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MARYLAND

I-495 & I-270 Managed Lanes Study

CA-5 STREAM RESTORATION DRAFT PHASE II MITIGATION PLAN

April 2022

U.S. Department of Transportation
Federal Highway Administration

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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1 INTRODUCTION

1.1 Overview

The Federal Highway Administration (FHWA), as the Lead Federal Agency, and the Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, are preparing a Final Environmental Impact Statement (FEIS) in accordance with the National Environmental Policy Act (NEPA) for the I-495 & I-270 Managed Lanes Study (Study). The I-495 & I-270 Managed Lanes Study (Study) is the first environmental study under the broader I-495 & I-270 Public-Private Partnership (P3) Program.

This Final CA-5 Stream Restoration Draft Final Mitigation Plan has been prepared to support the FEIS and focuses on the analysis of the Preferred Alternative. The Preferred Alternative, also referred to as Alternative 9 – Phase 1 South, includes building a new American Legion Bridge and delivering two high-occupancy toll (HOT) managed lanes in each direction on I-495 from the George Washington Memorial Parkway in Virginia to east of MD 187 on I-495, and on I-270 from I-495 to north of I-370 and on the I-270 eastern spur from east of MD 187 to I-270. Refer to **Figure 1**. This Preferred Alternative was identified after extensive coordination with agencies, the public and stakeholders to respond directly to feedback received on the DEIS to avoid displacements and impacts to significant environmental resources, and to align the NEPA approval with the planned project phased delivery and permitting approach.

The purpose of the Final CA-5 Stream Restoration Draft Final Mitigation Plan is to present the existing conditions, an assessment of potential direct impacts of the Preferred Alternative to the Permitting Agencies and final mitigation, if applicable, for unavoidable impacts. This Final CA-5 Stream Restoration Draft Final Mitigation Plan builds upon the analysis in the Draft CA-5 Stream Restoration Draft Final Mitigation Plan, DEIS and Supplemental DEIS (SDEIS), and has been prepared to support and inform the FEIS.

1.2 Study Corridors and the Preferred Alternative

In the SDEIS, published on October 1, 2021, FHWA and MDOT SHA identified the Preferred Alternative: Alternative 9 – Phase 1 South to be consistent with the previously determined phased delivery and permitting approach, which focuses on Phase 1 South. As a result, Alternative 9 – Phase 1 South includes the same improvements proposed as part of Alternative 9 in the DEIS but focuses the build improvements within the Phase 1 South limits only. The limits of Phase 1 South are along I-495 from the George Washington Memorial Parkway to east of MD 187 and along I-270 from I-495 to north of I-370 and on the I-270 east and west spurs as shown in **dark blue** in **Figure 1**. The improvements include two new HOT managed lanes in each direction along I-495 and I-270 within the Phase 1 South limits. There is no action, or no improvements included at this time on I-495 east of the I-270 east spur to MD 5 (shown in **light blue** in **Figure 1**). While the Preferred Alternative does not include improvements to the remaining parts of I-495 within the Study limits, improvements on the remainder of the interstate system may still be needed in the future. Any such improvements would advance separately and would be subject to additional environmental studies and analysis and collaboration with the public, stakeholders and agencies.

The 48-mile corridor Study limits remain unchanged: I-495 from south of the George Washington Memorial Parkway in Fairfax County, Virginia, to west of MD 5 and along I-270 from I-495 to north of I-

370, including the east and west I-270 spurs in Montgomery and Prince George's Counties, Maryland (shown in both dark and light blue in **Figure 1**).

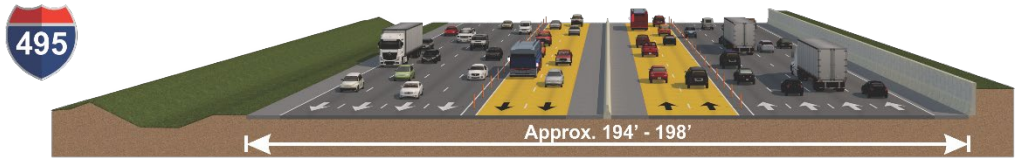
Figure 1 : I-495 & I-270 Managed Lanes Study Corridors – Preferred Alternative

1.3 Description of the Preferred Alternative

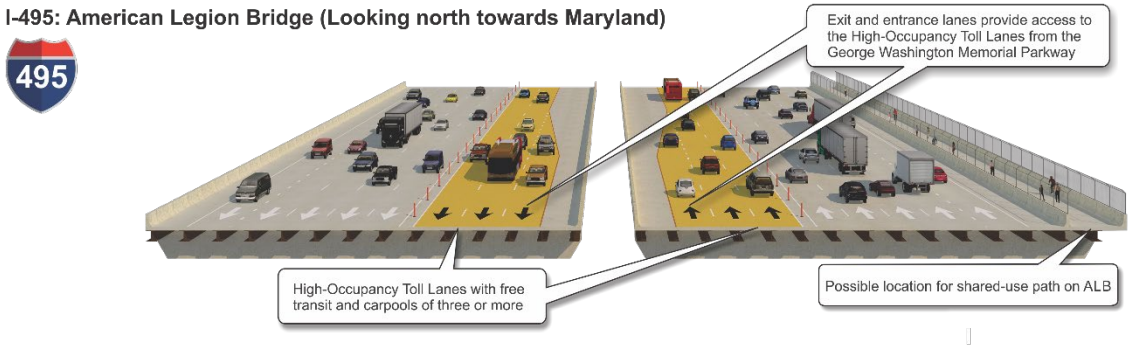
The Preferred Alternative includes a two-lane HOT managed lanes network on I-495 and I-270 within the limits of Phase 1 South only (**Figure 2**). On I-495, the Preferred Alternative consists of adding two, new HOT managed lanes in each direction from the George Washington Memorial Parkway to east of MD 187. On I-270, the Preferred Alternative consists of converting the one existing HOV lane in each direction to a HOT managed lane and adding one new HOT managed lane in each direction on I-270 from I-495 to north of I-370 and on the I-270 east and west spurs. There is no action, or no improvements included at this time on I-495 east of the I-270 east spur to MD 5. Along I-270, the existing collector-distributor (C-D) lanes from Montrose Road to I-370 would be removed as part of the proposed improvements. The managed lanes would be separated from the general purpose lanes using pylons placed within a four-foot wide buffer. Transit buses and HOV 3+ vehicles would be permitted to use the managed lanes toll-free.

Figure 2: Preferred Alternative Typical Sections (HOT Managed lanes Shown in Yellow)

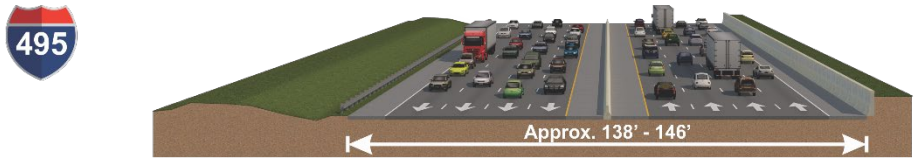
I-495 from the George Washington Memorial Parkway to east of MD 187



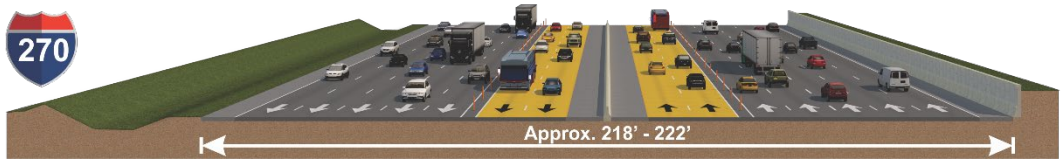
I-495: American Legion Bridge (Looking north towards Maryland)



I-495 east of MD 187 to west of MD 5 - NO ACTION AT THIS TIME



I-270 from I-495 to I-370



2 SITE DESCRIPTION

The Unnamed Tributary to Great Seneca Creek (referred to in this report as CA-5) stream restoration design project is located in Montgomery County, Maryland within Quince Orchard Valley Neighborhood Park. The Park is owned by Maryland National Capital Park and Planning Commission (M-NCPPC). This site known as CA-5 stream restoration site, is being used to fulfill partial compensatory mitigation for the I-495 & I-270 Merged Lane Study (MLS) under the I-495 & I-270 Public-Private Partnership (P3) Program. The Managed Lanes Study (MLS) is evaluating potential transportation improvements to portions of the I-495 and I-270 corridors in Montgomery and Prince George's County, Maryland, and Fairfax County, Virginia. "The purpose of the MLS is to develop a travel demand management solution(s) that addresses congestion and improves trip reliability on I-495 and I-270 within the study limits and enhances existing and planned multimodal mobility and connectivity. Efforts have been made throughout the planning process to avoid and minimize impacts to wetlands and waterways to the greatest extent practicable, while still achieving the goals of the MLS (CMP, 2020)." The CA-5 mitigation site includes the restoration of the CA-5 Mainstem 1 (WC7), Mainstem 2 (WC6) and two tributaries (WC9 and WC2) to Mainstem 1. The overall stream restoration of this site is 3,868 LF, with 3,637 LF suitable for mitigation credits, providing 721 functional feet in stream mitigation credit. Outlined below are the components of mitigation plan for the CA-5 Restoration site.

3 TWELVE MITIGATION PLAN COMPONENTS

In accordance with 33 CFR part 322 Compensatory Mitigation for Losses of Aquatic Resources dated April 10, 2008, and Maryland's required Phase II Wetland Mitigation Plan Checklist (January 23, 2020), the following section discusses the fundamental components that apply to the CA-5 stream restoration site. Site specific fundamental components (objectives, baseline information, determination of credits, mitigation work plan, maintenance plan, and monitoring requirements) are described below and supporting data is provided in the Appendices.

3.0 Project Objectives

The project objectives are to provide partial compensatory mitigation for the Maryland Department of Transportation (MDOT) State Highway Administration (SHA) I-495/270 MLS through stream restoration at CA-5 stream restoration site. The stream restoration goal will focus on achieving long-term stability throughout the mitigation reach. Because the Unnamed Tributary to Great Seneca Creek is Use Class I-P (Water Contact Recreation, Protect of Aquatic Life and Public Water Supply), the design will focus on improving habitat for fish and aquatic insects, in addition to providing overall functional uplift.

The primary objectives of this project are to:

1. Provide 3,079 LF of stream mitigation, providing 721 functional feet of mitigation credit
2. Increase floodplain connection
3. Provide a stable channel design
4. Increase bank stability
5. Stabilize groundwater seep and tributary headcut channels
6. Minimize the impact to adjacent trees and other natural resources
7. Provide consistent unit stream power to convey sediment through the stream reach

8. Stabilize the existing pond outlet and lower the overall pond elevation to create a functioning wetland habitat.
9. Provide diverse habitat for wildlife and other aquatic species

To achieve the goals and objectives of the stream mitigation, the design is proposing to repair and stabilize the eroding stream banks and alter the size and shape of the channel to minimize erosion. Reconnecting the stream to the floodplain will allow storm flows to be shifted to the riparian zone and slow water velocities within the channel, thus reducing erosive forces in the active channel. Instream structures are proposed to direct storm flows away from vulnerable banks and to provide grade control. Evidence-based hydraulic models and computations are used to verify the proposed design is stable. The stream banks and floodplain are proposed to be planted with native trees, shrubs, and grasses, which would provide shade and a variety of habitats for wildlife. The roots of these plants will provide stability to the restored streambanks and floodplain. These design elements are proposed to provide a stable, healthy stream and riparian zone that supports a diversity of wildlife and a sustainable ecosystem.

3.1 Site Selection

Site selection for mitigation sites located on publicly owned land was based on the traditional mitigation site search that is discussed in Section 5.4.1 of the Compensatory Mitigation Plan (CMP) (Final CMP, 2021).

Based on feedback from the regulatory agencies, the CA-5 stream restoration site was selected for restoration under the Public-Private Partnership (P3) Program as a site for partial compensatory mitigation for the I-495/270 MLS. The CA-5 stream restoration site is located in the federal Middle Potomac-Catoctin watershed (Federal HUC- 02070008). The proposed roadwork related to the I-495/270 MLS transects the Middle Potomac-Catoctin watershed. The CA-5 stream restoration site is located in the Maryland Seneca Creek watershed (8-digit watershed 02140208), which has been identified in the MDOT SHA TMDL Implementation Plan (Appendix I, Attachment A). As indicated in the TMDL Implantation Plan, Seneca Creek watershed was found to have impairments related to Ammonia (Total), Chlorides, Mercury in Fish Tissue, Phosphorus (Total), Sedimentation/siltation, Temperature, and Total Suspended Solids (TSS). Approximately 15,835 linear feet of stream was identified in Seneca Creek watershed as suitable for future restoration. The CA-5 stream restoration site was also chosen for its location on public land, located on Maryland-National Capital Park and Planning Commission (M-NCPPC) property. Upon site inspection approximately 3,927 linear feet of existing stream located within the identified CA-5 stream restoration site, was found in need of restoration and suitable for construction. However, approximately 600 linear feet of stream is located on property owned by The Potomac Electric Power Company (PEPCO) and will not be counted towards mitigation credit.

3.2 Site Protection Instrument

Pursuant to the Maryland Nontidal Wetlands Protection Act Rules (COMAR 26.23.04), and the Federal Clean Water Act, plus its implementing regulations at 33 CFR Part 332.7(a), the CA-5 stream restoration site will be protected to ensure conservation in perpetuity. The majority of the property for CA-5 stream restoration site is owned by M-NCPPC. M-NCPPC has signed a right of entry agreement on August 2, 2018 and extended it through November 2021. Once the design is approved a park permit will be obtained prior to construction, to allow access to the site and construction of the project. M-NCPPC and MDOT SHA have

developed a long-term agreement that will allow MDOT SHA future access to monitor and maintain the restored stream segment. After the completion of the monitoring period M-NCPPC will maintain the site in perpetuity. A small portion of the project area is on property owned by PEPCO, under a current utility easement. This portion of the project will be included as part of the stream restoration project but will not be included in the mitigation credit for the site, since the property cannot be placed under an easement to preserve conservation for perpetuity. An initial Right of Entry Permit was obtained to assess the PEPCO site. The site will only be granted temporary construction and post-construction monitoring access and will not specifically be included in the site protection instrument. Current access permits are provided in Appendix II.

M-NCPPC

Montgomery County M-NCPPC mitigation sites are already considered protected by park policies and M-NCPPC does not encumber properties with deed restrictions on parkland mitigation sites. M-NCPPC mitigation sites will be protected in accordance with M-NCPPC Montgomery County's integrated natural resource management plan, Natural Resource Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland. This plan published in February 2013 requires preservation and conservation of natural areas and wetlands like the proposed mitigation sites. This protection has been successfully used and accepted by USACE and MDE to preserve M-NCPPC mitigation sites on past projects.

The proposed mitigation sites would be considered environmentally sensitive areas in Natural Resource Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland and are protected park resources. The following goals, visions and legal protection are identified in the plan.

1. M-NCPPC Montgomery County Mission: Protect and interpret our valuable natural and cultural resources; balance the demand for recreation with the need for conservation; offer a variety of enjoyable recreational activities that encourage healthy lifestyles; and provide clean, safe, and accessible places for leisure-time activities.

2. Goal 11 of the Vision 2030 Strategic Plan: Inventory, conserve, and enhance ecologically healthy and biologically diverse natural areas with a focus on Park Best Natural Areas, Biodiversity Areas, and Environmentally Sensitive Areas as defined in the Land Preservation, Parks, and Recreation Plan (M-NCPPC, 2005).

3. Environmental Guidelines for Management and Development in Montgomery County Parks: "…the Montgomery County General Plan and local area master plans articulate County-wide and planning area-wide goals, objectives, principles, and policies to protect sensitive areas from the adverse effects of development, as required by the Annotated Code of Maryland Article 66B.

3.3 Baseline Information

The CA-5 stream restoration site is located in the Quince Orchard Valley Neighborhood Park. The Project Area Vicinity/Location Map is included in Appendix II, Attachment A. The existing conditions of the proposed mitigation area are briefly described below. Further detailed information is included in the Semi-Final Design Report, wetland delineation memo, and forest stand delineations and specimen tree survey memo in Appendix II (Attachments B-D).

The study area on CA-5 stream restoration site extends from where stream enters the eastern edge of M-NCPPC property in Quince Orchard Terrace Neighborhood Park to the confluence of the CA-5 stream restoration site and another unnamed tributary to Great Seneca Creek, near the western edge of M-NCPPC property, spanning between Suffolk Terrace and Sioux Lane. Photo documentation and existing on-site resources of the study area can be found in the Semi-Final Design Report (3/2021).

The CA-5 stream restoration site consists of three tributaries to Great Seneca Creek within the Seneca Creek Watershed (Maryland 8-digit watershed 02140208), which outlets to the Potomac River and eventually to the Chesapeake Bay. Great Seneca Creek is 21.5 miles long and travels through Montgomery County, Maryland. Great Seneca Creek begins in Damascus, roughly forty miles west of Baltimore City.

The river flows southwest through Germantown, Gaithersburg, and Seneca Creek State Park before converging with Little Seneca Creek to form Seneca Creek. The CA-5 stream restoration site joins Great Seneca Creek approximately 1,500 LF downstream of the study area, in Gaithersburg.

The watershed is characterized by runoff and sediment deposition from historical land clearing for agricultural production and current residential communities. With increased runoff due to land clearing and development the study reach receives increased flashier flows events. These events over time have caused severe erosion in portions of the site. Additionally, the runoff from the surrounding residential area brings nutrients and other pollution that ultimately decrease water quality and harm the aquatic species. The surrounding neighborhoods were constructed in the 1970's and 1980's prior to the adaptation of SWM requirements in Maryland.

The CA-5 stream restoration site is designated under the Maryland Stream Classification system as a Use I-P stream, prohibiting instream construction between March 1 and June 15, inclusive, during any year. The Seneca Creek Watershed is listed as impaired for several parameters including total suspended solids (TSS), nitrogen, phosphorus, chloride, and ammonia (MDE, 2018). The CA-5 stream restoration site watershed has approved TMDLs for Phosphorus (2010) and Total Suspended Solids (TSS; 2010 and 2011). In 2010 there was an approved Category 5 impairment for Chloride in CA-5 stream restoration site watershed (2018 Integrated Report).

The total drainage area to the downstream end of the CA-5 stream restoration site is 0.25 square miles (160 acres). The land use throughout the watershed varies, but the majority is mixed forest, medium-density residential, and institutional. Based on the 2010 Maryland Department of Planning (MDP) Land Use data (MDP, 2010) most common land use in the watershed is medium-density residential, which accounts for 76% of the total area. Forest land cover accounts for approximately 13% of the watershed, with industrial covering 9% and high-density residential the remaining 2%. Impervious area accounts for 35% of the watershed (GISHydro, 2010), which is much higher than the 15% threshold required for classification as an impaired urban watershed (Maryland Hydrology Panel, 2016).

The study reach is located within the Piedmont physiographic province of middle Montgomery County. The Piedmont physiographic province is comprised of mostly clay covered by a thin layer of rocky surface soil (MDP, 2010). The overall drainage area to the site is characterized predominately by Glenelg and Gaila silt loams, both well drained soils, and Travilah silt loam, a somewhat poorly drained soil. The study watershed is composed of B, C, and C/D soils (USDA, 2017). Hydrologic Soil Group map are included in the Semi-Final Design Report, Appendix II, Attachment B.

During the geomorphic assessment, the CA-5 stream restoration site was split into Reaches 1, 2, 3, 4, and 5/Mainstem 2. Two tributaries were also evaluated. A reach map has been included in Appendix II, Attachment A. Reach 1 extends from the M-NCPPC property line downstream to the confluence with the first tributary. Reach 2 extends from the first tributary to a significant change in valley slope where the valley gets steeper, and the stream drops over a bedrock control and gets significantly more incised. Reach 3 extends from the bedrock control to just upstream of the confluence with the second tributary, where the channel sinuosity increases significantly, and the slope decreases significantly. Reach 4 extends to the end of the study reach at the confluence with the unnamed tributary to Great Seneca Creek. Reach 5/Mainstem 2 begins just downstream of a Montgomery County DEP SWM facility outfall, continues through PEPCO ROW, and ends at Reach 4. The Tributary 1 begins at the outlet of a 36" RCP and extends to the confluence of Reach 1 and 2). The Tributary 2 begins at the southern boundary of M-NCPPC property and extends to Reach 4.

The overall slope (Reaches 1-4) of the channel is 2.1% however, the existing longitudinal profile is concave. There are steep slopes in Reach 1 that slowly gets less steep as you go downstream. The varying slopes appear to be the result of historic downcutting that has reached an equilibrium in the upper reaches where the stream has cut down to boulder and bedrock. The three upstream reaches have higher slopes and are able to effectively move sediment from the eroding banks through the reaches. The bank heights are lowest in the upper reaches, and highest in Reach 3 where the greatest downcutting has occurred. The slope flattens out significantly at the top of Reach 4, where additional excess sediment from Tributary 2 is also added to the stream. The change in slope along with the additional bedload has caused significant instability within this area. Reach 5/Mainstem 2 has an overall slope of 0.97% and is characterized by large floodplain terraces and defined channel benches. The existing channel is comprised mainly of medium sized gravels with the addition of small cobbles present. A small outfall protection area is present at the start of the reach protecting the downstream channel from outflows from the SWM facility.

Maryland Stream Waders volunteer stream monitoring program, site 857-5-2001 is located 0.31 miles downstream of the confluence of the CA-5 stream restoration site study reach within a tributary to Great Seneca Creek. In 2001, this site received a Benthic Index of Biotic Integrity (BIBI) Rating of Poor (1.57). Twelve different taxa of macroinvertebrates were found at this site, including three EPT taxa. EPT are the generally intolerant insect orders of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). This value summarizes taxa richness with macroinvertebrates that are considered to be sensitive to pollution and therefore, a lower number of taxa within the sample suggests poor water quality conditions (Stribling, *et al.* 1998).

There are three MBSS monitoring sites along different tributaries within approximately a two mile radius from the CA-5 stream restoration site. In order to report biological data that could closely compare to what may be found in the study reach, a site with a similar watershed size, land use, and soils was selected. MBSS site SENE-101-R-2001 is located along an unnamed tributary to Great Seneca Creek, about two miles northwest of the CA-5 stream restoration site. The drainage area for this site is 0.15 square miles. Site SENE-101-R-2001 received a Fish Index of Biotic Integrity (FIBI) score of Poor (1.3). The sample included 68 Eastern Blacknose Daces (*Rhinichthys atratulus*); a species tolerant to pollution. No other fish species was collected. SENE-101-R-2001 also received a Poor BIBI rating (2.0).

Physical habitat was assessed at this site during the 2001 study using MBSS protocols, which included visual assessments of various parameters. Aquatic habitat assessment methods are based on the Environmental Protection Agency's Rapid Bioassessment Protocol (RBP) (Barbour *et al.* 1999) and modified for use in Maryland streams. This protocol assigns a value out of 20 to each parameter. At site SENE-101-R-2001 instream habitat received a score of 9 (marginal), epifaunal substrate was scored at 14 (suboptimal), velocity/depth diversity a 6 (marginal), pool quality a 4 (poor), and riffle run quality a 7 (marginal). Shading for this site was 92% with an embeddedness of 10%. A more detailed description of the evaluation reaches, pre-construction photos documentation, and a site sketch is included in the Semi-Final Design Report, Appendix II, Attachment B.

A wetland delineation was conducted on March 24th, March 27th, and November 10th, 2020. During the field investigations, 18 waters of the U.S., including wetlands, were identified within the study area. The Wetland Delineation Memo is provided in Appendix II Attachment B, Appendix C.

There are four wetlands that will be permanently impacted and three wetlands that will be temporarily impacted by the project. Wetland impacts are noted in **Table 1** below.

Table 1: Wetland Impacts

Permanent Wetland Impacts

Wetland	Type	Wetland Impact (SF)	Wetland Impact (AC)
WL-4	PFO	177	<.01
WL-6	PFO	995	0.02
WL-7	PEM	349	0.01
WL-8	PEM	2,029	0.05
Total		**3,550**	**0.08**

Temporary Wetland Impacts

Wetland	Type	Wetland Impact (SF)	Wetland Impact (AC)
WL-2	PFO	618	0.01
WL-3	PFO	1,042	0.02
WL-6	PEM	683	0.02
	Total	**2,343**	**0.05**

Impacted wetlands are described below.

Wetland 2 (WL2) is a floodplain wetland located in the eastern portion of the study area that abuts WC3. Test plot WTP-2 characterizes this system, which is classified as a PFO1B wetland. Primary hydrologic indicators observed during the site visit included surface water, drift deposits, and water-stained leaves. Based on the dominance test for hydrophytic vegetation, 67 percent of the dominant species within the test plot were considered OBL, FACW, or FAC. Dominant species within the sampling plot included ash-

leaf maple, red maple, wine raspberry (Rubus phoenicolasius), rambler rose (Rosa multiflora), Japanese stilt grass, and small-spike false nettle (Boehmeria cylindrica). Soils in the wetland are mapped as Brinklow-Blocktown channery silt loam, which is considered predominantly hydric by NRCS. Soil samples met the Redox Dark Surface (F6) hydric soil indicator. Potential functions and values provided by this wetland include floodflow alteration, sediment/toxicant retention, nutrient removal, wildlife habitat, recreation, education/scientific value, and uniqueness/heritage.

Wetland 3 (WL3) is a floodplain wetland located in the western portion of the study area that abuts WC4 and WC5. Test plot WTP-3 characterizes this system, which is classified as a palustrine forest wetland with a temporarily flooded water regime (PFO1A). Primary hydrologic indicators observed during the site visit included surface water, a high-water table, saturation, and water-stained leaves. Based on the dominance test for hydrophytic vegetation, 67 percent of the dominant species within the test plot were considered OBL, FACW, or FAC. Dominant species within the sampling plot included river birch (Betula nigra), eastern cottonwood (Populus deltoides), rambler rose, Japanese barberry (Berberis thunbergii), Japanese stilt grass, and small-spike false nettle. Soils in the wetland are mapped as Codorus silt loam, which is considered predominantly non-hydric by NRCS. However, soil samples met the Depleted Matrix (F3) hydric soil indicator. Potential functions and values provided by this wetland include floodflow alteration, wildlife habitat, recreation, education/scientific value, and uniqueness/heritage

Wetland 4 (WL4) is an oxbow wetland located in the western portion of the study area that abuts WC6. Test plot WTP-4 characterizes this system, which is classified as a PFO1A wetland because it is an emergent wetland within a forested setting with approximately 60 percent canopy cover. Primary hydrologic indicators observed during the visit included a high-water table, saturation, and water-stained leaves. Based on the dominance test for hydrophytic vegetation, 100 percent of the dominant species within the test plot were considered OBL, FACW, or FAC. The dominant species within the sampling plot was sweet wood-reed (Cinna arundinacea). Soils in the wetland are mapped as Codorus silt loam, which is considered predominantly non-hydric by NRCS. However, soil samples met the Depleted Matrix (F3) hydric soil indicator. Potential functions and values provided by this wetland include floodflow alteration, sediment/shoreline stabilization, wildlife habitat, recreation, educational/scientific value, and uniqueness/heritage.

Wetland 6 (WL6) is a floodplain wetland located in the eastern portion of the study area adjacent to WC7. Test plot WTP-6 characterizes this system, which is classified as a PFO1A wetland. Primary hydrologic indicators observed during the visit included saturation and water-stained leaves. Based on the dominance test for hydrophytic vegetation, 100 percent of the dominant species within the test plot were considered OBL, FACW, or FAC. Dominant species within the sampling plot included red maple, ash-leaf maple, and Japanese stilt grass. Soils in the wetland are mapped as Baile silt loam, which is considered predominantly hydric by NRCS. Soil samples met the Redox Dark Surface (F6) hydric soil indicator. Potential functions and values provided by this wetland include floodflow alteration, sediment/toxicant retention, nutrient removal, sediment/shoreline stabilization, wildlife habitat, recreation, educational/scientific value, and uniqueness/heritage.

Wetland 7 (WL7) is a wetland bench located in the southwestern portion of the study area abutting WC6. Test plot WTP-7 characterizes this system, which is classified as a palustrine emergent wetland with a seasonally saturated water regime (PEM1B). Primary hydrologic indicators observed during the visit

included high water table, saturation, geomorphic position, and the FAC Neutral test. Based on the dominance test for hydrophytic vegetation, 100 percent of the dominant species within the test plot were considered OBL, FACW, or FAC. Dominant species within the sampling plot included leafy bulrush (Scirpus polyphyllus), Japanese stilt grass, rice cut grass (Leersia oryzoides), and small carp grass (Arthraxon hispidus). Soils in the wetland are mapped as Codorus silt loam, which is considered predominantly hydric by NRCS. Soil samples met the Depleted Matrix (F3) hydric soil indicator. Potential functions and values provided by this wetland include groundwater recharge/discharge, floodflow alteration, and wildlife habitat.

Wetland 8 (WL8) is a wetland bench and oxbow located in the southwestern portion of the study area abutting WC6. Test plot WTP-8 characterizes this system, which is classified as a PEM1A. Primary hydrologic indicators observed during the visit included drainage patterns and geomorphic position. Based on the dominance test for hydrophytic vegetation, 100 percent of the dominant species within the test plot were considered OBL, FACW, or FAC. Dominant species within the sampling plot included Japanese stilt grass. Soils in the wetland are mapped as Codorus silt loam, which is considered predominantly hydric by NRCS. Soil samples met the Depleted Matrix (F3) hydric soil indicator. Potential functions and values provided by this wetland include groundwater recharge/discharge, floodflow alteration, and wildlife habitat, recreation, education/scientific value, and uniqueness/heritage.

Eight waters of the US will be restored for this project. The approximate restored area is 3,927 LF (68,121 SF).

Watercourse 2 (WC2) is an ephemeral and perennial tributary to Watercourse 7 (WC7) with a cobble, gravel, and sand substrate (R3UB1/2). WC2 is located in the eastern portion of the study area and flows south from a culvert into WC7. The average channel width is four feet and channel depth ranges from one to three feet, respectively. During the site visit, the average water depth was variable throughout the reach, ranging from one to six inches. Habitat complexity was considered poor due to a general lack of stable habitat and having primarily shallow runs. Overall, bank erosion was considered minor with a small area of scour downstream of the foot bridge. Approximately 90 percent of the channel was shaded by woody species.

Watercourse 3 (WC3) is an intermittent tributary to WC7 with a cobble, gravel, and sand substrate (R4SB3/4). WC3 is located in the eastern portion of the study area and flows southwest from Wetland 2 (WL2) into WC7. The average channel width and depth are six and three feet, respectively. During the site visit, the average water depth was two inches. Habitat complexity was considered poor, as instream habitat was lacking. Overall, bank erosion was severe as the banks are actively eroding. Approximately 70 percent of the channel was shaded by woody species.

Watercourse 5 (WC5) is an intermittent tributary to WC7 with a gravel and sand substrate (R4SB3/4). WC5 is located in the western portion of the study area and flows west from Wetland 3 (WL3) to WC7 outside the study area. The average channel width and depth are three feet and one foot, respectively. During the site visit, the average water depth was three inches. Habitat complexity was considered marginal as there were shallow flows, but the stream had some root wads and leaf packs throughout. Overall, bank erosion was moderate as there was some scour throughout. Approximately 60 percent of the channel was shaded by woody species.

Watercourse 6 (WC6) is a perennial tributary to WC7 with a cobble, gravel, and sand substrate (R3UB1/2). WC6 is located in the western portion of the study area and flows northwest from outside the study area into WC7. The average channel width ranges from eight to 20 feet and the channel depth is four feet. During the site visit, the average water depth ranged from one to 10 inches. Habitat complexity was considered marginal as there was some stable woody debris and undercut banks, however the substrate within the riffles was mostly gravel. Overall, bank erosion was moderate but severe along meanders. Approximately 60 percent of the channel was shaded by woody species.

Watercourse 7 (WC7) is an unnamed, perennial tributary to Great Seneca Creek with a cobble, gravel, and sand substrate (R3UB1/2). WC7 enters the study area at the eastern end and flows west through the study area. The average channel width ranges from eight to 20 feet and the channel depth is four feet. During the site visit, the average water depth ranged from one to 12 inches. Habitat complexity was considered marginal as there was limited flow diversity, short riffles with mostly gravel substrate, and some large woody debris. Overall, bank erosion was moderate throughout most of the stream, however severe erosion was present along meanders and at some confluences with tributaries. Approximately 75 percent of the channel was shaded by woody species.

Watercourse 8 (WC8) is an intermittent tributary to WC7 with boulder, cobble, and gravel substrate (R4SB3/4). WC8 flows northwest from an old farm pond (WC10) into WC7. The average channel width and depth ranges from one to two feet. During the site visit, the average water depth was two inches. Habitat complexity was considered marginal as there was some larger boulders however the stream is subject to intermittent flows and lacked other stable habitat. Overall, bank erosion was minor with slight erosion present at the confluence with WC7. Approximately 75 percent of the channel was shaded by woody species.

Watercourse 9 (WC9) is an ephemeral and intermittent tributary to WC7 with cobble, gravel, and sand substrate (R4SB3/4). WC9 flows north from outside the study area into WC7. The average channel width ranges from four to 15 feet and the channel depth ranges from one to seven feet. During the site visit, the average water depth ranged from zero to three inches. Habitat complexity was considered poor as the stream was lacking stable habitat and is subject to ephemeral and intermittent flows. Overall, bank erosion was severe in the intermittent portion of the stream and minor to moderate in the ephemeral portion. In addition, a water or sewer line was exposed within the intermittent portion of the stream. Approximately 75 percent of the channel was shaded by woody species.

Watercourse 10 (WC10) is an old farm pond that is classified as palustrine open water (POW) by USACE and as a perennial waterway by MDE. This pond is in the southern floodplain of WC7 and drains north to WC8.

A forest stand delineation and specimen tree survey were conducted on March 27th, April 9th, and November 10, 2020. A total of four upland forest stands (A, B, C and D) and 49 specimen trees were identified within the study area, which includes the wetland buffers and the 100 year floodplain.

Stand A is a tuliptree – Eastern cottonwood forest occurring along the western floodplain of the CA-5 study area. The canopy of this early-mid successional forest is primarily in the 6-11.9" DBH size class and is dominated by tuliptree (*Liriodendron tulipifera*), ranging from 6-20" DBH and Eastern cottonwood (*Populus deltoides*), ranging from 10-18" DBH. Co-dominant species include red maple (*Acer rubrum*), American sycamore (Platanus occidentalis) , ash-leaf maple (*Acer negundo*), and black cherry (Prunus

serotina). Sixteen (16) specimen trees occur within this stand and canopy closure is approximately 70 percent. The understory contains saplings of red maple and ash-leaf maple, in addition to Japanese barberry (*Berberis thunbergii*), Autumn-olive (*Elaeagnus umbellata*), Japanese honeysuckle (Lonicera japonica), wine raspberry (*Rubus phoenicolasius*), rambler rose (*Rosa multiflora*), and Northern spicebush (Lindera benzoin). Dominant herbaceous species include Japanese stilt grass (*Microstegium vimineum*), crow garlic (*Allium vineale*), an unknown violet species (Viola sp.), and sweet wood-reed (*Cinna arundinacea).* Invasive species cover was moderate, with 40 percent invasive cover in the understory and 35 percent invasive ground cover. Downed woody debris is a common feature throughout this stand. Overall, Stand A is in good condition, as the stand is diverse with multiple canopy layers, and the moderate invasive cover that has not yet impacted the canopy.

Stand B is a tuliptree-American sycamore forest occurring along the hillslopes of the CA-5 study area. The canopy of this mid-successional forest is primarily in the 12-19.9" size class and is dominated by tuliptree in the 1-30+" DBH range and American sycamore in the 8-30+" DBH range. Co-dominant species include red maple, black cherry, and Virginia pine (*Pinus virginiana*). Twenty-four (24) specimen trees occur within this stand and canopy closure is approximately 75 percent. The understory contains saplings of tuliptree, red maple, and black cherry, in addition to Japanese barberry, Autumn-olive, and wine raspberry. Infill plantings, including Eastern redbud (*Cercis canadensis*) and various oak species (*Quercus sp*.), were observed but not included in the forest characterization. Dominant herbaceous species include an unknown violet species, crow garlic, garlic mustard (*Alliaria petiolata*), sweet wood-reed, Japanese stilt grass, and Christmas fern (*Polystichum acrostichoides*). Invasive species cover was moderate, with 15 percent invasive understory cover and 60 percent invasive ground cover present in the stand. Downed woody debris is a common feature throughout this stand. Overall, Stand B is in good condition, as the stand is diverse and well structured, and has moderate invasive cover that has not yet impacted the canopy.

Stand C is a red maple-ash-leaf maple forest occurring in the eastern floodplain of the CA-5 study area. The canopy of this early-successional forest is primarily in the 6-11.9" DBH size class and is dominated by red maple in the 1-16" DBH range and ash-leaf maple ranging from 1-22" DBH. Co-dominant species include black cherry, Callery pear (*Pyrus calleryana*), and river birch (*Betula nigra*). Other common species include tuliptree and American sycamore. One specimen tree occurs within this stand and canopy closure is approximately 60 percent. The understory contains saplings of the canopy species, except river birch, in addition to horsebrier (*Smilax rotundifolia*), wine raspberry, Southern arrow-wood (*Viburnum dentatum*), and European privet (*Ligustrum vulgare*). Dominant herbaceous species include an unknown speedwell species (*Veronica sp.),* an unknown violet species, an unknown bittercress species (*Cardamine sp.),* Japanese stilt grass, sweet wood-reed, garlic mustard, and crow garlic. Invasive species cover was moderate for the stand, with 3 percent invasive canopy cover, 10 percent invasive understory cover, and 75 percent invasive ground cover. Downed woody debris is an abundant feature throughout this stand. Overall, Stand C is in fair condition, as the stand is diverse with multiple canopy layers, but there is trash and evidence of disturbance from the surrounding development, as well as a high percentage of invasive species.

Stand D is a tuliptree forest occurring along the floodplain in the southwestern portion of the CA-5 study area. The canopy of this mid-successional forest is primarily in the 20-29.9" DBH size class and is dominated by tuliptree in the 8->30" DBH range. Co-dominant species include red maple. Other common

species include to black walnut (*Juglans nigra*), American elm (*Ulmus americana*), and black cherry. Eight (8) specimen trees occur within this stand and canopy closure is approximately 80 percent. The understory contains autumn olive, Japanese barberry and wine raspberry. Dominant herbaceous species include Japanese stilt grass, crow garlic, garlic mustard, deer-tongue rosette grass (*Dichanthelium clandestinum*), and Christmas fern. Invasive species cover was moderate for this stand with 35 percent invasive understory cover and 90 percent invasive ground cover. Downed woody debris is a common feature throughout this stand. Overall, Stand D is in good condition as most trees are healthy with no invasive cover in the canopy; however invasive groundcover is high, and the stand lacks a liberal shrub layer and overall species diversity.

Mass tree clearing within the LOD will not be performed on the site. All trees within the LOD not marked for removal will receive tree protection fence and tree planking". Since the project is located on parkland owned by M-NCPPC, great care was given to only removing the trees needed to accomplish the project goals. A total of 110 trees will be removed within the upland forest/wetland buffer/100 year floodplain for this project and 609 new trees will be planted within the LOD. The Forest Stand Delineation Memo is provided in Appendix II, Attachment B, Appendix C.

Existing invasive species are present throughout the site. The most prevalent invasive species was Japanese Stiltgrass (*Microstegium vimineum*), making up a large proportion of the overall herbaceous species throughout the site. Other herbaceous invasive species that were also present within the study area included; Garlic Mustard (*Alliaria petiolate*), Wild Garlic (*Allium vineale*), and Speedwell species (*Veronica sp.*). A few species of invasive vines and shrubs were also present on site such as: Japanese Barberry (*Berberis thunbergii*), Autumn Olive (*Elaeagnus umbellate*), Wineberry (*Rubus phoenicolasius*), Japanese Honeysuckle (*Lonicera japonica*), and Multiflora Rose (*Rosa multiflora*).

3.4 Determination of Credits

Mitigation credit at the CA-5 stream restoration site will be generated by providing functional uplift to approximately 3,079 LF of stream, located solely on M-NCPPC property. Stream mitigation credits at the CA-5 stream restoration site were calculated using the Maryland Stream Mitigation Framework (MSMF, USACE, 2020) which was recently provided in beta version. The Stream Mitigation Calculator spreadsheet was used to determine the mitigation potential of the CA-5 stream restoration site, measured in functional feet. A functional foot is defined as a linear foot of stream of perfect quality (100% or 1.0 score) and a drainage area of 1 square mile. A functional foot relates to streams of any flow type and quality in a stream network and these factors influence the value of a linear foot of stream as a functional foot. The CA-5 stream restoration site will provide 721 functional feet of stream mitigation credits. See Appendix III, Attachment A for datasheets and Attachment B for the Stream Mitigation Calculator spreadsheet. There will be approximately 3,550 SF (0.08 AC) permanent wetland impacts due to the stream restoration construction. The proposed oxbow wetlands and the farm pond enhancement, which will provide a total of 13,312 SF (0.31 AC) of on-site wetland creation for permanent wetland impacts. In addition, the 2,343 SF (0.05 AC) of temporary will be restored in place on-site.

3.5 Mitigation Work Plan

The CA-5 stream restoration site plan set (Appendix V, Attachment A) includes plan views with proposed grading and planform alignment, typical sections and details, and landscaping plant schedules and notes.

The specific activities required to implement the restoration components of the CA-5 stream restoration site are outlined below. All activities including site access, staging, and stockpiling will occur completely within the boundaries of the subject property.

Stream Restoration

The restoration of the main channel (Mainstem 1- Geomorphic Assessment Reaches 1-4) of the CA-5 stream restoration site begins just upstream of the pedestrian bridge, at the beginning of evaluation Reach 2, and continues downstream just over 2,901 LF to the confluence at the end of the site. Mainstem 2 (Reach 5) begins just downstream of the large Storm Water Management Facility present on-site and is comprised of approximately 766 LF of existing stream, with 535 LF located on M-NCPPC property and 231 LF on PEPCO property. Restoration of Tributary 1, approximately 50 LF, at the upstream end of the site, at the beginning of confluence at evaluation reach 1/2, will be stabilized downstream of the pedestrian crossing. Restoration of Tributary 2, approximately 151 LF, extends to the M-NCPPC property line and multiple smaller headcuts along the left and right banks is also proposed. The outlet from the farm pond along the left bank near the end of the site will be lowered, dropping the surface elevation of the water in the pond, reducing the overall hazard.

Mainstem 1 is designed with stable dimension, pattern, and profile in order to tie-in to existing stable channel bed features at the upstream and downstream ends of the restoration. The proposed channel design is based on a Rosgen type B channel. The intent of the design is to reduce shear stresses within the channel and access the limited floodplain surface during high flow events to below the critical shear stress threshold of the substrate. The overall size of the floodplain will be limited to avoid major earthwork and minimize impacts to existing trees and natural resources. Proposed channel bed features such as Riffle, Run, Pool and Glide will provide stable epifaunal substrate and create diverse in-stream habitat. The riffle and run features will be stabilized using rock and log structures. Energy dissipation will be achieved mainly through drops and hardened structures within the channel due to the confined floodplain. The existing conditions in the stable reaches of the channel suggest that this channel is transporting the majority of the fine sediments to the downstream reaches. Areas of instability are occurring where sinuosity has increased, and fine sediments are being deposited within the channel. The proposed design will establish a more consistent slope throughout the channel. The riffle slopes vary from 3.8-4.5%. This will stabilize the stream unit power and provide consistent sediment transport capacity throughout the channel. The existing overall profile shows a concave slope with Reaches 2 and 3 having higher slopes and Reach 4 having a relatively flat slope. The consistent slope will also raise the channel in Reaches 2, 3, and the upstream section of reach 4. This will provide additional protection to sanitary sewer crossings and help reconnect the channel to the existing floodplain at higher flows. The existing utilities are shown with the approximate elevations. Utility test pits will be performed prior to the next design phase to verify the elevations of the sewer and water crossings. By raising the channel extensive floodplain grading will be minimized while keeping bank heights low. Appendix II, Attachment B includes a Semi-Final Design Report with documentation used to support the proposed stream designs. Proposed Riffle Grade Control structures and other log and rock in-stream structures are proposed in the transitions between meanders will provide grade control and protect the designed channel from vertical degradation.

The Mainstem 2/Reach 5 stream will be restored by raising the stream invert elevation and lowering the adjacent floodplain. Stream realignment is proposed to remove sharp bends and move the channel further away from the adjacent sewer line. The goal of the mainstem 2/reach 5 tributary restoration is to allow storm flow to get out of the channel and spread out across the graded floodplain to reduce velocity and shear stress. This will be achieved by sizing the new channel to hold approximately 55% of the bankfull discharge. The channel contains a discharge of 25 cfs before flows will spread out onto the floodplain. A 1.5-year storm event bankfull discharge for this tributary is approximately 45 cfs. The proposed dimensions of the new channel include low bank heights of 1.0' and a high width to depth ratio of 23.0 with 5:1 side slopes to reduce the bank erosion potential. A high width to depth ratio was selected for this tributary to maintain low in-channel velocities of 2.9 ft/sec. and a low shear stress of 0.37 lb./sq. ft. Sediment deposition is not a concern due to the upstream SWM facility preventing fine sediment from being carried downstream. Proposed riffle grade control structures will be utilized to provide vertical stabilization to the channel and improve the hyporheic exchange between stream flow and subsurface flow. Riffle grade controls will use a mixture of salvaged riffle material and furnished rock to ensure material will remain since there is not a stable upstream substrate supply. Log and rock j-hook structures are proposed throughout the design for grade control and to provide permanent stabilization at the top and bottom of the reach. Toewood structures are proposed along the outer meander bank of pools to reduce bank erosion and provide in-stream habitat. An imbricated rock wall is proposed at approximately station 1+00 to stabilize the right outer meander bank that is within close proximity to the existing sewer line. The graded floodplain will give the channel an approximate floodprone width of 80'. To further stabilize the floodplain, log sills will be added laterally across the floodplain to prevent any channel cutting through the floodplain. At the downstream end of the site, the outlet of the farm pond will be lowered by about 1.5' and a stable weir/step pool is proposed to stabilize the outlet. A laser level survey of the existing conditions of the pond showed that the pond depth was consistently 2.0'. Therefore, in order to reduce the hazard and create a more sustainable wetland habitat, the outlet of the pond will be lowered by 1.5' and the area will be planted with native wetland vegetation. Once the outlet is lowered, the hazard of a deep pool on park property will be minimized and the M-NCPPC's request to make the pond more of a functioning wetland/vernal pool will be achieved.

Tributary 1 at the upstream end of the site will be stabilized downstream of the pedestrian crossing, step pools are proposed to provide a stable transition to the main channel. The upstream section of the channel is lined with riprap and does not require much stabilization. A plunge pool is proposed to stabilize the pipe outfall at the top of the reach.

Tributary 2 will also be stabilized. The tributary will be realigned at the downstream end to access an abandoned channel meander, and to provide a more stable tie in angle to the mainstem. The realigned channel will cross the now exposed sewer line approximately perpendicular and will tie into the main channel within a pool feature. The channel has been raised and added rock features have been added to protect the existing sewer. Step pools are proposed in the channel downstream of the footpath crossing. Upstream of the crossing there is exposed bedrock and lower banks. Since this area is somewhat stable and unlikely to show significant uplift from any major disturbance, it will remain predominately as-is. The Tributary 2 channel is designed to convey the predicted 2-year storm from TR-55.

The channel alignments were developed by examining valley slope and width, existing land constraints, and expected flood flow pattern. A longitudinal profile was created along the proposed alignment with

riffles along straight portions of the planform and pools at the bends. The channel profile is designed to have an alternating riffle-pool sequence to create varying instream habitats. Nearly all of the water surface elevation drop in the relocated stream channels occurs in riffle reaches, rather than in pools, which were designed to be nearly flat. The proposed thalweg elevations of the longitudinal profile at the upstream and downstream tie-in locations matches the existing grades. The proposed channel cross section design is based on the existing bankfull dimensions of the representative cross section. **Table 2** provides a summary of the proposed typical riffle cross section dimensions.

Table 2: CA-5 Stream Restoration Mainstem 1 & Mainstem 2 Riffle Dimensions

CA-5 Stream Restoration Site Design Parameter	Mainstem 1 Value	Mainstem 2 Value
Drainage Area (Mi2)	0.25	0.43
Discharge (cfs)	59	45.4
Cross-Sectional Area (ft2)	12.0	14.01
Width (ft)	14.7	15.0
Mean Depth (ft)	0.82	0.94
Max. Depth (ft)	1.10	1.22
Width/Depth Ratio	18.0	16.0
Hydraulic Radius (ft)	0.78	1.03
Proposed Riffle Slopes (%)	3.8-4.5	1.2–2.75

Instream Structures

A few in-stream structures are proposed which will be used to achieve the design goals. Wherever possible, the structures will be made of, or incorporate, riprap that was previously placed within the channel, and rootwads and/or logs. There are multiple locations along the stream channel where riprap had been placed throughout the years in an attempt to stabilize the banks near sanitary sewer assets and other park assets such as bridges or walking paths. When work is being completed in areas where riprap has been placed, every effort will be taken to reuse the existing material. Along the same lines, the stream is located within a forested area, and grading outside of the existing stream channel will result in the removal of trees. Wherever possible, trees being removed on site will be used in structures.

Instream log structures such as Log Rollers, Log and Rock J-hooks, Rock Sills, Boulder Cascades will be utilized to provide grade control to prevent any potential downcutting. The wood introduces carbon to the stream for nutrient retention and processing. These will create the permanent grade controls that would withstand large storm.

Stone Toe and Toe Log structures will be added along outside meander bends to provide additional bank protection in areas of high velocity and shear stress. The stone will serve as bank protection to ensure bank stability and reduce erosion.

Riffle Grade Controls are another structure proposed to provide permanent grade control at riffle bed features, increase flow diversity and withstand large storms. The riffle material will be sized to keep a portion of the bedload mobile. Since the stream is confined with no wide floodplain to deposit excess

sediment onto, the system will be designed to continue to move some sediment through the narrow valley. In many instances, Riffle Grade Control structures will be coupled with drop structures to make up grade and provide flow diversity. A combination of log and rock drop structures such as rock sills, log j-hooks, and log sills will be installed at the downstream end of the riffle grade controls to achieve these drops.

The floodplain depressions are proposed where the existing channel is abandoned. These depressions will act as naturally occurring oxbow channels that are formed in abandoned meanders. Additional Floodplain Log sills will be added to serve as grade control points within the floodplain.

Proposed Landscaping

The stream restoration landscaping plans are included in the design plans. The proposed landscaping plans include six (6) separate landscaping zones; Riparian Planting (lowland meadow establishment), Riparian shrub planting (lowland meadow establishment), Live Stake Planting (lowland meadow establishment), Oxbow wetland (wet meadow establishment), Disturbed PFO (riparian plantings and wet meadow establishment), and Turfgrass Establishment. Live stakes will be installed on the outside meanders and adjacent to straight sections along the slope of the stream bank, from bankfull to just above normal base flow. Riparian plantings will be installed adjacent to the stream channel in areas that are void of natural vegetation or have been impacted by restoration activities. Every effort will be made to save as many large trees as possible, which should keep some of the original canopy cover. Trees to be removed are indicated with "X's" on the ESC and landscaping plans. The plant species are listed in the planting schedules and included in the design plans. Forest impacts were avoided and minimized, and the Landscape Plan proposes to plant an equivalent number of trees to the number removed by the project on-site. Lowland meadow establishment seed mix will be applied to the areas where lives stakes, or riparian reforestation have been installed. Wet meadow establishment seed mix and herbaceous wetland plantings will be applied in the proposed floodplain depression areas, as shown on the plans. Turfgrass will be established in the areas of existing grass needed for access and stockpile.

The Contractor shall provide a warranty and maintain all landscape plantings for one year after Acceptance for Maintenance of plantings and landscape work. Acceptance for Maintenance for plantings and landscape work shall be implemented after all plant materials in the project have been planted, are true to species and minimum size, and are in a healthy and thriving condition in accordance with Section 710 of the Standard Specifications and the applicable Special Provisions. During this one-year warranty period, the Contractor shall provide all required plant care and maintenance. This work shall include, but is not limited to watering, weeding, fertilizing, pest control, invasive plant control, mulching, pruning, and replacement of any plant materials that are not in a healthy and thriving condition reflective of the species and in accordance with the MDOT SHA's Standard Specifications for construction and Materials and related SP Sections.

In addition to the installation of native species, Invasive Species treatment will be performed for the entire LOD. Special Provision 20 – Non-Native Invasive (NNI) Species Control outlines the management of Japanese Stiltgrass (*Microstegium vimineum)*, Garlic mustard (Alliaria petiolata), Wild Garlic (*Allium vineale*), Autumn olive (*Elaeagnus umbellata*), Multiflora rose (*Rosa multiflora*), Japanese honeysuckle

(*Lonicera japonica*), Wineberry (*Rubus phoenicolasius*), Japanese barberry (*Berberis thunbergii*), invasive Speedwell species (*Veronica sp.)* and others as specified by the Engineer during construction of the project. NNI removal will be focused heavily on the removal of Japanese Stiltgrass (*Microstegium vimineum)*. The extents of the NNI control is to occur within the limits of disturbance (LOD), the limits of planting (LOP), and within a buffer of 50 feet outside the LOD and LOP. The methods and application rates are based on the M-NCPPC's *Best Management Practices for Control of Non-native Invasives.*

Construction Schedule

It is estimated that the design will be completed in 2022/2023, and the mitigation site will be constructed prior to the completion of the overall I-495/270 MLS project. The Phase I of the project will include portions of I-270 will include impacts within the Middle Potomac-Catoctin watershed therefore this site will be constructed in concurrence with Phase I. The site shall be constructed under the supervision of an approved qualified restoration specialist. It is anticipated that the overall project will take approximately seven months to construct. No instream work will be conducted between March 1 and June 15, inclusively.

3.6 Maintenance Plan

M-NCPPC and MDOT SHA have developed a long-term agreement (Appendix IV, Attachment B) that will allow MDOT SHA future access to monitor and maintain the restored stream segment. After monitoring on the site is complete M-NCPPC will provide long term maintain of the site in perpetuity to ensure protection of the conservation practices.

Following construction, the project will be placed in MDOT SHA's monitoring program and will be subject to regular inspections to determine the progress and continued viability of the project. Monitoring will be conducted by MDOT SHA for 10 years, with reporting in years 1, 3, 5, 7, and 10 following project construction. If any maintenance work is deemed necessary based upon monitoring results, MDOT SHA will coordinate with the regulatory and resource agencies to determine the appropriate course of action and obtain the appropriate approvals prior to any construction activities.

3.7 Performance Standards

The stream will be re-evaluated, using the Maryland Stream Mitigation Framework (MSMF) stream calculator during years 3, 5, 7, and 10. Notes will be made in the calculation runs for earlier years 3, 5, and 7 where further improvements are expected to occur and with any remedial actions needed to maintain the project and vegetation. Credits will then be revised accordingly. At the end of the permitted monitoring period, MDOT SHA will need to demonstrate that the project has met the goals for the stream restoration efforts at the CA-5 stream restoration site, including:

1. Prevent lateral and vertical migration of the stream bed and bank
2. Promote floodplain connectivity
3. Increase bedform diversity by increasing percent of stable riffles post-construction

The project's ecologically based performance standards are tied to the site's objectives functional uplift parameters. Performance standards will be measured in accordance with the approved post construction monitoring protocols developed for the project. No wetland mitigation credit is being claimed for this stream restoration project beyond the "no net loss of impacted wetlands. **Table 3** shows the specific performance standards MDOT SHA will use to demonstrate that the project has met the design goals.

Table 3: Performance Standards and Methods for CA-5 Stream Restoration Goals

Streams Functional Pyramid Category: Hydraulic			
Goal	**Parameter**	**Performance Standard**	**Measurement Method**
Floodplain reconnection	Floodplain connectivity	Entrenchment Ratio, Bank Height Ratio	Cross-Section
Streams Functional Pyramid Category: Geomorphology			
Goal	**Parameter**	**Performance Standard**	**Measurement Method**
Channel stability	Vertical/Lateral migration	Stream bed/bank stability	Longitudinal Profile/BANCS
Stabilize stream bed	Bedform Diversity	Increase in percent stable riffles from pre- to post-restoration	Quantify percent of stable riffles

3.8 Monitoring Requirements

The CA-5 stream restoration site will be placed in MDOT SHA's Monitoring Program. Stream restoration monitoring will be required for ten years, with reports at years 1, 3, 5, 7, and 10 following project construction, with the first monitoring year beginning the first March after the completion of construction including planting. Annual monitoring reports will be submitted by MDOT SHA to both USACE and MDE no later than December 31st of each calendar year. As-built plans will be provided by MDOT SHA to MDE and USACE within 60 days of construction completion. Starting at the end of Year 5 of monitoring, if the mitigation site meets all final year performance standards for at least two consecutive monitoring years, the Permittee may request termination of the active monitoring period.

MDOT SHA will provide the monitoring team with as-built surveys in accordance with the special provisions of the project to ensure that structures and grading were built in accordance with the design plans. The as-built drawings will serve as a basis of comparison to determine overall changes to the channels and in-stream structures within the project reaches.

The proposed monitoring plan identifies two major components to ensure that the stream mitigation is providing the goals of the project, including: replacing lost functions and values to offset unavoidable impacts to aquatic resources and providing the long-term stability of the stream system. The plan will include monitoring the following indices:

- Geomorphological Monitoring; and
- Photo-Documentation.

A timeline of the various monitoring efforts is provided in **Table 4**.

Table 4: Monitoring Summary/Timeline

Monitoring Task		Pre-Construction (measured by	Yr. 1	Yr. 3	Yr. 5	Yr. 7	Yr. 10
General Stream Monitoring							
Visual Inspection / Photo Documentation	X	X	X	X	X	X	X
Physical Stream Monitoring (Cross Sections and Longitudinal Profile	X	X					X
Structure Stability Assessment				X		X	
Stream Habitat Assessment	X		X		X		
Invasive Species Assessments			X	X	X		X
Temporary Wetland Impacts				X	X		X
Wetland Creation (Oxbow)			X	X	X		X
Functional Uplift Stream Monitoring							
Floodplain Connectivity (BHR, ER)	X	X		X			X
Riparian Vegetation	X	X		X			X
Lateral Stability	X	X		X			X
Bedform Diversity	X	X		X			X
Annual Reporting							
Monitoring Report (Agency Submittal)			X	X	X	X	X
Agency Site Visit					X		TBD

3.8.1 Visual Inspection/Photographic Documentation

A stream walk should be conducted in years 1, 3, 5, 7, and 10 to evaluate the condition of the restoration and make note of any potential problems. Potential problems will be documented on a clean set of post construction as-built plans. Items such as eroding banks, excessive bar formation, scour, structure failure, erosion around structures, accumulated debris, and sparsely vegetated areas will be included on the sketch. Notes should also be included describing the condition of the in-stream structures. If problems are noted, they will be discussed in the monitoring report, and adaptive management will be considered and recommended, if necessary.

Pre-construction photo documentation stations for the existing channel were established during the baseline conditions assessment. Prior to monitoring, MDOT SHA will provide the monitoring team with a shapefile of Global Positioning System (GPS)-located photo stations which will be established along the restoration reach to depict preconstruction conditions, as well as digital photograph files. Photos will be repeated at the established photo stations in years 1, 3, 5, 7, and 10 to provide a comparison of lateral

and vertical stream stability, in-stream structures, and any changes in stream and floodplain morphology. In addition to the established photo stations, photographs of any unusual or noteworthy conditions will also be taken. A log of all photographs will be included in the monitoring report to provide a side-by-side comparison of the stream from each established photo station. A map of the photo station locations and the pre-construction photos, with descriptions and general directions can be found in Appendix II, Attachment B, Appendix A.

3.8.2 Physical Stream Monitoring

A. Cross Sections and Longitudinal Profiles

A survey of the existing stream conditions within the LOD, including geomorphology and bank stability, was conducted prior to the start of construction. As part of the pre-construction geomorphic assessment, ten cross-sections within the proposed restoration reaches and one cross section upstream of the proposed work area were established, monumented, and surveyed for future comparison during Physical Stream Monitoring in years 1 and 10.

On the Mainstem, one cross-section was established in Reach 1, upstream of the limits of work, where no instream work was proposed due to site limitations. Two cross-sections were established in Reach 2, downstream of the proposed pedestrian crossing after the confluence with Tributary 1. A fourth existing cross-section is located approximately mid-way through in Reach 3. The fifth, sixth, and seventh cross sections are located in the upstream portion of Reach 4, above the pond outfall. Additional cross sections were monumented, one in Reach 5, one in Tributary 1, and one in Tributary 2. Cross-sections monumented in Tributary 1 and 2 will not be utilized during Physical Stream Monitoring. In addition to the previously established cross-sections more cross sections may be added in Year 1 monitoring and surveyed in subsequent monitoring years. Cross-section data will be overlaid and compared in order to evaluate degree of variation in channel size and shape over the monitoring period. Channel dimensions for each cross-section should be evaluated, compared, and presented in tabular form.

During pre-construction survey, a longitudinal profile was surveyed along portions of the existing thalweg. During each monitoring year, a longitudinal profile will be taken through the thalweg of the mainstem reaches, starting and ending in the same locations as the pre-construction survey. Subsequent years of longitudinal survey data should be overlaid in order to evaluate the streambed stability. Reach slope and overall channel slope should be evaluated, compared, and presented in tabular form.

B. Structure Stability Assessments

Structures constructed of rock, wood or other materials are commonly used in stream restoration projects to provide stability in high stress areas, grade control or provide energy dissipation. The use of structures entails a certain degree of risk that may potentially compromise the stability of the project. Minor performance problems associated with one structure could potentially create problems with adjacent structures or the surrounding channel and floodplain areas. A visual inspection and photo documentation of each structure is recommended to validate structure stability or identify problems over time.

An assessment of structural stability shall be completed during leaf-off at the locations of the installed structures in years 3 and 7. The evaluation consists of a visual examination of each structure to determine areas of developing weaknesses or problems with structure performance, called failure indicators. The Field Stability Assessment rating system has been modeled after the Functional Pyramid. For each of the

Failure Indicators there are four possible Adjective Ratings (Functioning, Functioning at Risk, Not Functioning, and Failure).

The overall functionality of the structure should be decided using best professional judgment and take into consideration the observations of failure indicators and any additional notes on the stability of the structure. In this context, the structure is considered to have signs of Not Functioning if it is not durable, or if it is not performing a key function related to the reason for including the structure in restoration design (i.e., grade control, pool formation, etc.). If a structure is Functioning-at-Risk, it will continue to be closely monitored. If a structure is Not Functioning in multiple categories or has one or more indicators of Failure, adaptive management will be considered. Also, if a structure is Not Functioning, Functioning at Risk, or Failing, the designer will be contacted for an assessment.

Structure Stability Assessment forms are specific to their respective structure. A Structure Stability Assessment form should be completed for each structure listed in **Table 5**. Tributary 1 and 2 structures should still be inspected for stability and have been included in **Table 5**.

Table 5: Structures to be Assessed

Structure Type	Number
Log Roller (LR)	6
Riffle Grade Control (RGC)	57
Rock J-Hooks (RJH)	28
Riffle Grade Control (RGC) with Rock Sill (RS)	1
Boulder Cascades (BC)	14
Stone Toe (ST)	15
Toe Log (TL)	17
Rock Cross Vane/Compound Rock Cross Vane (RCV/CRCV)	2
Knickpoint Treatment	2

A minimum of two photos will be recorded at each assessed structure: one photo looking upstream and one photo looking downstream of the structure. Extra photos will be taken in order to capture any of the failure indicators observed during the site visit. Photos should be taken during leaf-off in order to clearly capture the banks and structures being assessed.

3.8.3 Functional Uplift Stream Monitoring

Functional uplift opportunities have been identified and incorporated into the proposed restoration design. Functional uplift opportunities will be organized according to the Stream Functions Pyramid (USFWS, 2011). Uplift is anticipated for functional pyramid Levels 2 (Hydraulic) and 3 (Geomorphology).

No performance standards are proposed for Level 1 (Hydrology), Level 4 (Physiochemical), or Level 5 (Biological). Protocols for post-construction monitoring are described in this monitoring plan for

functional pyramid Level 2, including assessment of floodplain connectivity (bank height ratio and entrenchment ratio) which will be calculated at riffle cross section locations. Monitoring for Level 3 will include assessment of riparian vegetation, lateral channel stability, and bedform diversity. Functional scores for each measurement method are provided in the design column of the tables provided, Protocols to assess functional uplift based on the existing and proposed conditions were adapted from the USFWS's Function- Based Rapid Stream Assessment Methodology (Starr et al., 2015), currently in final draft form, which is based on A Function-Based Framework for Stream Assessment and Restoration Projects (Harman et al., 2012).

Several measurement methods are provided to measure the existing functional capacity of each element of the hierarchy. Each measurement method is rated using three (3) general categories, including (1) Functioning, (2) Functioning-at-risk and (3) Not Functioning. For some parameters, the Functioning-at-risk category is further divided into two (2) subcategories (a) trending toward Functioning and (b) trending towards Not Functioning (Starr et al., 2015). Functional ratings for the pre-construction and design conditions for each measurement method are provided in the field data sheets included in Appendix III, Attachment A and are summarized in the table below.

Table 6: Function Based Scores and Ratings

Reach	Hydrology		Hydraulics		Geomorphology		Physicochemical		Biological	
	Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop
Mainstem 1	4	7	18	35	28	66	11	14	13	20
Mainstem 2	9	9	22	36	42	64	16	16	13	21

A. Level 2 Hydraulic

To monitor hydraulic function uplift, an assessment of floodplain connectivity will be completed using the Bank Height Ratio (BHR) and Entrenchment Ratio (ER). Geomorphic assessment data collected, and survey mapping analyzed during the design phase of the project was used to determine the pre-construction BHR and ER for each restoration reach. Monitoring data for the restoration reach is provided in the Semi-Final Design Report, Appendix II, Attachment B.

a. Bank Height Ratio

The pre-construction BHR of all the reaches (Mainstem 1 & Mainstem 2) is not functioning. The proposed BHR was determined based on the proposed top of bank height divided by the proposed bankfull height using the predicted bankfull discharge across the typical design cross-section for each restoration reach. Under the proposed condition, the BHR of all reaches is expected to be Functioning.

The post-construction BHR should be determined through field data collection following the guidance provided in the USFWS's Function-Based Rapid Stream Assessment Methodology (Starr et al., 2015). Post-construction BHR measurements should be performed during years 2 and 7. A qualified professional experienced in identifying bankfull must be present during field assessments. The BHR measurements should be provided in tabular form accompanied by a brief comparative analysis with preconstruction and proposed BHRs identified during development of the restoration design. It should be assumed that uplift has been achieved if the post-construction BHR is Functioning. **Table 7** shows the bank height ratio performance standards that should be used to evaluate the proposed conditions.

Table 7: Bank Height Ratio Performance Standards

Functioning	Functioning-At-Risk	Not Functioning
1.0 - 1.2	1.3 - 1.5	> 1.5

Performance standards from Harman et. al (2012)

b. Entrenchment Ratio

The ER for Mainstem 1 and 2 is considered mid to low Functioning. Under the proposed condition, all the ER ratings of the CA-5 restoration reaches are expected to increase and score as Functioning.

The post-construction ER will be determined through field data collection following the guidance provided in the USFWS's Function-Based Rapid Stream Assessment Methodology (Starr et al., 2015). Post-construction ER measurements should be performed during years 2 and 7. A qualified professional experienced in identifying bankfull must be present during field assessments. The ER measurements should be provided in tabular form accompanied by a brief comparative analysis with pre-construction and proposed ER identified during development of the restoration design. It should be assumed that uplift has been achieved if the post-construction ER for the restoration reach is functioning. **Table 8** shows the entrenchment ratio performance standards that should be used to evaluate the proposed conditions.

Table 8: Entrenchment Ratio Performance Standards

Reach	Functioning	Functioning-At-Risk	Not Functioning
Reach 1 - Relocation	> 2.2	2.0 - 2.2	< 2.0
Reach 2 - Restoration	> 1.4	1.2 - 1.4	< 1.2

Performance standards from Harman et. al (2012)

B. Level 3 Geomorphology

To monitor geomorphologic function uplift, an assessment of riparian vegetation, lateral stability, and bedform diversity will be used to determine the pre-construction conditions. Monitoring data for the restoration reach is provided in the Semi-Final Design Report, Appendix III, Attachment B.

a. Riparian Vegetation

Prior to construction, the approximate width of the riparian area generally covered by trees and / or shrubs was determined by the design team. The same estimates will be performed post-construction during the stream habitat assessment task in years 2 and 7. Additionally, a post-construction assessment of existing vegetative coverage should be conducted using a representative number of 1/10th acre plots along both streambanks of each restoration reach. Sample plots should be conducted as follows:

- One plot per 4 acres of forest stand area
- Two plots minimum per stand; and
- Three plots minimum of the total forested area of the site

Within each plot, data collection should include estimates of vegetative coverage within each stratum (i.e. trees, shrubs / saplings, herbaceous, woody vines), density of woody vegetation, dominant species within the plot, and any concerns such as invasive species coverage. A representative photograph should be taken at each plot.

Results of the plot data collection should be summarized in tabular form and should be accompanied by a brief comparative analysis with previous data collection. Guidance from the United States Fish and Wildlife Service (USFWS)'s Function-Based Rapid Stream Assessment Methodology (Starr et al., 2015) should be used to assess the functional category of the post-construction monitoring results using the Riparian Vegetation Zone measurement method. It should be assumed that uplift has been achieved if riparian vegetation has increased in width and diversity from the pre-construction condition. Due to constraints the riparian vegetation in Mainstem 1 & Mainstem 2 are expected to remain as Functioning at Risk on both banks but increase to higher score within the category. **Table 9** shows the riparian vegetation performance standards that should be used to evaluate the proposed conditions.

Table 9: Riparian Vegetation Performance Standards

Performance Standard	Functioning	Functioning-At-Risk	Not Functioning
Riparian Vegetation [1]	Width of riparian zone > 18 meters on each side; human activities have not impacted zone (Optimal, 9-10)	Width of riparian zone 12-18 meters on each side; human activities have impacted zone only minimally (Sub-Optimal, 6-8); width of riparian zone 6-12 meters on each side; human activities have impacted zone a great deal (Marginal, 3-5)	Width of riparian zone <6 meters on each side; little or no riparian vegetation due to human activity (Poor, 0-2)
Aerial Coverage [2]	Year 1: Greater than 50% native species cover Year 2: Greater than 60% native species cover Year 3: Greater than 70% native species cover Year 5 & Additional monitoring years thereafter: Greater than 85% native species cover Volunteer Species support functions consistent with project goals	Year 1: Minimum 50% native species cover Year 2: Minimum 60% native species cover Year 3: Minimum 70% native species cover Year 5 & Additional monitoring years thereafter: Minimum 85% native species cover Volunteer Species present	Year 1: Less than 50% native species cover Year 2: Less than 60% native species cover Year 3: Less than 70% native species cover Year 5 & Additional monitoring years thereafter: Less 85% native species cover Volunteer species minimal / not present
Non-Native and Invasive Species [2]	Invasive species make up less than 10% of relative plant cover over the entire site with no individual colony greater or equal to 5% of relative plant cover	Invasive species make up approximately 10% of relative plant cover over the entire site with no individual colony greater or equal to 5% of relative plant cover	Invasive species make up more than 10% of relative plant cover over the entire site. Individual colonies of invasive species are greater than 5% of relative plant cover

Performance Standard	Functioning	Functioning-At-Risk	Not Functioning
Vegetation Density for Forested Buffers [2]	Native plant density is greater than 435 living trees / shrubs per acre. Trees / shrubs have a minimum height of 10 inches by the end of year 1.	Native plant density is between 250 – 435 living trees / shrubs per acre. Tree / shrub heights have a minimum height of 8 inches by the end of year 1.	Native plant density is less than 250 living trees / shrubs per acre. Tree / shrub heights are less than 8 inches by the end of year 1.
Vegetation Cover for Forested Buffers [2]	Average tree height of the tallest 5 native trees within each sample plot is 3 feet or taller in height at year 3 and 5 feet or higher at year 5. Canopy cover of native trees and shrubs is greater than or equal to 30% by the end of the monitoring period.	Average tree height of the 5 tallest native trees within each sample plot is 2 - 3 feet in height at year 3 and 3 - 5 feet at year 5. Canopy cover of native trees and shrubs is between 20 – 30% by the end of the monitoring period.	Average tree height of the 5 tallest native trees within each sample plot is less than 2 feet in height at year 3 and less than 3 feet at year 5. Canopy cover of native trees and shrubs is less than 20% by the end of the monitoring period.
Aerial Coverage [2]	Year 1: Greater than 50% native species cover Year 2: Greater than 60% native species cover Year 3: Greater than 70% native species cover Year 5 & Additional monitoring years thereafter: Greater than 85% native species cover Volunteer Species support functions consistent with project goals	Year 1: Minimum 50% native species cover Year 2: Minimum 60% native species cover Year 3: Minimum 70% native species cover Year 5 & Additional monitoring years thereafter: Minimum 85% native species cover Volunteer Species present	Year 1: Less than 50% native species cover Year 2: Less than 60% native species cover Year 3: Less than 70% native species cover Year 5 & Additional monitoring years thereafter: Less 85% native species cover Volunteer species minimal / not present

[1] Performance standards from Harman et. al (2012)

[2]Metrics taken from *Ecological Performance Standards and Monitoring Protocol for Permitee-Responsible Nontidal Wetland Mitigation Sites in Maryland* (2022)

b. Lateral Stability

Lateral stability was documented by the design team using the Bank Assessment for Non-point source Consequences of Sediment (BANCS) method which includes Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) measurements as described below. The BEHI/NBS data was used to determine the functional category of existing conditions for the left and right banks of each reach using the Dominant Bank Erosion Rate Potential measurement method in USFWS's Function-Based Rapid Stream Assessment Methodology (Starr et al., 2015). Based on BEHI and NBS data, lateral stability for Mainstem 1 was determined to be Not Functioning for the left and right banks. The lateral stability for Mainstem 2 was determined to Functioning-at-risk for the left and right banks. Under the proposed condition, lateral stability based on the BEHI for the restoration reach is expected to be functioning.

Post-construction BEHI/NBS measurements and visual observations should be performed during years 2 and 7 where erosion is present using field data collection methods outlined in Rosgen (2006). A qualified

professional experienced in identifying bankfull must be present during field assessments. The BEHI/NBS should be provided in tabular form accompanied by a brief comparative analysis with pre-construction and proposed BEHI/NBS identified during development of the restoration design. It should be assumed that uplift has been achieved if the post-construction BEHI/NBS for each restoration reach is functioning post-construction. **Table 10** shows the lateral stability performance standards that should be used to evaluate the proposed conditions.

Table 10: Lateral Stability Performance Standards

Functioning	Functioning-At-Risk	Not Functioning
Dominant bank erosion rate potential is low or BEHI/NBS Rating: L/VL, L/L, L/M, L/H, L/VH, M/VL	Dominant bank erosion rate potential is moderate or BEHI/NBS Rating: M/L, M/M, M/H, L/Ex, H/L, M/VH, M/Ex, H/L, H/M, VH/VL, Ex/VL	Dominant bank erosion rate potential is high or BEHI/NBS Rating: H/H, H/Ex, VH/H, Ex/M, Ex/H, Ex/VH, VH/VH, Ex/Ex

Performance standards from Starr et. al (2015)

c. Bedform Diversity

Bedform diversity in the pre-construction and design conditions were evaluated by the design team using the pool depth variability and the Shelter for Fish and Macroinvertebrates measurement methods.

Field data collected of the representative stream sections during the design phase of the project has been used to determine the pre-construction percentage of substrate favorable for epifaunal colonization: mix of snags, submerged logs, gravel, cobble, and large rocks, or other bed features that remain stable based on the Shelter for Fish and Macroinvertebrates measurement method in the USFWS's Function-Based Rapid Stream Assessment Methodology (Starr et al., 2015). Based on the pre-construction assessment bedform diversity is considered Functioning-at-Risk for Mainstem 2. Mainstem 2 is considered Not Functioning. Under the proposed conditions, bedform diversity is expected to be Functioning for Mainstem 1 and Mainstem 2 where significant portions of the stream are restored.

Post-construction bedform diversity will be evaluated during years 2 and 7. Pool depth variability will be evaluated with a longitudinal profile by measuring the bankfull pool depth at each pool within the assessment reach, and then dividing these depths by a representative mean riffle bankfull depth. The bedform diversity will also be evaluated by calculating the percentage of favorable substrate for each reach using the Shelter for Fish and Macroinvertebrates methodology. The length of favorable substrate (broken out by length of stable riffles and runs, and length of pools and glides composed of woody debris) will be measured in the field during the stream habitat assessment task of the monitoring (Section 11.4.1). The total percentage of favorable substrate will then be calculated based on the overall length of restoration within the reach. Results of the bedform diversity assessment will be provided in tabular form and will be accompanied by a brief comparative analysis with previous data collection of existing and proposed conditions. It will be assumed that uplift has been achieved if the percentage of favorable

substrate is greater than 50%. **Table 11** shows the bedform diversity performance standards that should be used to evaluate the proposed conditions.

Table 11: Bedform Diversity Performance Standards

Measurement Method	Functioning	Functioning-At-Risk	Not Functioning
Pool Max Depth Ratio/Depth Variability	> 1.5	1.2 - 1.5	< 1.2
Shelter for Fish and Macroinvertebrates (EPA 1999)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, rubble, gravel, cobble and large rocks, or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient)	20-70% mix of stable habitat; suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)	Less than 20% mix of stable habitat; lack of habitat availability less than desirables obvious; substrate unstable or lacking

Performance standards from Starr et. al (2015)

3.8.4 Stream Habitat Assessment

Aquatic habitat will be assessed using the U.S. Environmental Protection Agency (EPA) Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition (Barbour et al. 1999). The RBP habitat assessment includes assessments for both high gradient and low gradient streams. The RBP high gradient habitat assessment uses a qualitative rating of 10 habitat parameters for Piedmont streams, including Epifaunal Substrate/Available Cover, Embeddedness, Velocity/Depth Diversity, Sediment Deposition, Channel Flow Status, Channel Alteration, Frequency of Riffles (or bends), Bank Stability, Vegetative Protection, and Riparian Vegetative Zone Width. Each parameter is given a score from 0-20, with the exception of Bank Stability, Vegetation Protection, and Riparian Vegetative Zone Width, which are scored from 0-10 for each bank. The scores for each parameter are then summed for a total score, which is compared to reference conditions (i.e., maximum possible score of 200) and given a narrative ranking. The RBP habitat ranking criteria are presented in **Table 12** below.

Table 12: RBP Habitat Ranking Criteria

Score	Comparability to Reference	Narrative Ranking
>180	>90%	Comparable to Reference
151-179	75.1-89.9%	Supporting
121-150	60.1-75%	Partially Supporting
≤120	≤60%	Non-Supporting

Monitoring stations will be established on each of the reaches prior to construction to characterize baseline habitat conditions. The pre-construction habitat data should be used as a baseline for comparison with post-construction monitoring data taken during monitoring years 2 and 5.

3.8.5 Invasive Species Assessments

Post -construction, the monitoring team will assess invasive cover in years 1, 3, 5, 7, and 10. Invasive species will be assessed during two monitoring periods, once in the late spring and once in summer, to identify potential invasive species that could occur during different times of the growing season. The monitoring protocol will include slowly walking transects parallel to both banks of the stream to identify invasive plant species recognized in the 2010 National Park Service/U.S. Fish and Wildlife Service document entitled Plant Invaders of Mid-Atlantic Natural Areas (Swearingen et al. 2010) and within the Maryland Invasive Species Council document entitled Invasive Species of Concern in Maryland (MD Invasive Species Council 2005). These lists include both non-native invasive species and native species considered locally invasive by resource agencies. All identified invasive plants within the project area will be documented on stream restoration plans by tracing the limits of each population on field maps and through the use of a hand-held Global Positioning System (GPS) to more accurately locate either the center of smaller patches or the upstream and downstream limits of extensive patches. For each distinct invasive species population, an estimate will be made of the amount of the invasive cover relative to the total plant cover in the area. The total cover of each invasive species will then be summarized for the entire project site.

After each monitoring event, the mapped invasive cover will be reviewed to determine whether treatment is necessary based on extent and species composition. Within one week after completing each invasive species field assessment, the monitoring team will prepare and submit to the agencies a brief memo describing the vegetative conditions and recommendations for treatment or adaptive management, if necessary. Invasive species conditions described in each memo will also be summarized in each monitoring report. The monitoring team will continue to review mapped populations over time throughout the monitoring period to determine whether populations have changed and if control is warranted.

Treatment will generally be required if more than 10 percent of relative plant cover over the entire site is made up by invasive species. However, invasive species management will be confounded by its landscape setting. The stream restoration project site lies within an active riparian corridor that is susceptible to

seed inputs through animal dispersal (e.g., bird and mammals) and overbank flooding of the stream. Thus, permanent eradication of all invasive species may be extremely difficult or impossible. Also, the project site abuts similar habitat that is privately owned. The proliferation of certain invasive species on adjacent land makes the complete control of certain species difficult, especially species such as Japanese stilt-grass (*Microstegium viminium*). Therefore, any required management of invasive plants within the site will primarily focus on those species whose area-wide distribution is patchier in nature and for which treatment options have a higher likelihood of success. Also, those invasive species whose presence either precludes the establishment of native plants or results in the death of native plants, will be most aggressively treated.

3.8.6 Wetland Monitoring

The CA-5 stream restoration will include both temporary wetland impacts and wetland creation areas in the oxbow wetland. Approximately 3,550 SF (0.08 AC) permanent wetland impacts are anticipated due to the stream restoration construction. The proposed oxbow wetlands and the farm pond enhancement, which will provide a total of 12,756 square feet of on-site wetland creation. In addition, and impacts determined to be temporary will be restored in place on-site as well.

A. Temporary Wetland Impacts

Monitoring of the temporary wetland impact areas will be conducted in years 3, 5, and 10 following construction. All wetland monitoring will occur during the growing season.

Temporary wetland impact areas must meet the wetland criteria for hydrology, soils, and vegetation as described in the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0* (USACE, 2012). In addition, temporarily impacted wetlands areas must be dominated by native woody species (indicator status FAC or wetter) in the scrub/shrub or forested wetlands and have at least 85% native (indicator status FAC or wetter) species for vegetation establishment to be considered successful. If the MDE and the USACE determine that the project does not meet these Project Standards, MDOT SHA shall remediate the site or otherwise complete their restoration requirement to the satisfaction of the MDE and the USACE. If it is determined that remediation will not result in the site meeting the Project Standards, MDOT SHA may be required by the MDE and the USACE to mitigate for the wetland impacts resulting from the stream restoration project.

Sample Plots

Prior to construction, MDOT SHA will establish GPS-located sample plots within each temporary wetland impact area and assess them as described below. Vegetation sample plot locations will be placed randomly to provide a minimum of 1 plot per wetland impact area. Pre-construction monitoring will also include GPS-located photo points of each impact area. MDOT SHA will provide mapping (including shapefiles) of sample plots and photo points (described below) and a memo of pre-construction monitoring results to the monitoring team.

Sample plots will be re-assessed in years 3, 5, and 10 during the growing season. Routine Data Forms applicable to the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0* (USACE, 2012) will be used to document hydrology,

vegetation, and soils data collected at each sample plot. Plot sizes will vary depending on the size of each wetland impact area but will follow guidance in the regional supplement. For very small impact areas, plots can consist of the entire impact area.

The results will be provided in the monitoring report in designated monitoring years in tabular form and accompanied by a brief comparative analysis, conclusions, and recommendations, if any. Results will document whether wetland hydrology and vegetation requirements are being met for each plot..

Visual Assessment

In addition to data collection at the sample plots, a visual assessment of each temporary wetland impact area will also be conducted in years 3, 5 and 10. The boundaries of wetlands and cover types (i.e., forest, scrub-shrub, and emergent) will be delineated and located with a GPS unit. Areas of bare soil greater than 0.01 acres in size will be noted and boundaries located with GPS. Areas dominated by invasive species will also be located with GPS and described, noting approximate percent cover, species, and degree of dominance. Additionally, areas of open surface water or saturation will be located with GPS. All features located with GPS will be shown on as-built plans to be included with the monitoring report in years 3, 5 and 10. MDOT SHA will provide the monitoring team with digital files (.dgn) of as-builts, if available.

Photo Documentation

Photographs of temporarily impacted wetlands will be taken in years 3, 5, and 10 at designated GPS-located photo points established pre-construction by MDOT SHA. A log of all photographs will be included in the monitoring report in designated years to provide a side-by-side comparison of each temporary wetland impact area. MDOT SHA will provide mapping of the photo point locations/directions (including shapefiles) and digital photograph files to the monitoring team.

B. Wetland Creation Monitoring (Oxbow Wetland and Farm Pond Enhancements)

The CA-5 stream restoration will result in 12,756 square feet of proposed oxbow wetlands and the farm pond enhancement. Within this area, any permanent impacts will meet wetland replacement requirements associated with the project. The location of the oxbow wetlands and the farm pond enhancement can be found on the 60% Design Plans dated March 2022.

Credit will not be sought for any wetlands created in excess of the replacement needs. Post-construction monitoring of the oxbow wetlands and the farm pond enhancement area will be conducted during the growing season in years 1, 3, 5, 7, and 10 to evaluate wetland hydrology and assess the presence and coverage of native and invasive vegetation.

Monitoring protocols for the oxbow wetlands and farm pond will follow the *Ecological Performance Standards and Monitoring Protocol for Permitee-Responsible Nontidal Wetland Mitigation Sites in Maryland.* Section I, *Performance Standards* of the referenced monitoring protocol provides final wetland performance standards for Wetland Vegetation Dominance, Aerial Cover Vegetative Standards, Non-Native and Invasive Species, Wetland Species Richness, Wetland Vegetation Density for Scrub-Shrub and Forested Wetlands, Wetland Vegetation Cover for Forested Wetlands, Wetland Hydrology, Anaerobic Soil

Conditions, Topsoil, Bulk Density, Microtopography, Woody Debris, Delineation of Aquatic Resources, and Wetland Function Assessment.

Evidence of wetland hydrology, as described in the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0* (USACE, 2012), will be used to determine project success. Created wetlands must also achieve a minimum of 85% native (indicator status of FAC or wetter) species to be considered successful. In addition, native woody species (FAC or wetter) must be dominant (represent more than 50% of all dominant woody plant species) in scrub-shrub or forested wetlands. If the MDE and the USACE determine that the project does not meet these Project Standards, MDOT SHA shall remediate the site or otherwise complete their restoration requirement to the satisfaction of the MDE and the USACE. If it is determined that remediation will not result in the site meeting the Project Standards, MDOT SHA may be required by the MDE and the USACE to mitigate for the wetland impacts resulting from the stream restoration project.

Reporting will follow the requirements stated in Section III of the *Ecological Performance Standards and Monitoring Protocol for Permitee-Responsible Nontidal Wetland Mitigation Sites in Maryland* titled Monitoring Reports. The report will include the required monitoring report measurements stated in Section IV.

Sample Plots

Sample plots will be established within the oxbow wetlands and the farm pond enhancement area and located with a GPS unit during year 1 of the monitoring period. Sample plots will be located on a random basis over the site in order to sample all areas of constructed wetlands. Plot sizes will vary depending on the size of each wetland but will follow guidance in the regional supplement. Each established plot will be sampled once during the growing season of year 1, 3, 5, 7, and 10. The assessment and reporting of the sample plot data for oxbow wetlands and the farm pond enhancement area areas will be the same as for temporary wetland impact areas, described above.

Visual Assessment

The visual assessment of the oxbow wetlands and the farm pond enhancement area will be the same as for temporary wetland impact areas, described above. However, the oxbow wetlands and the farm pond enhancement area will be assessed in years 1, 3, 5, 7, and 10.

Photo Documentation

The photo documentation of the oxbow wetlands and the farm pond enhancement area will be the same as for temporary wetland impact areas, described above. However, the monitoring team will establish GPS-located photo points at each sample plot during year 1 monitoring and will repeat them in years 1, 3, 5, 7, and 10.

3.8.7 Annual Report

Annual monitoring reports will be submitted by MDOT SHA to both USACE and MDE no later than December 31st of each calendar year. MDOT SHA will coordinate with the regulatory agencies concerning applicable remedial measures for any identified project failures and shall correct any project failures within one year of their identification.

3.8.8 Agency Site Visit

An Agency Site Visit consisting of MDOT SHA, MDE, and the USACE will occur in year 5 along with the Visual Inspection/Photo Documentation. A meeting minutes summary along with photos will be provided as the Final Monitoring Report in year 5. Starting at the end of Year 5 of monitoring, if the mitigation site meets all final year performance standards for at least two consecutive monitoring years, the MDOT SHA may request termination of the active monitoring period. If the site does not meet all final year performance standards, the MDOT SHA will continue to monitor the site and conduct an agency site visit at the end of year 10.

3.9 Long-term Management Plan

The purpose of the long-term management plan is to ensure that the CA-5 stream restoration site is monitored and managed after the maintenance and monitoring period is complete and it has been transferred to the Long-Term Steward (LTS). In this case, since all property rights will be held M-NCPPC, the M-NCPPC, will be the LTS. The small portion of the project located on PEPCO property will not be included in the mitigation for credit and will not require a Long-term Management Plan.

The CA-5 stream restoration site will be protected in perpetuity in accordance with M-NCPPC Montgomery County's integrated natural resource management plan, Natural Resource Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland. The Natural Resources Management Plan for Natural Areas will be the instrument that defines the roles and maintenance responsibilities of the LTS. Following the completion of monitoring, the site will be visited to assess condition as it relates to invasive species presence, trespassing, vandalism, nuisance wildlife, erosion, and hydrology. Upon completion of the construction, MDOT SHA will coordinate with the LTS on measures that will be considered to dissuade detrimental activities from occurring onsite such as off-road vehicles, hunting, etc. A Long-Term Management plan has been included as Appendix IV, Attachment B.

3.10 Adaptive Management Plan

The CA-5 stream restoration site will be monitored for success of the project goals that were mentioned previously in the report. If deficiencies are found, remedial action will occur, and additional monitoring will take place to ensure success. If the mitigation goals of the site are not being met, an Adaptive Management Plan will be developed to assess and remediate the problem(s). Depending on the problem, the plan could include various assessments and remediation techniques.

Adaptive management strategies for streams include:

- Structure stability assessments
- Physical stream surveys including; cross sections, longitudinal profile, and pebble counts
- Habitat assessments

- Supplemental vegetative plantings and vegetation assessments
- Invasive species treatment recommendations, if appropriate
- Channel stabilization

Once a site is assessed, the monitoring team will coordinate the findings with the designers and MDOT SHA and recommendations will be developed. The agencies will be informed of the assessment findings and the recommendations. If needed, an interagency meeting will be conducted with the regulatory agencies, landowners, and MDOT SHA to determine the best course of action.

If field changes or unforeseen conditions are encountered that change the purview of the design, the Stream Restoration Specialist and contractor will work with the design team to address the concerns and make plan changes accordingly and coordinated with MDOT SHA and the regulatory agencies.

3.11 Financial Assurance

MDOT SHA is an ideal candidate for permittee-responsible mitigation. MDOT SHA frequently manages and implements roadway projects requiring compensatory mitigation, and has a funded program dedicated to the management and monitoring of its mitigation sites. MDOT SHA has committed funding for the design, construction, and monitoring of the mitigation site as part of the compensatory mitigation for the I-495/270 MLS project, and will be responsible for monitoring and maintenance, as well as any remedial actions that may be necessary. MDOT SHA establishes upfront funding for monitoring based on estimates of past monitoring on similar projects. On an annual basis, MDOT SHA reviews its need for funding and includes costs associated with monitoring, management, and remediation. The state has allocated funds to complete the aspects of this project including mitigation and maintenance and has self-interest in completing the mitigation project, in accordance with performance standards.

3.12 Advance Mitigation

Advanced Mitigation is no longer proposed for the CA-5 stream restoration site.

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APPENDIX I

ATTACHMENT A – RARE THREATENED AND ENDANGERED (RTE) SPECIES COORDINATION

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

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

Coordination Sheet for MD DNR Environmental Review Related to Project Locations

Date of Request:	Name of Requestor:	FMIS Number:
June 19, 2020	Karl Hellmann	TBD

Project Name and Location:
Managed Lanes Study - Mitigation Site CA-5

The site is being pursued as a stream mitigation project for the I-495 & I-270 Managed Lanes Study. The proposed design entails grading and vegetating the vertical banks to improve channel stability and installing instream-structures to provide grade-control, protect utilities and enhance habitat.

NAME OF STREAM(S) (and MDE Use Classification) WITHIN THE STUDY AREA:
Unnamed Tributary to Great Seneca Creek

DNR RESPONSE:

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

ADDITIONAL RESOURCES NOTES:

A nearby Maryland Biological Stream Survey (MBSS) station documents the following summary of findings for fish: American Eel, Blacknose Dace, Bluegill, Bluntnose Minnow, Brown Bullhead, Central Stoneroller, Common Shiner, Creek Chub, Creek Chubsucker, Fallfish, Fantail Darter, Golden Shiner, Green Sunfish, Greenside Darter, Largemouth Bass, Longnose Dace, Pumpkinseed, Rosyside Dace, Swallowtail Shiner, White Sucker, and Yellow Bullhead.

Important fisheries resources in this area include American Eel presence. American Eels migrate upstream through this region to smaller streams where they grow to adult stages. Some eels may reside within the project study area long term. Their spawning runs then take them back through this area as they migrate downstream as adults to a specific region of the Atlantic Ocean to spawn. Special attention has been given to American Eel management in recent years, due to their ecological and economic importance, and their declining numbers.

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

This site is located in a forested area. DNR has concerns about forest impacts from potential access and construction of this project. Please utilize design techniques that would avoid any live tree removal. Please continue coordinating closely with DNR as design progresses.

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

During review for fisheries resources, we have noted the presence of DNR managed land within or adjacent to the project study area; please coordinate with DNR if these lands will be impacted.

ADDITIONAL COMMENTS ON BMPS:

This site is located in a forested area. DNR has concerns about forest impacts from potential access and construction of this project. Please utilize design techniques that would avoid any live tree removal. Please continue coordinating closely with DNR as design progresses.

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

The project area may be within or adjacent to mapped wetland areas, impacts from the use of heavy equipment, disposal of excavated material, or other construction activities should be avoided to the extent possible. When there is no reasonable alternative to the adverse effects on wetlands or other aquatic or terrestrial habitat, the applicant shall be required to provide measures to mitigate, replace, or minimize the loss of habitat.

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

MD DNR, Environmental Review Program signature

Gwen Gibson

Gwen Gibson

DATE: September 9, 2020

IPaC **U.S. Fish & Wildlife Service**

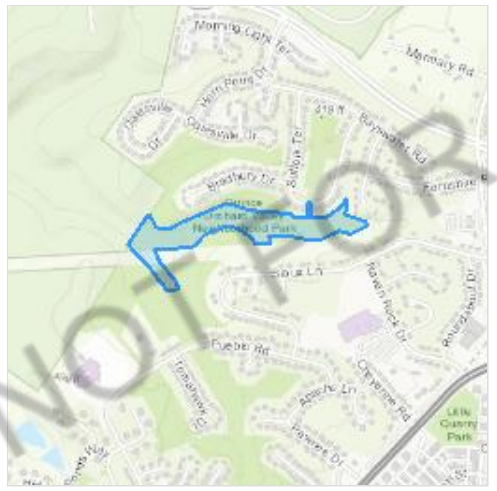
IPaC resource list

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

Montgomery County, Maryland



Local office

Chesapeake Bay Ecological Services Field Office

(410) 573-4599
(410) 266-9127

177 Admiral Cochrane Drive
Annapolis, MD 21401-7307

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

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[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Northern Long-eared Bat Myotis septentrionalis Threatened
Wherever found

This species only needs to be considered if the following condition applies:

- Projects with a federal nexus that have tree clearing = to or > 15 acres: 1. REQUEST A SPECIES LIST 2. NEXT STEP: EVALUATE DETERMINATION KEYS 3. SELECT EVALUATE under the Northern Long-Eared Bat (NLEB) Consultation and 4(d) Rule Consistency key

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider 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.

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 birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on

this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10

Rusty Blackbird Euphagus carolinus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

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. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps 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 a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

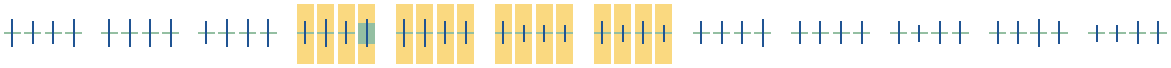
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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

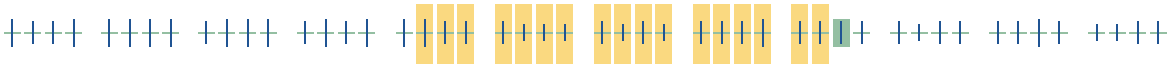
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

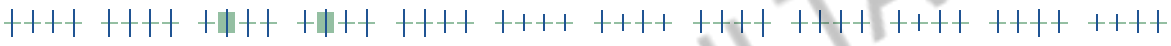
Prothonotary Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Red-headed Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rusty Blackbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Wood Thrush BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures 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) and other species that may warrant special attention in your project location.

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 and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology 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. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

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 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 on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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

THERE ARE NO REFUGE LANDS 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.

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

This location overlaps the following wetlands:

FRESHWATER POND

PUBHh

RIVERINE

R5UBH

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

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 tuberficid 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.

ATTACHMENT B – MARYLAND HISTORIC TRUST (MHT) COORDINATION

July 23, 2020

Ms. Elizabeth Hughes
State Historic Preservation Officer
Maryland Historical Trust
100 Community Place
Crownsville, MD 21032-2023

Ms. Julie Langan
State Historic Preservation Officer
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Dear Ms. Hughes and Ms. Langan:

This letter serves to continue consultation under Section 106 of the National Historic Preservation Act with the Maryland Historical Trust (MHT) and the Virginia Department of Historic Resources (DHR) for Project No. AW073A11, I-495 & I-270 Managed Lanes Study (MLS). The MLS is the first element of a broader I-495 & I-270 Public-Private Partnership (P3) Program which considers improvements along the entire length of I-495 (Capital Beltway) in Maryland, connecting into Virginia's portion of I-495, as well as the entire length of I-270 (Dwight D. Eisenhower Memorial Highway) up to I-70 in Frederick County, Maryland.

MDOT SHA coordinated the project's effect on historic properties and submitted the Cultural Resources Technical Report by letter dated January 10, 2020, with responses received from MHT and DHR dated March 12, 2020, and February 14, 2020, respectively. Per that, and subsequent correspondence with DHR, we understand DHR is awaiting resolution of National Register eligibility of resources in Virginia prior to commenting on the effect determination.

This update includes:

- An expansion of the Area of Potential Effects (APE) to encompass stream and wetland mitigation sites in Maryland
- New and revised eligibility determinations for three architectural resources in Maryland;
- New and revised effect determinations for six historic properties in Maryland;

Revised Area of Potential Effects

The APE for this project was previously defined as a 250-foot buffer of consideration on either side of the widest proposed alternative's Limits of Disturbance (LOD) (Alt 10). The APE includes additional buffer areas at the American Legion Bridge and elsewhere to capture setting, feeling, and viewshed effects. MDOT SHA has since identified potential environmental mitigation sites where stream and wetland restoration is proposed. Due to the nature of the work at these locations (restoration of existing natural features), the APE is confined to the LOD for each mitigation site, as no substantive visual elements are proposed that would be new or inconsistent with the existing character of these locations. The current known LOD of these sites have been added to the APE (**Attachment 1**).

Architecture

New and Updated Eligibility Determinations

Using the APE coordinated January 10, 2020, MDOT SHA identified two additional unrecorded architectural resources in Montgomery County, as documented in the attached Determination of Eligibility (DOE) forms (**Attachment 2**). The Forest Glen Tower (M: 31-81) is a steel lattice tower at Seminary Road and Forest Glen Road (MD 192); MDOT SHA has determined that this former Cold War-era air raid siren tower lacks integrity and is not eligible for listing in the National Register of Historic Places (NRHP). The Morningstar Tabernacle No. 88 Moses Hall and Cemetery (M: 35-212), at I-495 and Seven Locks Road, was the site of a late nineteenth-century African American benevolent society. MDOT SHA has determined that the property is eligible for listing in the NRHP under Criterion A for its association with the African American community in Cabin John and under Criterion C for its example of a vernacular African American cemetery.

Additionally, MDOT SHA updated the B&O Railroad, Metropolitan Branch (M: 37-16), DOE to provide additional information that expands upon previous surveys of the line (first surveyed in 1979 and determined eligible in 2000) to clarify the period of significance, revise the boundary, and provide a list of contributing and noncontributing resources. The Metropolitan Branch remains eligible for the NRHP. It is significant under Criterion A for its association with transportation and the agricultural and residential development of Frederick and Montgomery counties and under Criterion C for its engineering, representative of nineteenth and twentieth century railroad technology.

The new and updated eligibility determinations are summarized in **Table 1, Attachment 3**.

Updated Effect Assessments

Both physical effects as well as potential visual, atmospheric, or audible effects were considered within the entire APE. The effect assessment coordinated in the January 10, 2020, letter and

described in the Cultural Resources Technical Report found no adverse effect to 34 architectural historic properties and an adverse effect on 10 architectural historic properties. MDOT SHA has identified one additional architectural historic property in the APE: the Morningstar Tabernacle No. 88 Moses Hall and Cemetery, which will experience an adverse effect. In addition, new information in the updated DOE has resulted in a revised effect assessment for the B&O Railroad, Metropolitan Branch, which was previously determined to be adverse. In the January 10, 2020, letter, MDOT SHA also identified seven architectural historic properties where effects could not be fully determined. Ongoing project development has resulted in sufficient information to determine effects for four of the seven undetermined properties. Architectural historic properties with new or updated effect determinations are described below.

- ***Morningstar Tabernacle No. 88 Moses Hall and Cemetery (M: 35-212)***: Pending MHT concurrence that the resource is NRHP-eligible, MDOT SHA has determined that the project will adversely affect Morningstar Tabernacle No. 88 Moses Hall and Cemetery. The work proposed at this location includes widening along the outside of the I-495 inner loop to construct two new managed lanes and a new ramp to connect the managed lanes with MD 190 at the existing interchange. The width of new pavement beyond the existing edge of the outside shoulder is approximately 55 feet. A retaining wall is proposed along the edge of the proposed outside shoulder to minimize impacts to the property. The wall would retain fill for the widened roadway section. The limits of disturbance (LOD) are offset ten feet behind the proposed retaining wall to accommodate construction and maintenance of the wall, erosion and sediment control, drainage, and landscaping. A noise wall would be constructed within the LOD. As currently designed, the LOD would impact the historic property. Contributing elements within the LOD include portions of the Moses Hall foundation wall, a section of the former access road from Seven Locks Road, and at least one depression possibly marking a grave location. MDOT is continuing to examine engineering avoidance alternatives at this location, but based on current design an adverse effect is expected.

- ***B&O Railroad, Metropolitan Branch (M: 37-16)***: Activities at this location are unchanged, but new information in the DOE and further analysis of the LOD have resulted in a revised finding of no adverse effect for the property, pending MHT's concurrence with the revised DOE. The updated DOE form for the Metropolitan Branch demonstrates that the segment of the railroad within the LOD was realigned to the east during the construction of I-495 between 1957 and 1964, and the railroad bridge over I-495 was also completed at this time. The Metropolitan Branch's period of significance is 1873 to 1945, and the bridge and railroad alignment within the project area do not contribute to the significance of the branch. The current LOD include one contributing element of the Metropolitan Branch: Small Structure No. 15046X0, a stone arch culvert which carries Forest Glen Creek beneath the Metropolitan Branch and the adjacent Capitol View Avenue. The structure's southern spandrel wall appears within LOD on some imagery but is excluded from the limits and will not be affected. The project will cross the underground segment of Small Structure No. 15046X0 at the Metropolitan Branch tracks. The LOD at this location represent above-grade impacts, and no physical impacts to the historic property are anticipated; the vertical aspect

of the LOD remains at the surface. Current project engineering is not expected to alter the character of the property, and MDOT SHA is committed to both avoiding physical impacts to the aboveground spandrel wall and limiting ground disturbance along the underground segment of the small structure. Based upon the information presented in the updated DOE and the absence of impacts to Small Structure No. 15046X0, MDOT SHA has determined the project will not adversely affect the B&O Railroad, Metropolitan Branch.

- ***Carsondale (PG:73-36)***: Carsondale, one of the earliest suburban residential developments in Maryland to offer Veterans Administration (VA) financing for African American veterans, is eligible for the NRHP under Criterion A. Updated design information has allowed MDOT SHA to make a finding of adverse effect for the property. To accommodate widening along US 50 associated with realigning the US 50/I-495 interchange and replacement of the bridge carrying Whitfield Chapel Road over US 50, the LOD in Carsondale include: a narrow linear area that extends approximately 550 feet where the northern edge of the historic district meets US 50; and a narrow strip that extends 150 along the east side of Whitfield Chapel Road. Activities within Carsondale would consist of tree removal, grading, construction of a retaining wall, and access for construction vehicles and materials. Along Whitfield Chapel Road, the roadway height would be adjusted to meet the elevation of the new bridge across US 50. There are no physical impacts to contributing dwellings, but the LOD encompass minor portions of front or rear yards, including some secondary structures, of nine dwellings that contribute to the district's significance. These include the rear yards of seven dwellings along the north side of Wallace Road (9004, 9010, 9016, 9018, 9104, 9112, 9114) and the front yards of two dwellings on Whitfield Chapel Road (4907 and 4909). These multiple minor impacts to contributing resources will result in a cumulative diminishment of the property's integrity of setting and design.

- ***Capitol View Park Historic District (M: 31-7)***: Activities at this location are unchanged, but a detailed review of design needs have resulted in a revised finding of no adverse effect for the property. The LOD are in close proximity to contributing stone walls surrounding the parking lot for the Castle of Forest Glen at 10 Post Office Road. However, MDOT SHA has determined the stone walls will be avoided and no LOD impacts will occur, and the project will not adversely affect the Capitol View Park Historic District.

- ***Washington Aqueduct (M: 24-49)***: Activities at this location are unchanged, but MDOT SHA's design development has resulted in a revised finding of no adverse effect for the property. The LOD at this location represent above-grade impacts, and no physical impacts to the historic property are anticipated; the vertical aspect of the APE and LOD remains at the surface at this location, and ground disturbance that would affect the Aqueduct will be prohibited. The project will cross an underground segment of the aqueduct at MacArthur Boulevard. Current project engineering is not expected to alter the character of the property. The project will not adversely affect the Washington Aqueduct.

- ***Suitland Parkway (PG:76A-22)***: Suitland Parkway is listed on the NRHP under Criteria A and C in the areas of transportation and landscape architecture. MDOT SHA has determined that the project will not adversely affect Suitland Parkway. In addition to the widening of the I-495 bridge over Suitland Parkway, activities at this location include grading, tree removal, landscape plantings, erosion and sediment control, construction of an auxiliary pipe to augment the existing culvert conveying Henson Creek beneath I-495, and access for construction vehicles and materials. These activities will not affect any structures that contribute to the significance of Suitland Parkway, including bridges, culverts, stone-lined ditches, stone curbing, and drop inlets. The proposed pipe extension will occur at a pipe constructed for I-495. Improvement and maintenance of the outfall will direct water away from the historic property and reduce environmental degradation along the north side of the parkway, preserving its character. In areas affected by grading and tree removal, landscape plantings consistent with the original design and character of the parkway will be used to replace vegetation and will be maintained. The existing bridges carrying I-495 over Suitland Parkway are currently being widened and replaced by MDOT SHA. The bridges, currently under construction as part of a separate project and not part of the parkway itself, will accommodate the MLS improvements by the reduction of the median on the inside of I-495. The highway over Suitland Parkway will not be additionally widened, and no diminishment of the integrity of those characteristics that qualify the 9.18-mile long parkway for inclusion in the NRHP will result.

  MDOT SHA's use of the area impacted by the undertaking (I-495, bridges, relocated creek under I-495 and the proposed additional storm drain/culvert) will be authorized by a highway easement deed. NPS does not have the authority to authorize MDOT SHA use of NPS lands by way of a long-term maintenance agreement or other mechanism. NPS understands the highway easement deed will be issued by FHWA on behalf of the USA in accordance with 23 U.S.C. 107. The highway easement deed will provide MDOT SHA with an easement for their facilities, but NPS will retain the underlying ownership of the land. No character defining features of Suitland Parkway exist within the proposed area of transfer; furthermore, MDOT SHA and FHWA are subject to state (Maryland Historical Trust Act) and federal (Section 106) historic preservation requirements, which would ensure consideration of any impacts resulting from future actions related to these small MDOT SHA easement areas within Suitland Parkway.

The remaining three properties where effects cannot be fully determined will be subject to stipulations of the proposed Programmatic Agreement to avoid, minimize, or mitigate adverse effects as design advances. Updated property effect assessments are summarized in **Attachment 3**. MDOT SHA has determined the project continues to have an adverse effect on architectural historic properties.

Expanded APE in Maryland

MDOT SHA has conducted a preliminary review of the APE and has determined that the following mitigation sites will either not affect or will have no adverse effect on architectural historic properties.

- ***AN-1 (No Architectural Properties Affected)***: This site is a natural area within Crabbs Branch Stream Valley Park and includes no architectural resources
- ***AN-3 (No Architectural Properties Affected)***: This site is a natural area within Northwest Branch Stream Valley Park and includes no architectural resources.
- ***CA-2 (No Architectural Properties Affected)***: This site is a natural area within Great Seneca Stream Valley Park and includes no architectural resources.
- ***CA-3 (No Architectural Properties Affected)***: This site is a natural area within Magruder Branch Stream Valley Park and includes no architectural resources.
- ***RFP-1 (No Architectural Properties Affected)***: Includes multiple MIHP resources, all of which have been evaluated and determined not eligible, demolished, or both. The only remaining resource, the Bond Property (PG:60-10), was determined not eligible in November 2001. The Turner/Bond Family Cemetery (PG:60-2) was relocated to Union Cemetery in the 1980s by the Donaldson Funeral Home of Laurel; the cemetery location was field checked by MDOT SHA as below and confirmed to have been completely destroyed by gravel mining.
- ***RFP-4 (No Architectural Properties Affected)***: North of Greenock Road, Wilson Owens Branch passes through the golf course of the 1990 Cannon Country Club. A horse shed and fence at 5563 Greenock Road are within an area of proposed grading; however, these structures were constructed after 1981 (according to historical aerials). South of Greenock Road, the work will be confined to wooded areas along the stream bank, and the pre-1978 resources at 5461 and 5339 Greenock Road will not be affected by stream access areas.
- ***AN-6 and AN-7 (No Adverse Effect to Architectural Properties)***: These sites include the Beltsville Agricultural Research Center (BARC; PG:62-14), which is listed in the NRHP under Criteria A and C. The restoration of the existing stream will occur within a small portion of the 6500-acre resource and will not introduce new visual or physical elements out of character with the surrounding agricultural landscape; furthermore, no buildings or structures associated with BARC are within the APE. MDOT SHA's proposed stream restoration activities will not alter the characteristics that qualify BARC for the NRHP and do not meet the requirements of 36 CFR §800.5(1), Criteria of Adverse Effect.

MDOT SHA will undertake additional architectural historic property identification efforts at the remaining sites within the expanded APE, and the results will be coordinated during future consultation.

Archaeology

Maryland
The Study has identified proposed locations of stream restoration and mitigation, wetland creation, and fish passage improvements at eight sites on public lands and eight sites being developed on private lands by design consultants. MDOT SHA archaeologist Richard Ervin assessed the archaeological potential of the public and private mitigation sites, and additional archaeological investigations are being planned as follows. MDOT SHA will provide the results of these investigations when they are available.

MDOT SHA proposes the following archaeological evaluation approaches to the mitigation locations:

Mitigation Site	County	Proposed Work
AN-6 Paint Branch Fish Passage, South Farm	PG	Phase I archaeology will be undertaken at this site on BARC property; it is considered to have high archaeological potential based on prior sites recorded close to, but outside the LOD, and a favorable topographic setting.
AN-7 Paint Branch, South Farm	PG	Phase I archaeology will be undertaken at this site on BARC property, which is considered to have high archaeological potential based on prior sites recorded close to and within the LOD, and a favorable topographic setting. One site is recorded within the LOD: 18PR113 is a precontact short-term resource procurement site, and its status will be evaluated as part of the Phase I.
PA-1 Back Branch	PG	Phase I archaeological recordation will be undertaken at 18PR605, the Chesapeake Beach Railway. Most of the remaining portions of the mitigation site are considered to have low archaeological potential based on prior disturbance and poorly drained soils. However, limited Phase IA archaeological survey will be done in undisturbed, well-drained, high potential portions of the LOD.
RFP-3 Tuscarora Creek (Hope Site)	FR	Phase I archaeology will be undertaken based on high archaeological potential. One possible archaeological site is within the LOD, an Archaic Period quad file site BUCKEY-QF02. One standing structure is recorded in the survey area, the Hebb-Kline Farmstead (F-1-202).
RFP-4 Cabin-Branch (Bristol), Surplus Area, Surplus Streams	AA	Phase I archaeology will be undertaken at portions of the site that are considered to have high archaeological potential based on prior sites recorded nearby, and favorable topographic setting.

RFP-6 Mill Swamp Cr	CA	Phase I archaeology will be undertaken at portions of the site that are considered to have high archaeological potential based on favorable topographic setting. No sites are recorded in the LOD, but numerous sites have been recorded nearby, especially near the confluence of Pomonkey Creek and the Potomac River. One of these is 18CH73, a large pre-contact period site along the Potomac River 0.8 miles southwest of the LOD. Historic structures are shown in and near the project area on historic maps.
RFP-1 Indian Creek Tributaries at Konterra	PG	Based on prior disturbance, no further work is warranted at this time. The proposed LOD has been destroyed by sand and gravel quarrying. The Turner/Bond Family Cemetery (PG:60-2) was within Mitigation Area 5, located adjacent to but outside the proposed design. It was situated on a bluff overlooking the stream and its floodplain, but the cemetery has been moved. Its location has been destroyed by sand and gravel quarrying, as verified by a field visit by MDOT SHA. MDOT SHA will monitor project plans as the design progresses.
RFP-2 Cabin Branch Gaithersburg quad	MO	Based on prior disturbance and low archaeological potential, no further work is warranted at this time. Aerial imagery shows that the site has been disturbed by construction of a golf course. Most of the LOD is on frequently flooded soils within the active stream floodplain, or slopes steeper than 15%, settings where significant archaeological resources are not expected to occur. MDOT SHA will monitor project plans as the design progresses.
RFP-5 Henson Creek (Hovermale)	PG	Based on prior disturbance, no further work is warranted at this time. Most of the project is within areas of Urban land where significant archaeological resources are unlikely to occur. One standing structure is recorded in the survey area: Hovermale's Tastes Best Ice Cream (PG:80-25). No structures are depicted on historic maps (PG Co 1861; USGS East Washington 1886, Washington Vicinity 1917). MDOT SHA will monitor project plans as the design progresses.
AN-1 Crabbs Branch	MO	Based on low archaeological potential, no further work is warranted at this time. The LOD would mostly be confined to areas immediately adjacent to the stream channel, where significant archaeological resources are unlikely to occur. MDOT SHA will monitor project plans as the design progresses. Site 18PR320 (a Late Archaic short-term site) is documented approximately 1800 feet upstream of the proposed stream site.

AN-3 Northwest Branch Pebblestone Dr.	MO	Based on low archaeological potential and the negative results of prior survey, no further work is warranted at this time. Prior archaeological work indicates that the LOD is largely limited to terrain along Rolling Stone Creek that would have been too wet and low for occupation (Wagner 2014:131; in Mikolik and Reed [2014]). MDOT SHA will monitor project plans as the design progresses. The Bonifant Cemetery on North Sherwood Forest Lane, about 750 feet northwest of the stream, would not be impacted by the current design. Site 18MO596 (Late Archaic) is recorded approximately 2000 feet to the west of the study area.
CA-2 Lower Magruder Branch	MO	Based on low archaeological potential, no further work is warranted at this time. The results of prior archaeological survey at the adjacent SC-19 mitigation site (Emory 2011) suggest that the APE of CA-2, Lower Magruder Branch, is too wet for habitation, and is unlikely to contain significant archaeological resources. MDOT SHA will monitor project plans as the design progresses.
CA-3 Upper Magruder Branch	MO	Based on low archaeological potential, no further work is warranted at this time. The results of prior archaeological survey at the nearby SC-19 mitigation site (Emory 2011) suggest that the APE of CA-3, Lower Magruder Branch, is too wet for habitation, and is unlikely to contain significant archaeological resources. MDOT SHA will monitor project plans as the design progresses.
CA-5 Seneca Creek Tributary	MO	Based on low archaeological potential, no further work is warranted at this time. The LOD is mostly confined to areas of occasionally flooded soils on the active floodplain, or slopes greater than 15%. MDOT SHA will monitor project plans as the design progresses.

MDOT SHA noted several locations requiring additional archaeological study in our January 10, 2020 letter, and those will continue to be proposed as actions to be completed under the proposed Programmatic Agreement. To the extent feasible, limited additional investigations are being conducted at two cemetery locations, the Montgomery County Poor Farm and the Morningstar Tabernacle No. 88 Moses Hall and Cemetery. Preliminary mapping and recordation is underway at the Morningstar Tabernacle No. 88 Moses Hall and Cemetery to identify and record known interments, possible grave sites and depressions, and formal and informal grave markers. The foundation of the lodge building was also partially mapped. Completion of this initial work is pending required legal access to clear bamboo that obscures portions of the cemetery property. The technical report of the results of this work will be provided when it is available; MDOT

SHA will continue consultation including appropriate consulting parties on additional work expected beyond this surface mapping.

Virginia

No changes to the project, including the APE or effects assessments within Virginia are included in this letter, and it is informational for DHR, although any comments are welcome. MDOT SHA, National Park Service, and DHR will continue to coordinate on the outstanding eligibility and effects issues related to the George Washington Memorial Parkway (GWMP) and archaeological sites within the GWMP park boundaries under separate cover. MDOT SHA has requested an eligibility determination from the Keeper of the National Register regarding the proposed Dead Run Ridges Archaeological District in Fairfax County.

Ongoing Preliminary Engineering

For the overall project, MDOT SHA may require geotechnical borings or other minimally invasive preliminary engineering studies as part of project development prior to completion of Section 106 review. Consistent with MDOT SHA's statewide programmatic agreement, MDOT SHA will ensure cultural resources staff review proposed boring locations to avoid impacts to known archaeological sites. Geotechnical borings are assumed to have minimal potential to affect historic properties, and may inform on the potential for deeply buried surfaces within the LOD. For borings occurring outside MDOT SHA right-of-way, MDOT SHA will coordinate as appropriate with land-managing agencies on such borings.

MDOT SHA respectfully requests any comments on the revised APE, review by MHT of the enclosed information supporting the analysis, and concurrence on the following determinations:

- The Morningstar Tabernacle No. 88 Moses Hall and Cemetery is eligible for the NRHP and will be adversely affected
- The B&O Railroad, Metropolitan Branch, as revised, continues to be eligible for the NRHP but will not experience an adverse effect
- The Forest Glen Tower is **not** eligible for the NRHP
- There will be no adverse effect to the NRHP-eligible properties in Attachment 3, Table 4
- Properties in Attachment 3, Table 2 **will** experience an adverse effect
- Properties in Attachment 3, Table 3 should be subject to provisions of the proposed Programmatic Agreement to avoid, minimize or mitigate potential adverse effects
- No historic properties will be affected within the expanded APE at the following proposed mitigation sites: AN-1, AN-3, CA-2, CA-3, and RFP-1 (Table 5, Attachment 3).

We request the above responses from MHT by **August 24, 2020**. We look forward to working with the respective State Historic Preservation Offices and additional consulting parties on continued development of the proposed Programmatic Agreement for the MLS undertaking.

Please feel free to contact Steve Archer, MDOT SHA Cultural Resources Team Leader at 410-545-8508 or sarcher@mdot.maryland.gov with any questions or information needs on this project.

Sincerely,

Digitally signed by Steve Archer
Adobe Acrobat version: 2017.011.30171

Julie M. Schablitsky
for Chief Archaeologist/Assistant Division Chief
Environmental Planning Division

Attachments

cc:

Mr. Marc Holma, Virginia DHR
Ms. Jeanette Mar, Environmental Manager, FHWA Maryland Division
Mr. Tony Opperman, VDOT
Ms. Mandy Ranslow, ACHP
Mr. John Simkins, FHWA Virginia Division
Mr. Steve Archer, MDOT SHA-EPLD
Ms. Lisa B. Choplin, DBIA, Director, I-495 & I-270 P3 Office, MDOT SHA
Mr. Richard Ervin, MDOT SHA-EPLD
Mr. Jeffrey Folden, P.E., DBIA, Deputy Director, I-495 & I-270 P3 Office, MDOT SHA
Mr. Matt Manning, MDOT SHA-EPLD
Dr. Julie Schablitsky, MDOT SHA-EPLD
I-495 & I-270 MLS Section 106 Consulting Parties

-For Maryland Historical Trust Use Only-

Concurrence with the MDOT State Highway Administration's Determination(s) of Eligibility and/or Effects

Project Number: AW073A11 **MHT Log No.**_____
Project Name: I-495 & I-270 Managed Lanes Study (MLS)
County: Montgomery and Prince George's
Letter Date: July 23, 2020

The Maryland Historical Trust has reviewed the documentation attached to the referenced letter and concurs with the MDOT State Highway Administration's determinations as follows:

Appropriate Area of Potential Effects (Attachment 1)

[ ] Concur
[ ] Do Not Concur

Eligibility (as noted in the Eligibility Table [Attachment 3]):

[ ] Concur
[ ] Do Not Concur

Effect (as noted in the Effects Table [Attachment 3]):

[ ] No Properties Affected
[ ] No Adverse Effect
[ ] Conditioned upon the following action(s) (see comments below)
[ ] Adverse Effect

Comments:

_____

_____

_____

_____

_____

_____

By: _____ _____

MD State Historic Preservation Office/ Maryland Historical Trust — Date

Return by U.S. Mail or Facsimile to:
Dr. Julie M. Schablitsky, Assistant Division Chief, Environmental Planning Division,
MDOT State Highway Administration, P.O. Box 717, Baltimore, MD 21203-0717
Telephone: 410-545-8870 and Facsimile: 410-209-5046
A_Proj Number: 11729

Attachment 3

Table 1: New and Updated Eligibility Determinations

MIHP#	Name	Type	SHA NR Det.	SHPO Concurrence	Remarks
M: 37-16	B&O Railroad, Metropolitan Branch	Structure	Remains Eligible	Requested 7/2020	Updated DOE provides additional information that expands upon previous surveys (first surveyed in 1979 and determined eligible in October 2000) to clarify the period of significance, revise the boundary, and provide a list of contributing and noncontributing resources.
M: 31-81	Forest Glen Tower	Structure	Not Eligible	Requested 7/2020	Cold War-era air raid siren tower lacks integrity
M: 35-212	Morningstar Tabernacle No. 88 Moses Hall and Cemetery	District	Eligible	Requested 7/2020	Significant under Criteria A for its association with the African American community in Cabin John and under Criterion C for its example of a vernacular African American cemetery. Meets Criteria Consideration D.

Table 2: Properties Experiencing an Adverse Effect

MIHP#/DHR#	Name	Type	Impact	SHPO Concurrence	Period of Significance	NRHP Criteria	Remarks
PG:73-36	Carsondale	District	Adverse	Requested 7/2020	1955-1962	A	Eligible
M: 35-212	Morningstar Tabernacle No. 88 Moses Hall and Cemetery	Landscape	Adverse	Requested 7/2020	1887-1973	A, C, Criteria Consideration D	Eligible

Table 3: Properties Where Effects Cannot Be Fully Determined

MIHP#/DHR#	Name	Type	Impact	SHPO Concurrence	Period of Significance	NRHP Criteria	Remarks
M: 29-59	Carderock Springs Historic District	District	Effects Cannot Be Fully Determined	Concurred 3/2020	1962-1967	A, C	Listed
M: 29-39	Gibson Grove A.M.E. Zion Church	Building	Effects Cannot Be Fully Determined	Concurred 3/2020	1923	A, Criteria Consideration A	Eligible
M: 32-5	Polychrome Historic District	District	Effects Cannot Be Fully Determined	Concurred 3/2020	1934-1935	A, C	Listed

Table 4: Properties Experiencing No Adverse Effect

MIHP#/DHR#	Name	Type	Impact	SHPO Concurrence	Period of Significance	NRHP Criteria	Remarks
M: 37-16	B&O Railroad, Metropolitan Branch	Structure	No Adverse	Requested 7/2020	1873-1945	A, C	Eligible; project will avoid contributing resources
PG:62-14	Beltsville Agricultural Research Center (BARC)	District	No Adverse	Requested 7/2020	Not established		Listed; stream restoration
M: 31-7	Capitol View Park Historic District	District	No Adverse	Requested 7/2020	1887-1941	A, C	Eligible; project will avoid contributing resources
PG:76A-22	Suitland Parkway	District	No Adverse	Requested 7/2020	1942-1944	A, C	Listed
M: 29-49	Washington Aqueduct	Structure	No Adverse	Requested 7/2020	1853-1939	A, C	Listed (NHL); project will avoid below-ground impacts

Attachment 3

Table 5: Stream and Wetland Mitigation Site Summary

Site Number	County	Architecture	Archaeology	Effect	Remarks
AN-1	Montgomery	No architectural resources present	Low potential; no further work is warranted	**NPA**	
AN-3	Montgomery	No architectural resources present	Low potential, negative results of prior survey; no further work is warranted	**NPA**	
AN-6	Prince George's	No adverse effect	Phase I archaeology will be undertaken	**TBD**	Within Beltsville Agricultural Research Center (PG:62-14)
AN-7	Prince George's	No adverse effect	Phase I archaeology will be undertaken	**TBD**	Within Beltsville Agricultural Research Center (PG:62-14)
CA-2	Montgomery	No architectural resources present	Low potential, negative results of prior survey; no further work is warranted	**NPA**	
CA-3	Montgomery	No architectural resources present	Low potential, negative results of prior survey; no further work is warranted	**NPA**	
CA-5	Montgomery	Additional evaluation to be completed	Low potential; no further work is warranted	**TBD**	
PA-1	Prince George's	Additional evaluation to be completed	Phase I archaeology will be undertaken	**TBD**	
RFP-1	Prince George's	No architectural resources present	Prior disturbance; no further work is warranted	**NPA**	
RFP-2	Montgomery	Additional evaluation to be completed	Prior disturbance and low potential; no further work is warranted	**TBD**	
RFP-3	Frederick	Additional evaluation to be completed	Phase I archaeology will be undertaken	**TBD**	
RFP-4	Anne Arundel	No architectural resources present	Phase I archaeology will be undertaken	**TBD**	
RFP-5	Prince George's	Additional evaluation to be completed	Prior disturbance; no further work is warranted	**TBD**	
RFP-6	Calvert	Additional evaluation to be completed	Phase I archaeology will be undertaken	**TBD**	

September 4, 2020

Dr. Julie M. Schablitsky
MDOT State Highway Administration
707 North Calvert Street
Baltimore, MD 21202

Re: I-495 & I-270 Managed Lanes Study (MLS)
Montgomery and Prince George's Counties, Maryland
MDOT SHA Project No. AW073A11

Dear Dr. Schablitsky:

Thank you for providing the Maryland Historical Trust (Trust), the Maryland State Historic Preservation Office, with additional information regarding the above-referenced undertaking. The Maryland Department of Transportation State Highway Administration's (MDOT SHA) submittal represents ongoing consultation to assess the project's effects on historic properties, pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the Maryland Historical Trust Act of 1985, as amended, State Finance and Procurement Article §§ 5A-325 and 5A-326 of the Annotated Code of Maryland. Trust staff have conducted a thorough review of the materials and we are writing to provide our comments and concurrence.

Revised Area of Potential Effects (APE): Based on ongoing design development, MDOT SHA has expanded the undertaking's APE to include potential environmental mitigation sites and additional buffer areas in the vicinity of the American Legion Bridge. The Trust agrees that the MDOT SHA's redefined APE encompasses the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties.

Additional Identification and Evaluation of Historic Properties within the APE: MDOT SHA conducted additional assessments of the APE to identify historic properties. Determination of Eligibility (DOE) Forms were prepared for two newly identified architectural resources and an existing DOE was updated to identify the property's areas of significance.

The Trust concurs with MDOT SHA that the following properties are eligible for listing in the National Register:

MIHP No. M: 35-212	Morningstar Tabernacle No. 88 Moses Hall and Cemetery This property is eligible for the National Register under Criteria A and C as the site of a 19th century African American benevolent society and cemetery.
MIHP No. M: 37-16	B&O Railroad, Metropolitan Branch The Metropolitan Branch of the B&O Railroad was determined eligible in 2000. The Trust concurs with the MDOT SHA's updated documentation to identify a period of significance, National Register boundary, and contributing/non-contributing features.

The Trust concurs with MDOT SHA that the following property is not eligible for listing in the National Register:

MIHP No. M: 31-81	Forest Glen Tower The Trust agrees that the steel lattice tower lacks integrity and is not eligible for National Register-listing.

The potential for significant archeological resources was assessed by MDOT SHA within the expanded APE, including the environmental mitigations sites. We agree with MDOT SHA's recommendations on Pages 7-9 of your letter that additional Phase I investigations are warranted for several environmental mitigation areas. We look forward to receiving the results of this work, along with the analysis of several other locations requiring archeological study as noted in MDOT SHA's 10 January 2020 letter, as project planning continues.

Revised Assessment of Effects: The Trust concurs with MDOT SHA's determination that the overall proposed undertaking will have an adverse effect on historic properties, including archeological properties, in Maryland. Furthermore, the Trust agrees with the following specific findings stated in MDOT SHA's submittal letter dated 23 July 2020 and accompanying attachments:

- In addition to the properties noted as adversely affected in our previous correspondence, we agree that the undertaking will also adversely affect the Carsondale Historic District (MIHP No. PG:73-36) and the Morningstar Tabernacle No. 88 Moses Hall and Cemetery (MIHP No. M: 35-212).
- We agree that the undertaking may affect the historic properties listed in Table 3 (Attachment #3) and further consultation will be needed during design development to consider and address effects.
- We concur that the undertaking will have no adverse effect on the historic properties listed in Table 4 (Attachment #3).

The Trust appreciates MDOT SHA's robust and continuous coordination with our office and other consulting parties in accordance with Section 106. We look forward to working with your office as the project advances to develop and refine avoidance and minimization efforts.

If you have questions or need further assistance, please contact Tim Tamburrino (for historic structures) at tim.tamburrino@maryland.gov or Beth Cole (for archeology) at beth.cole@maryland.gov. Thank you for providing us this opportunity to comment.

Sincerely,

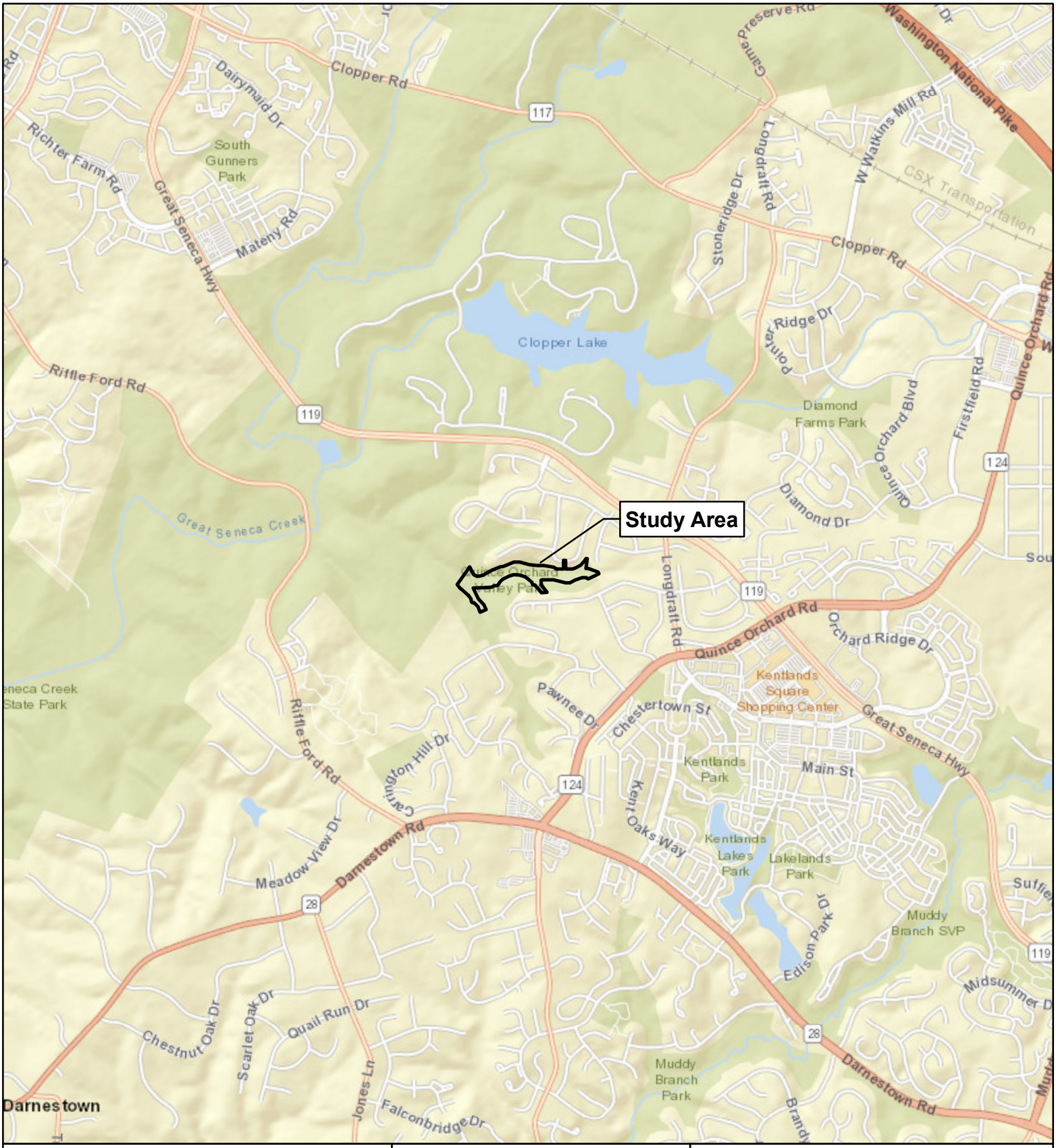
Elizabeth Hughes

Elizabeth Hughes
Director/State Historic Preservation Officer
EH/BC/TJT/202003475

cc: Caryn Brookman (SHA)
Jeanette Masr (FHWA)
Rebeccah Ballo (Montgomery County Planning)
Joey Lampl (Montgomery County Parks)
Sarah Rogers (Heritage Tourism Alliance of Montgomery County, Inc.)
Howard Berger (Prince George's County Planning Department)
Aaron Marcavitch (Anacostia Trails Heritage Area, Inc.)
Friends of Moses Hall

APPENDIX II

ATTACHMENT A – VICINITY MAP



Appendix II - Attachment A
I-495 & I-270 Managed Lanes Study
Phase II Mitigation Design Plan
Stream Site CA-5
Great Seneca Creek
Bradbury Dr. Tributary

Montgomery County, Maryland
November 2020

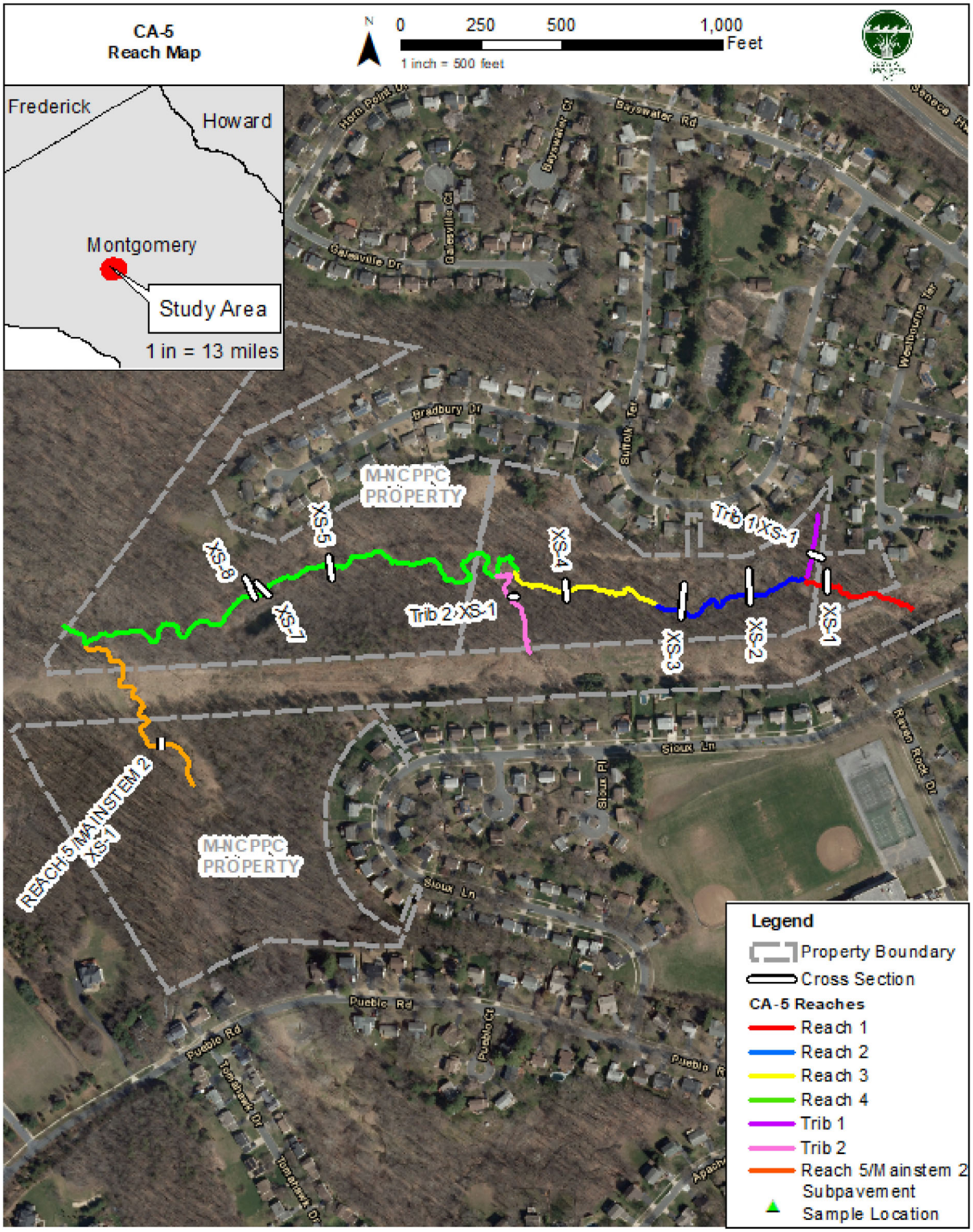
N
W E
S

1 inch = 2,400 feet

0 2,400 4,800
feet

Study Area

270
495
MANAGED LANES STUDY


CA-5
Reach Map
N
0
250
500
1,000
Feet
1 inch = 500 feet
Frederick
Howard
Montgomery
Study Area
1 in = 13 miles
M-NCPPC
PROPERTY
XS-5
XS-4
XS-3
XS-2
XS-1
Trib 1 XS-1
Trib 2 XS-1
REACH 5 MAINSTEM 2
XS-1
M-NCPPC
PROPERTY
Bradbury Dr
Suffolk Ter
Sioux Ln
Sioux Pl
Pueblo Rd
Pueblo Ct
Legend
Property Boundary
Cross Section
CA-5 Reaches
Reach 1
Reach 2
Reach 3
Reach 4
Trib 1
Trib 2
Reach 5/Mainstem 2
Subpavement
Sample Location

ATTACHMENT B – STREAM DESIGN REPORT (UNDER SEPARATE COVER)

ATTACHMENT C – GEOPROBE MAP AND LOGS

RK&K

SOIL PROBE LOG

DATE: 4/28/2020 **SOIL PROBE ID:** CA-5 SN-1

INSPECTOR:	Ted Chadeayne	DRILLING CONTRACTOR:	Tidewater, Inc.
PROJECT NAME:	495/270 Mitigation	SAMPLING METHOD:	Geoprobe 7822DT
COMMISSION #:	14136-30	SAMPLE INTERVAL:	Continuous
WEATHER:	Overcast, light rain 51 °F	GROUNDWATER DEPTH:	Free groundwater not encountered.

TIME	PLASTIC TUBE SAMPLE DEPTH FROM	PLASTIC TUBE SAMPLE DEPTH TO	CORE RECOVERY (FEET)	CORE RECOVERY (%)	SOIL DESCRIPTION
1110	0.0	4.0	3.2	80%	0 to 0.5 - dark brown clayey SILT, very soft, slightly moist, some thin roots. 0.5 to 2.3 - brown clayey SILT, soft, slightly moist, trace thin roots. 2.3 to 4.0 - as above, with faint mottling.
1115	4.0	8.0	3.3	83%	4.0 to 4.5 - brown clayey SILT, soft, slightly moist, trace thin roots, faint mottling. 4.5 to 6.4 - mottled orange-brown and gray silty CLAY, soft, slightly moist, slightly micaceous. 6.4 to 8.0 - dark brown SILT, soft, slightly moist, slight mottling, micaceous, faint degraded rock structure.
					END CORING AT 8.0 FEET BACKFILLED

LOG PREPARED BY: Ted Chadeayne

RK&K

SOIL PROBE LOG

DATE: **4/28/2020** **SOIL PROBE ID:** **CA-5 SN-2**

INSPECTOR:	Ted Chadeayne	DRILLING CONTRACTOR:	Tidewater, Inc.
PROJECT NAME:	495/270 Mitigation	SAMPLING METHOD:	Geoprobe 7822DT
COMMISSION #:	14136-30	SAMPLE INTERVAL:	Continuous
WEATHER:	Overcast, light rain 51 °F	GROUNDWATER DEPTH:	Free groundwater not encountered.

TIME	PLASTIC TUBE SAMPLE DEPTH FROM	PLASTIC TUBE SAMPLE DEPTH TO	CORE RECOVERY (FEET)	CORE RECOVERY (%)	SOIL DESCRIPTION
1020	0.0	4.0	1.9	48%	0 to 1.0 - very dark brown silty CLAY, trace sand, very soft, slightly moist, some thin roots. 1.0 to 4.0 - brown silty CLAY, little fine to course sand, trace gravel and cobble, very soft, moist.
1025	4.0	8.0	3.5	88%	4.0 to 4.5 - brown clayey SILT, little fine to course sand, little gray gravel, soft, moist, slightly micaceous. 4.5 to 8.0 - brown and dark gray clayey SILT and fine to course angular gravel, medium stiff, slightly moist, micaceous, faint degraded rock structure.
					END CORING AT 8.0 FEET BACKFILLED

LOG PREPARED BY: Ted Chadeayne

RK&K

SOIL PROBE LOG

DATE: **4/28/2020** **SOIL PROBE ID:** **CA-5 SS-1**

INSPECTOR:	Ted Chadeayne	DRILLING CONTRACTOR:	Tidewater, Inc.
PROJECT NAME:	495/270 Mitigation	SAMPLING METHOD:	Geoprobe 7822DT
COMMISSION #:	14136-30	SAMPLE INTERVAL:	Continuous
WEATHER:	Overcast, light rain 51 °F	GROUNDWATER DEPTH:	Free groundwater not encountered.

TIME	PLASTIC TUBE SAMPLE DEPTH FROM	PLASTIC TUBE SAMPLE DEPTH TO	CORE RECOVERY (FEET)	CORE RECOVERY (%)	SOIL DESCRIPTION
1230	0.0	4.0	3.2	80%	0 to 0.3 - very dark brown clayey SILT, little sand, very soft, slightly moist, thin roots. 0.3 to 2.1 - brown SILT, little sand and angular gravel, soft, slightly moist, trace thin roots. 2.1 to 4.0 - brown clayey SILT, soft, slightly moist, slightly micaceous, small mottling.
1235	4.0	8.0	3.9	98%	4.0 to 4.5 - very dark grayish brown CLAY, very soft, wet. 4.5 to 4.7 - gray silty CLAY, soft, moist. 4.7 to 7.3 - brown clayey SILT, soft, slightly moist, slightly micaceous, small mottling. 7.3 to 8.0 - gray medium to coarse SAND, some angular gravel, loose, slightly moist, faint degraded rock structure.
					END CORING AT 8.0 FEET BACKFILLED

LOG PREPARED BY: Ted Chadeayne

RK&K

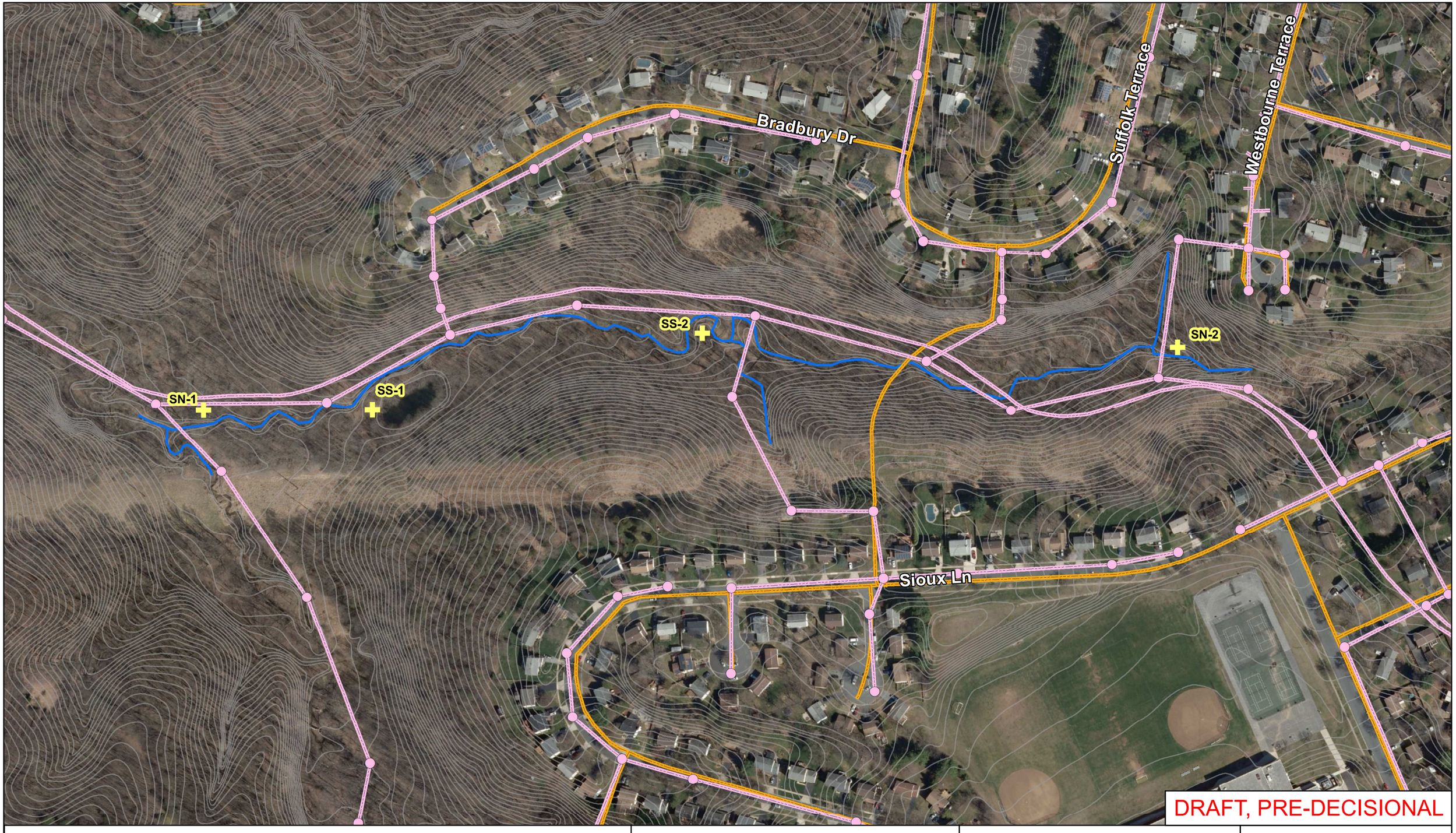
SOIL PROBE LOG

DATE: 4/28/2020 **SOIL PROBE ID:** CA-5 SS-2

INSPECTOR:	Ted Chadeayne	DRILLING CONTRACTOR:	Tidewater, Inc.
PROJECT NAME:	495/270 Mitigation	SAMPLING METHOD:	Geoprobe 7822DT
COMMISSION #:	14136-30	SAMPLE INTERVAL:	Continuous
WEATHER:	Overcast, light rain 51 °F	GROUNDWATER DEPTH:	Free groundwater not encountered.

TIME	PLASTIC TUBE SAMPLE DEPTH FROM	PLASTIC TUBE SAMPLE DEPTH TO	CORE RECOVERY (FEET)	CORE RECOVERY (%)	SOIL DESCRIPTION
1250	0.0	4.0	2.6	65%	0 to 0.5 - very dark brown silty CLAY, very soft, slightly moist, thin roots. 0.5 to 3.5 - brown SILT, some fine sand, little angular gravel and coarse sand, soft, slightly moist, little thin roots. 3.5 to 4.0 - brown clayey SILT, trace fine sand, soft, slightly moist, slightly micaceous.
1255	4.0	8.0	2.8	70%	4.0 to 4.7 - dark brown clayey SILT, trace fine sand, soft, slightly moist, slightly micaceous. 4.7 to 6.7 - brown SILT, some fine to medium sand, little angular gravel, medium stiff, slightly moist, slightly micaceous (gravel inclusions at 5.0 to 5.1 feet and 5.6 to 5.7 feet). 6.7 to 8.0 - brown to tan and gray SILT, some fine to medium sand and angular gravel, medium stiff, slightly moist, heavily micaceous, degraded rock structure.
					END CORING AT 8.0 FEET BACKFILLED

LOG PREPARED BY: Ted Chadeayne



Soil Sample & Groundwater Well (0)
Soil Sample (4)
Stream Site
2' Contours
Sewer Manhole
Sewer Line
Water Line

N
W
E
S

0 100 200 300 400 Feet

1 inch = 200 feet

I-495 & I-270 Managed Lanes Study
Soil Sampling and Well Construction
Stream Site CA-5
Seneca Creek Tributary

495 270 MANAGED LANES STUDY

ATTACHMENT D – RIGHT OF ENTRY PERMITS

Maryland State Highway Administration
I-495 and I-270 MLS

RIGHT OF ENTRY AGREEMENT

This Right of Entry Agreement ("Agreement") is made this 2 day of August 2018, by and between **THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION (M-NCPPC)** a public body corporate and agency of the State of Maryland, whose address is 8787 Georgia Avenue, Silver Spring, Maryland 20901, its successors and assigns, (the "Permittor**")** and **the Maryland State Highway Administration,** a public body corporate and agency of the State of Maryland, whose address is 707 North Calvert Street; P-601 Baltimore, MD, 21202 its successors and assigns (the "Permittee"), (Permittor and Permittee, collectively, the "Parties").

WHEREAS, Permittor is the owner of certain lands known as Rock Creek Regional Park, Cabin John SVU #2, Little Seneca SVU #1, Great Seneca SVU #4; Magruder Branch SVU #1, Cashell Local Park, Northwest Branch SVU #5, Wheaton Regional Park, Rock Creek SVU #2;Rock Creek SVU #16, Upper Rock Creek Local Park, North Branch SVU #4, Heritage Farm Neighborhood Park, Kensington Parkway SVP, Norwood Village NCA, Gunners Branch Local Park, Watts Branch SVU #1, Little Falls SVU #2, Capital Crescent Trail Special Park, Quince Orchard Valley Neighborhood Park and Booze Creek SVP and

WHEREAS, a portion of the Properties known as Rock Creek Regional Park, Cabin John SVU #2, Little Seneca SVU #1, Great Seneca SVU #4, Magruder Branch SVU #1, Cashell Local Park, Northwest Branch SVU #5, Wheaton Regional Park, Rock Creek SVU #2, Rock Creek SVU #16, Upper Rock Creek Local Park, North Branch SVU #4, Heritage Farm Neighborhood Park, Kensington Parkway SVP, Norwood Village NCA, Gunners Branch Local Park, Watts Branch SVU #1, Little Falls SVU #2, Capital Crescent Trail Special Park, Quince Orchard Valley Neighborhood Park and Booze Creek SVP as shown on the attached plans, known hereto as Exhibit A (the "MNCPPC Land") is necessary to be entered onto to facilitate an Investigative Environmental Assessment Survey and Soil Sampling.

W I T N E S S E T H:

The Maryland State Highway Administration., its contractors, assigns and business are hereby permitted to enter upon the MNCPPC property referenced above to conduct the Investigative Environmental Assessment and Monitoring Survey, subject to the terms and conditions set forth as follows:

1. Permittor warrants that the person signing this Agreement is authorized to execute this Agreement.

2. All employees, contractors and agents of the Maryland State Highway Administration will exercise all normal and reasonable safety precautions in the performance of the work hereunder

3. All Activities associated with this Right-of-Entry Agreement shall be conducted in accordance with the Scope of Work description provided by MD SHA and at the locations indicated on the accompanying maps; (See attached copies).

4. Appropriate barricades, fences, signs or other suitable devices necessary for employee or public safety shall be provided and adequately maintained.

5. No trash, debris or litter will be left on the Permittor's property and no vehicles, equipment or materials of any kind will be stored on Permittor's property.

6. Upon completion of the work, all areas disturbed by the work will be restored to a condition at least equivalent to their state just prior to the commencement of the work to the extent practicable.

7. The Maryland State Highway Administration shall require all contractors, assigns and business invitees who perform work on the Permittor's property to carry insurance in the usual and customary amounts for the type of work being done.

8. This Right of Entry shall commence upon execution by both the Permittor and Permittee and shall remain in effect until January 1, 2019.

9. All equipment required to perform the aforementioned surveys and soil sampling shall be hand-carried into park property. No motorized equipment shall be permitted on MNCPPC property other than in designated parking areas.

10. The Permittee shall notify the Permittor a minimum of 48 hours prior to entering onto MNCPPC property. Please notify Jay Childs at 301-370-3416 or at jay.childs@montgomeryparks.org prior to commencing any work covered under this agreement.

ACCORDINGLY, the parties hereto have caused this Right of Entry to be executed as of the day and year above first written.

PERMITTOR

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION, MONTGOMERY COUNTY DEPARTMENT OF PARKS

Jay Childs
Witness

Kurt Wiebusch
Construction Section Manager

7-25-18
Date

MARYLAND STATE HIGHWAY ADMINISTRATION

Witness

Name:

8/2/18
Date

Title:

Pepco
701 Ninth Street NW
Washington, DC 20068-0001
202.833.7500

pepco.com

September 25, 2020

Mr. Jeffrey T. Folden
Maryland Department of Transportation State Highway Administration
707 North Calvert Street, P-601
Baltimore, MD 21202

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("PEPCO") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

Dear Mr. Folden:

We have reviewed your application dated May 15, 2020 requesting access to a portion of Potomac Electric Power Company's ("PEPCO") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 in order to conduct Phase 1 mitigation sites for I-495 and I-270 Managed Lanes Study.

We are pleased to grant the permission requested provided Maryland Department of Transportation State Highway Administration (SHA), hereinafter referred to as the "Licensee," agrees to the following conditions:

YOUR RECEIPT OF THIS LETTER DOES NOT CONSTITUTE APPROVAL OF YOUR REQUEST. PEPCO'S APPROVAL SHALL NOT BECOME EFFECTIVE UNTIL THIS OFFICE RECEIVES THIS PERMISSION LETTER SIGNED BY SHA.

1. Licensee's use of the Property shall be limited to obtaining information in connection with the following field studies:

   - Wetland and Water Delineation
   - Phase 1 Topographic Surveys

2. Licensee shall conduct the surveys as described in the scope of work submitted by Licensee on May 15, 2020 and approved by PEPCO, said scope of work attached hereto as Exhibit "A" and made part hereof.

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("Pepco") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

3. Licensee shall access the Property from public roads, and any vehicular traffic within the Property shall be limited to the use of PEPCO's existing roads.

4. The Licensee shall ensure that unauthorized persons do not enter PEPCO's property while their representatives are on the property.

5. Licensee shall minimize the impact to PEPCO's property and shall restore any damage to the Property caused by the field studies and other related activities.

6. Licensee shall provide PEPCO with a minimum of three (3) business days advance notice prior to scheduling the commencement of activities described herein by notifying Mr. Marcus L. Smith, Manager, Real Estate and Third-Party Attachments, at (202) 872-3453 or (443) 518-0328.

7. Licensee shall complete all field studies within one (1) year from the date of this permission letter. Upon completion of the onsite activities, Licensee shall provide written notice of completion to PEPCO within five (5) business days. All notices shall be provided to:

    Mr. Marcus L. Smith,
    Manager, Real Estate & Third-Party Attachments,
    PHI Service Company,
    701 Ninth Street, N.W., Room 4223,
    Mailstop EP4223
    Washington, D. C. 20068
    Email: Marcus.Smith3@exeloncorp.com
    Phone: (202) 872-3453- Mobile- (443) 518-0328

8. Licensee shall provide PEPCO with copies of all data and reports generated in connection with these field studies within thirty (30) days of completion of the onsite activities. One (1) hardcopy and one (1) electronic copy shall be sent to Mr. Marcus L. Smith, at the above postal and email addresses.

9. No other uses of the Property will be permitted unless prior written permission is obtained from PEPCO.

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("Pepco") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

10. Extreme care shall be used in the location and operation of all persons and equipment to ensure that such persons and equipment will at no time come within 20 feet of any electric circuits attached to steel structures or within 10 feet of any other electric circuits. Also, all activities must be performed in strict compliance with the National Electric Safety Code (NESC) and all other applicable codes, laws and regulations, including but not limited to the Maryland High Voltage Line Act, Md. Code Ann., Lab. & Empl. §§ 6-101 et Seq. (1999).

11. Extreme care shall be used to avoid damaging any utilities which are located underground within the Property. At least 48 hours in advance of commencing work on PEPCO's property, the Licensee shall notify the national "One Call Notification System" by telephone (call 811).

12. Licensee shall be responsible for any damages to the Property or facilities arising directly or indirectly from this work, and shall promptly reimburse PEPCO for the cost of repairing any such damages.

13. Any debris left on the Property as a result of this use shall be promptly removed by Licensee.

14. Should this use of the Property create any erosion or drainage problems, Licensee shall promptly take necessary corrective action to remedy the problem.

15. Licensee's use of the Property shall not create or enlarge a non-tidal wetland. If the use of PEPCO's property impacts a wetland such that mitigation is necessary, the mitigation shall not be located on PEPCO's property.

16. Upon completion of the work, any disturbed areas within the Property shall be properly graded and sodded or fertilized and seeded in accordance with accepted practices.

17. If Licensee's use of the Property necessitates the relocation and/or adjustment of any of PEPCO's facilities or equipment, the Licensee shall promptly reimburse PEPCO for the cost of such relocation and/or other adjustment.

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("Pepco") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

18. PEPCO reserves the right to construct, reconstruct, maintain and add to, in, over, under, along, through and across said Property such overhead and/or underground electric transmission and/or distribution cables, pipes, conduits and/or wire and appurtenant facilities (including ground, neutral, or static wires and/or cables) as PEPCO may from time to time deem necessary or advisable.

19. The permission granted herein shall be non-exclusive and may be revoked at any time upon written notice to Licensee. PEPCO may grant to third parties easement rights in, or permission to use the Property.

20. If Licensee fails to perform any of the work or to comply with any of the stipulations set forth herein, PEPCO may upon the expiration of fifteen (15) calendar days written notice to Licensee, perform such work as is necessary to bring Licensee's use of property into compliance with the stipulations, and the costs of such work shall be paid by Licensee. Licensee agrees to pay, upon demand from PEPCO, the costs of any such work performed by PEPCO.

21. The Licensee and/ or its contractors shall indemnify and hold harmless PEPCO Holdings LLC its parents and their subsidiaries and affiliates ("Indemnified Persons") (which shall be deemed to include their shareholders, directors, officers, employees, agents, and servants) against any and all losses, expenses, demands, claims and liability in connection with property damage and injuries to persons, firms or corporations (including the parties hereto and their respective employees, licensees and invitees, trespassers and/or the general public's use of the Property) (collectively, "Claims") caused by or growing out of Licensee's presence on, or use of, the Property, except, however, with respect to any Claims arising from the gross negligence or intentional misconduct of any of the Indemnified Persons. The Licensee agrees to defend at its expense, including attorney's fees, any suit or action brought against the Indemnified Persons, based on any alleged injuries or damages, losses and expenses caused by or growing out of the Licensee's presence on or use of the Property, except, however, with respect to any Claims arising from the gross negligence or intentional misconduct of any of the Indemnified Persons.

22. No explosives shall be used on the Property unless prior written permission is obtained from PEPCO.

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("Pepco") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

23. At no time shall Licensee store vehicles, equipment, material, fuel or explosives on the Property.

24. Licensee shall comply with all applicable federal, state and local laws, codes and regulations pertaining to this use, and must obtain all necessary permits.

25. Licensee shall conduct all activities on the Property in compliance with all applicable environmental laws.

26. Prior to beginning work, Licensee and its contractors shall meet with a PEPCO safety inspector who will explain the PEPCO safety procedures that must be followed while working under PEPCO transmission lines.

27. PEPCO reserves the right but not the obligation to have one (1) safety inspector on site during any time work is performed on the Property. The Licensee shall reimburse PEPCO for the expenses incurred by the safety inspector associated with such project. The reimbursement rate shall be calculated at a minimum of four plus (4+) hours per day. The safety inspector will work no more than 40 hours per week, at PEPCO's then prevailing rate during any period of construction. All invoices for the safety inspector will be forwarded to Mr. Jeffrey T. Folden, SHA, 707 North Calvert Street, P-601, Baltimore, MD 21202. The Licensee agrees to pay all such invoices upon receipt without delay to PEPCO.

28. The Licensee and its contractors shall procure and maintain at its own expense the following minimum insurance in forms and with insurance companies rated at least A-VII by AM Best:

    (a) Commercial General Liability and/or Umbrella/Excess Liability (including contractual liability coverage equivalent to what is insured by ISO CGL form 00 01): $2,000,000 per occurrence and in the aggregate;

    (b) Workers Compensation insurance for statutory obligations imposed by Workers Compensation, Occupational Disease, or other similar laws;

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("Pepco") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

(c) Employer's Liability: $1,000,000 per accident/ per disease, per employee/ per disease, policy limits

(d) Business Automobile Liability (for all owned, non-owned, hired, and leased vehicles): $2,000,000 per accident.

(e) Licensee shall provide certificates of insurance and applicable policy wording and/or endorsements to PEPCO Holdings LLC to Potomac Electric Power Company, Attention: Marcus L. Smith, Manager, Real, 701 9th Street NW suite 4214, Mailstop EP4223, Washington, D.C. 20068.

(f) With respect to subsections (a) and (d) above, such insurance shall include PEPCO Holdings LLC, its officers, directors, employees and agents as additional insured. All insurance required hereunder shall provide a waiver of subrogation in favor of PEPCO Holdings LLC, state that required coverage is primary to any other valid insurance available to PEPCO Holdings LLC (to the extent permitted by applicable insurance law), and allow cross-liabilities and coverage regardless of fault. Developer shall provide at least thirty (30) days prior written notice to PEPCO Holdings LLC of cancellation of any required coverage if not replaced.

(g) Notwithstanding the forgoing, Licensee may self-insure any of the required insurance under the same terms as required by this letter. In the event Licensee elects to self-insure its obligation under this letter, the following conditions apply: (i) Licensee shall promptly provide PEPCO with written notice of any claim, demand, lawsuit, or the like for which it seeks coverage pursuant to this Section and provide PEPCO with copies of any demands, notices, summonses, or legal papers received in connection with such claim, demand, lawsuit, or the like; (ii) Licensee shall not settle any such claim, demand, lawsuit, or the like without the prior written consent of PEPCO; and (iii) PEPCO shall fully cooperate with Licensee in the defense of the claim, demand, lawsuit, or the like.

(h) Licensee shall maintain adequate insurance coverage for subcontractors, and in the event any subcontractor(s) provide any services hereunder, Licensee shall require such subcontractor(s) to maintain insurance in

Re: Request for Permission to Ingress and Egress Potomac Electric Power Company's ("Pepco") Quince Orchard to Bureau of Standards 69 kV RW T/L Property No. M-703 and M-704 to Conduct Wetlands and Waters delineations and Topographic Survey in Connection with Traffic Relief Plan (TRP) to Reduce Congestion on Maryland Roads

accordance with this Section.

30. Licensee shall guarantee that its contractors shall agree to and abide by the terms and conditions set forth in this permission letter.

If the foregoing is acceptable to SHA, please so indicate by having this letter executed by an authorized officer of SHA and returned to Mr. Marcus Smith, Manager of Real Estate & Third-Party Attachments.

The grant of permission herein shall not become effective until PEPCO has received this letter, fully executed, which receipt must occur within thirty (30) calendars days from the date of this letter.

Sincerely,

Marcus L. Smith

Marcus Smith,
Manager, Real Estate & Third Party Attachments

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION

Accepted and Agreed to: Lisa B. Choplin
Printed Name

Signature: Lisa B Ch

Title: Director

Date: 9/30/20

APPENDIX III

ATTACHMENT A – FUNCTIONAL ASSESSMENT

EXISTING and PROPOSED REACH LEVEL STREAM FUNCTION-BASED RAPID ASSESSMENT FIELD DATA SHEET

Watershed:	Seneca Creek	Rater(s):	JS, SM, SN
Stream:	Un. Trib to Great Seneca Creek	Date:	12/07/2020
Reach Length:	2901	Latitude:	39.130736
Photo(s):	See attached photo document	Longitude:	-77.253939
Reach ID:	Mainstem 1	Reach Score/Reach Total	Ex. 100/170 Prop.: 145/170 Quality: Ex: 0.58 Prop:0.85

Function-based Rapid Reach Level Stream Assessment

Assessment Parameter	Measurement Method	Category: Functioning			Functioning-at-Risk				Not Functioning		
Runoff	**Stream Function Pyramid Level 1 Hydrology**										
	1. Concentrated Flow	No potential for concentrated flow/impairments from adjacent land use			Some potential for concentrated flow/impairments to reach restoration site, however, measures are in place to protect resources				Potential for concentrated flow/impairments to reach restoration site and no treatments are in place		
	Existing Condition	10	9	8	7	6	5	4	3	(2)	1
	Proposed Condition	10	9	8	7	6	(5)	4	3	2	1
	2. Flashiness	Non-flashy flow regime as a result of rainfall patterns, geology, and soils, impervious cover less than 6%			Semi-flashy flow regime as a result of rainfall patterns, geology, and soils, impervious cover 7 - 15%				Flashy flow regime as a result of rainfall patterns, geology, and soils, impervious cover greater than 15%		
	Existing Condition	10	9	8	7	6	5	4	3	(2)	1
	Proposed Condition	10	9	8	7	6	5	4	3	(2)	1
	Stream Function Pyramid Level 1 Hydrology Overall EXISTING Condition					**F**	**FAR**	**(NF)**		**Score:**	4
	Stream Function Pyramid Level 1 Hydrology Overall PROPOSED Condition					**F**	**(FAR)**	**NF**		**Score:**	7
Floodplain Connectivity (Vertical Stability)	**Stream Function Pyramid Level 2 Hydraulics**										
	3. Bank Height Ratio (BHR)	<1.20			1.21 - 1.50				>1.50		
	Existing Condition	10	9	8	7	6	5	4	3	2	(1)
1.0	Proposed Condition	10	(9)	8	7	6	5	4	3	2	1
	4a. Entrenchment (Meandering streams in alluvial valleys or Rosgen C, E, DA Streams)	>2.2			2.1 - 1.4				<1.4		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	4b. Entrenchment (Non meandering streams in colluvial valleys or Rosgen B Streams)	>1.4			1.3 - 1.1				<1.1		
~1.4	Existing Condition	10	9	(8)	7	6	5	4	3	2	1
~1.3	Proposed Condition	(10)	9	8	7	6	5	4	3	2	1
	5. Floodplain Drainage	no concentrated flow; runoff is primarily sheet flow; hillslopes < 10%; hillslopes >200 ft from stream; ponding or wetland areas and litter or debris jams are well represented			runoff is equally sheet and concentrated flow (minor gully and rill erosion occurring); hillslopes 10 - 40%; hillslopes 50 - 200 ft from stream; ponding or wetland areas and litter or debris jams are minimally represented				concentrated flows present (extensive gully and rill erosion); hillslopes >40%; hillslopes <50 ft from stream; ponding or wetland areas and litter or debris jams are not well represented or absent		
	Existing Condition	10	9	8	7	6	(5)	4	3	2	1
	Proposed Condition	10	9	8	(7)	6	5	4	3	2	1
	6. Vertical Stability Extent	Stable			Localized Instability				Widespread Instability		
	Existing Condition	10	9	8	7	6	5	(4)	3	2	1
	Proposed Condition	10	(9)	8	7	6	5	4	3	2	1
	Stream Function Pyramid Level 2 Hydraulics Overall EXISTING Condition					**F**	**(FAR)**	**NF**		**Score:**	18
	Stream Function Pyramid Level 2 Hydraulics Overall PROPOSED Condition					**(F)**	**FAR**	**NF**		**Score:**	35

Stream Function Pyramid Level 3 Geomorphology

Riparian Vegetation (Score = Average of Left and Right bank, max score of 10)	7. Riparian Vegetation Zone (EPA, 1999, modified)	Riparian zone extends to a width of >100 feet; good vegetation community diversity and density; human activities do not impact zone; invasive species not present or sparse			Riparian zone extends to a width of 25-100 feet; species composition is dominated by 2 or 3 species; human activities greatly impact zone; invasive species well represented and alter the community				Riparian zone extends to a width of <25 feet; little or no riparian vegetation due to human activities; majority of vegetation is invasive		
	Left Bank Existing	10	9	8	7	6	5	4	3	2	1
	Left Bank Proposed	10	9	8	7	6	5	4	3	2	1
	Right Bank Existing	10	9	8	7	6	5	4	3	2	1
	Right Bank Proposed	10	9	8	7	6	5	4	3	2	1
Lateral Stability (Score =Average of Left and right bank, max score of 10)	8. Dominant Bank Erosion Rate Potential	Dominate bank erosion rate potential is low or BEHI/NBS Rating: L/VL, L/L, L/M, L/H, L/VH, M/VL			Dominate bank erosion rate potential is moderate or BEHI/NBS Rating: M/L, M/M, M/H, L/Ex, H/L, M/VH, M/Ex, H/L, H/M, VH/VL, Ex/VL				Dominate bank erosion rate potential is high or BEHI/NBS Rating: H/H, H/Ex, VH/H, Ex/M, Ex/H, Ex/VH, VH/VH, Ex/Ex		
	Existing Condition (Right bank)	10	9	8	7	6	5	4	3	2	1
	Proposed Condition (Right Bank)	10	9	8	7	6	5	4	3	2	1
	Existing Condition (Left bank)	10	9	8	7	6	5	4	3	2	1
	Proposed Condition (Left Bank)	10	9	8	7	6	5	4	3	2	1
	9. Lateral Stability Extent	Stable			Localized Instability				Widespread Instability		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
Bedform Diversity (Do not complete if stream is ephemeral)	10. Shelter for Fish and Macroinvertebrates (EPA 1999)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, rubble, gravel, cobble and large rocks, or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient)			20-70% mix of stable habitat; suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)				Less than 20% mix of stable habitat; lack of habitat availability less than desirables obvious; substrate unstable or lacking		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	11a. Pool-to-Pool Spacing Ratio (Watersheds < 10 mi^2)	4.0 - 5.0			3.0 - 4.0 ***or*** 5.0 - 7.0				< 3.0 ***or*** >7.0		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
~4.9	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	11b. Pool-to-Pool Spacing Ratio (Watersheds > 10 mi^2)	5.0 - 7.0			3.5 - 5.0 ***or*** 7.0 - 8.0				<3.5 ***or*** >8.0		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	12a. Pool Max Depth Ratio/Depth Variability (Gravel Bed Streams)	>1.5			1.2 - 1.5				<1.2		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
~1.8	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	12b. Pool Max Depth Ratio/Depth Variability (Sand Bed Streams)	>1.2			1.1 - 1.2				<1.1		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1

Bedform Diversity (Do not complete if stream is ephemeral)

Moderate Gradient Perennial Streams in Colluvial Valleys

11. Pool-to-Pool Spacing Ratio (3-5% Slope)	2.0 - 4.0			4.0 - 6.0				>6.0		
Existing Condition	10	9	8	7	6	5	4	3	2	1
Proposed Condition	10	9	8	7	6	5	4	3	2	1
12. Pool Max Depth Ratio/Depth Variability	>1.5			1.2 - 1.5				<1.2		
Existing Condition	10	9	8	7	6	5	4	3	2	1
Proposed Condition	10	9	8	7	6	5	4	3	2	1

Stream Function Pyramid Level 3 Geomorphology Overall EXISTING Condition F FAR (NF) **Score:** 78

Stream Function Pyramid Level 3 Geomorphology Overall PROPOSED Condition (F) FAR NF **Score:** 66

Water Quality and Nutrients (Do not complete if stream is ephemeral)

Stream Function Pyramid Level 4 Physicochemical

13. Water Appearance and Nutrient Enrichment (USDA 1999)	Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks. Clear water along entire reach; diverse aquatic plant community includes low quantities of many species of macrophytes; little algal growth present			Frequent cloudiness especially after storm events; objects visible to depth 0.5 to 3.0 ft; may have slight green color; no oil sheen on water surface. Fairly clear or slightly greenish water along entire reach; moderate algal growth on stream substrate				Very turbid or muddy appearance most of the time; objects visible at depth< 0.5 ft; slow moving water maybe bright green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface; or strong odor of chemicals, oil, sewage, or other pollutants. Pea-green, gray, or brown water along entire reach; dense stands of macrophytes clogging stream; severe algal blooms creating thick		
Existing Condition	10	9	8	7	6	(5)	4	3	2	1
Proposed Condition	10	9	8	(7)	6	5	4	3	2	1
14. Detritus (Petersen, 1992)	Mainly consisting of leaves and wood without sediment covering it			Leaves and wood scarce; fine organic debris without sediment				Fine organic sediment - black in color and foul odor (anaerobic) or detritus absent		
Existing Condition	10	9	8	7	(6)	5	4	3	2	1
Proposed Condition	10	9	8	(7)	6	5	4	3	2	1

Stream Function Pyramid Level 4 Physicochemical Overall EXISTING Condition F (FAR) NF **Score:** 11

Stream Function Pyramid Level 4 Physicochemical Overall PROPOSED Condition F (FAR) NF **Score:** 14

Biology (Do not complete if stream is ephemeral)

Stream Function Pyramid Level 5 Biology

15. Macroinvertebrate	Abundant			Rare				Not present		
Existing Condition	10	9	8	7	6	(5)	4	3	2	1
Proposed Condition	10	9	8	(7)	6	5	4	3	2	1
16. Macroinvertebrate Tolerance	Abundant intolerant species			Limited intolerant species				Only tolerant species		
Existing Condition	10	9	8	7	6	(5)	4	3	2	1
Proposed Condition	10	9	(8)	7	6	5	4	3	2	1
17. Fish Presence	Abundant			Rare				Not present		
Existing Condition	10	9	8	7	6	5	4	(3)	2	1
Proposed Condition	10	9	8	7	(6)	5	4	3	2	1

If existing biology is FAR or NF, provide description of cause(s): BIBI = 1.57 Poor, 12 taxa found, 3 EPT Taxa; FIBI = 1.3 Poor; only Eastern Blacknose Dace = BIBI-20 Poor

Stream Function Pyramid Level 5 Biology Overall EXISTING Condition F (FAR) NF **Score:** 13

Stream Function Pyramid Level 5 Biology Overall PROPOSED Condition F (FAR) NF **Score:** 20

EX = 74/170 (Not functioning) = 0.41

Prop = 143/170 (functioning) = 0.84

Bankfull Determination and Rosgen Stream Classification

Rosgen Stream Type (Observation)	B4-B4c, F4b				
Regional Curve (circle one):	Piedmont	Coastal Plain	Allegheny Plateau/Ridge and Valley	Urban	Karst
DA (sqmi)	0.25				
BF Width (ft)	21.5		BF Area (sqft)	17.8	
BF Depth (ft)	0.8		Percent Impervious (%)	35.0%	

Field Measurements

Parameter	Measurements and Ratios			
	Reach 1	Reach 2	Reach 3	Reach 4
Water surface to geomorphic feature elevation difference	0.22	0.18	0.25	0.25
Riffle Mean Depth at Bankfull Stage (dbkf)	0.80	0.80	1.00	0.80
Riffle Width at Bankfull Stage (Wbkf)	13.70	14.60	16.30	21.50
Riffle XS Area at Bankfull Stage (Abkf = dbkf*Wbkf)	11.40	11.70	16.30	17.20
Floodprone Area Width (Wfpa) (Wfpa=Width at elevation determined by 2xDmax)	18.10	22..0	16.90	43.60
Entrenchment Ratio (ER) (ER=Wfpa/Wbkf)	1.30	1.50	1.00	2.00
Low Bank Height (LBH)	2.40	3.30	3.30	3.80
Riffle Maximum Depth at Bankfull Stage (Dmax)	1.20	1.30	1.40	1.30
Bank Height Ratio (BHR) (BHR=LBH/Dmax)	2.00	2.50	2.40	2.90
BEHI/NBS Ratings and Lengths	Refer to CA5_Semi-Final Design Report, Table 15: BEHI Summary Table and Appendix B for ratings and lengths			
Pool to Pool Spacing (P-P)	20.40	29.20	26.70	41.40
Pool to Pool Spacing Ratio (P-P Ratio) (P-P Ratio=P-P/Wbkf)	1.49	2.00	1.64	1.93
Pool Maximum Depth at Bankfull Stage (Dmbkfp)	1.27	1.33	1.39	1.59
Pool Depth Ratio (Dmbkfp Ratio) (Dmbkfp Ratio=Dmbkfp/dbkf)	1.59	1.66	1.39	1.99
Macroinvertebrate Taxa Observed	N/A	N/A	N/A	N/A

CA-5 Photo Point 1 Upstream; Long Pro Start

CA-5 Photo Point 1 Downstream

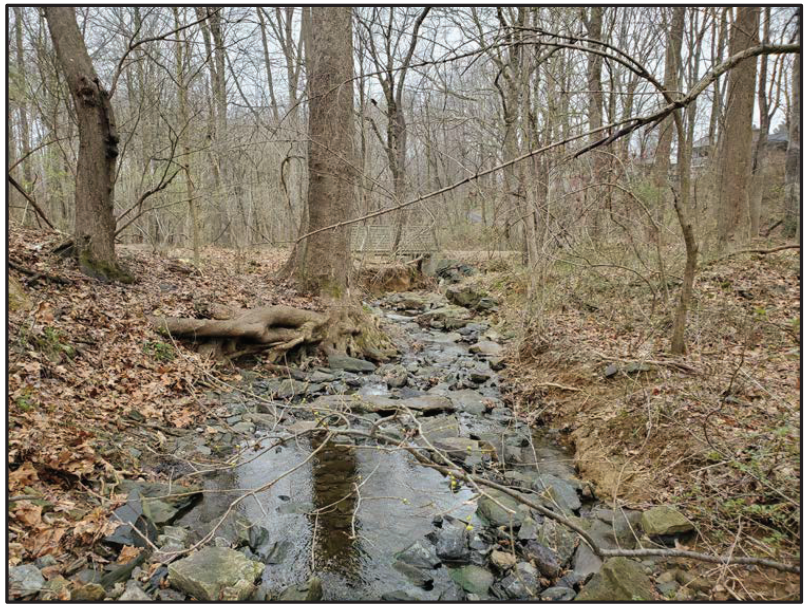
CA-5 Photo Point 2 Upstream

CA-5 Photo Point 2 Downstream

CA-5 Photo Point 3 Upstream

CA-5 Photo Point 3 Downstream

CA-5 Photo Point 4 Upstream



CA-5 Photo Point 4 Downstream

CA-5 Photo Point 5 Upstream at Confluence

CA-5 Photo Point 5 Downstream at Confluence

CA-5 Photo Point 6 Upstream

CA-5 Photo Point 6 Downstream

CA-5 Photo Point 7 Upstream

CA-5 Photo Point 7 Downstream

CA-5 Photo Point 8 Upstream at Floodplain

CA-5 Photo Point 8 Downstream at Floodplain

CA-5 Photo Point 9 Upstream

CA-5 Photo Point 9 Downstream

CA-5 Photo Point 9 Upstream at Floodplain Seep

CA-5 Photo Point 10 Upstream at Confluence with Headcut Trib

CA-5 Photo Point 10 Downstream at Confluence with Headcut Trib

CA-5 Photo Point 11 Upstream at Valley

CA-5 Photo Point 11 Downstream at Valley

CA-5 Photo Point 12 Upstream

CA-5 Photo Point 12 Downstream

CA-5 Photo Point 13 Upstream

CA-5 Photo Point 13 Downstream

CA-5 Photo Point 14 Upstream

CA-5 Photo Point 14 Downstream

CA-5 Photo Point 15 Upstream

CA-5 Photo Point 15 Downstream

CA-5 Photo Point 16 Upstream

CA-5 Photo Point 16 Downstream

CA-5 Photo Point 17 Upstream

CA-5 Photo Point 17 Downstream

CA-5 Photo Point 18 Upstream

CA-5 Photo Point 18 Downstream

CA-5 Photo Point 19 Upstream

CA-5 Photo Point 19 Downstream

CA-5 Photo Point 20 Upstream

CA-5 Photo Point 20 Downstream

CA-5 Photo Point 21 Upstream

CA-5 Photo Point 21 Downstream

CA-5 Photo Point 22 Upstream

CA-5 Photo Point 22 Downstream

CA-5 Photo Point 23 Upstream

CA-5 Photo Point 23 Downstream

CA-5 Photo Point 24 Down Valley at Farm Pond

CA-5 Photo Point 25 Upstream Pond Outfall

CA-5 Photo Point 25 Downstream Pond Outfall

CA-5 Photo Point 26 Up Valley at Farm Pond

CA-5 Photo Point 27 Upstream

CA-5 Photo Point 27 Downstream

CA-5 Photo Point 28 Upstream

CA-5 Photo Point 28 Downstream

CA-5 Photo Point 29 Upstream

CA-5 Photo Point 29 Downstream

CA-5 Photo Point 30 Upstream

CA-5 Photo Point 30 Downstream

CA-5 Photo Point 31 Upstream

CA-5 Photo Point 31 Downstream

CA-5 Photo Point 32 Upstream at Confluence with Mainstem 2

CA-5 Photo Point 32 Upstream Mainstem 2

CA-5 Photo Point 32 Downstream Mainstem 2

EXISTING and PROPOSED REACH LEVEL STREAM FUNCTION-BASED RAPID ASSESSMENT FIELD DATA SHEET

Watershed: Seneca Creek
Stream: Un. Trib to Great Seneca Creek
Reach Length: 511
Photo(s): See attached photo document
Reach ID: Mainstem 2

Rater(s): JS, SM, SN
Date: 12/07/2020
Latitude: 39.129621
Longitude: -77.257339

Reach Score/Reach Total Ex. 100/170 Prop.: 145/170 Quality: Ex: 0.58 Prop:0.85

Function-based Rapid Reach Level Stream Assessment

Assessment Parameter	Measurement Method	Category: Functioning			Functioning-at-Risk				Not Functioning		
Runoff	**Stream Function Pyramid Level 1 Hydrology**										
	1. Concentrated Flow	No potential for concentrated flow/impairments from adjacent land use			Some potential for concentrated flow/impairments to reach restoration site, however, measures are in place to protect resources Large Swm				Potential for concentrated flow/impairments to reach restoration site and no treatments are in place		
	Existing Condition	10	9	8	7	(6)	5	4	3	2	1
	Proposed Condition	10	9	8	7	(6)	5	4	3	2	1
	2. Flashiness	Non-flashy flow regime as a result of rainfall patterns, geology, and soils, impervious cover less than 6%			Semi-flashy flow regime as a result of rainfall patterns, geology, and soils, impervious cover 7 - 15%				Flashy flow regime as a result of rainfall patterns, geology, and soils, impervious cover greater than 15% High Impervious but Swm creek		
	Existing Condition	10	9	8	7	6	5	4	(3)	2	1
	Proposed Condition	10	9	8	7	6	5	4	(3)	2	1
	Stream Function Pyramid Level 1 Hydrology Overall EXISTING Condition					F (FAR) NF				**Score:** 9	
	Stream Function Pyramid Level 1 Hydrology Overall PROPOSED Condition					F (FAR) NF				**Score:** 9	
Floodplain Connectivity (Vertical Stability)	**Stream Function Pyramid Level 2 Hydraulics**										
	3. Bank Height Ratio (BHR)	<1.20			1.21 - 1.50				>1.50		
2.8	Existing Condition	10	9	8	7	6	5	4	3	2	(1)
1.0	Proposed Condition	(10)	9	8	7	6	5	4	3	2	1
	4a. Entrenchment (Meandering streams in alluvial valleys or Rosgen C, E, DA Streams)	>2.2			2.1 - 1.4				<1.4		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	4b. Entrenchment (Non meandering streams in colluvial valleys or Rosgen B Streams)	>1.4			1.3 - 1.1				<1.1		
2.0	Existing Condition	10	(9)	8	7	6	5	4	3	2	1
>1.4	Proposed Condition	(10)	9	8	7	6	5	4	3	2	1
	5. Floodplain Drainage	no concentrated flow; runoff is primarily sheet flow; hillslopes < 10%; hillslopes >200 ft from stream; ponding or wetland areas and litter or debris jams are well represented			runoff is equally sheet and concentrated flow (minor gully and rill erosion occurring); hillslopes 10 - 40%; hillslopes 50 - 200 ft from stream; ponding or wetland areas and litter or debris jams are minimally represented				concentrated flows present (extensive gully and rill erosion); hillslopes >40%; hillslopes <50 ft from stream; ponding or wetland areas and litter or debris jams are not well represented or absent		
	Existing Condition	10	9	8	(7)	6	5	4	3	2	1
	Proposed Condition	10	9	8	(7)	6	5	4	3	2	1
	6. Vertical Stability Extent	Stable			Localized Instability				Widespread Instability		
	Existing Condition	10	9	8	7	6	(5)	4	3	2	1
	Proposed Condition	10	(9)	8	7	6	5	4	3	2	1
	Stream Function Pyramid Level 2 Hydraulics Overall EXISTING Condition					F (FAR) NF				**Score:** 22	
	Stream Function Pyramid Level 2 Hydraulics Overall PROPOSED Condition					(F) FAR NF				**Score:** 36	

Stream Function Pyramid Level 3 Geomorphology

Riparian Vegetation (Score = Average of Left and Right bank, max score of 10)	7. Riparian Vegetation Zone (EPA, 1999, modified)	Riparian zone extends to a width of >100 feet; good vegetation community diversity and density; human activities do not impact zone; invasive species not present or sparse			Riparian zone extends to a width of 25-100 feet; species composition is dominated by 2 or 3 species; human activities greatly impact zone; invasive species well represented and alter the community				Riparian zone extends to a width of <25 feet; little or no riparian vegetation due to human activities; majority of vegetation is invasive		
	Left Bank Existing	10	9	8	7	6	5	4	3	2	1
	Left Bank Proposed	10	9	8	7	6	5	4	3	2	1
	Right Bank Existing	10	9	8	7	6	5	4	3	2	1
	Right Bank Proposed	10	9	8	7	6	5	4	3	2	1
Lateral Stability (Score =Average of Left and right bank, max score of 10)	8. Dominant Bank Erosion Rate Potential	Dominate bank erosion rate potential is low or BEHI/NBS Rating: L/VL, L/L, L/M, L/H, L/VH, M/VL			Dominate bank erosion rate potential is moderate or BEHI/NBS Rating: M/L, M/M, M/H, L/Ex, H/L, M/VH, M/Ex, H/L, H/M, VH/VL, Ex/VL				Dominate bank erosion rate potential is high or BEHI/NBS Rating: H/H, H/Ex, VH/H, Ex/M, Ex/H, Ex/VH, VH/VH, Ex/Ex		
	Existing Condition (Right bank)	10	9	8	7	6	5	4	3	2	1
	Proposed Condition (Right Bank)	10	9	8	7	6	5	4	3	2	1
	Existing Condition (Left bank)	10	9	8	7	6	5	4	3	2	1
	Proposed Condition (Left Bank)	10	9	8	7	6	5	4	3	2	1
	9. Lateral Stability Extent	Stable			Localized Instability				Widespread Instability		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
Bedform Diversity (Do not complete if stream is ephemeral)	10. Shelter for Fish and Macroinvertebrates (EPA 1999)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, rubble, gravel, cobble and large rocks, or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient)			20-70% mix of stable habitat; suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)				Less than 20% mix of stable habitat; lack of habitat availability less than desirables obvious; substrate unstable or lacking		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	11a. Pool-to-Pool Spacing Ratio (Watersheds < 10 mi^2)	4.0 - 5.0			3.0 - 4.0 **or** 5.0 - 7.0				< 3.0 **or** >7.0		
	3.5 Existing Condition	10	9	8	7	6	5	4	3	2	1
	~5.5 Proposed Condition	10	9	8	7	6	5	4	3	2	1
	11b. Pool-to-Pool Spacing Ratio (Watersheds > 10 mi^2)	5.0 - 7.0			3.5 - 5.0 **or** 7.0 - 8.0				<3.5 **or** >8.0		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1
	12a. Pool Max Depth Ratio/Depth Variability (Gravel Bed Streams)	>1.5			1.2 - 1.5				<1.2		
	1.3 Existing Condition	10	9	8	7	6	5	4	3	2	1
	~2.3 Proposed Condition	10	9	8	7	6	5	4	3	2	1
	12b. Pool Max Depth Ratio/Depth Variability (Sand Bed Streams)	>1.2			1.1 - 1.2				<1.1		
	Existing Condition	10	9	8	7	6	5	4	3	2	1
	Proposed Condition	10	9	8	7	6	5	4	3	2	1

Bedform Diversity (Do not complete if stream is ephemeral)

Moderate Gradient Perennial Streams in Colluvial Valleys

11. Pool-to-Pool Spacing Ratio (3-5% Slope)	2.0 - 4.0			4.0 - 6.0				>6.0		
Existing Condition	10	9	8	7	6	5	4	3	2	1
Proposed Condition	10	9	8	7	6	5	4	3	2	1
12. Pool Max Depth Ratio/Depth Variability	>1.5			1.2 - 1.5				<1.2		
Existing Condition	10	9	8	7	6	5	4	3	2	1
Proposed Condition	10	9	8	7	6	5	4	3	2	1

Stream Function Pyramid Level 3 Geomorphology Overall EXISTING Condition F (FAR) NF **Score:** 42

Stream Function Pyramid Level 3 Geomorphology Overall PROPOSED Condition (F) FAR NF **Score:** 64

Stream Function Pyramid Level 4 Physicochemical

Water Quality and Nutrients (Do not complete if stream is ephemeral)

13. Water Appearance and Nutrient Enrichment (USDA 1999)	Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks. Clear water along entire reach; diverse aquatic plant community includes low quantities of many species of macrophytes; little algal growth present			Frequent cloudiness especially after storm events; objects visible to depth 0.5 to 3.0 ft; may have slight green color; no oil sheen on water surface. Fairly clear or slightly greenish water along entire reach; moderate algal growth on stream substrate				Very turbid or muddy appearance most of the time; objects visible at depth< 0.5 ft; slow moving water maybe bright green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface; or strong odor of chemicals, oil, sewage, or other pollutants. Pea-green, gray, or brown water along entire reach; dense stands of macrophytes clogging stream; severe algal blooms creating thick		
Existing Condition	10	9	8	7	6	5	4	3	2	1
Proposed Condition	10	9	8	7	6	5	4	3	2	1
14. Detritus (Petersen, 1992)	Mainly consisting of leaves and wood without sediment covering it			Leaves and wood scarce; fine organic debris without sediment				Fine organic sediment - black in color and foul odor (anaerobic) or detritus absent		
Existing Condition	10	9	8	7	6	5	4	3	2	1
Proposed Condition	10	9	8	7	6	5	4	3	2	1

Stream Function Pyramid Level 4 Physicochemical Overall EXISTING Condition F (FAR) NF **Score:** 16

Stream Function Pyramid Level 4 Physicochemical Overall PROPOSED Condition F FAR NF **Score:** 16

Stream Function Pyramid Level 5 Biology

Biology (Do not complete if stream is ephemeral)

15. Macroinvertebrate	Abundant			Rare				Not present		
Existing Condition	10	9	8	7	6	(5)	4	3	2	1
Proposed Condition	10	9	8	(7)	6	5	4	3	2	1
16. Macroinvertebrate Tolerance	Abundant intolerant species			Limited intolerant species				Only tolerant species		
Existing Condition	10	9	8	7	6	(5)	4	3	2	1
Proposed Condition	10	9	(8)	7	6	5	4	3	2	1
17. Fish Presence	Abundant			Rare				Not present		
Existing Condition	10	9	8	7	6	5	4	(3)	2	1
Proposed Condition	10	9	8	7	(6)	5	4	3	2	1
If existing biology is FAR or NF, provide description of cause(s)	macro watershed BIBI = 1.57 poor 12 taxa found			FIBI = 1.3 poor 3 EPT found				Fish 1 sp. BIBI = 20 poor		

Stream Function Pyramid Level 5 Biology Overall EXISTING Condition F (FAR) NF **Score:** 13

Stream Function Pyramid Level 5 Biology Overall PROPOSED Condition F (FAR) NF **Score:** 21

Ex = 102/170 = 0.60 (Functioning-at-Risk)

Prop = 146/170 = 0.86 (Functioning)

Bankfull Determination and Rosgen Stream Classification

Rosgen Stream Type (Observation)	B4c				
Regional Curve (circle one):	Piedmont	Coastal Plain	Allegheny Plateau/Ridge and Valley	Urban	Karst
DA (sqmi)	0.41				
BF Width (ft)	11.3		BF Area (sqft)		12.3
BF Depth (ft)	1.1		Percent Impervious (%)		33.8%

Field Measurements

Parameter	Measurements and Ratios			
Water surface to geomorphic feature elevation difference	0.33			
Riffle Mean Depth at Bankfull Stage (dbkf)	1.10			
Riffle Width at Bankfull Stage (Wbkf)	11.30			
Riffle XS Area at Bankfull Stage (Abkf = dbkf*Wbkf)	12.30			
Floodprone Area Width (Wfpa) (Wfpa=Width at elevation determined by 2xDmax)	22.30			
Entrenchment Ratio (ER) (ER=Wfpa/Wbkf)	2.00			
Low Bank Height (LBH)	5.65			
Riffle Maximum Depth at Bankfull Stage (Dmax)	1.60			
Bank Height Ratio (BHR) (BHR=LBH/Dmax)	3.53			
BEHI/NBS Ratings and Lengths	Refer to CA5_Semi-Final Design Report, Table 15: BEHI Summary Table and Appendix B for ratings and lengths			
Pool to Pool Spacing (P-P)	52.20			
Pool to Pool Spacing Ratio (P-P Ratio) (P-P Ratio=P-P/Wbkf)	4.60			
Pool Maximum Depth at Bankfull Stage (Dmbkfp)	1.89			
Pool Depth Ratio (Dmbkfp Ratio) (Dmbkfp Ratio=Dmbkfp/dbkf)	1.72			
Macroinvertebrate Taxa Observed	N/A			

- CA-5 Photo Point 33 Upstream Main Channel

- CA-5 Photo Point 33 Downstream Main Channel

- CA-5 Photo Point 34 Upstream Main Channel

- CA-5 Photo Point 34 Downstream Main Channel

- CA-5 Photo Point 35 Upstream Main Channel

- CA-5 Photo Point 35 Downstream Main Channel

- CA-5 Photo Point 36 Upstream Main Channel

- CA-5 Photo Point 36 Downstream Main Channel

- CA-5 Photo Point 37 Upstream Main Channel

- CA-5 Photo Point 37 Downstream Main Channel

- CA-5 Photo Point 38 Upstream Main Channel

- CA-5 Photo Point 38 Downstream Main Channel

- CA-5 Photo Point 39 Upstream Main Channel

- CA-5 Photo Point 39 Downstream Main Channel

- CA-5 Photo Point 40 Upstream Main Channel

- CA-5 Photo Point 40 Downstream Main Channel

ATTACHMENT B – MITIGATION CREDIT REPORT

STREAM MITIGATION CALCULATOR

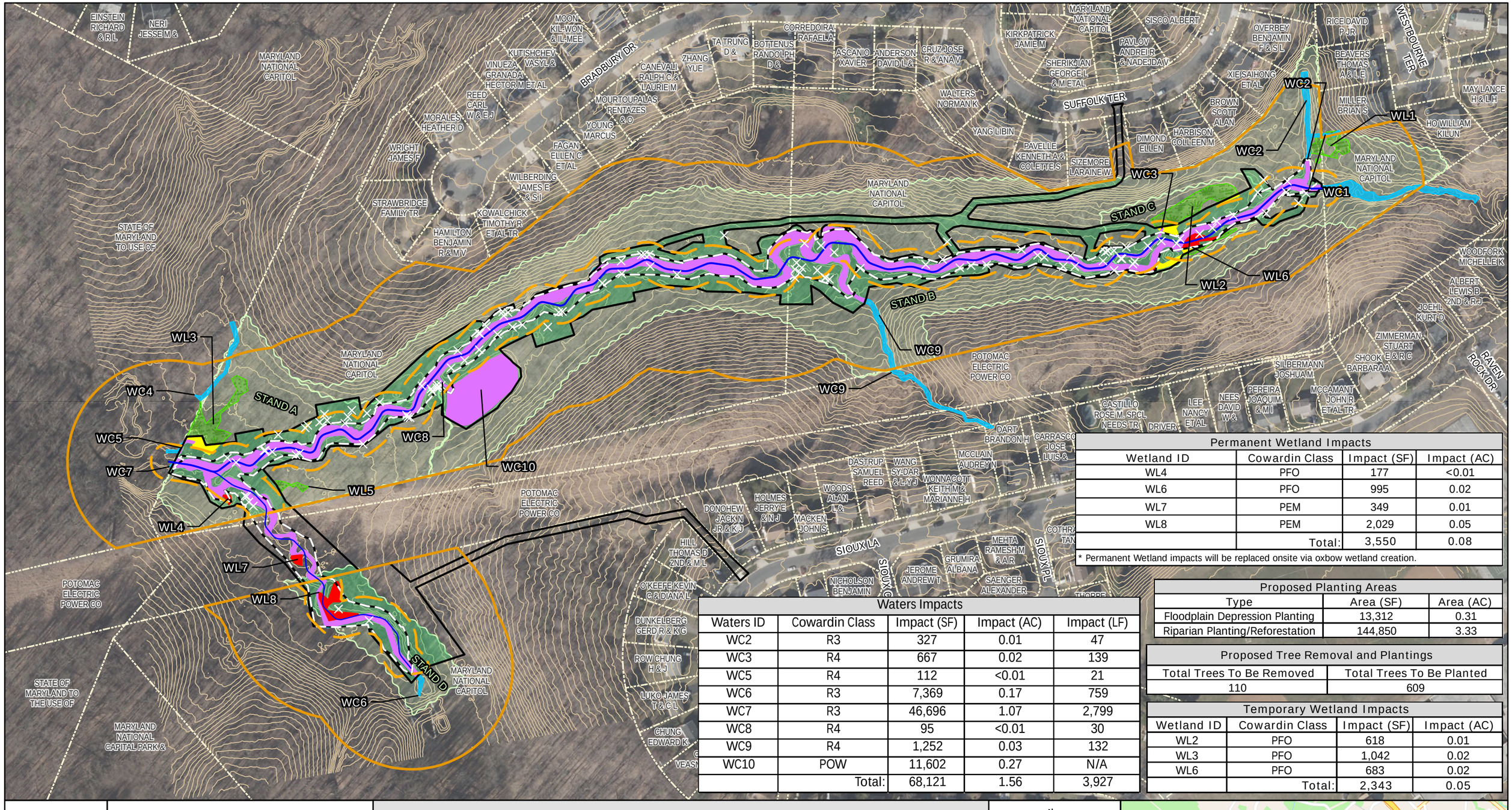
BACKGROUND INFORMATION

Corps Project ID #:	TBD	Corps PM:	
Project Name:	CA-5 Seneca Creek	Date:	3/4/2022
Lat/Long:	39.13030063, -77.25646132	Sponsor:	MDOT SHA
County:	Montgomery	Collaborators:	Coastal Resources, Inc.

Total Stream Gains (Functional Feet) 721

Raw Change in Reach Value (Functional Feet)											Stream Mitigation Adjustments					Stream Gains (Functional Feet)	REMARKS
Reach Name	Physiographic Region	Evaluation	Activity	Resource Type	Length (Feet)	Stream Quality	Channel Thread	Drainage Area (sqmi)	Raw Reach Value (Functional Feet)	Raw Change in Value (Functional Feet)	Site Sensitivity	Site Protection	Buffer Adjustment				
Mainstem 1	Piedmont	Existing	Preliminary Resource Evaluation	Perennial Headwater	2901	41%	Primary	0.25	693	596	1	Deed Restriction	Evaluation	Buffer Area (Acres)	Buffer Quality	655	
							1	0.58			0.1	0	Existing Buffer	250.23	58%		
	Piedmont	Proposed	Restoration/Enhancement	Perennial Headwater	2634	84%	Primary	0.25	1289		60	0	Proposed Buffer	250.23	58%		
							1	0.58					Functional Feet		0		
Mainstem 2	Piedmont	Existing	Preliminary Resource Evaluation	Perennial Headwater	511	60%	Primary	0.43	221	55	2	Deed Restriction	Evaluation	Buffer Area (Acres)	Buffer Quality	66	Part of buffer area from Mainstem 1 overlapped with Mainstem 2. Only accounted for overlap area under Mainstem 1 buffer adjustments.
							1	0.72			0.2	0	Existing Buffer	64.07	42%		
	Piedmont	Proposed	Restoration/Enhancement	Perennial Headwater	445	86%	Primary	0.43	275		11	0	Proposed Buffer	64.07	42%		
							1	0.72					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		
	Not Selected	Existing	Preliminary Resource Evaluation	NA	0	0%	NA	0	0	0	0	Select From List	Evaluation	Buffer Area (Acres)	Buffer Quality	NA	
							0	FALSE			0	0	Existing Buffer				
	Not Selected	Proposed	NA	NA	0	0%	NA	0	0		0	NA	Proposed Buffer				
							0	FALSE					Functional Feet		0		

ATTACHMENT C – MITIGATION MAP



Permanent Wetland Impacts			
Wetland ID	Cowardin Class	Impact (SF)	Impact (AC)
WL4	PFO	177	<0.01
WL6	PFO	995	0.02
WL7	PEM	349	0.01
WL8	PEM	2,029	0.05
	Total:	3,550	0.08

* Permanent Wetland impacts will be replaced onsite via oxbow wetland creation.

Waters Impacts				
Waters ID	Cowardin Class	Impact (SF)	Impact (AC)	Impact (LF)
WC2	R3	327	0.01	47
WC3	R4	667	0.02	139
WC5	R4	112	<0.01	21
WC6	R3	7,369	0.17	759
WC7	R3	46,696	1.07	2,799
WC8	R4	95	<0.01	30
WC9	R4	1,252	0.03	132
WC10	POW	11,602	0.27	N/A
	Total:	68,121	1.56	3,927

Proposed Planting Areas		
Type	Area (SF)	Area (AC)
Floodplain Depression Planting	13,312	0.31
Riparian Planting/Reforestation	144,850	3.33

Proposed Tree Removal and Plantings	
Total Trees To Be Removed	Total Trees To Be Planted
110	609

Temporary Wetland Impacts			
Wetland ID	Cowardin Class	Impact (SF)	Impact (AC)
WL2	PFO	618	0.01
WL3	PFO	1,042	0.02
WL6	PFO	683	0.02
	Total:	2,343	0.05

COASTAL RESOURCES INC.

CA-5 Stream Redesign

Appendix **III**

Attachment C

Sheet 1 of 1

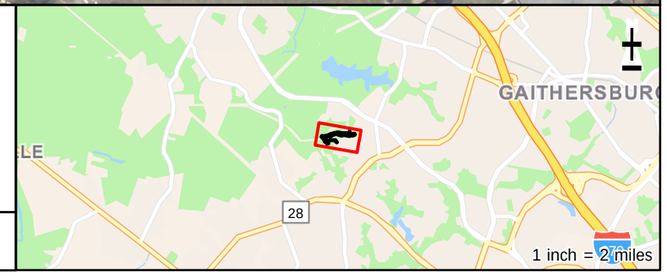
Montgomery County, Maryland
March 2022

- Limit of Disturbance
- Limit of Grading Area
- Parcel Boundary
- Forested Buffer
- 35' Buffer
- 2' Contour
- Permanent Impact, Wetland
- Temporary Impact, Wetland
- Impact, Water
- Wetland, Outside LOD
- Water, Outside LOD
- Redesign Baseline
- Tree Removal
- Forest Stand
- Forest Impact

N E S W

0 80 160
feet
1 inch = 180 feet

Map Center, NAD83
39.1301°, -77.2541°



APPENDIX IV

ATTACHMENT A – PHOTO STATION LOCATIONS

PP-105 at GW Seeps Adj to Trail

PP-106 US

PP-106 DS

XS-1 RIFFLE

4 FT

PP-5 DS at Confluence

3 FT

PP-5 US at Confluence

4 FT

PP-3 DS

PP-3 US

PP-4 DS

PP-4 US

PP-1 DS

PP-1 US

PP-2 DS

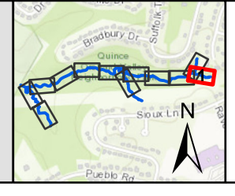
4 FT

PP-2 US

4 FT

I-495 & I-270 Managed Lanes Study
Phase II Mitigation Design Plan
Stream Site CA-5: Great Seneca Creek
Bradbury Dr. Tributary
Appendix A: CA-5 Site Sketch Map
Sheet 1 of 12

- Photo Point
- Bulk Sample
- Log Jam
- Placed Boulders
- Bedrock
- Culvert
- Outlet
- Bank Height (ft)
- Waters
- Foot Path
- Trails
- Cross Section Pin
- Cross Section
- Exposed Pipe
- Exposed Sewer Pipe
- Headcut
- Bench
- Sediment Bar
- Mainstem 1 Reach 1
- Mainstem 1 Reach 2
- Mainstem 1 Reach 3
- Mainstem 1 Reach 4
- Mainstem 2
- Tributary 1
- Tributary 2
- 2 FT Contour
- Study



N W E S

1 inch = 20 feet

0 10 20

Feet

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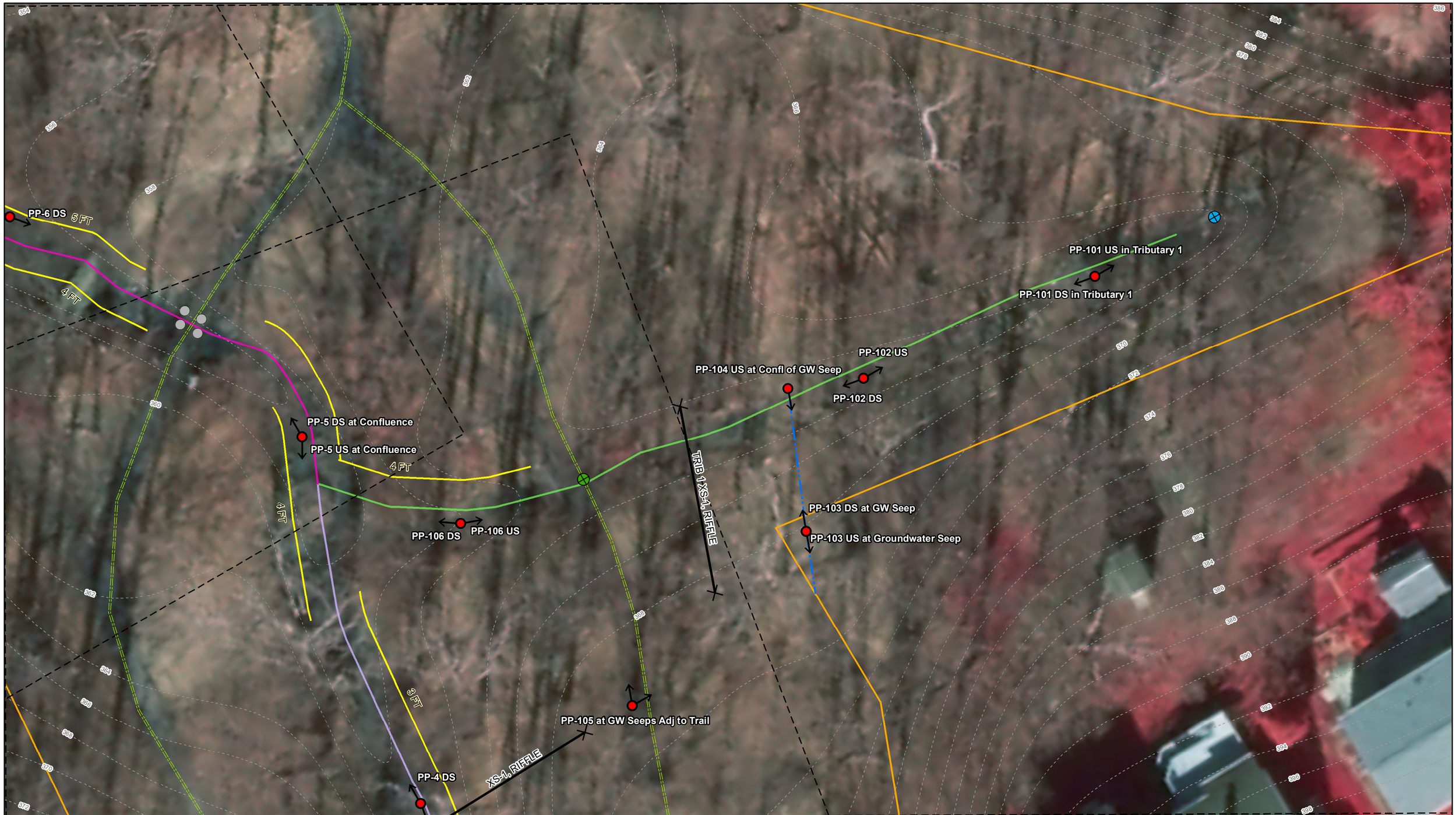
270 495 MANAGED LANES STUDY



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Bradbury Dr. Tributary
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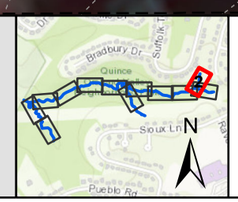
- Mainstem 1 Reach 2
- Mainstem 1 Reach 3
- Mainstem 1 Reach 4
- Mainstem 2
- Tributary 1
- Tributary 2
- 2 FT Contour
- Study



1 inch = 20 feet
0 10 20
Feet

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PP-201 US at GW Seep Headcut

PP-201 DS at GW Seep Headcut

XS-2, RIFFLE

PP-202 US Start of Headcut

PP-202 DS Start of Headcut

PP-6 US

PP-6 DS

PP-5 DS at Confluence

PP-5 US at Confluence

PP-11 US valley

PP-11 DS Valley

PP-7 US

PP-7 DS

PP-8 US Floodplain

PP-8 DS Floodplain

PP-9 US

PP-9 US at Floodplain

I-495 & I-270 Managed Lanes Study
Phase II Mitigation Design Plan
Stream Site CA-5: Great Seneca Creek
Bradbury Dr. Tributary

Appendix A: CA-5 Site Sketch Map

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Photo Point
Bulk Sample
Log Jam
Placed Boulders
Bedrock
Culvert
Outlet
Bank Height (ft)
Waters
Foot Path
Trails
Cross Section Pin
Cross Section
Exposed Pipe
Exposed Sewer Pipe
Headcut
Bench
Sediment Bar
Mainstem 1 Reach 1
Mainstem 1 Reach 2
Mainstem 1 Reach 3
Mainstem 1 Reach 4
Mainstem 2
Tributary 1
Tributary 2
2 FT Contour
Study

1 inch = 20 feet

0 10 20

Feet

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PP-13 DS
PP-13 US
4 FT
5 FT
5 FT
PP-12 US
PP-12 DS
6 FT
6 FT
3 FT
PP-10 DS at Confluence
PP-10 US at Confluence
PP-205 US at Confluence
3 FT
XS-9, RIFFLE
PP-204 US
4 FT
PP-204 DS
PP-203 DS
PP-203 US
4 FT
3 FT
2 FT
4 FT
PP-9 DS
5 FT

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Photo Point
Bulk Sample
Log Jam
Placed Boulders
Bedrock
Culvert
Outlet
Bank Height (ft)
Waters
Foot Path
Trails
Cross Section Pin
Cross Section
Exposed Pipe
Exposed Sewer Pipe
Headcut
Bench
Sediment Bar

1 inch = 20 feet
0 10 20
Feet

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495 270 MANAGED LANES STUDY

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Bradbury Dr. Tributary
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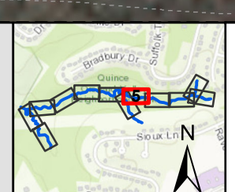
- Photo Point
- Bulk Sample
- Log Jam
- Placed Boulders
- Bedrock
- Culvert
- Outlet
- Bank Height (ft)
- Waters
- Foot Path
- Trails
- Cross Section Pin
- Cross Section
- Exposed Pipe
- Exposed Sewer Pipe
- Headcut
- Bench
- Sediment Bar
- Mainstem 1 Reach 1
- Mainstem 1 Reach 2
- Mainstem 1 Reach 3
- Mainstem 1 Reach 4
- Mainstem 2
- Tributary 1
- Tributary 2
- 2 FT Contour
- Study



N W E S

1 inch = 20 feet

0 10 20

Feet

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495 270 MANAGED LANES STUDY

PP-20 DS
PP-20 US
PP-18 DS
PP-18 US
PP-19 US
PP-19 DS
PP-304 US at Confluence
PP-17 DS
PP-17 US
PP-303 DS at Floodplain
PP-303 US Floodplain
1 FT
4 FT
5 FT
6 FT
7 FT
8 FT
324
326
328
330
332
334
336
338
340
342

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Photo Point
Bulk Sample
Log Jam
Placed Boulders
Bedrock
Culvert
Outlet
Bank Height (ft)
Waters
Foot Path
Trails
Cross Section Pin
Cross Section
Exposed Pipe
Exposed Sewer Pipe
Headcut
Bench
Sediment Bar
Mainstem 1 Reach 1
Mainstem 1 Reach 2
Mainstem 1 Reach 3
Mainstem 1 Reach 4
Mainstem 2
Tributary 1
Tributary 2
2 FT Contour
Study

N
1 inch = 20 feet
0 10 20
Feet

COASTAL RESOURCES INC.
270
495
MANAGED LANES STUDY

I-495 & I-270 Managed Lanes Study
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- Placed Boulders
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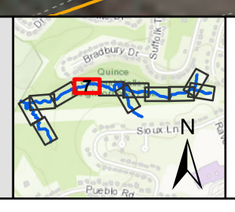
- Culvert
- Outlet
- Bank Height (ft)
- Waters
- Foot Path
- Trails
- Cross Section Pin
- Cross Section
- Exposed Pipe
- Exposed Sewer Pipe
- Headcut
- Bench
- Sediment Bar
- Mainstem 1 Reach 1
- Mainstem 1 Reach 2
- Mainstem 1 Reach 3
- Mainstem 1 Reach 4
- Mainstem 2
- Tributary 1
- Tributary 2
- 2 FT Contour
- Study



N
W E
S
1 inch = 20 feet
0 10 20
Feet

COASTAL RESOURCES INC.

495 270 MANAGED LANES STUDY

I-495 & I-270 Managed Lanes Study
Phase II Mitigation Design Plan
Stream Site CA-5: Great Seneca Creek
Bradbury Dr. Tributary
Appendix A: CA-5 Site Sketch Map
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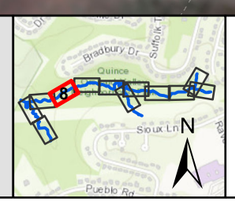
Photo Point
Bulk Sample
Log Jam
Placed Boulders
Bedrock
Culvert
Outlet
Bank Height (ft)
Waters
Foot Path
Trails
Cross Section Pin
Cross Section
Exposed Pipe
Exposed Sewer Pipe
Headcut
Bench
Sediment Bar
Mainstem 1 Reach 1
Mainstem 1 Reach 2
Mainstem 1 Reach 3
Mainstem 1 Reach 4
Mainstem 2
Tributary 1
Tributary 2
2 FT Contour
Study



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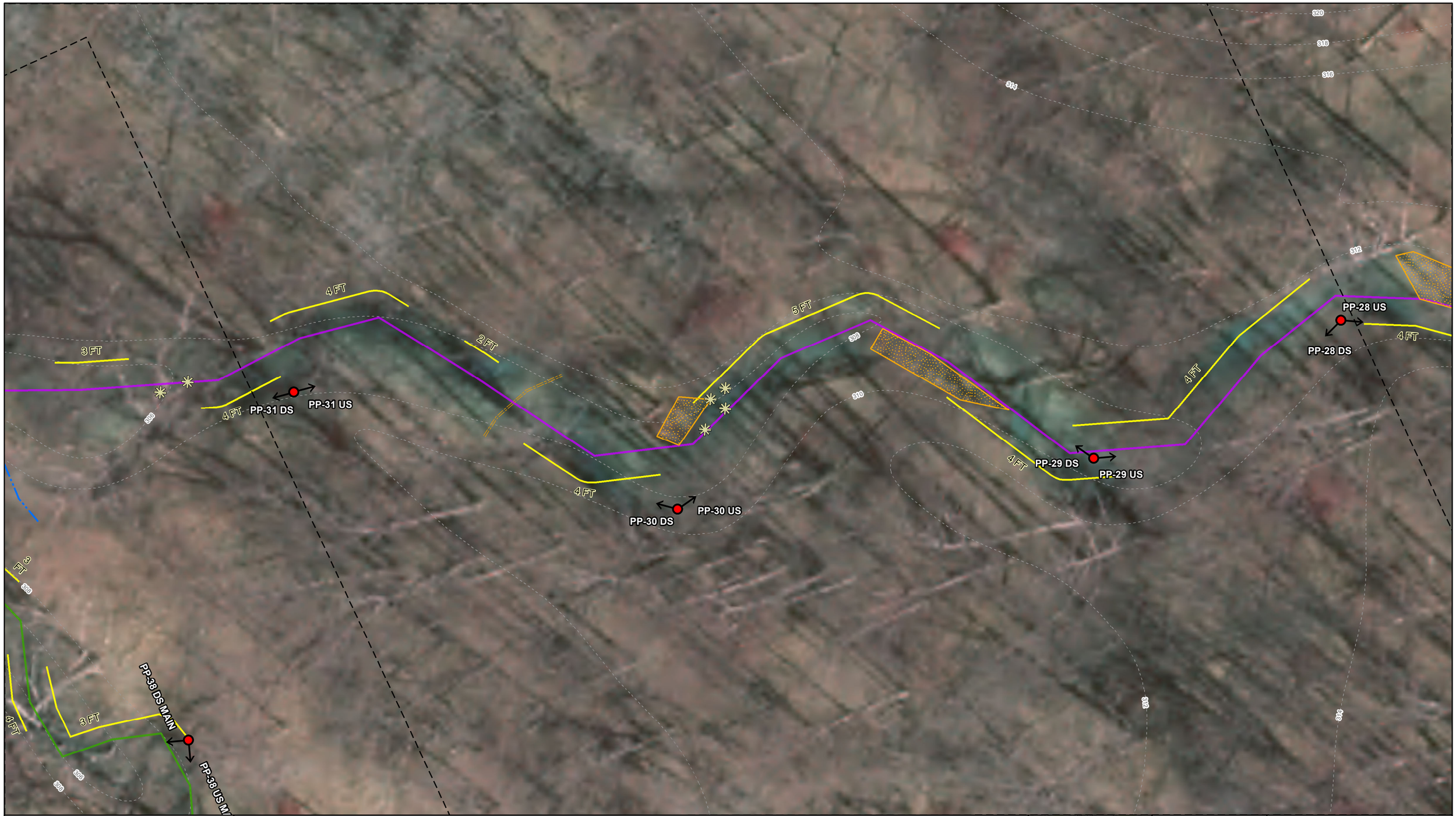
COASTAL RESOURCES INC.

495 270 MANAGED LANES STUDY



I-495 & I-270 Managed Lanes Study
Phase II Mitigation Design Plan
Stream Site CA-5: Great Seneca Creek
Bradbury Dr. Tributary
Appendix A: CA-5 Site Sketch Map
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- Photo Point
- Bulk Sample
- Log Jam
- Placed Boulders
- Bedrock
- Culvert
- Outlet
- Bank Height (ft)
- Waters
- Foot Path
- Trails
- Cross Section Pin
- Cross Section
- Exposed Pipe
- Exposed Sewer Pipe
- Headcut
- Bench
- Sediment Bar
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- Mainstem 1 Reach 2
- Mainstem 1 Reach 3
- Mainstem 1 Reach 4
- Mainstem 2
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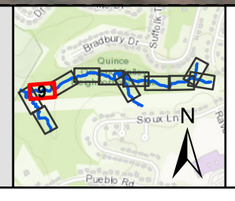
- Tributary 2
- 2 FT Contour
- Study



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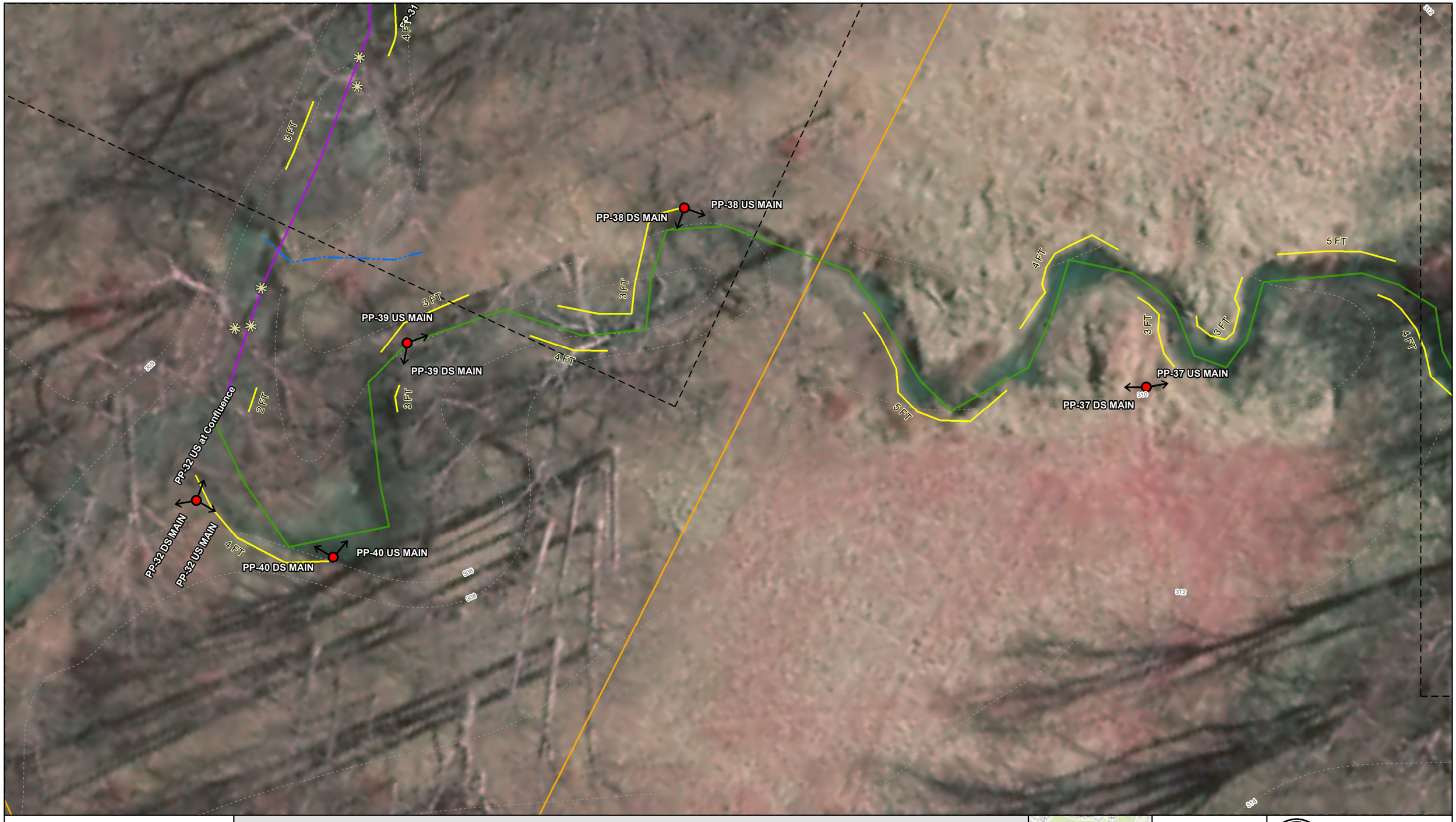

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Tributary 2
2 FT Contour
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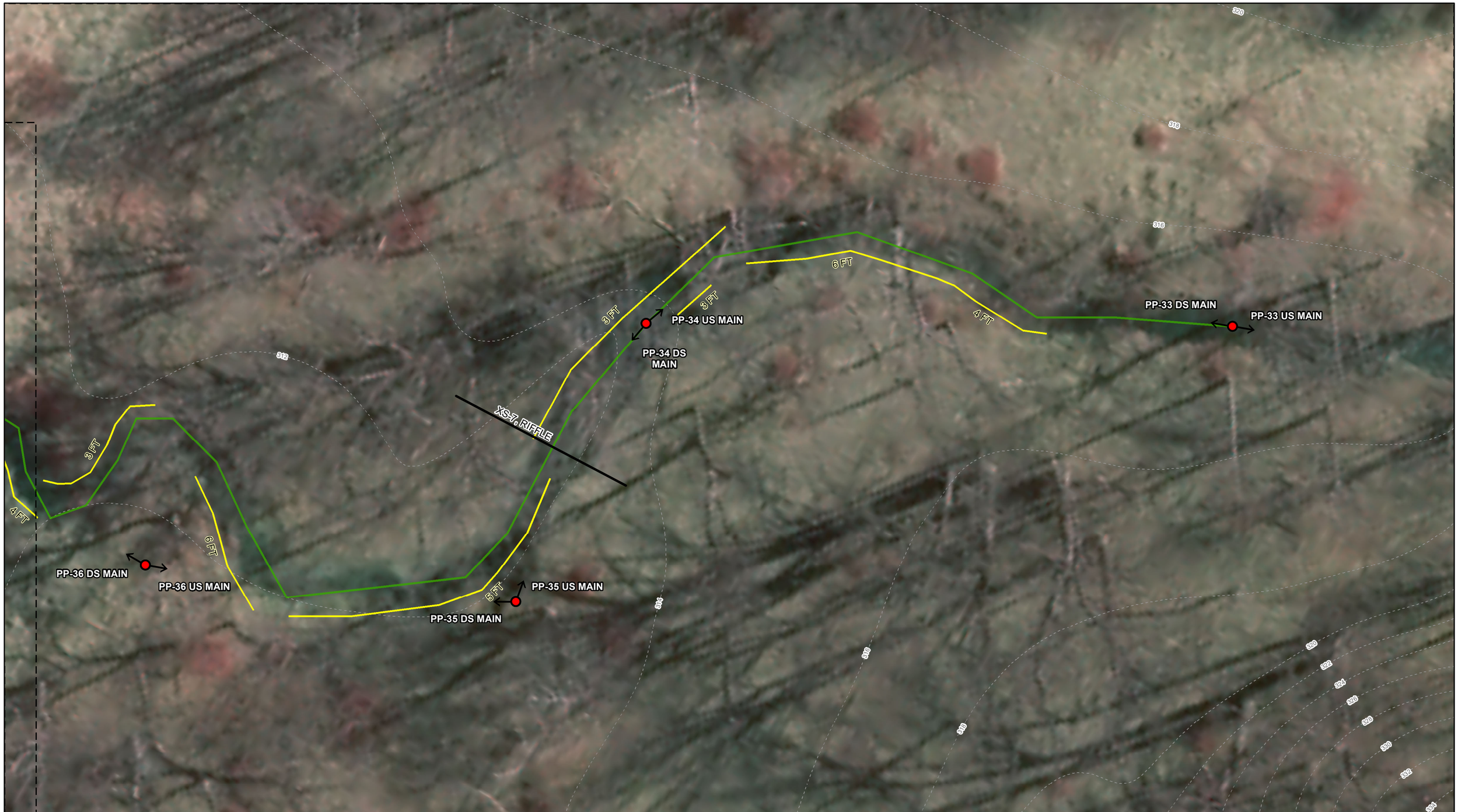
495 270 MANAGED LANES STUDY



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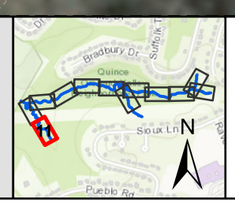

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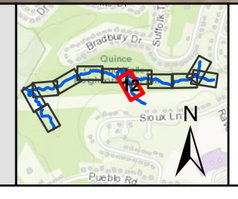

1 inch = 20 feet
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COASTAL RESOURCES INC.

270 495 MANAGED LANES STUDY

CA-5 Photo Point 1 Upstream; Long Pro Start

CA-5 Photo Point 1 Downstream

CA-5 Photo Point 2 Upstream

CA-5 Photo Point 2 Downstream

CA-5 Photo Point 3 Upstream

CA-5 Photo Point 3 Downstream

CA-5 Photo Point 4 Upstream

CA-5 Photo Point 4 Downstream

CA-5 Photo Point 5 Upstream at Confluence

CA-5 Photo Point 5 Downstream at Confluence

CA-5 Photo Point 6 Upstream

CA-5 Photo Point 6 Downstream

CA-5 Photo Point 7 Upstream

CA-5 Photo Point 7 Downstream

CA-5 Photo Point 8 Upstream at Floodplain

CA-5 Photo Point 8 Downstream at Floodplain

CA-5 Photo Point 9 Upstream

CA-5 Photo Point 9 Downstream

CA-5 Photo Point 9 Upstream at Floodplain Seep

CA-5 Photo Point 10 Upstream at Confluence with Headcut Trib

CA-5 Photo Point 10 Downstream at Confluence with Headcut Trib

CA-5 Photo Point 11 Upstream at Valley

CA-5 Photo Point 11 Downstream at Valley

CA-5 Photo Point 12 Upstream

CA-5 Photo Point 12 Downstream

CA-5 Photo Point 13 Upstream

CA-5 Photo Point 13 Downstream

CA-5 Photo Point 14 Upstream

CA-5 Photo Point 14 Downstream

CA-5 Photo Point 15 Upstream

CA-5 Photo Point 15 Downstream

CA-5 Photo Point 16 Upstream

CA-5 Photo Point 16 Downstream

CA-5 Photo Point 17 Upstream

CA-5 Photo Point 17 Downstream

CA-5 Photo Point 18 Upstream

CA-5 Photo Point 18 Downstream

CA-5 Photo Point 19 Upstream

CA-5 Photo Point 19 Downstream

CA-5 Photo Point 20 Upstream

CA-5 Photo Point 20 Downstream

CA-5 Photo Point 21 Upstream

CA-5 Photo Point 21 Downstream

CA-5 Photo Point 22 Upstream

CA-5 Photo Point 22 Downstream

CA-5 Photo Point 23 Upstream

CA-5 Photo Point 23 Downstream

CA-5 Photo Point 24 Down Valley at Farm Pond

CA-5 Photo Point 25 Upstream Pond Outfall

CA-5 Photo Point 25 Downstream Pond Outfall

CA-5 Photo Point 26 Up Valley at Farm Pond

CA-5 Photo Point 27 Upstream

CA-5 Photo Point 27 Downstream

CA-5 Photo Point 28 Upstream

CA-5 Photo Point 28 Downstream

CA-5 Photo Point 29 Upstream

CA-5 Photo Point 29 Downstream

CA-5 Photo Point 30 Upstream

CA-5 Photo Point 30 Downstream

CA-5 Photo Point 31 Upstream

CA-5 Photo Point 31 Downstream

CA-5 Photo Point 32 Upstream at Confluence with Mainstem 2

CA-5 Photo Point 32 Upstream Mainstem 2

CA-5 Photo Point 32 Downstream Mainstem 2

- CA-5 Photo Point 33 Upstream Main Channel

- CA-5 Photo Point 33 Downstream Main Channel

- CA-5 Photo Point 34 Upstream Main Channel

- CA-5 Photo Point 34 Downstream Main Channel

- CA-5 Photo Point 35 Upstream Main Channel

- CA-5 Photo Point 35 Downstream Main Channel

- CA-5 Photo Point 36 Upstream Main Channel

- CA-5 Photo Point 36 Downstream Main Channel

- CA-5 Photo Point 37 Upstream Main Channel

- CA-5 Photo Point 37 Downstream Main Channel

- CA-5 Photo Point 38 Upstream Main Channel

- CA-5 Photo Point 38 Downstream Main Channel

- CA-5 Photo Point 39 Upstream Main Channel

- CA-5 Photo Point 39 Downstream Main Channel

- CA-5 Photo Point 40 Upstream Main Channel

- CA-5 Photo Point 40 Downstream Main Channel

CA-5 Photo Point 101 Upstream in Tributary 1

CA-5 Photo Point 101 Downstream in Tributary 1

CA-5 Photo Point 101 36” Reinforced Concrete Pipe with Energy Dissipation into Tributary 1

CA-5 Photo Point 102 Upstream

CA-5 Photo Point 102 Downstream

CA-5 Photo Point 103 Upstream at Groundwater Seep

CA-5 Photo Point 103 Downstream at Groundwater Seep

CA-5 Photo Point 104 Upstream at Groundwater Seep from Confluence

CA-5 Photo Point 104 Downstream from Confluence

CA-5 Photo Point 105 at Groundwater seep adjacent to Trail

CA-5 Photo Point 105 at Groundwater seep adjacent to Trail

CA-5 Photo Point 106 Upstream

CA-5 Photo Point 106 Downstream

CA-5 Photo Point 201 Upstream at Groundwater Seep Headcut

CA-5 Photo Point 201 Downstream at Groundwater Seep Headcut

CA-5 Photo Point 202 Upstream Start of Headcut

CA-5 Photo Point 202 Downstream Start of Headcut

CA-5 Photo Point 203 Upstream

CA-5 Photo Point 203 Downstream

CA-5 Photo Point 204 Upstream

CA-5 Photo Point 204 Downstream

CA-5 Photo Point 205 Upstream at Confluence

CA-5 Photo Point 301 Upstream at Top of Tributary 2

CA-5 Photo Point 301 Downstream at Top of Tributary 2

CA-5 Photo Point 302 Upstream Near Trail

CA-5 Photo Point 302 Downstream Near Trail

CA-5 Photo Point 303 Upstream at Headcut

CA-5 Photo Point 303 Downstream

CA-5 Photo Point 303 at Abandoned Tributary

CA-5 Photo Point 304 Upstream at Confluence

ATTACHMENT B – LONG TERM MANAGEMENT PLAN

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION
LONG-TERM MANAGEMENT PLAN CA-5 MITIGATION SITE

Contents

LONG-TERM MANAGEMENT PLAN

I Introduction

A Purpose of Establishment

Compensatory mitigation is required when unavoidable impacts to, and to conserve and protect waters of the U.S. This Long-Term Management Plan (LTMP) was developed to protect and ensure the integrity of the mitigation as required by the 2008 Federal Mitigation Rule (33 CRF 332).

B Purpose of this Long-Term Management Plan

The purpose of this LTMP is to ensure the CA-5 Mitigation Site is managed, monitored, and maintained in perpetuity. This management plan establishes objectives, priorities and tasks to monitor, manage, maintain and report on the waters of the U.S., covered species and covered habitat on the site after Performance Standards established for the site have been achieved

C Long Term Steward and Responsibilities

The Long-Term Steward for the CA-5 Mitigation Site is the Maryland National Capital Park and Planning Commission (M-NCPPC). The small portion of the project located on Potomac Electric Power Company (PEPCO) property, Long-Term Steward is being discussed with Maryland Department of Transportation State Highway Administration (MDOT SHA). The Long-Term Steward, and subsequent Long-Term Stewards upon transfer, shall implement this long-term management plan, managing and monitoring the mitigation property in perpetuity to preserve its habitat and conservation values. Long-term management tasks shall be funded through the SHA Environmental Preservation Fund. The Long-Term Steward will maintain a copy of the Long-term Management Plan and all addendums associated with the CA-5 Site including all deed restrictions and/or easements. Any subsequent grading, or alteration of the site's hydrology and/or topography by the Long-Term Steward or its representatives must be approved by the U.S. Army Corps of Engineers (COE) and the Maryland Department of the Environment (MDE), i.e., "regulatory agencies" and the necessary permits, such as a Section 404 permit and/or Maryland Nontidal Wetlands Permit, must be obtained if required.

D Eminent Domain

If the site is taken in whole or in part through eminent domain, the Long-Term Steward shall use all monies received as compensation for lands and all associated services and values taken to provide replacement compensation within the same service area subject to COE and MDE approval. The COE and MDE shall have the right to participate in any proceeding associated with the determination of the amount of such compensation. Replacement compensation may be determined in consultation with the COE and MDE.

II Long-Term Management Reports

Long-Term Management reports will be produced for the CA-5 mitigation site. Reports will provide information obtained from inspections and observations made during the annual walk through. Reports will follow the following format.

Property Description

A Setting and Location

The Report will provide the address and a location map depicting the sites location in relation to cities, towns, or major roads, and other distinguishable landmarks. The CA-5 property map will show site and property boundaries on a topographic map.

B History and Land Use

A brief description of the site's history and land use will be provided.

C Cultural Resources

A brief discussion on any cultural resources identified during mitigation work plan development and approval will be provided.

D Topography and Hydrology

A description of site topography and hydrology will be provided. Hydrologic conditions observed during the annual walk-through will be noted and monthly rainfall amounts for the year prior to the site walk through will be provided and compared to seasonal averages to supply some perspective on the observed condition. Any significant precipitation events (storms or flooding) will be noted. Any discernible change in hydrologic inputs such as precipitation, surface run-off and/or out of bank flooding will be noted. Likewise, should contributing drainage areas undergo significant land use change; a description of such change will be provided.

However, unless deemed necessary, no borings will be conducted nor monitoring wells be installed.

E Adjacent Land Uses

A description of land use adjacent to the mitigation site will be provided. Any significant change in adjacent land use will be described in order to provide some perspective, if any, on its influence of the mitigation site.

F Results of Annual Management and Monitoring

A summary of any site management will be provided describing any action(s) taken to ensure long-term sustainability of the mitigation site as further described in **Section III** below.

III Management and Monitoring

The overall goal of long-term management is to foster the long-term viability of the mitigation site's waters of the U.S., and any listed species/habitat. Routine monitoring and minor maintenance tasks are intended to assure the viability of the mitigation site in perpetuity.

A Biological Resources

The approach to the long-term management of the mitigation site's biological resources is to conduct annual site examinations and monitoring of selected characteristics to determine stability and ongoing trends of the preserved, restored, enhancement, and created waters of the U.S., including wetlands and streams. Annual monitoring will assess the site's condition, degree of erosion, establishment of invasive or non-native species, water quality, fire hazard, and/or other aspects that may warrant management actions. While it is not anticipated that major management actions will be needed, an objective of this long-term management plan is to conduct monitoring to identify any issues that arise and using adaptive management

to determine what actions might be appropriate. Those chosen to accomplish monitoring responsibilities will have the knowledge, training, and experience to accomplish monitoring responsibilities.

Adaptive management means an approach to natural resource management which incorporates changes to management practices, including corrective actions as determined to be appropriate by the regulatory agencies in discussion with the Long-Term Steward. Adaptive management includes those activities necessary to address the effects of climate change, fire, flood, or other natural events. Before considering any adaptive management changes to the long-term management plan, the regulatory agencies will consider whether such actions will help ensure the continued viability of a site's biological resources.

The Long-Term Steward for the site shall implement the following:

Element A1. Waters of the U.S., including wetlands

Objective: Monitor, conserve, and maintain the mitigation site's waters of the U.S., including wetlands and/or streams. Limit any impacts to waters of the U.S. from vehicular travel or other adverse impacts.

Task: At least one annual walk-through survey will be conducted to qualitatively monitor the general condition of these habitats. General topographic conditions, hydrology, general vegetation cover and composition, invasive species, erosion, will be noted, evaluated and mapped during a site examination. Notes to be made will include observations of species encountered, water quality, general extent of wetlands and streams, and any occurrences of erosion, structure failure, or invasive or non-native species establishment

Task: Establish reference sites for photographs and prepare a site map showing the reference sites for the mitigation site's file. Reference photographs will be taken of the overall site at least every five years from the beginning of the long-term management.

Special attention should be paid to any area adjacent to or draining from the site. Streams and wetlands should be observed near site boundaries to observe if increased sediment deposition has occurred. The report should provide a discussion of any recent changes in the watershed (i.e., subdivision being developed upstream of stream bank).

Element A2. Threatened/Endangered Plant Species Monitoring (*if applicable*)

The CA-5 mitigation site has no known Rare, Threatened or Endangered plant species, thus this segment of the LTM plan is not applicable.

Objective: Monitor population status and trends.

Objective: Manage to maintain habitat for species(s) identified in the Mitigation Work Plan.

Task: Monitor status every year by conducting population assessment surveys. The annual survey dates will be selected during the appropriate period as identified by the Maryland department of Natural resources (MD DNR) and/or the U.S. Fish and Wildlife

Service (USFWS). Occupied habitat will be mapped and numbered to allow repeatable data collection over subsequent survey years. Abundance will be assessed semi-quantitatively using broad abundance categories, i.e., 0, 1 - 100, 101 - 500, 501 - 1,000, and >1,000 plants.

Task: Visually observe for changes to occupied habitat, such as changed hydrology or vegetation composition. Record any observed changes. Size of population (1 acre, etc).

Task: Implement other tasks that enhance or monitor habitat characteristics for the specie(s) identified in the Mitigation Work Plan.

Element A3. Threatened/Endangered Animal Species Monitoring *(if applicable)*

The CA-5 mitigation site has no known Threatened or Endangered animal species, thus this segment of the LTM plan is not applicable.

Objective: Manage to maintain habitat for specie(s) identified in the Mitigation Work Plan.

Task: Monitor status every year by conducting population assessment surveys. [The annual survey dates will be selected during the appropriate period each year as identified by MD DNR and/or USFWS.]

Task: Implement other tasks that enhance or monitor habitat characteristics for specie(s) identified in the Mitigation Work Plan.

Element A4. Invasive Species

Invasive species threaten the diversity or abundance of native species through competition for resources, predation, parasitism, interbreeding with native populations, transmitting diseases, or causing physical or chemical changes to the invaded habitat.

Objective: Monitor and maintain control over invasive species that diminish site quality for which the site was established. The Long-Term Steward shall consult the MD DNR at http://www.dnr.state.md.us for guidance on what species may threaten the site and on management of those species.

Task: Mapping of invasive species cover or presence shall occur each year. Mapping shall be accomplished through use of available technologies, such as GIS and aerial photography.

Task: Each year's annual walk-through survey (or a supplemental survey) will include a qualitative assessment (e.g. visual estimate of cover) of invasive species. Additional actions to control invasive species will be evaluated and prioritized in coordination with the regulatory agencies.

Element A5. Vegetation Management

Objective: Analyze effects of any authorized silvicultural manipulations on the wetland, streams, and buffers on the site. If determined appropriate, develop and implement specific silvicultural manipulations (e.g. selective thinning) in coordination with the regulatory agencies.

Objective: Adaptively manage vegetation based on site conditions and data acquired through monitoring to maintain biological values.

Task: Review and explore potential vegetation management regimes as proposals and/or opportunities and funding arise. If determined to potentially maintain site quality, develop specific silvicultural practices, amend this long-term management plan with the regulatory agencies approval to reflect those practices, and implement silvicultural actions as funding allows.

Task: Implement vegetation management techniques, if determined beneficial and as funding allows, to allow development of vegetation as identified in the Mitigation Work Plan. Implementation of vegetation management techniques must be approved by the regulatory agencies.

B Security, Safely, and Public Access

The CA-5 mitigation site will be fenced or appropriately marked and shall have no general public access, nor any regular public use. Research and/or other educational programs or efforts, hunting, and passive recreational activities may be allowed on the site as deemed appropriate by the regulatory agencies but are not specifically funded or a part of this long-term management plan.

Potential mosquito abatement issues will be addressed through the development of a plan by the Long-Term Steward and any local mosquito control district or local health department in coordination with and approved by the regulatory agencies.

Potential wildfire fuels will be reduced as needed where approved by the regulatory agencies.

Element B1. Trash and trespass

Objective: Monitor sources of trash and trespass.

Objective: Collect and remove trash, repair vandalized structures, and rectify trespass impacts.

Task: During each site visit, record occurrences of trash and/or trespass. Record type, location, and management mitigation recommendations to avoid, minimize, or rectify a trash and/or trespass impact.

Task: At least once yearly collect and remove as much trash as possible and repair and rectify vandalism and trespass impacts.

Element B2. Fire Hazard Reduction

Objective: Maintain the site as required for fire control while limiting impacts to biological values.

Task: Reduce vegetation in any areas recommended by authorities, and was approved by the regulatory agencies, for fire control.

C Infrastructure and Facilities

Element C1. Fences, Gates, Signage, Crossings, and Property Boundaries

Objective: Monitor condition of fences, gates, signage, crossings, and property boundaries.

Objective: Maintain fences, gates, signage, crossings and property boundaries to prevent casual trespass, allow necessary access, and facilitate management.

Task: During each site visit, record condition of fences, gates, signs, crossings, and property boundaries. Record location, type, and recommendations to implement repair or replacement to fence, gate, signage, crossings or property boundary markers, if applicable.

Task: Maintain fences, gates, signs, crossings and property boundary markers as necessary by replacing posts, wire, gates, and signs. Replace fences and/or gates, as necessary, and as funding allows. Note any trespass by livestock.

Element C2. Berms, Structures, and Roads

Objective: Monitor condition of berms, structures, and roads.

Objective: Maintain berms, structures, and roads to facilitate management and maintain conditions of wetlands and streams.

Task: During each site visit, record condition of berms, structures, and roads. Record location, type, and recommendations to implement repair or replacement to berms, structures, and roads, if applicable.

Task: Maintain berms, structures, and roads as necessary. Replace berms, structures, and roads as necessary, and as funding allows.

D Reporting and Administration

Element D1. Annual Report

Objective: Provide annual report on all management tasks conducted and general site conditions to COE and MDE and any other appropriate parties. Each report shall include a cover page with the following information: the site name (if applicable), Long-Term Steward (name, address, phone number, and email address), monitoring year, and any requested action (e.g. maintenance recommendations requiring regulatory approval).

Task: Prepare annual report and any other additional documentation. Include a summary. Complete and circulate to the COE and MDE and other parties by December 31 of each year. Reports should be distributed electronically.

Task: Make recommendations with regard to (1) any enhancement measures deemed to be warranted, (2) any problems that need near-,short-, and long-term attention (e.g., weed removal, fence repair, erosion control), and (3) any changes in the monitoring or management program that appear to be warranted based on monitoring results to date. Provide documentation of the cost of any recommended maintenance and repairs.

IV Transfer, Replacement, Amendments, and Notices

A Transfer

Any subsequent transfer of responsibilities under this long-term management plan to a different Long- Term Steward shall be requested by the Long-Term Steward in writing to the COE and MDE, shall require written approval by the COE and MDE, and shall be incorporated into this long-term management plan by amendment.

The long-term steward shall be required to ensure that any subsequent property owners (if not identified as the long-term steward) are notified of the deed restriction, conservation easement, purpose and location of the mitigation site lands, and requirement for long-term stewardship.

B Replacement

Any subsequent transfer of responsibilities under this long-term management plan to a different Long- Term Steward shall be requested by the Long-Term Steward in writing to the COE and MDE, shall require written approval by the COE and MDE, and shall be incorporated into this long-term management plan by amendment.

The long-term steward shall be required to ensure that any subsequent property owners (if not identified as the long-term steward) are notified of the deed restriction, conservation easement, purpose and location of the mitigation site lands, and requirement for long-term stewardship.

C Amendments

The Long-Term Steward, property owner, and the regulatory agencies may meet and confer from time to time, upon the request of any one of them, to revise the long-term management plan to better meet management objectives and preserve the conservation values of the mitigation site. Any proposed changes to the long-term management plan shall be discussed with the COE and MDE and the Long- Term Steward. Any proposed changes will be designed with input from all parties.

Amendments to the long-term management plan shall be approved by the COE and MDE in writing shall be required management components and shall be implemented by the Long-Term Steward.

If the Maryland Department of Natural Resources (MD DNR) or U.S. Fish and Wildlife Service (USFWS) determine, in writing, that continued implementation of the long- term management plan would jeopardize the continued existence of a state or federally listed species, any written amendment to this long-term management plan, determined by either the MD DNR or USFWS as necessary, shall be a required management component and shall be implemented by the Long-Term Steward.

D Notices

Any notices regarding this long term management plan shall be directed as follows:

Long-Term Steward:

Maryland-National Capital Park and Planning Commission
6611 Kenilworth Avenue, Riverdale, Maryland 20737 PH – 301-699-2255
Email: matthew.harper@montgomeryparks.org

MDOT SHA Contact:

Maryland Department of Transportation State Highway
Administration Office of Environmental Design
707 N. Calvert Street, Baltimore, Maryland 21202 PH -410-545-8628
Email: WBuettner@mdot.maryland.gov

Regulatory Agencies:

U.S Army Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203
PH – 410-962-7608

Maryland Department of the Environment Baltimore District
1800 Washington Boulevard
Baltimore, Maryland 21230
PH – 410-537-3000

V Funding and Task Prioritization

A Funding

The funding of costs for the long term management of any mitigation site shall be provided by the Maryland State Highway Administration through the Environmental Preservation Fund.

B Task Prioritization

Due to unforeseen circumstances, prioritization of tasks, including tasks resulting from new requirements, may be necessary if insufficient funding is available to accomplish all tasks. The Long-Term Steward and the regulatory agencies shall discuss task priorities and funding availability to determine which tasks will be implemented. In general, tasks are prioritized in this order: 1) required by a local, state, or federal agency; 2) tasks necessary to maintain or remediate a mitigation site (including unauthorized impacts); and 3) tasks that monitor resources, particularly if past monitoring has not shown downward trends.

Equipment and materials necessary to implement priority tasks will also be considered priorities. Final determination of task priorities in any given year of insufficient funding will be determined in consultation with the COE and MDE and as authorized by the COE and MDE in writing.

C Enforcement

The regulatory agencies and its authorized agents shall have the right to inspect the Bank sites and take actions necessary to verify compliance with this Long-Term Management Plan. The Long-Term Management Plan herein shall be enforceable by any proceeding at law or in equity or administrative proceeding by the Corps or MDE. Failure by any agency (or owner) to enforce the Long-Term Management Plan contained herein shall in no event be deemed a waiver of the right to do so thereafter.

APPENDIX V

ATTACHMENT A – DESIGN PLANS (UNDER SEPARATE COVER)