain-mint (*Pycnanthemum tenuifolium*), and reddish bulrush (*Scirpus penduliis*). No communities within the study area would meet DCR's description of the Upland Depressional Swamp.

9. WSSI also evaluated the site for several state-rare disease plant species (none of which are listed as endangered or threatened) that are considered rare by DCR, and for which DCR has recommended surveys and/or expressed concern in northern Virginia in the past. These "rare" plant species generally occur in grassy, semi-open disease glades or prairie-like plant communities, usually dominated by the grasses little bluestem (*Schizachyrium scoparium*) and Indian grass (*Sorghastrum nutans*) and not heavily dominated by non-native plants. Mapped disease soils are not present on the study area. Therefore, it is WSSI's opinion that the state-rare disease plant species are not present on the study area.

Limitations

This study is based on examination of the conditions on the study site at the time of our review and does not address conditions in the future. Such conditions change over time. Therefore, our conclusions may vary from future observations. Our ETS Habitat Evaluation and Rare Species/Community Assessment map has been prepared in accordance with generally accepted guidelines for the conduct of such evaluations. We make no other warranties, either expressed or implied, and our evaluation is not a recommendation to buy, sell or develop the property.

We offer no opinion and do not purport to opine on the possible application of various building codes, zoning ordinances, other land use or platting regulations, environmental or health laws and other similar statutes, laws, ordinances, code and regulations affecting the possible use and occupancy of the Property for the purpose for which it is being used, except as specifically provided above. The opinions set forth above are rendered only and exclusively for the benefit of the addressees and no other parties, successors or assigns. The foregoing opinions are based on applicable laws, ordinances, and regulations in effect as of the date hereof and should not be construed to be an opinion as to the matters set out herein should such laws, ordinances or regulations be modified, repealed or amended.

This document is solely for your benefit and is not to be quoted in whole or in part or otherwise referred to in any statement or document (except for purposes of identification) nor is it to be filed with any governmental agency or other person (except with respect to the proposed rezoning), without the prior written consent of this firm, unless required by law.

LEGEND

- STUDY AREA BOUNDARY
- PERENNIAL STREAM (PER WSSI'S OBSERVATIONS)
- APPROXIMATE LIMITS OF PERENNIAL STREAM (PER WSSI OBSERVATIONS - NOT SURVEYED)
- INTERMITTENT STREAM (PER WSSI'S OBSERVATIONS)
- APPROXIMATE LIMITS OF INTERMITTENT STREAM (PER WSSI OBSERVATIONS - NOT SURVEYED)
- JURISDICTIONAL WETLAND AREAS
- SOIL SERIES BOUNDARY AND SYMBOL
- POTENTIAL SMALL WHORLED POGONIA HABITAT

VCS 1983 NORTH ZONE

COWARDIN CLASSIFICATION

R3	RIVERINE UPPER PERENNIAL
R4	RIVERINE INTERMITTENT
PFO	PALUSTRINE FORESTED WETLAND
PEM	PALUSTRINE EMERGENT WETLAND

Mapped Soils (Prince William County)

Mapping Unit Number	Soil Series Name	Slope [%]
6A	Balle loam	0-4
10B	Buckhall loam	2-7
10C	Buckhall loam	7-15
24D	Glenelg-Buckhall complex	15-25
29B	Hoadly loam	2-7
38B	Meadowville loam	0-5
44D	Occoquan sandy loam	7-25
54B	Urban Land-Udorthents	0-7

GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

Table 1. Listed Endangered and Threatened Species Summary Table, PW Parkway ES, Prince William County, VA

NAME	STATUS	HABITAT	POTENTIAL FOR OCCURRENCE ON SITE
Atlantic Sturgeon (*Acipenser oxyrinchus*)	FE,SE	Estuaries, including tidal freshwater and brackish water bodies as well as offshore waters.	The streams within the study area do not provide suitable habitat for this species.
Northern Long-Eared Bat (*Myotis septentrionalis*)	FT	Forested areas containing snags or exfoliating bark, A fencerow, riparian forests, or other linear features are used as a travel corridor.	Potentially suitable habitat is present within the study area due to forested areas that contain trees with exfoliating bark and some snags
Brook Floater (*Alasmidonta varicosa*)	SE	Fast-flowing, clean water substrates that contain relatively firm gravel and sand, free of siltation.	No streams within the study area contain suitable habitat for this species.
Wood Turtle (*Glyptemys insculpta*)	ST	Clear streams in forested floodplains and nearby fields, wet meadows, and farmlands.	No suitable habitat within the study area. Presumed absent.
Peregrine Falcon (*Falco peregrinus*)	ST	Nests on cliffs, and occasionally on tall bridges and buildings, and forages on birds in a variety of open habitats.	No suitable habitat present within the study area.
Upland Sandpiper (*Bartramia longicauda*)	ST	Grassy pastures, hayfields, and early-stage old fields with medium to tall herbaceous vegetation.	No suitable habitat is present within the study area. The fields on the study area lack the suitable habitat and given the species' current range and extreme rarity in northern Virginia, there is a low probability that this species occurs in the study area.
Loggerhead shrike and Migrant loggerhead shrike (*Lanius ludovicianus, Lanius ludovicianus migrans*)	ST	Open habitats, such as fields, pastures, and early-stage old fields, with scattered trees and shrubs for nesting.	No suitable habitat is present within the study area. The fields on the study area lack the suitable habitat and given the species' current range and extremely low populations in northern Virginia, there is a low probability that this species occurs in the study area.
Henslow's sparrow (*Ammodramus henslowi*)	ST	Moist meadows and abandoned fields in early regeneration stages. Occupied habitat usually has a high percentage of grasses, some standing dead vegetation, a well-developed layer of dead herbaceous plant litter, and few shrubs.	No suitable habitat is present within the study area. The fields on the study area lack the suitable habitat and given the species' current range and extreme rarity in northern Virginia, there is a low probability that this species occurs in the study area.
Regal Fritillary (*Speyeria idalia idalia*)	FS	Open, sparsely grassed and barren areas usually in very close proximity to oak or pine forests. The presence of dwarf cinquefoil (*Potentilla canadensis*), the caterpillar host plant, is an important habitat requirement.	The open fields in the study area do not provide suitable habitat for this species. According to the FWIS, regal fritillary has not been documented in Prince William County, and therefore, it is not expected to occur on the project site. Presumed absent.
Bald Eagle (*Haliaeetus leucocephalus*)	ST	Nests in large trees; forages primarily along rivers and coastlines, and at large lakes.	May occur in the study area vicinity as a rare migrant or transient. However, no suitable breeding, foraging or roosting habitat is present in the study area.
Yellow Lance (*Elliptio lanceolata*)	FS	Fast-flowing, clean water substrates that contain relatively firm gravel and sand, free of siltation.	No streams within the study area contain suitable habitat for this species.
Alewife (*Alosa pseudoharengus*)	FS	Migrate from the ocean to freshwater rivers and streams using anadromous fish pathways.	No streams within the study area contain suitable habitat for this species.
Blueback Herring (*Alosa aestivalis*)	FS	Migrate from the ocean to freshwater rivers and streams using anadromous fish pathways.	No streams within the study area contain suitable habitat for this species.
Harperella (*Ptilimnium nodosum*)	FE	Small to medium-sized perennial streams with swift flowing water and regular flooding events.	The perennial streams in the study area do not provide suitable habitat for this species.
Small Whorled Pogonia (*Isotria medeoloides*)	FT, SE	Mature deciduous forest with relatively open canopy and understory, usually on north- and east-facing slopes on acidic soils.	There is potential habitat for the small whorled pogonia in this study area. Although not a dominant species, American beech and some associate plant species are found in portions of the study area, along with some areas containing an open understory.

FE = Federal Endangered, FT = Federal Threatened, FS = Federal Species of Concern, SE = State Endangered, ST = State Threatened

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ENDANGERED AND THREATENED SPECIES HABITAT EVALUATION AND RARE SPECIES/COMMUNITY ASSESSMENT

Prepared For: Prince William County Public Schools

PW Parkway ES
Prince William County, Virginia

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REVISIONS

No.	Date	Description	By	Apr By

DATE: November 2015 | SCALE: 1"=100' | C.I.: 2'

Horizontal Datum: VCS NAD 83
Vertical Datum: NAVD88
Boundary and Topo Source: Prince William County Digital Data

Design	Draft	Approved
GTM	JMC	BNR

Sheet # 1 of 4

Computer File Name: