DISTRICT DEPARTMENT OF THE ENVIRONMENT

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U.S. Department of the Interior
National Park Service

Restoration of Unnamed Tributary to Broad Branch

Rock Creek Park

ENVIRONMENTAL ASSESSMENT

February 2012

DC DEPARTMENT OF THE ENVIRONMENT

NATIONAL PARK SERVICE
U.S. DEPARTMENT OF THE INTERIOR

Rock Creek Park
Washington, DC

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Rock Creek Park

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PROJECT SUMMARY

INTRODUCTION

The District Department of the Environment (DDOE) and the National Park Service (NPS) have prepared an Environmental Assessment (EA) to evaluate alternatives for the restoration of an unnamed tributary to Broad Branch in Washington, DC. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. DDOE and NPS have conducted consultation under Section 106 of the National Historic Preservation Act (NHPA) in coordination with this EA.

An administrative unit of the National Park System, Rock Creek Park is located in the Northwest quadrant of Washington, DC. The park's main section is a largely wooded valley stretching from the Maryland state line south to the National Zoological Park, with associated tributaries and upland areas. The two-mile long Rock Creek and Potomac Parkway runs south of the National Zoological Park to its southern terminus at Virginia Avenue, NW. The park also encompasses several stream valley parks, including Glover Archbold Park, as well as portions of the Civil War Defenses of Washington (Fort Circle Parks).

PURPOSE AND NEED FOR THE ACTION

DDOE and the NPS, as co-lead agencies, propose to restore approximately 1,600 linear feet of an unnamed tributary to Broad Branch. It is located just upstream of 36th Street to just upstream of the crossing on Broad Branch Road, NW across the street from the entrance to the Embassy of the Ivory Coast. The tributary drains into the approximately 170-acre Broad Branch watershed and currently is piped beneath property owned by the NPS and the District of Columbia (District). The Broad Branch watershed is a highly urbanized sub-watershed of Rock Creek located in Washington, DC.

The purpose of the project is to remove a portion of the stream that was piped underground in 1937 and restore it to its historic channel, a process known as "daylighting;" help process and remove pollutants from the stream by exposing it to sunlight, air, soil, and vegetation; and reduce nutrient and sediment pollution from erosion caused by fast-flowing stormwater and non-point source pollution by increasing groundwater infiltration and creating meanders and floodplain wetlands.

The project is needed because fast free-flowing stormwater has caused erosion of gullies located on Peruvian Embassy property, which have eroded the banks of the unnamed tributary and have caused sedimentation to occur. This has destabilized the surrounding environment, reduced infiltration of water into underlying aquifers, and compromised wildlife habitat. Because the unnamed tributary to Broad Branch is not conveyed through a healthy stream, piped stormwater is not treated for pollutants, nor harnessed before it enters Broad Branch. Without intervention, fast stormwater flows would continue to degrade and pollute these resources.

OVERVIEW OF THE ALTERNATIVES

This EA analyzes the no action alternative, Alternative 1, along with two alternatives for the daylighting and restoration of the unnamed tributary to Broad Branch. The difference in the action alternatives is the extent and length of restoration of the stream. Under Alternative 2, the full restoration alternative, approximately 1,600 linear feet of stream would be daylighted and restored with associated stormwater wetlands and regenerative step-pools for additional stormwater management. Under Alternative 3, the partial restoration alternative, approximately 400 linear feet of stream would be daylighted and restored. No stormwater wetlands are proposed to be constructed under this alternative.

Alternative 2 is the Preferred Alternative. The restoration of 1,600 linear feet of the stream would provide the largest beneficial impacts. Alternative 2 would best protect, preserve, and enhance cultural and natural resources. Daylighting the stream would improve water quality at the location and downstream by exposing water to sunlight, air, soil, and vegetation, all of which help process and remove pollutants. Furthermore, restoring the stream would reduce erosion caused by fast-flowing stormwater and lower the amount of nutrient and sediment pollution that is entering the stream. This reduction would be achieved by creating meanders and floodplain wetlands.

HOW TO COMMENT

To comment on this EA, you may mail comments or submit them online at *http://parkplanning.nps.gov/ROCR* and follow the appropriate links. Please be aware that your comments and personal identifying information may be made publicly available at any time. While you may request that NPS withhold your personal information, we cannot guarantee that we will be able to do so. Please mail comments to:

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

The District Department of the Environment (DDOE) and the National Park Service (NPS) propose to restore approximately 1,600 linear feet of an unnamed tributary to Broad Branch from just upstream of 36th Street to just upstream of the crossing on Broad Branch Road, NW across the street from the entrance to the Embassy of the Ivory Coast. The tributary drains into the approximately 170-acre Broad Branch watershed and currently is piped beneath property owned by the NPS and the District of Columbia (District). The project area is located in the Northwest quadrant of Washington, DC and includes a portion of Rock Creek Park, which is an administrative unit of the National Park Service, and a parcel of land owned by the Peruvian Embassy (see Figure 1).

This EA analyzes the no action alternative along with two action alternatives for restoring a portion of an unnamed tributary to Broad Branch. The EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the regulations of the Council on Environmental Quality for implementing NEPA (40 Code of Federal Regulation (CFR) 1500-1508), and NPS Director's Order #12, Conservation Planning, Environmental Impact Analysis, and Decision-making. In accordance with Section 800.8 of the Advisory Council on Historic Preservation's regulations (36 CFR 800), the process and documentation required for preparation of this EA has been coordinated with consultation under Section 106 of the National Historic Preservation Act (NHPA).

PURPOSE OF AND NEED FOR ACTION

The purpose of the project is to restore the function and value of an unnamed tributary of Broad Branch that was piped underground in 1937. Restoring the tributary to its historic channel, a process known as "daylighting", and addressing damaged caused by stormwater entering the tributary from the Peruvian Embassy property, would provide several benefits: (1) exposing the tributary's main channel to sunlight, air, soil, and vegetation, which would allow growth of aquatic and riparian vegetation that can help in water quality improvement by uptake of organic and inorganic pollutants (ODEQ 2011); and (2) reducing nutrient levels and sedimentation by managing erosive stormwater, increasing groundwater infiltration, and creating meanders and floodplain wetlands.

The project is needed because the unnamed tributary to Broad Branch is not conveyed through a healthy stream system. In particular, piped water is not treated for pollutants, nor harnessed before it enters Broad Branch. Also, fast free-flowing stormwater has eroded gullies located on Peruvian Embassy property and the banks of the unnamed tributary and has caused sedimentation to occur. This has destabilized the surrounding environment, reduced infiltration of water into underlying aquifers, and compromised wildlife habitat.

Figure 1 – Project location

PROJECT BACKGROUND

In a natural environment, a significant portion of precipitation infiltrates the soil and eventually enters groundwater aquifers. Moved by gravity, water emerges over time from these aquifers into above-ground waterways, where is referred to as "base flow." However, in urbanized

environments, impervious surfaces, such as roads and parking lots, hamper infiltration and decrease base flow. During precipitation events, water runoff from impervious surfaces discharges directly or indirectly into waterways, often causing erratic and violent storm surges. Many waterways are not equipped to handle the energy and volume of these surges, which harm surrounding vegetation and cause sediment deposition downstream, negatively impacting aquatic species. Over the past several decades, the Rock Creek watershed has experienced substantial development that has impacted the stream's health. Surges of stormwater from stormwater drains and overflows from combined sewer/stormwater lines have contributed to point and non-point source pollutants and created erratic or "flashy" stream flow that is disruptive to habitat and stable channel conditions. The stream's water quality is affected by elevated levels of metals, bacteria, and organics that exceed the allowable total maximum daily loads (TMDLs) for Rock Creek, as defined by the U.S. Environmental Protection Agency (EPA). These impairments are documented in the EPA's 2008 water quality report.

In 2003, DDOE (then called the Department of Health, Environmental Health Administration) began a planning process to develop Watershed Implementation Plans (WIPs) for each of the District's impaired watersheds. The Rock Creek WIP, which was finalized and approved by the EPA in 2010, included a prioritized list of potential restoration projects.

This project, "daylighting" a portion of the unnamed tributary to Broad Branch, was identified through this process. The tributary is partially piped and partially free flowing (see Figure 2). During heavy storm events, fast-flowing stormwater causes erosion of the gullies located on Peruvian Embassy property and erosion and sedimentation within the free-flowing portion of the stream channel. This erosion and sedimentation has destabilized the surrounding environment, reduced infiltration of water into underlying groundwater aquifers, and compromised wildlife habitat. These flows have also caused sediment deposition further downstream within Broad Branch.

As authorized by Section 319 of the Clean Water Act (33 USC § 1251), the District of Columbia receives an annual grant from the EPA for projects to reduce non-point source pollution. In fiscal year 2007, the DDOE requested incremental 319 grant funds from the EPA for the design of a stream restoration project to daylight the unnamed tributary of Broad Branch. Since this time, DDOE has requested and been approved for additional EPA 319 grant funds to implement the proposed designs.

SIGNIFICANCE OF ROCK CREEK PARK

The park's enabling legislation, passed in 1890, continues to guide planning and management. It states that Rock Creek Park is to be "perpetually dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people of the United States." It specifies that the park is to "provide for the preservation from injury or spoliation of all timber, animals, or curiosities within said park, and their retention in their natural condition, as nearly as possible."

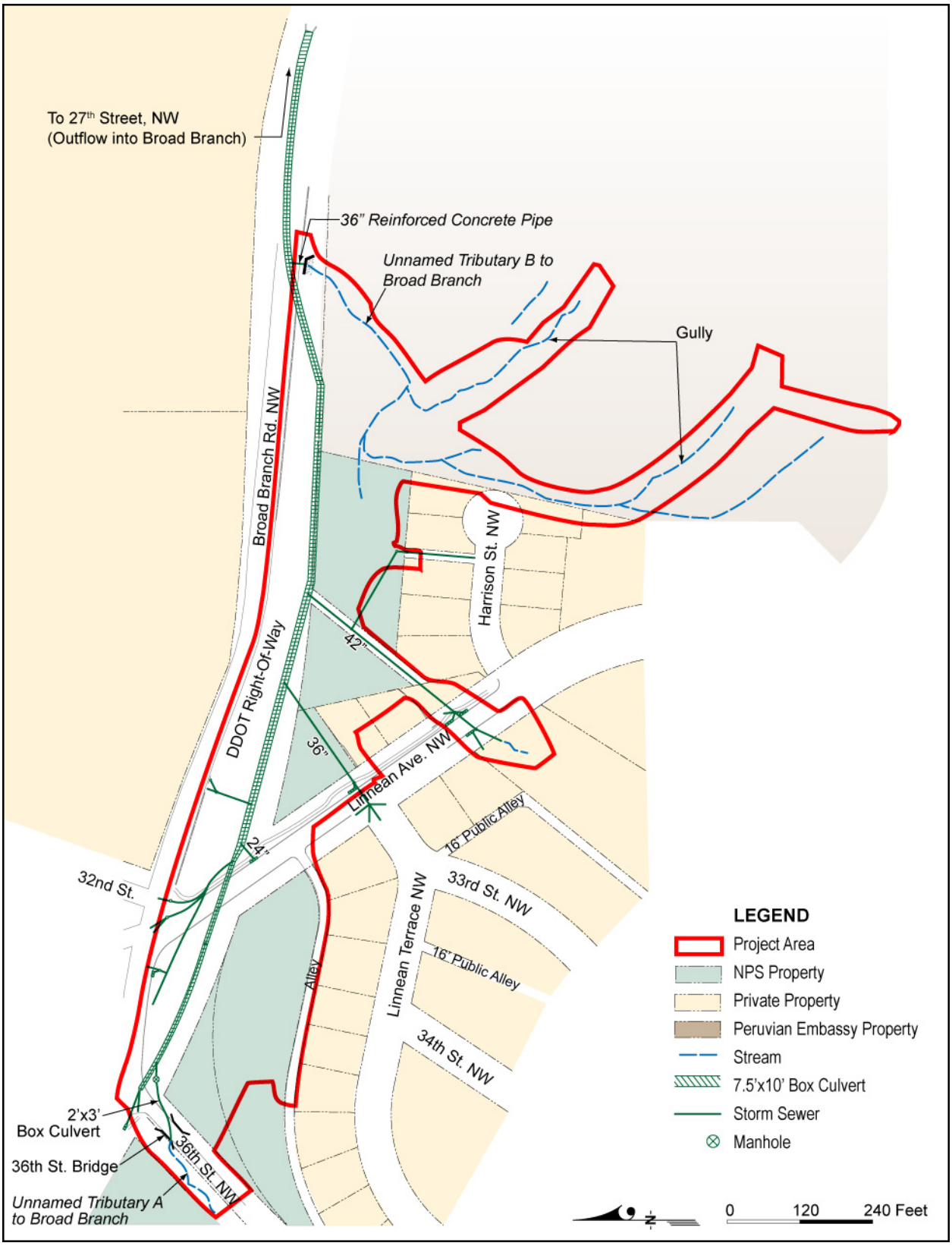

Figure 2 – Project area map

Rock Creek Park is an administrative unit of the National Park Service that includes Rock Creek Park proper (Reservation 339), and Rock Creek and Potomac Parkway (Reservation 360). It is located in the Northwest and Northeast quadrants of Washington, DC. One of the park's most notable features is Rock Creek, which bisects the length of Rock Creek Park. Rock Creek is a tributary of the Potomac River, which is part of the Chesapeake Bay watershed. Broad Branch is a tributary of Rock Creek.

The Civil War Defenses of Washington (Fort Circle Parks) is comprised of the remains of the fortifications that protected Washington, DC from 1861-1865. Managed by three different units of the National Park Service, the Civil War Defenses of Washington also includes small parcels that were purchased for the development of a scenic drive that was to encircle the city. Although the scenic drive was only partially constructed, the parcels acquired as part of this effort and the individual fort sites make up the Civil War Defenses of Washington under the management of the National Park Service (NPS 2004).

The proposed project lies within portions of US Reservation 515 (Civil War Defenses of Washington) that is managed by Rock Creek Park and within the District of Columbia right-of-way lands. The project area, bounded by 36th Street, NW, Broad Branch Road, NW, and 27th Street, NW and is largely wooded and with an intact stream buffer.

RELATIONSHIP TO LAWS, EXECUTIVE ORDERS, POLICIES, AND OTHER PLANS

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969, AMENDED (42 U.S.C. 4321-4347)

NEPA requires federal agencies to integrate environmental values into their decision-making process by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

NEPA is implemented through the Council on Environmental Quality Regulations for Implementing NEPA (40 CFR 1500-1508). In accordance with these regulations, the NPS has adopted Director's Order #12, Conservation Planning, Environmental Impact Analysis, and Decision-making which provides procedures for NEPA compliance for the NPS.

NATIONAL HISTORIC PRESERVATION ACT, AS AMENDED THROUGH 2000 (16 U.S.C 470)/SECTION 106

Section 106 of the National Historic Preservation Act, as amended, and implemented by 36 CFR Part 800, requires federal agencies to consider the effects of their actions on historic properties. It provides the State Historic Preservation Officer(s) (SHPO) and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on federal projects, prior to implementation that would have an effect on historic properties. Historic properties are defined as archaeological sites, standing structures, or other historic resources listed in or eligible for listing in the National Register of Historic Places (NRHP).

HISTORIC SITES ACT OF 1935

This act declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance (16 USC § 461-67). It authorizes the Secretary of the Interior and the NPS to restore, reconstruct, rehabilitate, preserve, and maintain historic or

prehistoric sites, buildings, objects, and properties of national historical or archeological significance.

NPS ORGANIC ACT

In the National Park Service Organic Act of 1916 (the "Organic Act"), Congress directed the U.S. Department of the Interior and the NPS to manage park units "to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as would leave them unimpaired for the enjoyment of future generations" (16 USC § 1). Although the Organic Act affords the NPS latitude when making decisions about visitor recreation and resource preservation, actions that permanently "impair" park resources are prohibited unless otherwise specifically allowed by law (*Id.* § 1a-1).

Because conservation remains predominant, the NPS seeks to avoid or to minimize adverse impacts on park resources and values. However, the NPS has discretion to allow impacts on park resources and values when necessary and appropriate to fulfill a purpose identified in the establishing legislation or proclamation of the park (NPS 2006 sec. 1.4.3). While some actions and activities cause impacts, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006, NPS Organic Act). An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative impacts of the impact in question and other impacts" (NPS 2006).

NATIONAL PARKS OMNIBUS MANAGEMENT ACT OF 1998

The National Parks Omnibus Management Act (NPOMA) (16 USC 5901 et seq.) underscores NEPA and is fundamental to NPS management decisions. Both acts provide direction for articulating and connecting the ultimate resource management decision to the analysis of impacts, using appropriate technical and scientific information. Both also recognize that such data may not be readily available and provide options for resource impact analysis should this be the case. NPOMA directs the NPS to obtain scientific and technical information for analysis. The NPS handbook for Director's Order 12 states that if "such information cannot be obtained due to excessive cost or technical impossibility, the proposed alternative for decision would be modified to eliminate the action causing the unknown or uncertain impact, or other alternatives would be selected" (NPS 2006).

CLEAN WATER ACT

The Clean Water Act (CWA) establishes the basic structure for regulating pollutant discharges to navigable waters of the U.S. It sets forth procedures for effluent limitations, water quality standards and implementation plans, national performance standards, and point source (such as municipal wastewater discharges) and nonpoint source programs. The CWA also establishes the National Pollutant Discharge Elimination System (NPDES) under Section 402 and permits for dredged or fill material under Section 404.

EXECUTIVE ORDER 11988 FLOODPLAIN MANAGEMENT

Executive Order 11988 (Floodplain Management) requires federal agencies to avoid direct or indirect support of development within the 100-year floodplain whenever there is a practicable alternative. A floodplain is defined as the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year. The critical action floodplain is defined as the 500-year floodplain (0.2 percent chance floodplain). The 500-year floodplain as defined by 40 CFR 9 is an area, including the base floodplain, which is subject to inundation from a flood having a 0.2 percent chance of being equaled or exceeded in any given year.

EXECUTIVE ORDER 11990 PROTECTION OF WETLANDS

Executive Order 11990 requires federal agencies to avoid to the greatest extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. A wetland is defined as an area where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season.

EXECUTIVE ORDER 13514: FEDERAL LEADERSHIP IN ENVIRONMENTAL, ENERGY, AND ECONOMIC PERFORMANCE

Issued on October 5, 2009, Executive Order 13514 seeks to make improvements in the overall sustainability of the federal government. This order requires all federal agencies to develop a plan to meet a wide range of goals for improving sustainability, such as sustainable community planning, water efficiency, environmental management, high performance buildings and systems, and reduced greenhouse gas emissions (Exec. Order No. 13514 74 FR 52117 2009).

Local Plans and Policies

ROCK CREEK WATERSHED IMPLEMENTATION PLAN (WIP)

The EPA requires all jurisdictions that receive EPA grants to address non-point source pollution to develop WIPs to achieve TMDL goals for their priority restoration watersheds. In 2003 DDOE (then called the Department of Health, Environmental Health Administration) began a planning process to develop WIPs for each of the District's impaired watersheds. The Rock Creek WIP, which was finalized and accepted by the EPA in 2010, included a prioritized list of potential restoration projects. The project DDOE and NPS are proposing in this Environmental Assessment – "daylighting" a portion of the unnamed tributary to Broad Branch – is one of these projects.

NPS Policies and Plans

DIRECTOR'S ORDER 28: CULTURAL RESOURCE MANAGEMENT

Director's Order 28 calls for the NPS to protect and manage cultural resources in its custody through effective research, planning, and stewardship in accordance with the policies and

principles contained in the NPS Management Policies (NPS 2006). This order also directs the NPS to comply with the substantive and procedural requirements described in the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation;* the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Treatment of Cultural Landscapes;* and the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings.* Additionally, the NPS would comply with the 2008 Service-wide Programmatic Agreement (PA) with the ACHP and the National Conference of State Historic Preservation Officers. The accompanying handbook to this order addresses standards and requirements for research, planning, and stewardship of cultural resources as well as the management of archeological resources, cultural landscapes, historic and prehistoric structures, museum objects, and ethnographic resources.

DIRECTOR'S ORDER 77-1: WETLAND PROTECTION

Director's Order 77-1 was issued in response to Executive Order 11990, Protection of Wetlands. The Director's Order establishes the policies, requirements, and standards through which the NPS would meet its responsibilities to protect and preserve wetlands.

DIRECTOR'S ORDER 77-2: FLOODPLAIN MANAGEMENT

Director's Order 77-2 was issued in response to Executive Order 11988, Floodplain Management. This order applies to all proposed NPS actions that could adversely affect the natural resources and functions of floodplains or increase flood risks. This includes those proposed actions that are functionally dependent upon locations in proximity to the water and for which non-floodplain sites are not practicable alternatives.

NPS MANAGEMENT POLICIES 2006

The NPS Management Policies 2006 (NPS 2006) is the basic NPS policy document, adherence to which is mandatory unless specifically waived or modified by the NPS Director or certain Department of the Interior officials, including the U.S. Secretary of the Interior. Actions under this EA are in part guided by these management policies.

ROCK CREEK PARK GUIDANCE AND POLICY

ROCK CREEK PARK AND ROCK CREEK AND POTOMAC PARKWAY FINAL GENERAL MANAGEMENT PLAN/ENVIRONMENTAL IMPACT STATEMENT (2005)

This document, known as the GMP, is a comprehensive management plan for Rock Creek Park. The purpose of the GMP is to specify resource conditions and visitor experiences to be achieved in the park and the parkway, and to provide a foundation for decision-making and the preparation of more specific resource plans. In addressing the difficulty of satisfying the often-conflicting purposes of protecting the scenic, natural, and cultural resources of the park, while concurrently providing for appropriate public use of these resources, it outlines the following:

- **Natural Resource Management Requirements**
  - Natural soil resources and processes function in as natural a condition as possible, except where special management considerations are allowable under policy;
  - Native plant and animal species function in as natural a condition as possible, except where special management considerations are allowable under policy; and
  - Invasive species are reduced in numbers and area, or are eliminated from natural areas of the park.

- **Cultural/Historical Resource Management Requirements**
  - Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. In the cases where disturbance or deterioration is unavoidable, the site may be professionally documented and salvaged; and
  - Qualities of historic properties, such as historic structures and cultural landscapes, which contribute to their listing or eligibility are protected in accordance with the Secretary of the Interior's standards, unless it is determined through formal processes that disturbance or natural deterioration is unavoidable.

RESOURCES MANAGEMENT PLAN ROCK CREEK PARK (1996)

The Resources Management Plan for Rock Creek Park provides specific management objectives. Those that apply to this project include:

- Work cooperatively with other federal agencies, agencies in Maryland and the District of Columbia, private organizations, and members of the public to develop programs to reduce flooding and pollution in the Rock Creek watershed and to prevent or repair damage to park resources caused by human activities;
- Improve the quality of the visitor experience by better protecting natural resources;
- Preserve and perpetuate the park's plant and wildlife resources in as natural a condition as possible, and reduce the adverse effects of human activities and exotic species on the natural environment;
- Identify, protect, and perpetuate the park's historic resources, including its mills, Civil War fortifications, and archeological sites;
- Monitor and evaluate current recreational uses of the park's lands and redirect these activities in order to reduce adverse impacts;
- Foster understanding and appreciation of the park's natural and cultural values through interpretive and educational programs focusing on Rock Creek's biological, geological, historic, and prehistoric resources; and
- Establish contact and cooperation with citizen associations, governmental agencies, and other groups or individuals that surround, or have direct effects on or interests in the welfare of, the park.

FORT CIRCLE PARKS FINAL MANAGEMENT PLAN

During the Civil War, the federal government built fortifications surrounding Washington, DC to protect the city and vital supply routes. The remains of these fortifications are preserved by the NPS and are designated as the Fort Circle Parks (Civil War Defenses of Washington).

In 2004, the NPS completed a GMP for the Fort Circle Parks. The GMP allows for these resources to be preserved for future generations and to be interpreted in an easily understandable manner (NPS 2004). Rock Creek Park, one of three NPS units that manage the Fort Circle Parks, administers a semicircle of these Civil War sites. A portion of the project area for the Broad Branch stream restoration project lies within the Rock Creek Park portion of the Fort Circle Parks (Civil War Defenses of Washington).

SCOPING PROCESS AND PUBLIC PARTICIPATION

Scoping is the effort to involve agencies, organizations, and the public in determining the issues to be addressed in an environmental assessment. Among other tasks, scoping determines important issues; eliminates issues determined not to be important; allocates assignments among the interdisciplinary team members and/or other participating agencies; identifies related projects and associated documents; identifies other permits, surveys, and consultations required with other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. Scoping is a process that seeks opinions and consultation from any interested agency or agency with legal jurisdiction.

Internal Scoping. Multidisciplinary team meetings between the NPS, DDOE, the District Department of Transportation (DDOT), and the District of Columbia Water and Sewer Authority (DC Water) have been conducted since this project was proposed. Issues of particular concern that were raised during these meetings include impacts to water resources and vegetation, plans by DDOT to repave/resurface Broad Branch Road, NW, and the impact to existing water utilities in the project area.

External Scoping. DDOE held five public meetings about the Broad Branch restoration project. A project introduction meeting was held on January 27, 2008, and approximately 20 people attended. All attendees expressed support for the project, including the Friends of Rock Creek's Environment (FORCE), which recently became the Rock Creek Conservancy. A description of the project was presented at the regularly scheduled Advisory Neighborhood Commission (ANC) meetings for ANC 3F on April 19, 2010 and ANC 3G on April 26, 2010. An announcement about the project also was made on April 20, 2010, at the Chevy Chase Civic Association (CCCA) meeting, and interested parties were invited to attend a detailed meeting on May 3, 2010. On May 3, 2010, a community meeting was held in which a project description and conceptual plans were presented. Prior to this meeting, DDOE staff distributed invitations to the residential area surrounding the project area inviting the public were distributed.

On June 18, 2009, DDOE staff met with the staff from the Peruvian Embassy to conduct a site visit of the project area and the land owned by the Peruvian Embassy to document any concerns

they may have regarding the proposed project. During this site visit, DDOE staff answered questions on how the project would impact Peruvian Embassy property.

On April 19, 2011, DDOE sent scoping letters requesting comment on the proposed project. Recipients included ANCs 3G/3F, Rock Creek Community Garden, FORCE, CCCA, and the Peruvian Embassy. No comments were received.

ISSUES AND IMPACT TOPICS

Issues describe problems or concerns associated with impacts from current environmental conditions and operations, as well as problems or concerns that may arise from the implementation of any of the alternatives presented in this EA. Potential issues associated with the proposed actions at Rock Creek Park were identified by DDOE during internal scoping meetings with NPS. An Environmental Screening Form was also completed by DDOE and NPS staff that helped identify potential issues that required additional investigation to meet the requirements of the National Environmental Policy Act of 1969 and Director's Order 12. The issues and impact topics identified on the form are explained below.

Issues and concerns affecting the proposed action were identified by specialists within DDOE and the NPS, including the resource management staff of Rock Creek Park. Issues and concerns affecting the proposed action were also identified through public scoping. Issues and concerns identified include:

Natural Resources

- Stormwater runoff has caused extensive bank erosion, sediment loading and incised channels, affecting the area's natural resources including soils, topography, water quality, hydrology, vegetation, and wildlife.

Impact Topics Analyzed in this EA

The following impact topics are discussed in the "Affected Environment" chapter and analyzed in the "Environmental Consequences" chapter. The topics are resources of concern that could be beneficially or adversely affected by the actions proposed under each alternative. They were developed to ensure that the alternatives are evaluated and compared based on the most relevant resource topics. These impact topics were either identified during scoping; reflect requirements found in federal laws, regulations, executive orders, NPS Management Policies 2006; or come from NPS staff knowledge of limited or easily impacted resources.

SOILS AND TOPOGRAPHY

Project construction activities would impact soils and topography. The historic stream channel was filled in with soil when the unnamed tributary was piped. This soil would need to be excavated and removed in certain areas. Therefore, impacts to soil and topography have been analyzed to determine the potential effects of the proposed actions.

STREAMS AND WETLANDS

The proposed project would daylight and restore a portion of an unnamed tributary to Broad Branch. It has the potential to alter wetlands within the project area. Therefore, impacts to streams and wetlands have been analyzed.

FLOODPLAINS

Executive Order 11988 requires an examination of impacts to floodplains and the potential risk involved in placing facilities within floodplains. The project area lies within the 100-year floodplain that was determined using Technical Release (TR) -55 and TR-20 hydrology models. Flooding continues to occur in the surrounding residential neighborhood streets during storm events. Therefore, the alternatives to the proposed action have been analyzed to determine their impacts to the floodplain.

WATER QUALITY

Due to stormwater volumes, scouring occurs and erodes the banks and the bottom of the stream (the streambed) of the unnamed tributary to Broad Branch. Erosion also causes sedimentation in the downstream reaches of Broad Branch and Rock Creek. Total Maximum Daily Loads (TMDLs) have been established for known pollutants in this stream, and the proposed restoration would affect water quality. Therefore, water quality issues have been analyzed.

HYDROLOGY

The proposed project would alter the tributary's hydrology during storm events by slowing down the fast-flowing stormwater flow. The addition of Regenerative Stormwater Conveyances (RSCs) and a stormwater seepage wetland would recharge groundwater hydrology. Therefore, impacts to hydrology have been analyzed.

VEGETATION

The stream restoration project would require the removal of vegetation within the project area. However, these areas would be landscaped with native vegetation once construction is complete. Therefore, the alternatives for the proposed action have been analyzed to determine the effect to vegetation.

WILDLIFE

The NPS protects the abundance and diversity of all naturally occurring plant and animal communities within its jurisdiction (NPS 2006; DO 77). The proposed project would impact wildlife and wildlife habitat due to the temporary disturbance to the aquatic ecosystem and the removal of vegetation that creates habitat for local wildlife. Therefore, the impact topic of wildlife has been analyzed.

Impact Topics Dismissed from Further Analysis

The non-controversial topics discussed below either would not be affected or would be affected negligibly by the alternatives evaluated in this document. Therefore, these topics are briefly

discussed in this section of the EA and then dismissed from further consideration or evaluation. Negligible effects are effects that are localized and immeasurable at the lowest level of detection.

CULTURAL RESOURCES

NHPA, NEPA, the NPS Organic Act, Director's Orders 12, and NPS-28: Cultural Resources Management Guidelines require the impacts to cultural resources that might be affected by a proposed federal action be considered. The NHPA specifically requires consideration of impacts to a cultural resource either listed in, or eligible to be listed in, the NRHP. Cultural resources include archeological resource; cultural landscapes; historic structures and districts; ethnographic resources; and museum objects, collections, and archives.

MUSEUM COLLECTIONS

None of the proposed actions would have any impacts to recognized museum collections (historic artifacts, natural specimens, and archival and manuscript materials). Therefore, this impact topic was not studied in detail.

ETHNOGRAPHIC RESOURCES

The NPS defines ethnographic resources as any "site, structure, object, landscape or natural resource feature assigned traditional legendary, religious, subsistence or other significance in the cultural system of a group traditional associated with it" (Director's Order #12, NPS-28, P. 181). Ethnographic resources present in Rock Creek Park include the Colored Union Benevolent Cemetery and Quaker Burial Ground. To date, no ethnographic resources have been identified in or around the proposed project area. Therefore, this topic was dismissed from further analysis.

CULTURAL LANDSCAPES

Cultural landscapes, as defined by The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes, consist of "a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (NPS 1996). The NPS uses 13 features to determine if a landscape is significant. There are four general types of cultural landscapes: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes. None of the proposed actions would have any impacts on recognized cultural landscapes since none are present in the proposed project area. Therefore, this impact topic was dismissed from further analysis.

HISTORIC STRUCTURES/DISTRICTS

No individual historic structures are located within the project area. Two historic districts are located in the vicinity of the proposed project area: the Civil War Defenses of Washington (Fort Circle Parks) Historic District and the Rock Creek Park Historic District. The project area is located within the Civil War Defenses of Washington Historic District. The project area boundaries do not extend into the Rock Creek Park Historic District. In an email dated June 2, 2011 (see Appendix B), the DC SHPO

determined that none of the proposed actions would have an adverse effect on historic resources. Therefore, historic structures and districts were dismissed from further analysis.

ARCHEOLOGY RESOURCES

The results of geoarcheological investigations conducted in July 2011 indicate there is no potential for the presence of intact archeological resources within project area (see Appendix A). A four-year archeological inventory and evaluation study of Rock Creek Park was completed in 2008 (Bedell et al. 2008). As a part of these archeological investigations, more than 1,100 acres of the park were inventoried at varying levels of intensity for archeological resources, resulting in the identification of 51 archeological sites. The 51 archeological sites included 11 with archeological components of known historic sites, such as Civil War Forts DeRussy and Totten, as well as civilian sites such as Peirce Mill. The remaining 40 archeological sites are previously unrecorded resources that include Native American camps and quarries, dumps and barracks areas associated with Civil War forts, colonial and 1800s farms and tenant buildings, and remains associated with the Battle of Fort Stevens that occurred during July 1864.

As part of the four-year study, several areas to the north and west of the unnamed tributary of Broad Branch were investigated for the presence of archeological resources (Bedell et al. 2008:39), although the project area was not surveyed at that time. Three archeological sites were located in the vicinity, but outside of, the unnamed tributary of Broad Branch restoration project area. These consist of 51NW0168 and 51NW0169 (the Civil War-era Batteries Smeade and Kingsbury, both associated with Fort DeRussy), and 51NW0182 (a scatter of machine-cut nails). Given the proximity of these resources to the project area, as well as the overall high potential for archeological resources within Rock Creek Park, a geoarcheological evaluation of the project area was conducted.

The goal of the geoarcheological evaluation of the project area was to determine, through examination and analysis of representative soil profiles, whether there was a potential for the presence of intact and buried archaeological resources within the project area. The field investigations were designed to examine below-surface deposits, based on hand-augured soil profiles, in order to develop a model for topographic distribution, variations in soil thickness, and potentials for former intact surfaces beneath fill, erosional, or flood-deposited strata. The results of investigations were intended to identify the distribution of buried deposits, if present, and provide guidance on the appropriate level of effort for archeological investigations in areas containing buried deposits, if appropriate.

The geoarcheological evaluation of the proposed project area was conducted during July 2011. The hand-augured tests were conducted within both National Park Service property west of Linnean Avenue, NW and District of Columbia property east of Linnean Avenue, NW. A total of six auger tests, three within National Park Service and three within District of Columbia property, were excavated. In addition, more steeply sloped areas in the project area to the south of the former unnamed tributary bed were visually inspected. The results indicated that much of the area adjacent to the former streambed was covered by between three feet and 10 feet of fill, with the deeper fill deposits more

common west of Linnean Avenue, NW. In a few instances east of Linnean Avenue, NW, floodplain formations were exposed. These deposits are characterized as stratified recent alluvium that has no potential for the presence of precontact Native American resources. Based on the geoarcheology survey, the project area was most likely characterized by high-energy water flows that created a poor environment for habitation or scoured landforms to the extent that archeological sites were destroyed. The adjacent slopes are characterized as having been graded to the level of degenerating bedrock and were disturbed to the extent that no potential for precontact Native American or Historic period resources are present (Wagner, 2010). These results indicate that there is no potential for the presence of intact archeological resources within project area. Therefore, this impact topic has been dismissed.

AMERICAN INDIAN TRADITIONAL CULTURAL PROPERTIES

Secretarial Order 3175 requires that environmental documents explicitly address any anticipated impacts to Indian trust resources from a proposed action by Department of Interior (DOI) agencies. The Federal Indian Trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaskan native tribes.

There are no Indian trust resources within the project area. The lands are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, this impact topic was not studied in detail.

RARE, THREATENED, AND ENDANGERED CANDIDATE SPECIES AND SPECIES OF SPECIAL CONCERN

In addition to NPS policy, the Endangered Species Act of 1973 protects rare, threatened, and endangered species (flora and fauna). The US Fish and Wildlife Service (USFWS) lists one endangered or threatened species that occurs within Rock Creek Park – the endangered Hay's Amphipod, a small, colorless and eyeless crustacean that lives at natural springs. In a letter dated September 28, 2011, the USFWS stated that no proposed or federally listed endangered or threatened species are known to exist within the project impact area. In a letter dated May 2, 2011, DDOE stated that there are no federally-listed rare, threatened, or endangered species and/or unique habitats within the proposed project area.

The proposed project would occur outside of the Hay's Amphipod habitat and would not affect the groundwater flows that create the amphipod's habitat. Therefore, the impact topic of rare, threatened, and endangered candidate species and species of special concern is dismissed from further analysis.

SOCIOECONOMIC RESOURCES

Surrounding the proposed project area are higher-income areas with residences, commercial businesses, and schools. The proposed project would not affect the operation or enjoyment of these facilities. It would, however, have a short-term, beneficial impact by providing temporary employment for construction workers, whose purchases could stimulate the local economy. Any

increase, however, would be temporary and negligible, lasting only as long as construction. Therefore, this impact topic was dismissed from further analysis.

ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority or low-income populations.

Washington, DC has a high percentage of minorities and low-income populations. However, the proposed project would not result in any identifiable adverse human health effect. The impacts associated with the proposed action would not disproportionately affect any minority or low-income population or community. Therefore, Environmental Justice was dismissed as an impact topic.

TRANSPORTATION/TRAFFIC

Proposed construction activities would have a negligible impact on the use of nearby roads. No lane closures or detours would occur. Therefore, this impact topic was dismissed from further analysis.

HEALTH AND SAFETY

Although all construction sites are potentially hazardous, the contractor chosen to perform the work for the proposed project would abide by all applicable health and safety regulations. Furthermore, the work would be performed outdoors, in a wooded area away from buildings and public gatherings. Therefore, the impact topic of health and safety was dismissed from further analysis.

VISITOR USE AND EXPERIENCE

The project area encompasses only a small portion of the remains of the Civil War Defenses of Washington that is managed by Rock Creek Park. There are no trails or recreational amenities within the project limits. The project area is located approximately 0.5-mile from the Western Ridge Trail, a recreational amenity of Rock Creek Park. The project area is in an urban setting surrounded by noise associated with an urban environment; therefore, noise and disturbance from construction equipment would not affect visitor use and experience. Construction activities would last approximately 50 work days. Since the proposed project would not affect how park visitors use and enjoy Rock Creek Park, this impact topic was dismissed from further analysis.

PARK OPERATIONS AND MANAGEMENT

Stream restoration projects are designed to be self-maintaining ecosystems. Therefore, the proposed project should not require ongoing maintenance by the NPS. Therefore, this impact topic was dismissed from further analysis.

CHAPTER 2: ALTERNATIVES

INTRODUCTION

NEPA requires federal agencies to explore reasonable alternatives aimed at addressing the purpose and need of the proposed project. The alternatives under consideration must include the "no action" alternative (40 CFR § 1502.14). Project alternatives may originate from the proponent agency, local government officials, or members of the public. Alternatives may also originate from coordinating or cooperating agencies.

In accordance with NEPA, the alternatives analyzed in this EA are the result of internal and external scoping. They satisfy the management objectives of the park while meeting the overall purpose and need of the proposed action. They were selected in lieu of alternatives that were considered but rejected because they were not technically feasible, created excessive adverse impacts to cultural and/or natural resources, and/or conflicted with overall management principles of the park.

The following alternatives were analyzed in this EA:

- Alternative 1 – No Action
- Alternative 2 – Full Restoration Alternative
- Alternative 3 – Partial Restoration Alternative

DESCRIPTIONS OF ALTERNATIVES

Alternative 1 – No Action

Under the No Action Alternative, the restoration of the unnamed tributary to Broad Branch would not occur. A portion of the unnamed tributary to Broad Branch, unnamed tributary A, would continue to flow freely until the 36th Street Bridge, where it is intercepted by storm drains and conveyed to the reinforced concrete box culvert within the Broad Branch Road, NW right-of-way. Discharge collected at this point would continue to be conveyed to the reinforced concrete box outfall on Broad Branch Road, NW near 27th Street, NW. The stream length between 36th Street, NW and Broad Branch Road, NW would remain piped. A second portion of the unnamed tributary to Broad Branch, unnamed tributary B, would remain a free-flowing stream and would continue to be conveyed to a 36-inch reinforced concrete pipe. This pipe would continue to collect the stream flow and convey it to the reinforced concrete box culvert within the Broad Branch Road, NW right-of-way. This flow would continue to combine with the upstream flow already in the box culvert, and would continue to be discharged into Broad Branch and, ultimately, Rock Creek (see Figure 3).

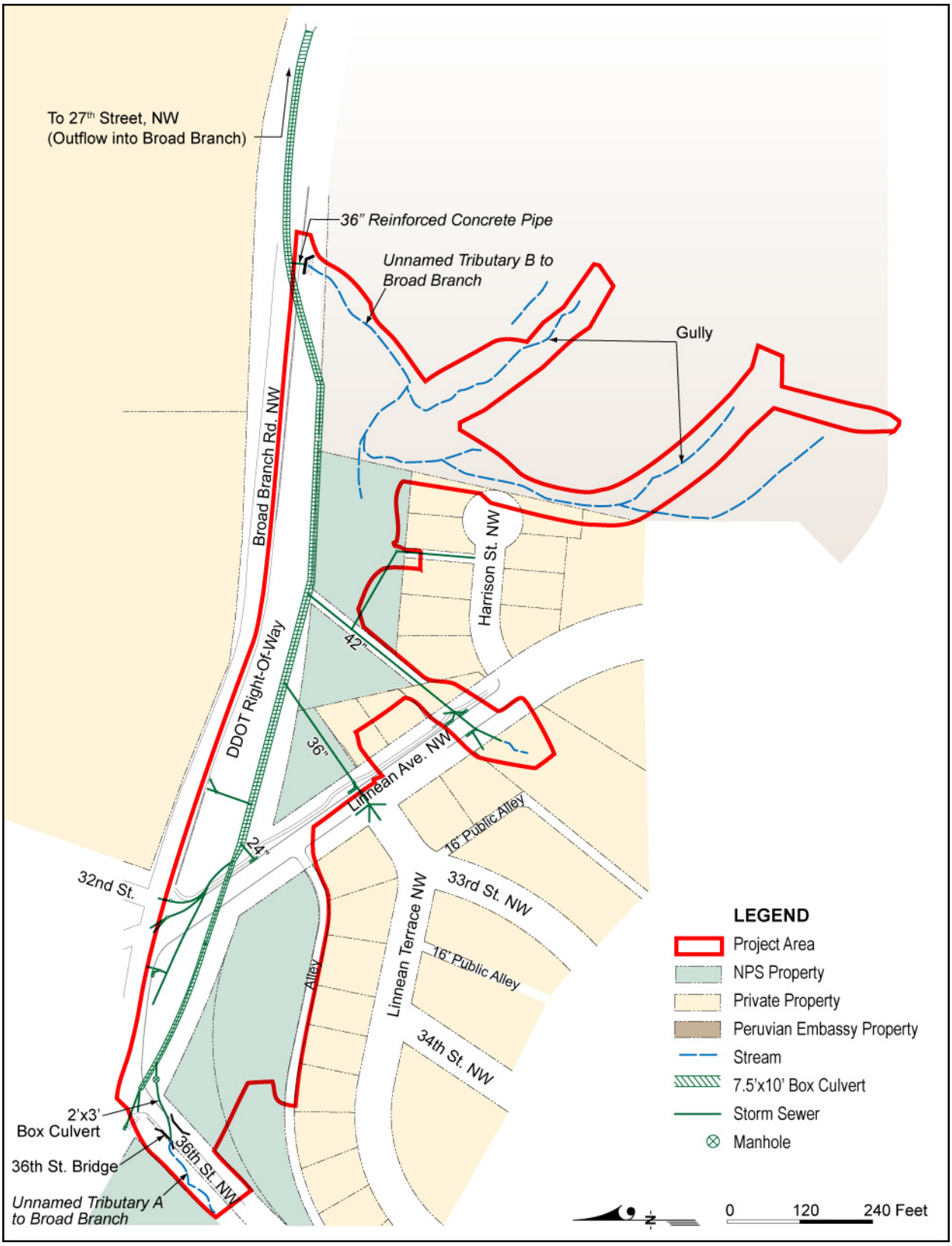

Figure 3: Alternative 1 - No Action

ACTION ALTERNATIVES

Alternative 2 – Full Restoration Alternative

This project involves the restoration of approximately 1,600 linear feet of stream, which is currently piped beneath property owned by NPS and the District. The stream restoration work would involve the use of stormwater infiltration best management practices (BMPs) and streambed protection to simulate a natural watercourse. This would slow stormwater flows, allowing for more groundwater recharge and restoring the natural stream flow (see Figure 4).

The design for this alternative would be a low-energy meandering stream characterized by natural channel and floodplain geometry. This alternative would use the existing stream valley and historic stream channel to the maximum extent possible. Structural features would include low-gradient riffles and deep pools with low-velocity flow in the surface water, as well as an active but low-velocity subsurface flow through the substrate between the bed features. Seepage wetlands and lateral wetland project structural components would be incorporated into the design to compliment the flow and habitat features of the project area and to re-establish the stream's baseflow.

Specifically this alternative would:

1. Stabilize the bank along the slope west of 36th Street, NW near the 36th Street Bridge on property owned by the NPS. This would be done with grouted riprap from the edge of pavement along 36th Street, NW down to the toe of the embankment in the severely eroded area approximately 10 feet south of the 36th Street Bridge.
2. Install curb and gutter, inlet, and pipe to capture and divert flows stormwater from 36th Street, NW before it reaches the bridge on 36th Street, NW. The pipe outlet would be in the area of 36th Street, NW on property owned by NPS. All other work would be completed within DDOT right-of-way.
3. Construct three stormwater recharge facilities (SWRF[1]):
   - SWRF 1 and 2 would be located along the alley upstream of Linnean Avenue, NW. Inlets within the alley would collect and divert alley runoff to the SWRFs, which would be on property owned by the NPS.
   - SWRF 3 would be located at the corner of Broad Branch Road, NW and Linnean Avenue, NW. Stormwater runoff from the existing inlet along Broad Branch would be diverted to the SWRF via a new pipe. The existing 12-inch corrugated metal pipe would be removed. This facility would be constructed within the DDOT right-of-way.

[1] A stormwater recharge facility is a vegetated depression underlain by permeable substrate like mulch, planting soil and sand which encourages percolation of runoff and surface water in order to replenish depleted groundwater. Plants used within the stormwater recharge facilities are water tolerant and uptake nutrients dissolved in stormwater.

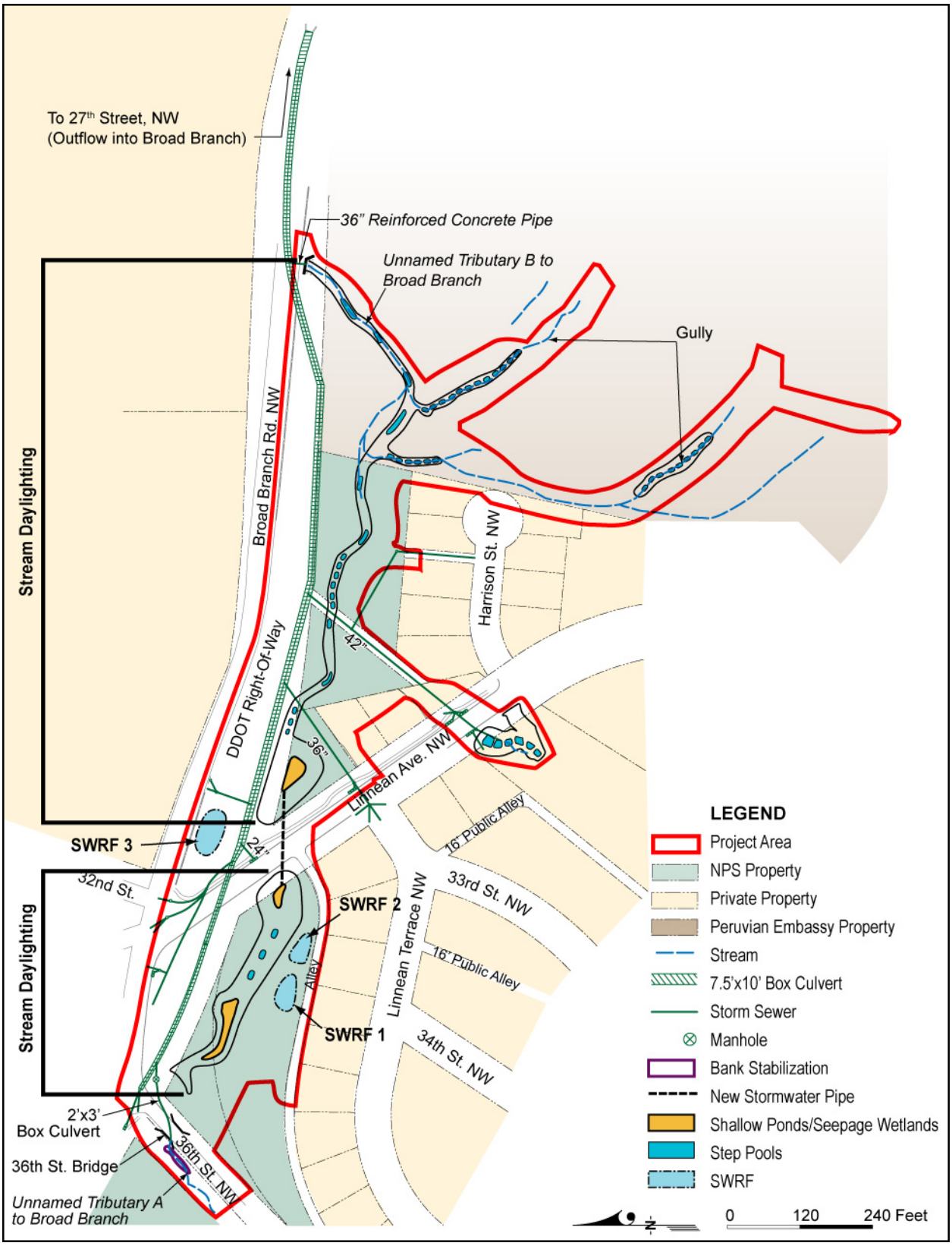

Figure 4: Alternative 2 – Full Restoration

4. Daylight a portion of the stream just east of 36th Street, NW. The piped stream would be daylighted into a series of shallow ponds and seepage wetlands. The new streambed would be routed under Linnean Avenue, NW to another series of ponds and seepage wetlands just east of Linnean Avenue, NW. A portion of this facility would be located on NPS property, and the remainder would be on property owned by the District.
5. Construct regenerative step pools along the steep eroded gullies adjacent to the Peruvian Ambassador's residence and along the unnamed tributary down to the storm drain inlet under Broad Branch. This work would occur on Peruvian Embassy property.

Alternative 3 – Partial Restoration Alternative

This alternative involves the restoration of approximately 400 linear feet of stream, which currently is piped beneath property owned by the NPS and the District. The stream restoration work would involve the use of streambed protection to simulate a natural watercourse. This also would slow stormwater flows, allowing for more groundwater recharge and restoring the natural streamflow (see Figure 5).

The design would be a low-energy meandering stream system characterized by natural channel and floodplain geometry. It would use the existing stream valley and historic stream channel to the maximum extent possible. Structural features would include low-gradient riffles and deep pools with low-velocity flow in the surface water, as well as a low-velocity subsurface flow through the substrate between the bed features. Seepage wetlands would be incorporated into the design to compliment the flow and habitat features of the project area and to re-establish baseflow.

Specifically, this alternative would:

1. Stabilize the bank along the slope west of 36th Street, NW near the 36th Street Bridge on property owned by the NPS. This would be done with grouted riprap from the edge of pavement along 36th Street, NW down to the toe of the embankment in the severely eroded area approximately 10 feet south of the 36th Street Bridge.
2. Install curb, inlet, and pipe to capture and divert stormwater from 36th Street, NW before it reaches the historic bridge on 36th Street, NW. The pipe outlet would be in the area of 36th Street, NW on property owned by NPS. All other work would be completed within the DDOT right-of-way.
3. Daylight a portion of the stream just east of 36th Street, NW. The piped stream currently in the existing elevated manhole would be daylighted into a series of shallow ponds and seepage wetlands. The new streambed would be routed to the existing storm system under Linnean Avenue, NW.

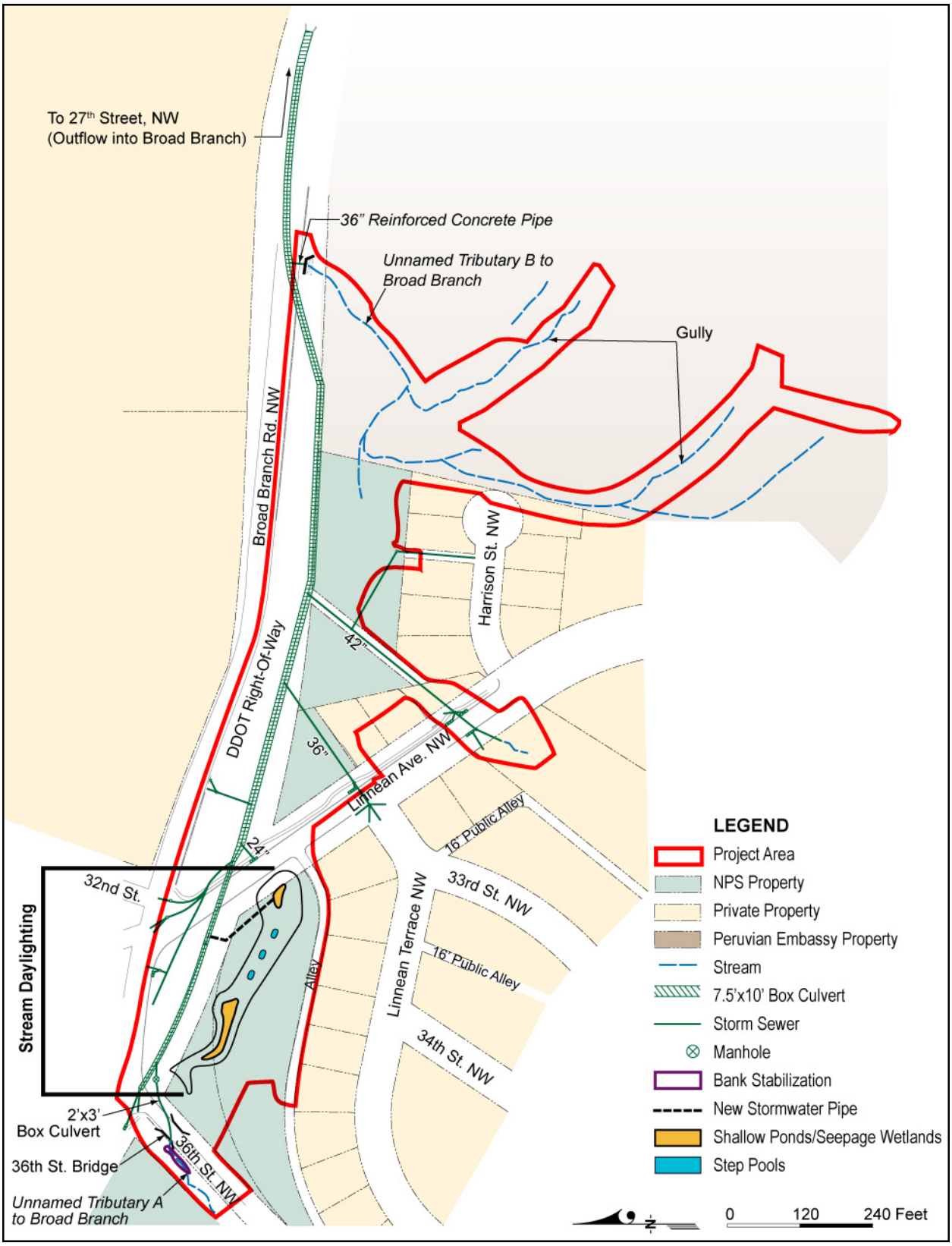

Figure 5: Alternative 3 – Partial Restoration

MITIGATION MEASURES OF THE ACTION ALTERNATIVES

DDOE and NPS work to avoid, minimize, and mitigate potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources, the following protective measures would be implemented as part of the selected action alternative. DDOE and NPS would implement an appropriate level of monitoring throughout the construction process to help ensure that protective measures are being properly implemented and are achieving their intended results.

SOILS AND TOPOGRAPHY

Proper erosion and sediment control measures would be utilized to minimize the overall impacts to soils. These measures could include super silt fencing, earth dike installation, and pump-around diversions for all surface and stormwater. The construction would progress from downstream to upstream to minimize disturbance to soils and topography.

STREAMS AND WETLANDS

Best Management Practices (BMPs) would be implemented during construction in non-tidal wetlands, buffers, and waterways. These practices would include the use of protective matting for areas where construction vehicles are used, restoring the area to preconstruction condition, and adherence to an in-stream construction schedule to protect aquatic species during sensitive breeding or migration periods. The impacts would occur within the delineated limits of disturbance and permits would be obtained from the U.S. Army Corps of Engineers (USACE) and DDOE. The project could qualify under Nationwide Permit 27, Aquatic Habitat Restoration, Establishment and Enhancement Activities, which is at the discretion of the USACE. DDOE would issue a Clean Water Act Section 401 water quality certification. The impacts to water resources would be self-mitigating since the stream would be restored and daylighted and additional wetland areas would be created.

WATER QUALITY AND HYDROLOGY

A Clean Water Act Section 401 water quality certification would be obtained from DDOE. Erosion and sediment control measures such as super silt fences, stream diversions, and a strict sequence of construction would occur. The measures used would be approved by Technical Services Branch of DDOE prior to construction.

VEGETATION

Native trees (such as black gum, sycamore, pin oak, and silver maple) and shrubs (such as arrow wood, maple leaf viburnum, and spice bush) would be planted along the riparian buffer of the streambank and floodplain. Under the DDOT Urban Forestry Special Tree Removal Permit and standard park practice, the total number of trees planted would have to at a minimum equal the total circumference of all the trees that were removed from the project site. Native plantings also would be established within the stormwater recharge areas.

The right and left banks of all graded and newly constructed banks would be stabilized with live stakes installed along the bank from one foot above the edge of the water to the bankfull

elevation at a spacing interval of one foot. The live stakes would consist of a mix of three or more species reviewed and approved by the NPS, such as spice bush, maple leaf viburnum, and river birch. All other disturbed and graded areas would be seeded and mulched. After construction, the project area would be monitored to ensure that replacement vegetation becomes established and that invasive species do not encroach into the project area.

WILDLIFE

The replacement of native trees and shrubs, as noted under the Vegetation section above, would restore wildlife habitat that potentially could be lost during construction.

ARCHEOLOGICAL RESOURCES

The geoarcheology survey that was conducted determined that there is no potential for the presence of intact archeological resources within the proposed project area. However, if unanticipated archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be evaluated and an appropriate mitigation strategy developed, if necessary. This strategy would be developed in consultation with the NPS National Capital Region and DC SHPO following procedures detailed by the ACHP for post-review discoveries in *Protection of Historic Properties* (36 CFR 800.13). In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Criteria for selecting the environmentally preferable alternative include:

- Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assuring for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- Preserving important historic, cultural, and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
- Enhancing the quality of renewable resources and approaching the maximum attachable recycling of depletable resources (NEPA, Section 110).

The NPS is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. DDOE and the NPS, in accordance with the DOI policies contained in the Departmental Manual (516 DM 4.10) and the Council on Environmental Quality's (CEQ) NEPA's Forty Most Asked Questions, defines the environmentally preferable alternative (or alternatives) as the alternative that best promotes the

national environmental policy expressed in NEPA (Section 101(b) (516 DM 4.10). In their Forty Most Asked Questions, CEQ further clarifies the identification of the environmentally preferable alternative, stating "[o]rdinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources."

After completing the environmental analysis, the DDOE and NPS identified Alternative 2 as the environmentally preferable alternative because it best meets the definition established by the CEQ. The No Action alternative would continue the erosion and sedimentation that are degrading the unnamed tributary to Broad Branch, which have destabilized the surrounding environment, reduced infiltration of water into underlying aquifers, and compromised wildlife habitat. Alternative 3 would continue to degrade the unnamed tributary to Broad Branch because the downstream reach would still be affected by erosion and sedimentation. The drainage gullies on the Peruvian Embassy grounds would not be stabilized. They would continue to erode and ultimately deposit sediment into Rock Creek.

Alternative 2 best protects, preserves, and enhances existing resources. Daylighting the stream would improve water quality at the project location and downstream by exposing water to sunlight, air, soil, and vegetation, all of which help process and remove pollutants. Furthermore, the stream's restoration would reduce nutrient and sediment pollution from erosion caused by fast-flowing stormwater. The project would create meanders and floodplain wetlands, which would provide wider stream cross-sections and greater channel depths than the pipe the new streambed would replace.

A summary of environmental consequences associated with each alternative is shown below in Table 1.

Table 1– Summary of Environmental Consequences

Impacted Resource	Alternative 1 - No Action	Alternative 2: Full Restoration Alternative	Alternative 3: Partial Restoration Alternative
Soils and Topography	Implementation of the no action alternative would result in long-term, moderate, adverse impacts to soils from erosion and changes in topography. The no action alternative would not add to beneficial cumulative impacts of other projects occurring in the area. The impacts from the no action alternative, when combined with the impacts of the other past, present, and future actions, would result in long-term, adverse cumulative impacts.	Alternative 2 would have short-term, minor, adverse impacts to soils during construction activities. Long-term beneficial impacts to soils and topography would occur due to the stabilization of the stream channel and from reducing the erosion and scouring of the streambanks.	Alternative 3 would result in short-term, minor, adverse impacts to soils and topography during construction. Long-term beneficial impacts to soils and topography would occur due to the stabilization of the stream channel within the upper reach of the project area. However, long-term, minor, adverse impacts would continue because a portion of the stream would not be restored.

Impacted Resource	Alternative 1 - No Action	Alternative 2: Full Restoration Alternative	Alternative 3: Partial Restoration Alternative
Streams and Wetlands	The no action alternative would have long-term, moderate, adverse impacts on streams and wetlands due to the urbanized nature of the watershed and high stormwater velocities that are flooding the area and degrading the stream channel. The no action alternative would not contribute to the overall beneficial cumulative impact of other projects occurring in the area.	Alternative 2 would result in beneficial impacts to streams and wetlands by restoring the functions and values that are currently diminished due to erosion and sedimentation. During construction, short-term, minor, adverse impacts are expected to occur. When combined with Alternative 2, the various road, trail and stream restoration projects noted in this EA would have beneficial cumulative impacts on streams and wetlands.	Alternative 3 would have beneficial impacts to streams and wetlands within the unnamed tributary A by restoring the functions and values that are currently diminished due to erosion and sedimentation. The downstream reach would continue to degrade, since it would not be restored, causing long-term, moderate, adverse impacts. During construction, short-term, minor, adverse impacts are expected to occur. Alternative 3 would add a minor amount to the overall net beneficial cumulative impact.
Floodplains	The no action alternative would have long-term, moderate, adverse impacts to floodplains due to the reduced function of the floodplain from scouring the banks and stream channel. The no action alternative would contribute additional adverse impacts to the overall adverse cumulative impact to floodplains. However, it would not contribute to the beneficial cumulative impacts.	Alternative 2 would result in beneficial impacts to floodplains by restoring the natural channel and reconnecting the stream to its natural floodplain. During construction there would be short-term, minor, adverse impacts due to construction activities occurring within the floodplain. Alternative 2 would contribute additional beneficial impacts to the overall beneficial cumulative impacts.	Alternative 3 would raise the elevation of the streambed, minimize the erosion occurring on the banks, and reconnect the stream to the floodplain in the upstream reach of the project area. This would contribute beneficial impacts to floodplains. The downstream reach would not be stabilized and a minor, long-term, adverse impact would continue to affect the floodplain from stormwater flow. The adverse impacts from implementing Alternative 3 would slightly diminish the overall net beneficial cumulative impact to floodplains.

Impacted Resource	Alternative 1 - No Action	Alternative 2: Full Restoration Alternative	Alternative 3: Partial Restoration Alternative
Water Quality	The no action alternative would have long-term, moderate, adverse impacts to water quality due to uncontrolled stormwater velocities and excess erosion and sediment loading in the stream. The no action alternative would not cumulatively contribute to the beneficial impacts occurring within the watershed.	Alternative 2 would have long-term, beneficial impacts to water quality due to the restoration of the unnamed tributary to Broad Branch. Stormwater velocities, excess erosion, and sediment loading would be controlled, and the amount of pollutants in the stream would be reduced. Short-term, minor, adverse impacts would occur during construction. Alternative 2 would contribute to the overall beneficial cumulative impacts to water quality in the watershed.	Alternative 3 would result in beneficial impacts to water quality due to the restoration of the unnamed tributary A. Stormwater velocities, excess erosion, and sediment loading would be controlled in the upper reach. The amount of pollutants in the stream would not be reduced, as unnamed tributary B would not be restored and stormwater would not be treated. Therefore, there would be long-term, minor, adverse impacts in addition to the beneficial impacts. The adverse impacts from implementing Alternative 3 would slightly diminish the overall net beneficial cumulative impact.

Impacted Resource	Alternative 1 - No Action	Alternative 2: Full Restoration Alternative	Alternative 3: Partial Restoration Alternative
Hydrology	The no action alternative would have long-term, moderate, adverse impacts to hydrology due to the urbanized nature of the watershed, high stormwater velocities flooding the area and degrading the stream channel, and poor groundwater recharge. The no action alternative would not contribute to beneficial cumulative impacts. However, it would add to the overall adverse cumulative impact on the hydrology of the watershed.	Alternative 2 would result in beneficial impacts to hydrology by restoring the functions and values that are currently diminished due to erosion and sedimentation. Additional storage from seepage ponds and step pools would dissipate energy from stormwater flows. During construction, short-term, minor, adverse impacts would be expected to occur. The impacts from Alternative 2, when combined with the impacts of other past, present, and future actions, would result in long-term, beneficial, cumulative impacts, with a net adverse cumulative impact due to the urbanization within the watershed.	Alternative 3 would create beneficial impacts to hydrology within the unnamed tributary A by restoring the functions and values that are currently diminished due to erosion and sedimentation. The downstream reach would continue to degrade, since it would not be restored, and RSCs would not be installed on the Peruvian Embassy land, causing long-term, moderate, adverse impacts. During construction of the partial restoration, short-term, minor, adverse impacts would be expected to occur. Alternative 3 would contribute to the beneficial cumulative impacts to hydrology. However, it would add to the overall adverse cumulative impact on the hydrology of the watershed.

Impacted Resource	Alternative 1 - No Action	Alternative 2: Full Restoration Alternative	Alternative 3: Partial Restoration Alternative
Vegetation	Vegetation losses would continue to occur as a result of stream bank erosion that would result in minor, long-term, adverse impacts to vegetation. The no action alternative would not add to the beneficial cumulative impacts to vegetation. The impacts from the no action alternative, when combined with the impacts of the other past, present, and future actions, would result in long-term, adverse cumulative impacts.	The overall impact to vegetation for Alternative 2 would be beneficial, as the stream would be stabilized, and the riparian vegetative habitat restored. Some of the upland areas would also be revegetated, while other areas would have buffer protection from construction activities with the implementation of silt fencing and tree protective fencing. Short-term and long-term, minor, adverse impacts would occur to vegetation from construction activities and the removal of trees. The impacts from Alternative 2, when combined with the impacts of the other past, present, and future actions, would add to the overall beneficial and adverse cumulative impacts.	Alternative 3 would have beneficial impacts to vegetation in the upper reach of the stream near the unnamed tributary A, as the restoration project would protect it from erosion. Short-term and long-term, minor, adverse impacts would occur to vegetation from construction activities and the removal of trees. However, vegetation losses would continue to occur during storm events that would contribute to the minor, long-term, adverse impacts to vegetation in the downstream reach of the stream. The impacts from Alternative 3, when combined with the impacts of the other past, present, and future actions, would add to the overall beneficial and adverse cumulative impacts.
Wildlife	The no action alternative would continue to erode and degrade the stream causing long-term, adverse, minor impacts to wildlife and habitat. The no action alternative would not contribute to the beneficial cumulative impacts.	Alternative 2 would help stabilize the streambed and slopes and help restore aquatic and non-aquatic habitat, creating long-term, beneficial impacts to wildlife. Short-term, minor, adverse impacts would occur during construction activities. Alternative 2 would contribute additional beneficial impacts to the overall beneficial cumulative impacts.	Alternative 3 would have beneficial impacts to wildlife in the upstream reach due to the restoration of aquatic habitat. Short-term, minor, adverse impacts would occur during construction activities. The downstream reach would continue to degrade because it would not be restored. This would have a long-term, minor, adverse impacts to wildlife. The adverse impacts that would occur as a result of Alternative 3 would slightly diminish the overall net beneficial cumulative impact.

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CHAPTER 3: AFFECTED ENVIRONMENT

This chapter describes existing environmental conditions in the vicinity of the Broad Branch Stream Restoration project. These conditions serve as a baseline for understanding the resources that could be impacted by implementing the proposed action. The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in "Chapter 4: Environmental Consequences."

SOILS AND TOPOGRAPHY

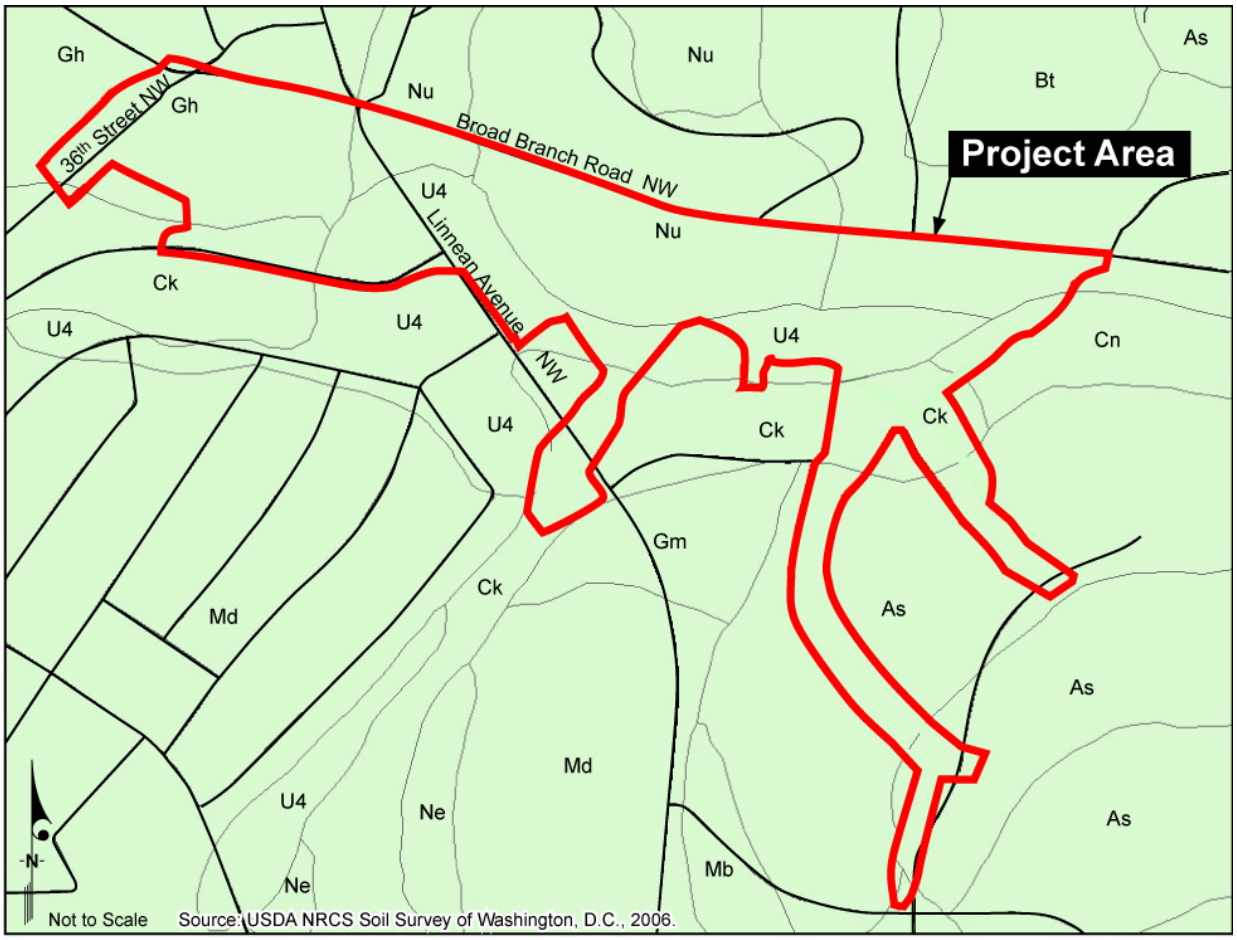
The proposed Broad Branch Stream Restoration Project is located within the upland section of the Piedmont physiographic province. The topography within the project area consists of gently rolling hills with two steep areas. These steep areas contain narrow erosion gullies that are on the Peruvian Embassy land. The upstream elevation of the project area is approximately 228 feet above sea level, and the downstream elevation is approximately 192 feet above sea level.

According to the U.S. Department of Agriculture (USDA) Web Soil Survey (USDA 2006) for the District of Columbia, the majority of soils present within the project area are classified as Ashe, Brandywine, Codorus, Glenelg, Neshaminy, and Udorthents. (A brief summary of these soils is listed in Table 2, below.) The soils in the project area, shown on the map in Figure 6, are disturbed due to the placement of fill material, particularly within the areas where the relic stream channel was filled. (The unnamed tributary to Broad Branch was piped and fill was placed in the natural channel in 1937.) The Codorus (Ck and Cn) are the only soil types found within the project area that are listed on the National Hydric Soils Lists (USDA 2006). There are no prime farmland soils in the project area.

Table 2: Soil Series Description (NRCS, 2011)

Soil Series	Description
Ashe	Moderately deep, somewhat excessively drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and weathered from felsic or mafic igneous and high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. Mean annual air temperature is about 52 degrees F., and mean annual precipitation is about 50 inches near the type location. Slope ranges from two to 95 percent.
Brandywine	Very deep somewhat excessively drained or excessively drained, moderately rapidly permeable soils on uplands. They formed in material weathered from gneiss. Slopes range from zero to 65 percent. Mean annual temperature is 53 degrees F. and mean annual precipitation is about 40 inches.
Codorus	Very deep, moderately well drained and somewhat poorly drained soils. These soils formed in recently deposited alluvial materials derived from upland soils materials weathered from mostly metamorphic and crystalline rocks. They are on floodplains with smooth, nearly level slopes of zero to three percent. Saturated hydraulic conductivity is moderately high to high. Mean annual precipitation is 42 inches, and mean annual temperature is 52 degrees F.
Glenelg	Very deep, well drained soils formed in residuum weathered from micaceous schist on uplands of the Blue Ridge and the Northern Piedmont. Slopes range

Soil Series	Description
	from zero to 55 percent. Saturated hydraulic conductivity is moderately high in the subsoil and moderately high to high in the substratum. Mean annual temperature is 53 degrees F., and mean annual precipitation is 40 inches.
Neshaminy	Deep and very deep, well drained soils formed in materials weathered from diabase and other dark colored basic rocks. Saturated hydraulic conductivity is moderately high. Slopes range from zero to 70 percent. Mean annual precipitation is 42 inches. Mean annual temperature is 50 degrees F.
Udorthents	Consists mostly of loamy fill material that has been placed on soils of various drainage classes on terraces, uplands, and floodplains. This unit is almost exclusively in the Piedmont. Areas range from about one acre to 25 acres in size. These areas have been created to provide sites for buildings, roads, recreational facilities, and other uses. Slopes are very complex and irregular. They range from nearly level to steep but are dominantly nearly level to moderately sloping.



As	Ashe loam	Gh	Glenelg-urban land complex
Ck	Codorus silt loam	Nu	Neshaminy-urban land complex
Cn	Codorus-urban land complex	U4	Udorthents, loamy

Figure 6: Soils within the project area

STREAMS AND WETLANDS

The unnamed tributary to Broad Branch flows into Broad Branch, which is a western tributary of Rock Creek. The original stream valley section from 36th Street, NW to approximately 450 feet downstream of Linnean Avenue, NW has been abandoned since 1937, when the majority of the tributary was piped underground. As shown in Figure 7, the upstream reach of the unnamed tributary is located above 36th Street, NW and includes unnamed tributary A and the piped section located from 36th Street, NW to approximately 450 feet downstream of Linnean Avenue, NW. The downstream reach includes unnamed tributary B that is partially on Peruvian Embassy land. Secondary tributaries and erosion gullies also are located on the Peruvian Embassy land.

In accordance with Director's Order #12 (Conservation Planning, Environmental Impact Analysis, and Decision-making), areas that are classified as a wetland habitat according to the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et al., 1979) are subject to implementation of procedures outlined in the "Procedural Manual #77-1: Wetland Protection." The stream and wetlands in the project area were identified during a formal wetland delineation in June and November, 2009. The wetlands and waters of the U.S. were delineated according to the 1987 Army Corps of Engineers Wetlands Delineation Manual (USACE, 1987) and represent those areas that are within the regulatory jurisdiction of the USACE and/or DDOE. Wetlands and streams in the project area also were classified according to the Cowardin System.

Four wetlands totaling 0.10 acre (4,477 square feet) and eight waters of the U.S. totaling 1,714 linear feet (12,894 square feet) exist within the project area. In addition to the surface waters and wetlands found within the project area, approximately 1,400 linear feet of the unnamed tributary to Broad Branch has been piped through the project area. The wetlands and waters of the U.S. within the project area are summarized in Table 3, illustrated in Figure 8 and discussed below.

Waterway 1 (WL01) is an upper perennial stream segment (R3). It is part of the main tributary to Broad Branch and flows east to west. (A perennial stream is one that has continuous flow throughout the year.) Waterway 1 is the furthest downstream segment within the project area. Waterway 1 is approximately four to 10 feet in width, incised one to two feet and is 360 linear feet in length within the project area.

Wetland (WL02) is a palustrine, emergent wetland (PEM), which is approximately 0.06 acre in size. This wetland is located adjacent to Waterway 1, and is considered an emergent wetland within the channel but does not contain water. Vegetation within this wetland consists of Japanese knotweed, lizard's tail, and various sedges. At the time of wetland delineation, the soil was saturated to the surface and drainage patterns and drift lines were present throughout the wetland. The functions and values of WL02 include groundwater recharge/discharge, flood flow alteration, sediment stabilization, toxicant retention, and wildlife diversity/abundance.

Waterway 3 (WL03) is an intermittent (R4) segment of the Tributary to Broad Branch, which means it contains water periodically throughout the year. This stream segment flows east to west within the project area. This channel is three to five feet in width and is incised approximately one to three feet. At the time of the wetland delineation, no water was observed within the stream channel. The streambed consists of sandy particulate and is approximately 257 feet in length.

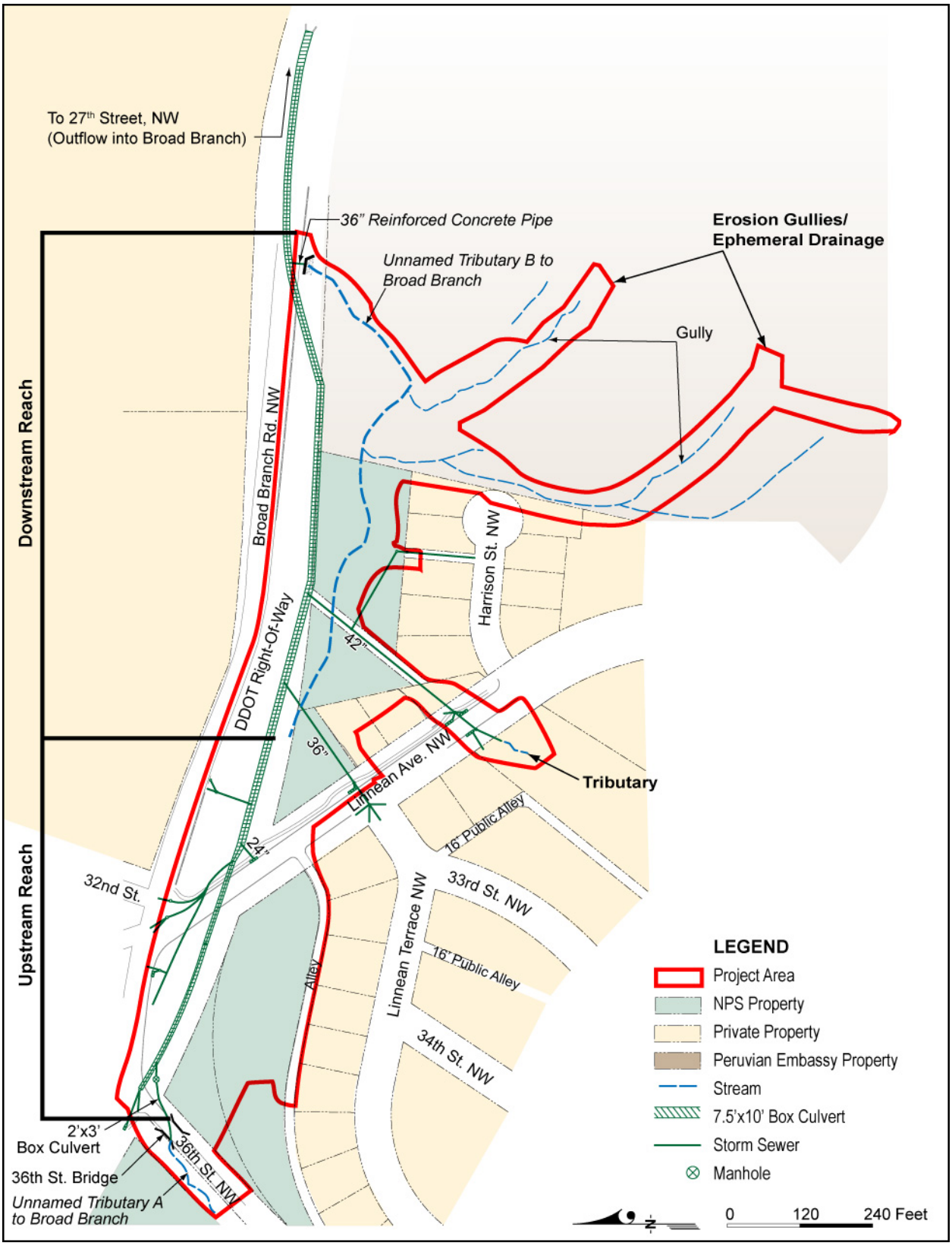


Figure 7: Broad Branch tributary reach map

Waterway 4 (WL04) is an ephemeral drainage channel that conveys stormwater flow from Linnean Avenue, NW and Harrison Street, NW, along with flows from Waterway 5 (WL05), which overtop Linnean Avenue, NW during large storm events. The water is conveyed to Waterway 3.

Waterway 5 (WL05) is an upper perennial tributary (R3). Vegetation on the banks consists of a large quantity of Japanese knotweed. This channel is two to four feet in width, incised one to three feet and is approximately 65 feet in length. Low flow to Waterway 5 south of Linnean Avenue, NW is captured by a 42-inch reinforced concrete pipe and conveyed to the reinforced concrete box culvert within the Broad Branch right-of-way. The 42-inch reinforced concrete pipe appears to be undersized, as site visits revealed that storm flows during large storm events overtop Linnean Avenue, NW instead of entering the pipe.

Table 3: Water Resources and Wetlands Observed within the Project Area

Water Resource Identification	Type of Resource	Cowardin Classification	Length (LF)	Area (SF)	Area (Acre)
WL01*	Waters of the U.S.	R3 -- upper perennial stream	360	4,757.22	0.11
WL02*	Wetland	PEM – palustrine emergent wetland	-	2,773.15	0.06
WL03*	Waters of the U.S.	R4 – intermittent stream	257	5,655.71	0.13
WL04	Waters of the U.S.	Ephemeral	152	152	0.003
WL05	Waters of the U.S.	R3 – upper perennial stream	65	318.67	0.01
WL06	Wetland	PFO – palustrine forested wetland	-	923.26	0.02
WL07*	Waters of the U.S.	R3 – upper perennial stream	154	1,076.71	0.02
WL08	Waters of the U.S.	R3 – upper perennial stream	220	2,699.22	0.06
WL09	Wetland	PFO – palustrine forested wetland	-	250.79	0.01
WL10	Waters of the U.S.	Ephemeral	238	238	0.005

Water Resource Identification	Type of Resource	Cowardin Classification	Length (LF)	Area (SF)	Area (Acre)
WL11	Waters of the U.S.	R4 – intermittent stream	15	63.49	0.001
WL12	Wetland	PFO -- palustrine forested wetland	-	530.32	0.01

***These features represent surface waters found that contribute to Broad Branch. Due to the disturbed nature of this stream, the segments were delineated separately.**

Wetland 6 (WL06) is a palustrine, forested, broad-leaved deciduous wetland (PFO) which is approximately 0.02 acre in size within the project area. This wetland is located adjacent to Waterway 7 (WL07). Vegetation consists of box elder, spicebush, black walnut, lizard's tail, and various sedges. At the time of the wetland delineation, the wetland had saturated soils and drainage patterns. The functions and values of WL06 include groundwater recharge/discharge, flood flow alteration, sediment stabilization, toxicant retention, and wildlife diversity/abundance.

Waterway 7 (WL07) is an upper perennial tributary (R3), located within the project area. This channel is approximately one to three feet in width and is incised approximately one foot. The 36th Street Bridge has been filled in with brick at this point; therefore, the downstream portion of Waterway 7, between 36th Street, NW and Linnean Avenue, NW, is not an active stream channel. Instead, the channel is diverted for 100 feet via an underground pipe through an adjacent backfilled area.

Waterway 8 (WL08) is a spring-fed seep that originates on the Peruvian Embassy land. It is buffered by Wetland 9 (WL09), a PFO wetland that is vegetated with spicebush and skunk cabbage, and by Wetland 12, which is vegetated with black gum and soft rush. Waterway 8 connects to Waterway 1. Waterway 8 is approximately two to three feet in width and is incised approximately one foot.

WL09 is a PFO wetland that is approximately 0.01 acre (250 square feet) in size. This wetland is a spring-fed seep wetland located adjacent to Waterway 8. The spring is located further upstream, and is the source of Wetland 9. Vegetation consists of skunk cabbage, spicebush, American beech, and Japanese honeysuckle. The soil was saturated to the surface at the time of the wetland delineation; drainage patterns, water marks, and drift lines were present throughout the system. The functions and values of WL09 include groundwater recharge/discharge, flood flow alteration, sediment stabilization toxicant retention and wildlife diversity/abundance.

Waterway 10 (WL10) is a drainage/erosion gully that originates on Peruvian Embassy land before its confluence with Waterway 1. This feature conveys stormwater flow during some rain events, but does not appear to convey a long duration of flow. Waterway 10 is eroded within the project site.

Waterway 11 (WL11) is an intermittent groundwater seep tributary (R4), which drains from north to south and connects with Waterway 1. This stream is one to two feet in width and is incised one to two feet. Waterway 11 is approximately 15 feet in length.

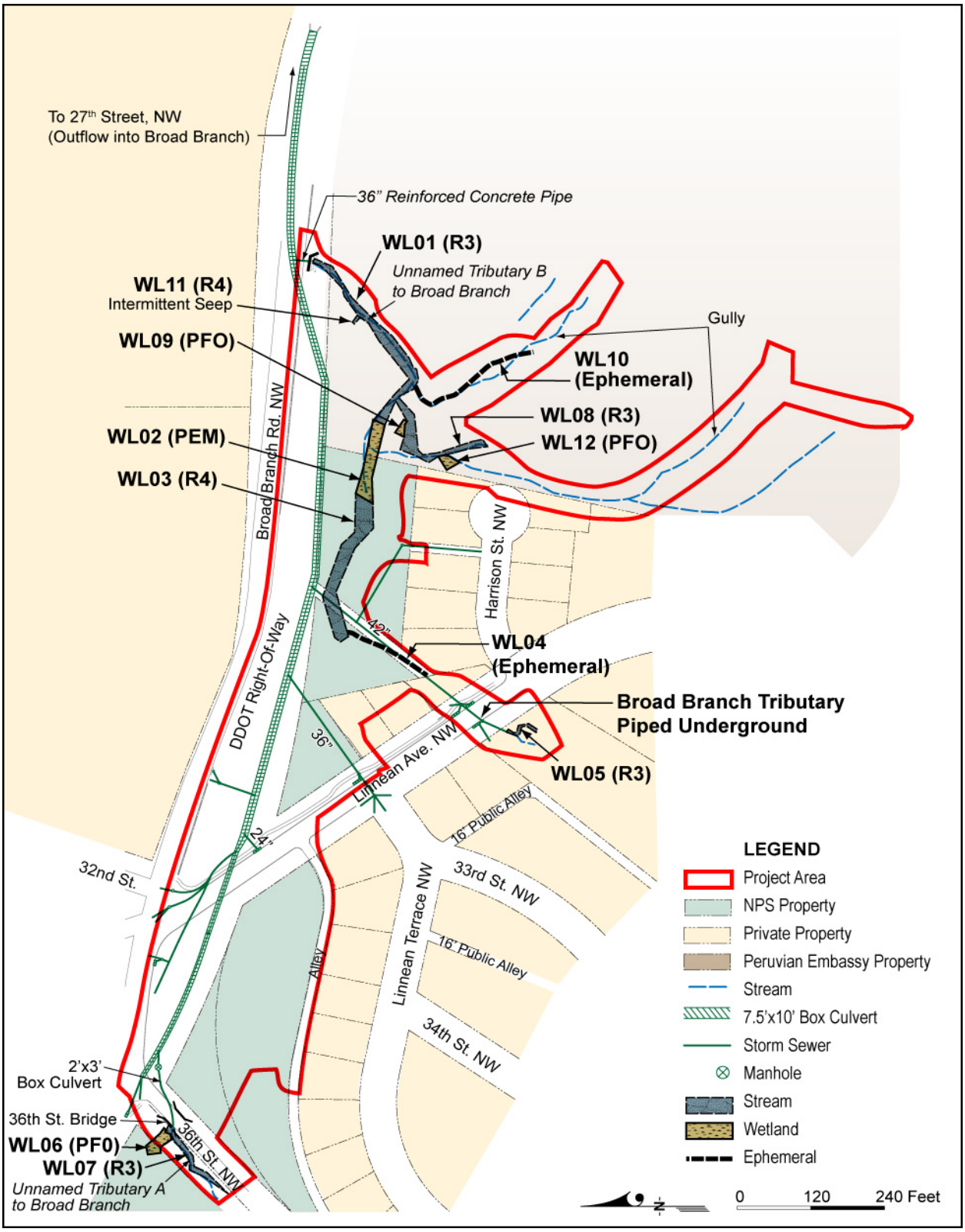


Figure 8: Water Resources and Wetlands in the project area

Wetland 12 (WL 12) is a PFO wetland, which is approximately 530 square feet in size (0.01 acre). The vegetation consists of red maple, soft rush, black, spicebush, and umbrella flatsedge. The functions and values of WL12 include groundwater recharge/discharge, flood flow alteration, sediment stabilization toxicant retention, and wildlife diversity/abundance.

FLOODPLAINS

According to the NPS, floodplains are "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands and (including at a minimum), that area subject to temporary inundation by a regulatory flood" (DO 77-2). According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map 11001 0010B, dated November 15, 1985, the proposed project is located in the FEMA flood Zone C, which is located outside of the 100-year floodplain (Figure 9). Because the FEMA map did not include a detailed analysis of this stream within the project area, a floodplain study was conducted in the project area as part of the initial studies for the proposed restoration project. This study used TR-55 and TR-20 hydrologic models to determine the one-, two-, five-, 10- and 100-year discharges.[2] These models provided a detailed engineering analysis to predict the amount of stormwater runoff that flows through the unnamed tributary to Broad Branch. HEC-RAS, a hydraulic modeling program, was utilized to determine the effect these flows have on existing topography and stream flow, as well as to delineate the 100-year floodplain of this stream. The existing 100-year floodplain based on this detailed engineering analysis is shown on Figure 10.

Typical functions and values of floodplain consist of flood flow alteration, sediment stabilization, and toxicant retention. Healthy floodplains create ecological biodiversity and provide habitat for plant and animal communities. The unnamed tributary to Broad Branch currently has diminished floodplain function due to the uncontrolled stormwater flows in the project area. During storm events, the deepened stream channel erodes the streambed further away from its banks and further from its natural floodplain.

[2] One-year, two-year, five-year, 10-year and 100-year storm events refer to the average recurrence interval between storm events of certain magnitude. The 100-year storm is the standard used by the Federal Emergency Management Agency (FEMA) to determine the need for flood insurance, and is the flood event that has a one percent chance of being equaled or exceeded in a given year. A one-year storm event is one that could happen on average once per year or statistically has a 100 percent chance on average of occurring in a given year. A two-year storm event is one that could happen once every two years or statistically has a 50 percent chance on average of occurring in a given year. A five-year storm even is one that could happen once every five years or statistically has a 20 percent chance on average of occurring in a given year. A 10-year storm event is one that could happen once every 10 years or statistically has a 10 percent chance on average of occurring in a given year.

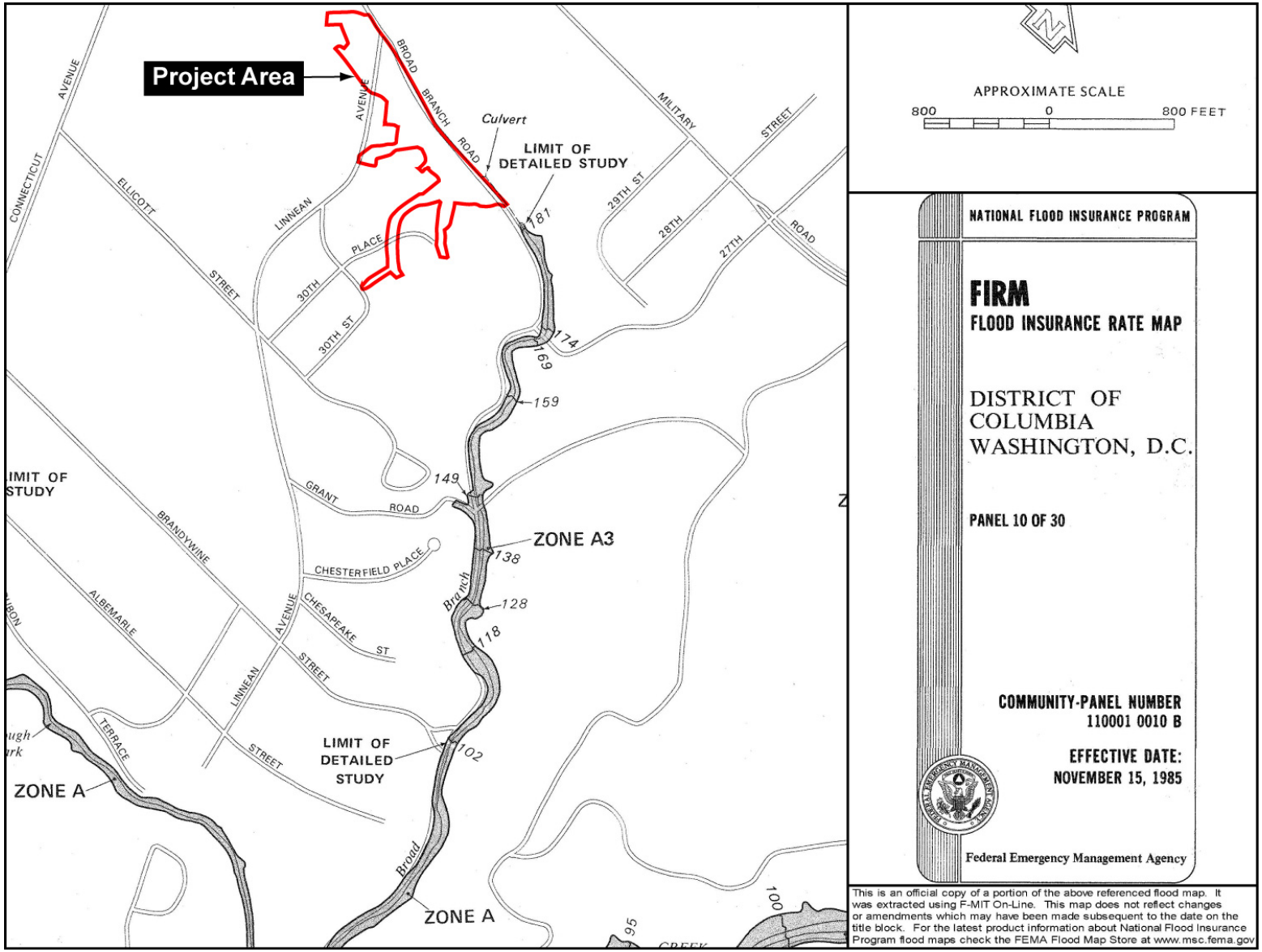


Figure 9: FEMA floodplain map

WATER QUALITY

Currently, the water quality of the unnamed tributary to Broad Branch is being degraded by storm flows and non-point source pollution from development in the project area. This has resulted in stream bank erosion, incised channels, and reduced water quality from sedimentation. In addition, because much of the unnamed tributary to Broad Branch is piped underground, it is not exposed to air, sunlight, soil, and vegetation, all of which normally would help to remove pollutants (ODEQ, 2011). Exposure to sunlight, air, and soil allows growth of aquatic and riparian vegetation, which can help in water quality by increasing the uptake of organic and inorganic pollutants.

Existing pollutant loads within the tributaries to Broad Branch have been calculated according to the DC Department of Health's *Storm Water Management Guide* (DC DOH, 2003) for six pollutants: total phosphorus (TP), total nitrogen (TN), Biochemical oxygen demand (BOD), lead (Pb), zinc (Zn), and total suspended solids (TSS) as shown in Table 4.

Table 4. Existing Site Pollutant Load

Pollutant	Concentration C (mg/l)	Initial Load (lbs/year)
TP	0.39	51.25
TN	3	394.20
BOD	7.7	1,011.78
Pb	0.06	7.88
Zn	0.03	3.94
TSS	101	1,3271.45

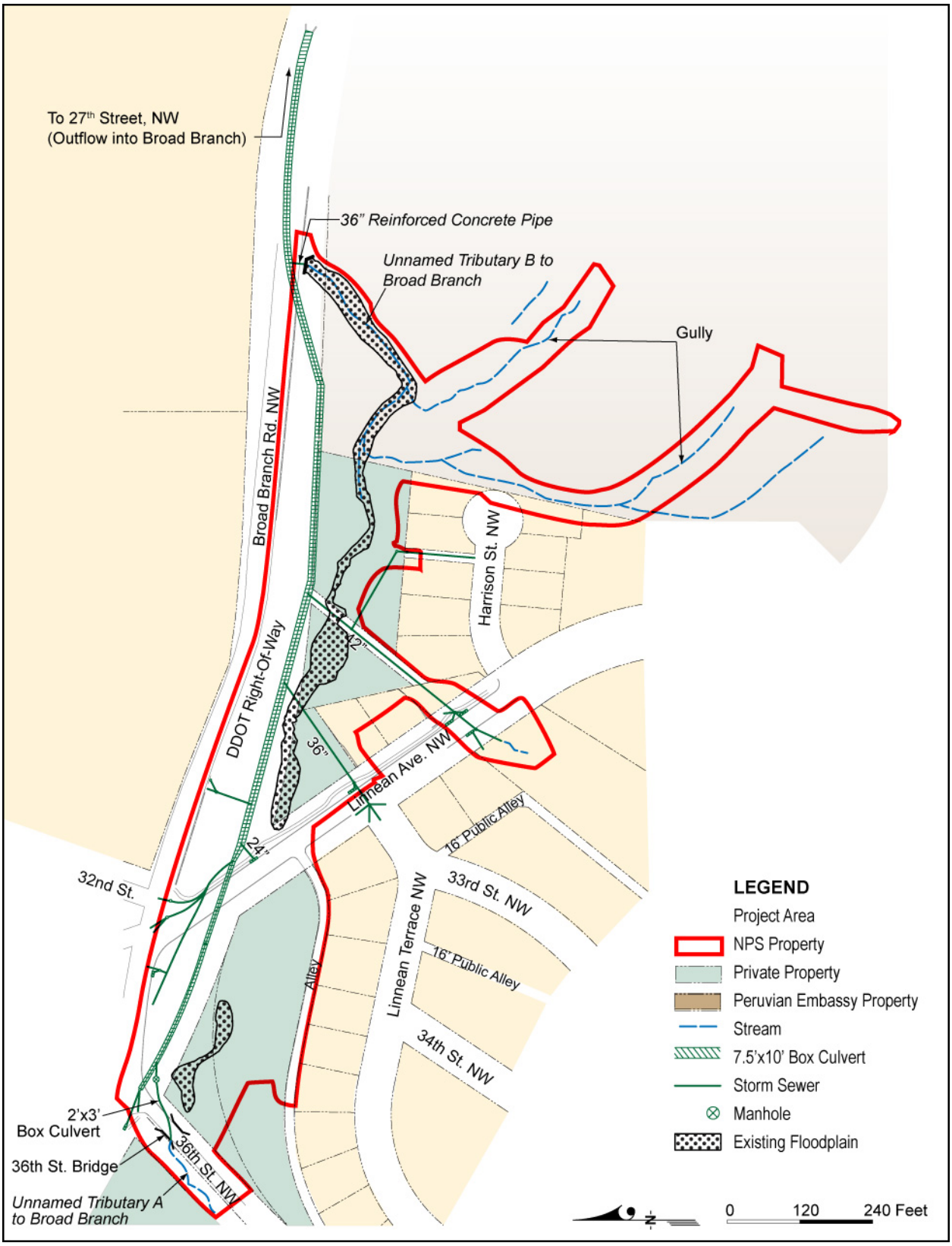


Figure 10: Existing 100- year floodplain, based on HEC-RAS model

HYDROLOGY

The unnamed tributary to Broad Branch flows in an easterly direction into Broad Branch, which is a western tributary of Rock Creek. The Broad Branch tributary is part of the Broad Branch subwatershed. The Broad Branch drainage area is within a highly urbanized watershed.

Unnamed tributary A is an above-ground, free-flowing stream that appears to be fed by overland surface runoff and groundwater upstream of the 36th Street Bridge. At the 36th Street Bridge, the stream is diverted to two-by-three foot box culvert and does not reemerge downstream of the bridge. A two-by-three foot reinforced concrete box culvert captures the stream and conveys it to a 7.5 foot by 10 foot reinforced concrete box culvert that is within the Broad Branch right-of-way and that was constructed in 1927. The stream is conveyed to a reinforced concrete box outfall on Broad Branch Road, NW near 27th Street, NW. Unnamed tributary B is a free-flowing stream with few meanders that begins approximately 500 feet upstream of Broad Branch Road (just east of Linnean Avenue, NW), where groundwater seeps provide baseflow to the stream channel. The tributary ultimately is collected by a 36-inch reinforced concrete pipe and conveyed to the box culvert. This flow combines with the upstream flow already in the box culvert and is discharged at the outfall on Broad Branch Road, NW near 27th Street, NW. Flow at the outfall continues downstream to Rock Creek. Unnamed Tributary B is extremely shallow and sluggish because of heavy sediment deposition from soils that erode from two steep incised gullies located on land owned by the Peruvian Embassy. The gullies carry no measureable baseflow, but during larger storm events they convey large amounts of stormwater runoff and sediment to the stream channel.

The existing hydrology of the Broad Branch subwatershed includes fast stream flow during storm events, which is disruptive to aquatic habitat and water quality. The stream often floods surrounding streets in the residential neighborhood during large storm events. TR-20 and TR-55 hydrologic models were used to estimate peak discharges for the one-year, two-year, five-year, 10-year, and 100-year 24 hour storms. Peak discharges for the unnamed Tributary A ranged from 4.5 cubic feet per second (cfs) for the one-year storm event to 18.2 cfs for the 100-year storm event. Peak discharges for the unnamed Tributary B range from 16.9 cfs for the one-year storm event to 233.7 cfs for the 100-year storm event.

VEGETATION

A detailed tree survey was completed by a certified arborist on April 26, 2011. The vegetation within the Broad Branch Stream Restoration project area varies along the stream reaches. In the area adjacent to unnamed tributary, the vegetation consists of early- to mid-successional forest. Southeast of 36th Street, NW, there is a stand of mature forest where the stream has been piped and diverted from its original channel. Downstream of Linnean Avenue, NW, also within the piped reach, the project area consists of an open grassed area. In the downstream reach, adjacent to where the unnamed tributary to Broad Branch resurfaces (Section B), the forest is early-successional. Several large specimen trees exist in the area, including a 44-inch and 50-inch poplar and 38-inch and 60-inch sycamore; however the majority of mature trees fall within a range of 18 inches to 24 inches. Special trees (trees with over 55-inch circumference or 17.5-inch diameter) have been identified and their condition assessed for purposes of obtaining a Special Tree Permit from DDOE for tree removal. Substantial amounts of invasive species

(English ivy, oriental bittersweet, and others) exist throughout the area, particularly just upstream of Linnean Avenue, NW. Table 5 lists the majority of the vegetative species observed at the site.

Table 5: Plant Species Observed Within the Project Area

Common Name	Scientific Name
Allegheny blackberry	*Rubus allegheniensis*
American beech	*Fagus grandifolia*
Black walnut	*Juglans nigra*
Box elder	*Acer negundo*
Sedge	*Carex spp*
Common roundleaf greenbrier	*Smilax rotundifolia*
Deer-tongue grass	*Panicum clandestinum*
Eastern poison ivy	*Toxicodendron radicans*
English ivy	*Hedera helix*
Fescue grass	*Festuca sp.*
Indian strawberry	*Duchesnea indica*
Jack in the pulpit	*Arisaema triphyllum*
Japanese honeysuckle	*Lonicera japonica*
Japanese knotweed	*Polygonum cuspidatum*
Mapleleaf viburnum	*Viburnum acerifolium*
Multiflora Rose	*Rosa multiflora*
Musclewood	*Carpinus caroliniana*

Common Name	Scientific Name
Norway maple	*Acer platanoides*
Red maple	*Acer rubrum*
Skunk cabbage	*Symplocarpus foetidus*
Spicebush	*Lindera benzoin*

WILDLIFE

The project area contains wildlife and wildlife habitat. Birds observed in the project area during the wetland delineation in June 2009 and November 2009 are those associated with urbanized areas. They include gray catbird (*Dumetella carolinensis*), northern mockingbird (*Mimus polygottos*), blue jay (*Cyanocitta cristasa*), and northern cardinals (*Cardinalis cardinalis*). Also observed were brown thrashers (*Toxostoma rufum*), downy woodpeckers (*Picoides pubescens*), Carolina chickadee (*Poecile carolinensis*), black-capped chickadee (*Poecile atricapillus*), and tufted titmice (*Baeolophus bicolor*). Other species observed in the project area during the wetland delineation were red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), black rat snake (*Elaphe obsolete*), and eastern gray squirrel (*Sciurus carolinensis*). Healthy streams similar to the one found at the project site support a wide variety of aquatic species, such as northern tow-line salamanders (*Eurycea bislineata)* and macroinvertebrates such as chironomids, crayfish, and caddisflies. No aquatic species were found in the project area during the wetland delineation conducted in June 2009 and November 2009.

On May 29, 2011, DDOE biologists surveyed the site in response to an inquiry letter for species of concern at the site. Two avian species of greatest conservation need (SGCN) -- the eastern towhee (*Pipilo erthropthalmus)* and the wood thrush (*Hylocichla mustelina* -- and one mammalian species -- Virginia opossum (*Didelphis virginiana)* -- were identified during that survey.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter analyzes both beneficial and adverse impacts that would result from implementing the alternatives considered in this EA. This chapter also includes definitions of impact thresholds (negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. As required by the CEQ regulations implementing NEPA, a summary of the environmental consequences for each alternative is provided in Table 1, which can be found in "Chapter 2: Alternatives." The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in "Chapter 3: Affected Environment."

GENERAL METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS BY RESOURCE

The following elements were used for establishing impact thresholds and measuring the effects of the alternatives on each resource category:

- General analysis methods as described in guiding regulations, including the context and duration of environmental effects;
- Basic assumptions used to formulate the specific methods used in this analysis;
- Thresholds used to define the level of impact resulting from each alternative;
- Methods used to evaluate the cumulative impacts of each alternative in combination with unrelated factors or actions affecting park resources; and
- Methods and thresholds used to determine if impairment of specific resources would occur under any of the alternatives.

These elements are described in the following sections.

General Analysis Methods

The analysis of impacts follows CEQ guidelines and Director's Order 12 procedures (NPS 2001). This analysis incorporates the best available scientific literature applicable to the region and setting, the species being evaluated, and the actions being considered in the alternatives.

As described in Chapter 1, the NPS created an interdisciplinary science team to provide important input to the impact analysis. For each resource topic addressed in this chapter, the applicable analysis methods are discussed, including assumptions and impact intensity thresholds.

Impact Thresholds

Determining impact thresholds is a key component in applying NPS *Management Policies* and Director's Order 12. These thresholds provide the reader with an idea of the intensity of an impact on a specific topic. The impact threshold is determined primarily by comparing the effect to a relevant standard based on applicable or relevant/appropriate regulations or guidance, scientific literature and research, or best professional judgment. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed

in this document. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major impacts. In all cases, the impact thresholds are defined for adverse impacts. Beneficial impacts are addressed qualitatively.

Potential impacts of all alternatives are described in terms of type (beneficial or adverse); context; duration (short- or long-term); and intensity (negligible, minor, moderate, major). Definitions of these descriptors include:

> **Beneficial**: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
>
> **Adverse**: A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.
>
> **Context**: The affected environment within which an impact would occur, such as local, park-wide, regional, global, affected interests, society as whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic. Therefore, the impact analysis determines the context, not vice versa.
>
> **Duration**: The duration of the impact is described as short-term or long-term. Duration is variable with each impact topic. Therefore, definitions related to each impact topic are provided in the specific impact analysis narrative.
>
> **Intensity**: Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed.

Cumulative Impacts Analysis Method

The CEQ regulations implementing NEPA require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). As stated in the CEQ handbook, “Considering Cumulative Impacts” (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected, and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including the no action alternative.

For the proposed project, cumulative impacts were determined by combining the impacts of the alternatives being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans at Rock Creek Park and, if applicable, the surrounding area. Table 6 summarizes the actions that could affect the various resources at the park, along with the plans and policies of both the park and surrounding jurisdictions, which were discussed in Chapter 1. The analysis of cumulative impacts was accomplished using four steps:

Step 1 — Identify Resources Affected: Fully identify resources affected by any of the alternatives. These include the resources addressed as impact topics in Chapters 3 and 4 of the document.

Step 2 — Set Boundaries: Identify an appropriate spatial and temporal boundary for each resource.

Step 3 — Identify Cumulative Action Scenario: Determine which past, present, and reasonably foreseeable future actions to include with each resource. These are listed in Table 3 and described below.

Step 4 — Cumulative Impact Analysis: Summarize impacts of these other actions (x) plus impacts of the proposed action (y), to arrive at the total cumulative impact (z). This analysis is included for each resource in Chapter 4.

Table 6: Cumulative Impacts Projects

Type of Action	Cumulative Impacts Project	Description	Status
Repair	Peirce Mill	The NPS recently completed a major rehabilitation of Peirce Mill, a historic structure located on Tilden Street near Beach Drive. Affected Resources: Soils, Floodplains, and Vegetation	Present
Civil Works Projects	Reconstruction of Oregon Avenue & Broad Branch Road	DDOT plans to reconstruct Oregon Avenue and Broad Branch Road. Affected Resources: Soils and Topography, Streams and Wetlands, Floodplains, Water Quality, Vegetation, Wildlife	Future
	Klingle Valley Trail	The Federal Highway Administration and DDOT have proposed to construct a multi-use trail on a closed section of Klingle Road and rehabilitate the adjacent stream. Affected Resources: Soils and Topography, Streams and Wetlands, Floodplains, Water Quality, Vegetation, Wildlife	Present, Future
	Installation of Regenerative Stormwater Conveyances at Bingham Run and Milkhouse Run	The NPS and DDOE recently have stabilized and rehabilitated Bingham Run and Milkhouse Run within Rock Creek Park by installing regenerative stormwater conveyances (RSCs). Affected Resources: Soils and Topography, Streams and Wetlands, Floodplains, Water Quality, Hydrology, Vegetation, Wildlife	Present, Future

SOILS AND TOPOGRAPHY

Methodology and Assumptions

Existing soil maps and related documents were reviewed in order to analyze potential impacts to soils from the restoration work. The majority of the soils in the project area are highly disturbed in nature, especially within the areas where the relic stream channel was filled.

Study Area

The study area for soil resource impacts is the limits of disturbance required for the construction of the stream restoration project and any necessary staging areas for stockpile material and construction equipment.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts to soils:

Negligible — The action would result in a change to soil resources, but the change would be so small it would not be of any measurable or perceptible consequence.

Minor — The action would result in impacts to soil resources, but the change would be small and localized and of little consequence. Mitigation would be needed to offset adverse impacts. The mitigation would be relatively simple to implement and would likely be successful.

Moderate — The action could result in a change to soil resources. The change would be measurable and of consequence. Mitigation measures would be necessary to offset adverse impacts and would likely be successful.

Major — The action would result in a noticeable change to soil resources. The change would be measurable and result in a severely adverse impact. Mitigation measures necessary to offset adverse impacts would be needed and extensive, and their success would not be guaranteed.

Duration — Short-term impact to soils would occur during the construction activities. Long-term impacts to soils would extend after completion of the project.

Impacts of Alternative 1

Under the no action alternative, the soils and topography in the project area would continue to be negatively affected. There is currently no means to control or slow the force of the stormwater as it flows downslope from the Peruvian Embassy land; under the no action alternative, no improvements would be made. Stormwater flowing down these steep slopes would continue to erode soil, scour the stream banks and cause channel incising, and deposit sediment into the unnamed tributary to Broad Branch. Within the piped portion of the stream, the flows would continue to be uncontrolled as they leave the concrete box culvert, and continue to cause erosion of the streambed at the outlet. As a result of these erosive conditions, the topography would become more extreme within the stream channel as the streambed becomes deeper and further away from the stream banks. Therefore, long-term, moderate, adverse impacts to soils and topography would continue to occur. Soils in the area of the NPS-owned grassed field would

remain stable. Under the no action alternative, the grassy field east of Linnean Avenue, NW would remain stable.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to soils and topography in the project area. Urbanization within the watershed has led to eroded soils and scoured topography within streams. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, the Klingle Valley Trail construction and stream restoration, and the installation of RSCs at Bingham Run and Milkhouse Run would disturb and potentially displace soils and the local topography, creating a short-term, minor, adverse impact. These projects would result in long-term beneficial impacts to soils through the implementation of various BMPs. The no action alternative would not add to these beneficial cumulative impacts. The impacts from the no action alternative, when combined with the impacts of the other past, present, and future actions, would result in long-term, moderate adverse cumulative impacts.

CONCLUSION

Implementation of the no action alternative would result in long-term, moderate, adverse impacts to soils from erosion and changes in topography. The no action alternative would not add to beneficial cumulative impacts of other projects occurring in the area. The impacts from the no action alternative, when combined with the impacts of the other past, present, and future actions, would result in long-term, adverse cumulative impacts.

Impacts of Alternative 2

Short-term, minor, adverse impacts to soils would occur during construction activities associated with Alternative 2. The stream daylighting and the construction of SWRFs, step pools, and shallow ponds proposed in Alternative 2 would require soil grading and excavation, as banks would be created in certain locations to daylight the stream and widened in others to accommodate step pools. Soils and topography would be disturbed in the upper reach, where soils would be regraded and compacted from construction equipment. To minimize the overall impacts to soils, mitigation would consist of utilizing proper erosion and sediment control measures to include super silt fencing, tree protection fencing, earth dike installation, and pump-around diversions for all surface and stormwater. The construction would progress from downstream to upstream to minimize disturbance to soils and topography.

Upon completion, daylighting and restoring the unnamed tributary to Broad Branch would stabilize soils and topography. It also would provide grade control for the currently degraded streambed and banks through the creation of step pools that would include rock/boulder material of sufficient weight to avoid being carried downstream during large storm events, and/or root wads[3] and vegetative material. This would minimize the erosion of soils occurring on the banks. Root wads embedded into the soil provide a strong anchor, preventing erosion. Similarly,

[3] A root wad is a mass of roots associated with a tree adjacent to or in a stream that provides refuge for fish or other aquatic life. Root wads are normally used for bank protection or to anchor large woody debris.

vegetation, including trees, grasses, and shrubs, prevent erosion. Their root networks help to secure the soil in place, and their stems, trunks, and leaves above ground act as a barrier, slowing rushing water down and reducing stresses on the soil. The steep slopes on the Peruvian Embassy property would be stabilized with step pools (Figure 11). This would dissipate the energy of the stormwater flow, thereby decreasing erosion of soils and sedimentation into the unnamed tributary to Broad Branch. This would result in long-term, beneficial impacts to soils and topography.

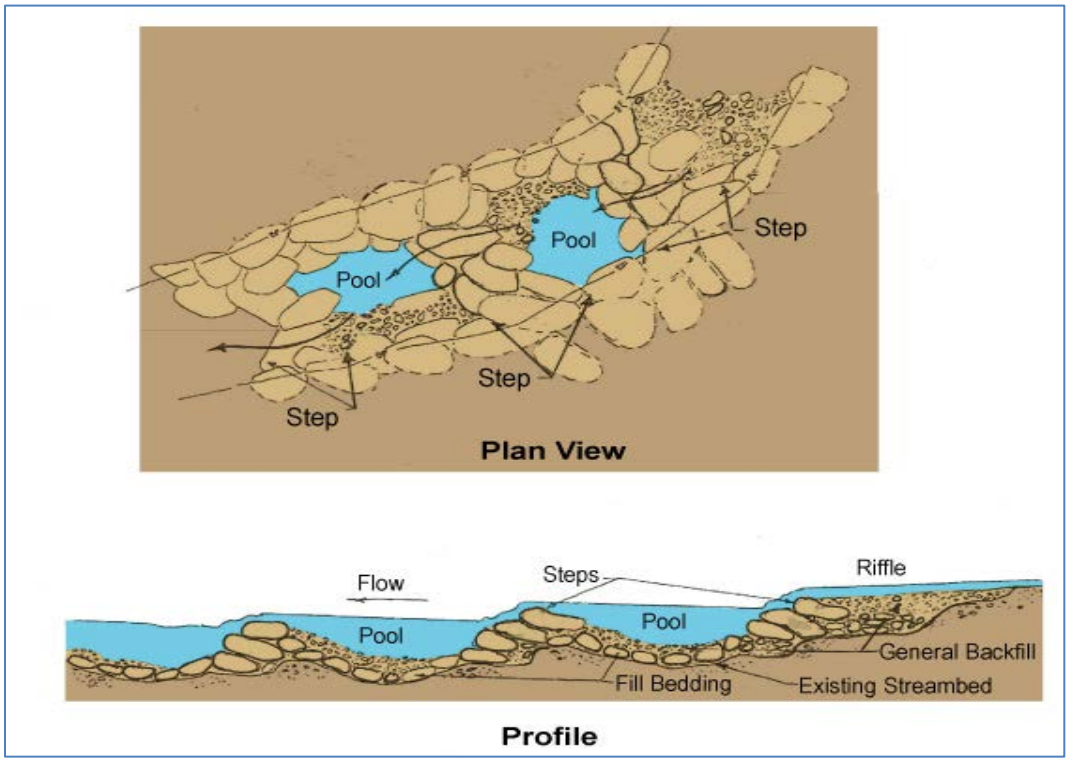


Figure 11: Typical step-pool

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to soils and topography in the project area. Urbanization within the watershed has led to eroded soils and scoured topography within streams. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, the Klingle Valley trail and stream restoration, and the installation of RSCs at Bingham Run and Milkhouse Run would disturb and potentially displace soils and the local topography, creating short-term, minor, adverse impacts. After completion, these projects would result in long-term, beneficial impacts to soils through the implementation of various BMPs. The impacts from Alternative 2, when combined with the impacts of other past, present, and future actions, would result in an overall net beneficial cumulative impact.

CONCLUSION

Alternative 2 would have short-term, minor, adverse impacts to soils during construction activities. Long-term beneficial impacts to soils and topography would occur due to the stabilization of the stream channel and from reducing the erosion and scouring of the

streambanks. The impacts from Alternative 2, when combined with the impacts of other past, present, and future actions, would result in an overall net beneficial cumulative impact.

Impacts of Alternative 3

Short-term, minor, adverse impacts to soils would occur during construction activities associated with Alternative 3. The daylighting proposed in Alternative 3 would require soil grading and excavation, as banks would be created in certain locations to daylight the stream. Soils and topography would be disturbed in the upper reach where soils would be removed and potentially compacted from construction equipment. To minimize the overall impacts to soils during construction, mitigation would consist of utilizing the proper erosion and sediment control measures including super silt fencing, tree protection fencing, earth dike installation, and pump-around diversions for all surface water and stormwater. The construction would progress from downstream to upstream to minimize disturbance.

Upon completion, daylighting a portion of the unnamed tributary to Broad Branch would stabilize soils and topography in the upper reach, creating long-term, beneficial impacts to soils. However, the tributary downstream of Linnean Avenue, NW would continue to be affected by erosion and sedimentation because the entire stream within the project area would not be daylighted and restored. The steep slopes on the Peruvian Embassy land would not be stabilized and they would continue to erode and deposit sediment into the lower reach of the unnamed tributary to Broad Branch. By not daylighting the entire stream in the project area, long term, minor, adverse impacts to soils and topography would continue to occur.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to soils and topography in the project area. Urbanization within the watershed has led to eroded soils and scoured topography within streams. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, the Klingle Valley Trail and stream restoration, and the installation of RSCs at Bingham Run and Milkhouse Run would disturb and potentially displace soils and the local topography, creating a short-term, minor, adverse impact. These projects would result in long-term beneficial impacts to soils through the implementation of various BMPs. Alternative 3 would slightly add to the overall beneficial cumulative impacts.

CONCLUSION

Alternative 3 would result in short-term, minor, adverse impacts to soils and topography during construction. Long-term beneficial impacts to soils and topography would occur due to the stabilization of the stream channel within the upper reach of the project area. However, long-term, minor, adverse impacts would continue because a portion of the stream would not be restored. Alternative 3 would slightly add to the overall beneficial cumulative impacts.

STREAMS AND WETLANDS

Methodology and Assumptions

The NPS protects and preserves wetlands and water resources under EO 11990, Director's Order 77-1, 2002, and the NPS Procedural Manual 77-1: Wetland Protection, 2011. According to NPS

DO #77-1, a statement of findings (SOF) is required when the proposed action would occur in a wetland, unless the action qualifies for an exemption. Rock Creek staff coordinated with the NPS Water Resources Division and determined that the proposed project qualifies for an exemption under Section 4.2 (h) of Director's Order 77-1, as the proposed action is designed for the purposed of restoring a degraded stream, wetland, and aquatic habitat. Therefore, a SOF is not required for this project.

A wetland delineation was conducted in June and November 2009. Predictions about short- and long-term project impacts on wetlands were based on general characteristics and proposed actions associated with alternatives affecting the streams wetlands within the project area.

Study Area

The study area for water resources impacts is the limits of disturbance required for the construction of the stream restoration project. It also includes any necessary staging areas for stockpile material and construction equipment, as well as the overall watershed and drainage area to the Broad Branch tributary.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts to streams and wetlands:

Negligible — The action would result in a change to streams and wetlands, but the change would be so small it would not be of any measurable or perceptible consequence.

Minor — The action would result in impacts to streams and wetlands, but the change would be small and localized and of little consequence. Mitigation would be needed to offset adverse impacts. The mitigation would be relatively simple to implement and would likely be successful.

Moderate — The action could result in a change to streams and wetlands. The change would be measurable and of consequence. Mitigation measures would be necessary to offset adverse impacts and would likely be successful.

Major — The action would result in a noticeable change to stream and wetlands. The change would be measurable and result in a severely adverse impact. Mitigation measures necessary to offset adverse impacts would be needed and extensive, and their success would not be guaranteed.

Duration — Short-term impact to soils would occur during the construction activities. Long-term impacts to the streams and wetlands would extend after completion of the project.

Impacts of Alternative 1

Under the no action alternative, there would be no construction within streams or wetlands. The unnamed tributary to Broad Branch would continue to be piped underground. Unnamed tributary B and associated wetlands would continue to degrade due to uncontrolled stormwater velocities during storm events. Stormwater velocities would continue to scour the stream banks

and cause channel incising, which would deepen and widen the stream. Deepening the stream would cause an imbalance in the groundwater between the stream and the wetlands. Widening of the stream from erosion would cause the wetland to eventually erode into the stream. As vegetation in the wetland is destroyed through erosion or loss of hydrology, the wetland habitat would be lost. Local flooding would continue on residential streets. These impacts to streams and wetlands would be long-term, moderate, and adverse.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to streams and wetlands in the project area. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, restoration of Klingle Valley trail and stream, and the installation of RSCs at Bingham Run and Milkhouse Run noted in this EA would disturb wetland and stream areas during construction. However, these projects would ultimately result in long-term, beneficial impacts to the watershed through stabilized streams and improved stormwater management. During the construction activities of these projects, short-term, minor, adverse impacts are expected. The no action alternative would not contribute to the overall beneficial cumulative impact.

CONCLUSION

The no action alternative would have long-term, moderate, adverse impacts to streams and wetlands due to the urbanized nature of the watershed and high stormwater velocities that are flooding the area and degrading the stream channel. The no action alternative would not contribute to the overall beneficial cumulative impact of other projects occurring in the area.

Impacts of Alternative 2

Construction of the SWRFs would not impact waters of the U.S. Approximately 805 linear feet of perennial stream, 14 linear feet of intermittent stream, 230 linear feet of ephemeral stream, 115 square feet of forested wetland, and 3,067 square feet of emergent wetland would be disturbed from the use of construction equipment, resulting in short-term, minor, adverse impacts. The construction impacts would be mitigated through the use of silt fencing, the creation of stream diversions, grading, and the addition of natural rock material to the streambed. Additional BMPs to be utilized include the use of protective matting for areas where construction vehicles are used, restoring area to preconstruction condition, and adherence to an in-stream construction schedule to protect aquatic species during sensitive breeding or migration periods. The impacts would occur within the delineated limits of disturbance and permits would be obtained from the USACE and DDOE. The project could qualify under Nationwide Permit 27, Aquatic Habitat Restoration, Establishment and Enhancement Activities, which is at the discretion of the USACE. DDOE would issue a Clean Water Act Section 401 water quality certification.

Under Alternative 2, approximately 1,600 linear feet of stream and 3,182 square feet of wetlands would be created, resulting in a net gain in stream length and wetlands in the project area. The creation of the stream and wetlands would stimulate a natural watercourse that would slow stormwater flows, decreasing erosion and sedimentation. The proposed daylighting project would provide improvements to the functional values of the waterway by increasing hydraulic

capacity for flood control and lowering stormwater velocities, which would in turn reduce downstream erosion. These improvements would stabilize and rehabilitate the surrounding environment, including associated aquatic habitat and biodiversity. This impact would be long-term and beneficial. Impacts to streams and wetland would be self-mitigating, since the stream would be restored and daylighted, and additional wetland areas would be created.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to streams and wetlands in the project area. The rehabilitation of Peirce Mill disturbed wetland and stream areas. However, the project will result in long-term, beneficial impacts to the watershed. The restoration of the Klingle Valley stream and the installation of RSCs at Bingham Run and Milkhouse Run would have long-term, beneficial impacts to streams and wetlands by helping to restore some of the values and functions of the wetlands lost through erosion. The reconstruction of Oregon Avenue and Broad Branch Road also would contribute beneficial impacts as BMPs would be utilized. These projects, when combined with Alternative 2, would have beneficial cumulative impacts to streams and wetlands.

CONCLUSION

Alternative 2 would result in beneficial impacts to streams and wetlands by restoring the functions and values that are currently diminished due to erosion, sedimentation, or piping. During construction, short-term, minor, adverse impacts are expected to occur. When combined with Alternative 2, the various road, trail, and stream restoration projects noted in this EA would have beneficial cumulative impacts to streams and wetlands.

Impacts of Alternative 3

During construction of the stream daylighting project, no waters of the U.S. would be impacted. Approximately 154 linear feet of perennial stream and 8,923 square feet of forested wetland would be disturbed by equipment, resulting in short-term, minor, adverse impacts. The construction impacts would be mitigated through the use of silt fencing, the creation of stream diversions, grading, and the addition of natural rock material to the streambed. Additional BMPs to be utilized include the use of protective matting for areas where construction vehicles are used, restoring the area to preconstruction condition, and adherence to an in-stream construction schedule to protect aquatic species during sensitive breeding or migration periods. The impacts would occur within the delineated limits of disturbance, and permits would be obtained from the USACE and DDOE. The project could quality under Nationwide Permit 27, Aquatic Habitat Restoration, Establishment and Enhancement Activities, which is at the discretion of the USACE. DDOE would issue a Clean Water Act Section 401 water quality certification.

Under Alternative 3, approximately 400 linear feet of perennial stream would be restored. The restored stream channel and partial daylighting of unnamed tributary A would have beneficial impacts to streams due to the stabilization of the stream ecosystem. No wetland creation is proposed under this alternative, and the downstream reach would continue to degrade due to high stormwater velocities during storm events. The erosion, scouring, and sedimentation would continue to occur in unnamed tributary B, resulting in long-term, moderate, adverse impacts.

Impacts to streams and wetlands would be self-mitigating, since the stream would be restored and daylighted and additional wetland areas would be created.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to streams and wetlands in the project area. The rehabilitation of Peirce Mill disturbed wetland and stream areas. However, this project will result in long-term, beneficial impacts to the watershed. The restoration of the Klingle Valley stream and the installation of RSCs at Bingham Run and Milkhouse Run would have long-term, beneficial impacts to streams and wetlands by helping to restore some of the values and function of the wetlands lost through erosion. The reconstruction of Oregon Avenue and Broad Branch Road would also contribute beneficial impacts as BMPs would be utilized. Alternative 3 would add a minor amount to the overall net beneficial cumulative impact.

CONCLUSION

Alternative 3 would have beneficial impacts to streams and wetlands in the unnamed tributary A by restoring the functions and values that are currently diminished due to erosion and sedimentation. The downstream reach would continue to degrade since it would not be restored, causing long-term, moderate, adverse impacts. During construction, short-term, minor, adverse impacts are expected to occur. Alternative 3 would add a minor amount to the overall net beneficial cumulative impact.

FLOODPLAINS

Methodology and Assumptions

The impact analysis is based on the review of floodplain information in relation to the proposed design of the action alternatives. The FEMA floodplain map does not show detailed floodplain information within the project area. Therefore, a detailed analysis was performed to map the proposed floodplains in the project area.

Under NPS DO# 77-2: Floodplain Management, a SOF is required when a proposed action would have an adverse effect on a floodplain. The SOF is intended to provide documentation as to why the proposed site was selected and a less flood-prone alternative site was rejected. After consulting with Gary Smillie, a NPS scientist and floodplain compliance specialist with the NPS Water Resources Division, it was determined that a SOF would not be required because the impacts to the floodplain would be beneficial and not adverse.

Study Area

The study area for floodplain impacts is the limits of disturbance required for the construction of the stream restoration project, and any necessary staging areas for storing material and construction equipment.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts to floodplains:

Negligible — The action would result in a change to floodplains, but the change would be so small it would not be of any measurable or perceptible consequence.

Minor — The action would result in impacts to a floodplains, but the change would be small and localized and of little consequence. The mitigation would be needed to offset adverse impacts. It would be relatively simple to implement and would likely be successful.

Moderate — The action could result in a change to floodplains. The change would be measurable and of consequence. Mitigation measures would be necessary to offset adverse impacts and would likely be successful.

Major — The action would result in a noticeable change to floodplains. The change would be measurable and result in a severely adverse impact. Mitigation measures necessary to offset adverse impacts would be needed and extensive, and their success would not be guaranteed.

Duration — Short-term impact to floodplains would occur during the construction activities. Long-term impacts to floodplains would extend after completion of the project.

Impacts of Alternative 1

Under the no action alternative, flooding during storm events would continue due to the existing piping of the unnamed tributary. Stormwater velocities from flood events would continue to erode and scour the banks, depositing sediment into the unnamed tributary B and ultimately into the Rock Creek. Local flooding from the one-year storm event would continue to burden residential storm sewers and create increased flooding in streets. The stream channel would continue to deepen as flood waters scour the channel bottom and increase the distance from the banks to the floodplain. Typical functions and values of floodplains consist of flood flow alternation, sediment stabilization, and toxicant retention. Healthy floodplains create ecological biodiversity and provides habitat for plant and animal communities. The no action alternative would not improve the diminished floodplain function due to the uncontrolled stormwater flows in the project area. Therefore, long-term, moderate, adverse impacts would continue as the overall function of this floodplain continues to degrade.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to floodplain functions and values in the project area. The rehabilitation of the stream in Klingle Valley and the installation of RSCs at Bingham Run and Milkhouse Run would have beneficial impacts to floodplains. The Peirce Mill rehabilitation would have both short-term and long-term, minor, adverse impacts and long-term beneficial impacts to floodplains. The reconstruction of Oregon Avenue and Broad Branch Road would have minor, short-term adverse impacts and long-term beneficial impacts to local floodplains. The no action alternative would contribute additional adverse impacts to the overall

adverse cumulative impact to floodplains. However, it would not contribute to the beneficial cumulative impacts.

CONCLUSION

The no action alternative would have long-term, moderate, adverse impacts to floodplains due to the reduced function of the floodplain from scouring the banks and stream channel. The no action alternative would contribute additional adverse impacts to the overall adverse cumulative impact to floodplains. However, it would not contribute to the beneficial cumulative impacts.

Impacts of Alternative 2

Alternative 2 entails regrading the streambed and banks, and daylighting the unnamed tributaries A and B. Since any disturbance to soil or vegetation in a floodplain is considered an impact, and filling and grading is proposed within the floodplain, impacts to the floodplain would occur. After construction, the soil would be stabilized and revegetated. Therefore, the construction impacts would be short-term, minor, and adverse.

Under Alternative 2, proposed stormwater management would be composed of a series of wetlands, SWRFs and regenerative step pools. The stream restoration would raise the streambed elevation and minimize the erosion occurring on the banks. Typical functions and values of a floodplain consist of flood flow alteration, sediment stabilization, and toxicant retention. Healthy floodplains create ecological biodiversity and provides habitat for plant and animal communities. The proposed daylighting project would provide improvements to the functional values of the waterway by increasing hydraulic capacity for flood control and lowering stormwater velocities, which would reduce downstream erosion. Under Alternative 2, wider cross-sections of the stream are proposed that would reconnect the stream to the floodplain, thereby restoring its function and value. Based upon floodplain modeling conducted for both the existing conditions and as part of the design for this alternative, the stream restoration would accommodate a 100-year flood event. Because of this capacity, less flooding would occur in the surrounding residential neighborhood streets. The proposed floodplain (Figure 12) would be wider and would dissipate stormwater flow during flood events. The project would create riparian habitat and enhance floodplain connectivity. Improvements to floodplain connectivity would improve the ability of stream flows during larger storm events to access the floodplain, resulting in more water storage within the stream corridor and reducing downstream flooding in Broad Branch and Rock Creek. Channel stability would be maintained by the installation of shallow ponds/seepage wetlands, step pools, and root packs which would, in some locations, provide temporary stability until vegetation is established. In other locations, the step pools and root packs would provide the permanent stability necessary in order to maintain the morphology of the newly designed channel during larger storm events. Therefore, Alternative 2 would have beneficial impacts to floodplains.

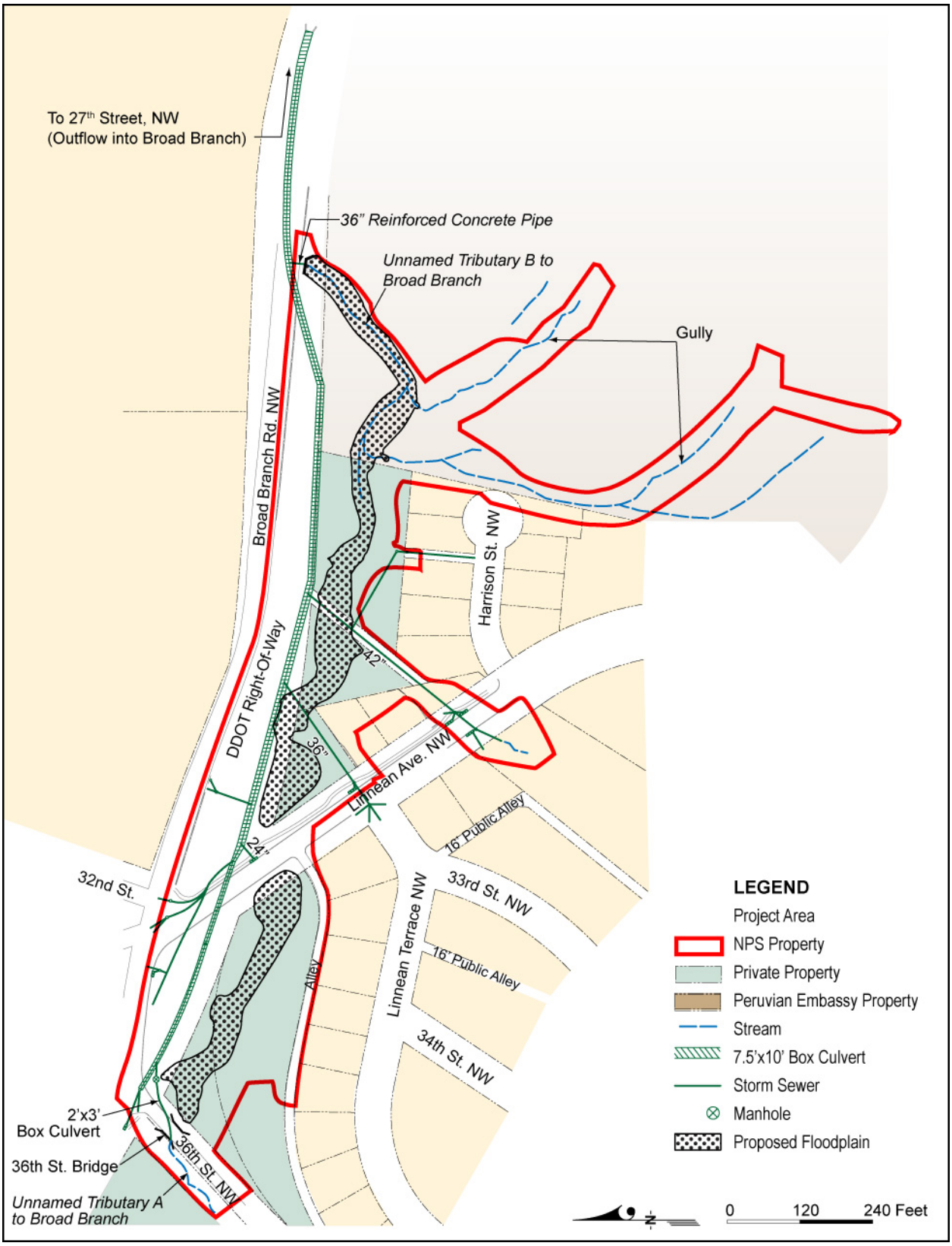


Figure 12: Proposed Floodplain

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to floodplain functions and values in the project area. The rehabilitation of the stream in Klingle Valley and the installation of RSCs would have beneficial impacts to floodplains. The Peirce Mill rehabilitation would have both short-term and long-term, minor, adverse impacts and long-term, beneficial impacts to floodplains. The reconstruction of Oregon Avenue and Broad Branch Road would have minor, short-term, adverse impacts and long-term, beneficial impacts to local floodplains. Alternative 2 would contribute additional beneficial impacts to the overall beneficial cumulative impacts.

CONCLUSION

Alternative 2 would result in beneficial impacts to floodplains by restoring the natural channel and reconnecting the stream to its natural floodplain. During construction, there would be short-term, minor, adverse impacts due to construction activities occurring within the floodplain. Alternative 2 would contribute additional beneficial impacts to the overall beneficial cumulative impacts.

Impacts of Alternative 3

Alternative 3 entails regrading the streambed and banks, and daylighting part of the piped portion of the stream located east of Linnean Avenue, NW. Since any disturbance to soil or vegetation in the floodplain is considered an impact, and filling and grading is proposed within the floodplain, impacts to the floodplain would occur. After construction, the soil would be stabilized and revegetated. Therefore, construction impacts to floodplains would be a short-term, minor, adverse impact to the floodplain.

Under Alternative 3, stormwater management would be composed of series of wetlands. Typical functions and values of a floodplain consist of flood flow alteration, sediment stabilization, and toxicant retention. Healthy floodplains create ecological biodiversity and provides habitat for plant and animal communities. Restoring unnamed tributary A would raise the streambed elevation of the stream, minimize the erosion occurring on the banks, and reconnect the stream to the floodplain, creating a beneficial impact. Based upon floodplain modeling conducted for both the existing conditions and as part of the design for this alternative, the stream restoration project would be designed to accommodate a 100-year flood event. Therefore, less flooding would occur in the surrounding residential neighborhood streets. However, Alternative 3 would not benefit the entire length of stream. Much of the current stormwater flows are impacting the downstream reach of the stream, east of Linnean Avenue, NW, and under this alternative there would be no new wetlands or SWRFs to diminish stormwater flows during flood events. Stormwater flows from the gullies on the Peruvian Embassy would not be diminished under this alternative. The stream channel, east of Linnean Avenue, NW, would continue to deepen as stormwater would continue to scour the channel bottom and increase the distance from the banks to the floodplain. Minor, long-term, adverse impacts would continue to occur near the downstream reach of the stream.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to floodplain functions and values in the project area. The rehabilitation of the stream in Klingle Valley and the installation of RSCs

would have beneficial impacts to floodplains. The Peirce Mill rehabilitation would have both short-term and long-term, minor, adverse impacts and long-term, beneficial impacts to floodplains. The reconstruction of Oregon Avenue and Broad Branch Road would have minor, short-term adverse impacts and long-term beneficial impacts to local floodplains. The adverse impacts as a result of Alternative 3 would slightly diminish the overall net beneficial cumulative impact.

CONCLUSION

Alternative 3 would contribute beneficial impacts to floodplains in the upstream reach of the project area. The downstream reach would not be stabilized and a minor, long-term, adverse impact would continue to affect the floodplain from stormwater flow. The adverse impacts as a result of Alternative 3 would slightly diminish the overall net beneficial cumulative impact to floodplains.

WATER QUALITY

Methodology and Assumptions

The impact analysis is based on the review of water quality information in relation to the proposed design of the action alternatives. The methodology outlined in the DC Department of Health's *Storm Water Management Guidebook (Appendix D)* was used to estimate post development pollutant loads for the alternatives. This method uses an estimate for existing annual pollutant loads based on current land use and impervious cover to estimate post construction pollutant loading based on BMP removal efficiencies for different nutrients of concern.

Study Area

The study area includes the Broad Branch tributary in the limits of disturbance of the proposed stream restoration, as well as the Rock Creek, which is downstream of the project site.

Impact Thresholds

The following thresholds were defined for water quality:

Negligible — Impacts (chemical, physical, or biological effects) would not be detectable, would be well within acceptable water quality standards or criteria, and would be within historical or desired water quality conditions.

Minor — Impacts (chemical, physical, or biological effects) would be detectable but would be well within acceptable water quality standards or criteria and within historical or desired water quality conditions.

Moderate — Impacts (chemical, physical, or biological effects) would be detectable but would be at or within acceptable water quality standards or criteria. However, historical baseline or desired water quality conditions would be altered on a short-term basis.

Major — Impacts (chemical, physical, or biological effects) would be detectable and would be frequently fall outside the historical baseline or desired water quality conditions in the long-term; and/or chemical, physical, or biological water quality standards or criteria would be slightly and singularly exceeded on a short-term basis.

Duration — Short-term impacts last less than one year. Long-term impacts last longer than one year.

Impacts of Alternative 1

Under the no action alternative, no stream restoration activities would occur and the unnamed tributary to Broad Branch would continue to be piped under Broad Branch Road, NW. Therefore, there would be no new impacts to water quality. However, existing water quality impacts would continue and there would be no reduction in existing pollutant loads within the tributaries to Broad Branch. During storm events, all runoff would continue to be intercepted either by the storm drain system at 36th Street, NW, or by the 36-inch reinforced concrete pipe at Broad Branch Road, NW. Infiltration would continue to be impaired and the area within the unnamed tributary B would continue to be subject to a heavy sediment load due to erosion of the gullies on the Peruvian Embassy property and the free-flowing portion of the stream channel. Sediment entering the 36-inch reinforced concrete pipe at Broad Branch Road, NW would continue to enter the reinforced concrete box in the Broad Branch Road, NW right-of-way, and would be conveyed downstream and discharged to Broad Branch and Rock Creek. Therefore, the impacts to water quality would be long-term, moderate, and adverse.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts towater quality in the project area. The rehabilitation of the stream in Klingle Valley, the reconstruction of Oregon Avenue and Broad Branch Road, and the installation of RSCs would affect water quality during construction. However, these projects ultimately would result in beneficial impacts to water quality in the watershed through stabilized streams and improved stormwater management. The no action alternative would not contribute to the overall beneficial cumulative impacts occurring within the watershed.

CONCLUSION

The no action alternative would have long-term, moderate, adverse impacts to water quality due to uncontrolled stormwater velocities and excess erosion and sediment loading in the stream. The no action alternative would not cumulatively contribute to the beneficial impacts occurring within the watershed.

Impacts of Alternative 2

During construction of Alternative 2, soils would be disturbed during excavation and grading for the daylighting and stream restoration effort, and there would be potential for soil to enter waterways. Prior to the commencement of construction activities, a CWA Section 401 water quality certification would be obtained from DDOE. The short-term, minor, adverse impacts to water quality during construction would be mitigated through the use of erosion and sediment

control measures such as super silt fences, stream diversions and a strict sequence of construction. These BMPs would be approved by DDOE prior to construction. By utilizing BMPs, these mitigation measures would reduce the adverse impacts during construction from moderate to minor.

Under Alternative 2, the unnamed tributary to Broad Branch would be restored and daylighted. The proposed project would improve water quality both within the unnamed tributary and in areas adjacent to the site that contribute surface runoff. The proposed riparian vegetation within the stream corridor would provide uptake and filtering of stormwater and enhance the removal of sediment and pollutants. Daylighting the unnamed tributary to Broad Branch would expose the currently piped stream to sunlight, air, soil, and vegetation. These features would provide natural filtering processes to remove pollutants from the stream. Exposure to sunlight, air, and soil allows growth of aquatic and riparian vegetation that can help improve water quality by uptaking organic and inorganic pollutants. The stormwater retention facilities and stormwater wetlands that are proposed within the unnamed tributary and on the Peruvian Embassy would slow stormwater flows to a non-erosive level, allowing the water to be filtered naturally. This would remove pollutants before the water is released into the stream channel, reducing sediment and nutrient loads in the unnamed tributary to Broad Branch and in downstream waterways.

Table 7 provides the estimated pollutant loads that would be removed from the tributaries to Broad Branch and the final pollutant loads after the implementation of Alternative 2. The pollutant loads were calculated using existing loads found in Table 4 and the post construction pollutant loading based on BMP removal efficiencies for the different nutrients of concern (DC DOH, 2003).

Table 7: Estimated Pollutant Loads

Pollutant	Wet Pond Removal Rate (lbs/year)	Bioretention Removal Rate (lbs/year)	Final Load (lbs/year)
TP	20.78	0.25	30.22
TN	96.66	1.47	296.07
BOD	No Data	No Data	1,011.78
Pb	No Data	No Data	7.88
Zn	1.56	0.03	2.35
TSS	10,388.20	0	2,883.25

This reduction in pollutants would result in beneficial impacts to water quality.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to water quality in the project area. The rehabilitation of the stream in Klingle Valley, the reconstruction of Oregon Avenue and Broad Branch Road, and the installation of RSCs would affect water quality during construction. However, these projects would ultimately result in beneficial impacts to water quality in the watershed through stabilized streams and improved stormwater management. Alternative 2 would contribute to the overall beneficial cumulative impacts to water quality in the watershed.

CONCLUSION

Alternative 2 would have long-term, beneficial impacts to water quality due to the restoration of the unnamed tributary to Broad Branch. Stormwater velocities, excess erosion, and sediment loading would be controlled, and the amount of pollutants in the stream would be reduced. Short-term, minor adverse impacts would occur during construction. Alternative 2 would contribute to the overall beneficial cumulative impacts to water quality in the watershed.

Impacts of Alternative 3

During construction of Alternative 3, soils would be disturbed during excavation and grading for the daylighting and stream restoration effort, and there would be potential for soil to enter waterways. Prior to the commencement of construction activities, a CWA Section 401 water quality certification would be obtained from DDOE. The short-term, minor, adverse impacts to water quality during construction would be mitigated through the use of erosion and sediment control measures such as super silt fences, stream diversions, and a strict sequence of construction. These BMPs would be approved by DDOE prior to construction. By utilizing BMPs, these mitigation measures would reduce the adverse impacts during construction from moderate to minor.

Under Alternative 3, approximately 400 linear feet of the unnamed tributary A would be daylighted and restored. Within the upper reach of the unnamed tributary to Broad Branch, the proposed project would improve water quality within the unnamed tributary A. The proposed riparian vegetation within the stream corridor would provide uptake and filtering of stormwater and enhance the removal of sediment and pollutants. This alternative would expose a portion of the currently piped stream to sunlight, air, soil, and vegetation. This would provide natural filtering processes to remove pollutants from the stream. Exposure to sunlight, air, and soil allows growth of aquatic and riparian vegetation that can help improve water quality by uptaking organic and inorganic pollutants. Tables 8 provides the estimated pollutant loads that would be removed from the tributaries to Broad Branch and the final pollutant loads after the implementation of Alternative 3. The pollutant loads were calculated using existing loads found in Table 4, and the post construction pollutant loading were based on BMP removal efficiencies for the different nutrients of concern (DC DOH, 2003).

Table 8: Estimated Pollutant Loads for Alternative 3

Pollutant	Wet Pond Removal Rate (lbs/year)	Final Load (lbs/year)
TP	20.67	30.58
TN	103.82	290.38
BOD	No Data	1,011.78
Pb	No Data	7.88
Zn	2.11	1.83
TSS	8,628.95	4,642.50

This reduction in pollutants would create minor, long-term, beneficial impacts in water quality. However, under Alternative 3 there would be no stormwater retention facilities and no stormwater wetlands proposed to filter and process stormwater before it is released into the stream channel. Alternative 3 would not reduce sediment and nutrient loads in the downstream reach of the project area as unnamed tributary B would not be restored, and stormwater would not be treated. Therefore, the conditions in the downstream reach would continue to have long-term, minor, adverse impacts to water quality.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to water quality in the project area. The rehabilitation of the stream in Klingle Valley, the reconstruction of Oregon Avenue and Broad Branch Road, and the installation of RSCs would affect water quality during construction. However, these projects ultimately would result in beneficial impacts to water quality in the watershed through stabilized streams and improved stormwater management. The adverse impacts as a result of Alternative 3 would slightly diminish the overall net beneficial cumulative impact.

CONCLUSION

Alternative 3 would result in beneficial impacts to water quality due to the restoration of the unnamed tributary A. Stormwater velocities, excess erosion, and sediment loading would be controlled in the upper reach. The amount of pollutants in the stream would not be reduced, as unnamed tributary B would not be restored and stormwater would not be treated. Therefore, there would be long-term, minor, adverse impacts in addition to the beneficial impacts. The adverse impacts as a result of Alternative 3 would slightly diminish the overall net beneficial cumulative impact.

HYDROLOGY

Methodology and Assumptions

The existing hydrology within the project area was documented by team engineers and reviewed. The impacts were analyzed for each alternative based on calculations for the hydrology. Hydraulics for the alternatives were developed using the proposed cross-sections and the conditions of the stream and were input into a HEC-RAS model.

Study Area

The geographic area for hydrology is the Broad Branch watershed.

Impact Thresholds

The following thresholds were used to determine to magnitude of the impact on the hydrology.

Negligible – Impacts to hydrology would be below or at the lower levels of detection.

Minor – Impacts to hydrology would be detectable and small. Mitigation may be needed to offset adverse impacts. The mitigation would be relatively simple to implement and likely be successful.

Moderate – Impacts to hydrology would be readily apparent and result in a change to hydrology over a relatively wide area. Mitigation measures would be necessary to offset adverse impacts and likely be successful.

Major – Impacts to hydrology would be readily apparent and would substantially change the character of the hydrology over a large area, both within and outside of the park. Mitigation measures to offset adverse impacts would be needed and extensive, and their success could not be guaranteed.

Duration – Short-term impacts less than one year. Long-term impacts last longer than one year.

Impacts of Alternative 1

Under the no action alternative, the unnamed tributary to Broad Branch would continue to be piped underground and there would be no changes to the exiting hydrology in the project area. The stream and associated wetlands would continue to degrade due to uncontrolled stormwater velocities during storm events from surrounding roads, residential areas, and the incised gullies located on the land owned by the Peruvian Embassy. The flows from this stormwater convey large amounts of stormwater runoff and sediment to the stream channel during heavy storm events, which is a main contributor to erosion within the tributary. (In a natural stream state, flows within streams would be slower and less powerful, and ultimately less erosive). In addition, there would be no improvements to groundwater recharge under this alternative. Due to the high velocity flows within unnamed tributaries A and B and the poor groundwater recharge, long-term, moderate, adverse impacts to hydrology would continue.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts tohydrology within the Rock Creek watershed. The reconstruction of Oregon Avenue and Broad Branch Road, the restoration of the Klingle Valley Trail and stream, and the installation of RSCs at Bingham Run and Milkhouse

Run would have beneficial impacts to hydrology. The urbanized nature of the watershed would continue to have long-term, moderate, adverse impacts on the hydrology of the watershed. The no action alternative would not contribute to beneficial cumulative impacts. However, it would add to the overall adverse cumulative impact on the hydrology of the watershed.

CONCLUSION

The no action alternative would have long-term, moderate, adverse impacts tohydrology. This is due to the urbanized nature of the watershed, the high stormwater velocities flooding the area and degrading the stream channel, and the poor groundwater recharge. The no action alternative would not contribute to beneficial cumulative impacts. However, it would add to the overall adverse cumulative impact on the hydrology of the watershed.

Impacts of Alternative 2

Under Alternative 2, approximately 1,600 linear feet of stream would be daylighted and restored. The unnamed tributary would be daylighted from the existing two-by-three foot reinforced concrete box culvert and pedestal manhole to a series of shallow ponds and regenerative step pools with associated riparian corridor. The two-by-three foot reinforced concrete box culvert and pedestal manhole would remain in place to convey larger storm event runoff to the existing 10-by-7.5 foot reinforced concrete box culvert located in the Broad Branch right-of-way. The regenerative step pools would allow stream flow to slow for infiltration and for sediment to settle out. A 36-inch reinforced concrete pipe would be installed under Linnean Avenue, NW in order to connect daylighted flows from upstream Linnean Avenue, NW to the downstream reach. A 15-inch reinforced concrete pipe also would be installed to convey stormwater runoff from Linnean Avenue, NW into the newly daylighted stream reach downstream of Linnean Avenue, NW. During construction, it is expected that the impacts to hydrology would be short-term, minor, and adverse. These impacts would include stream diversions and grading, and the addition of natural rock material to the streambed.

The proposed daylighting project would provide improvements to the functional values of the waterway by increasing hydraulic capacity for flood control and lowering stormwater velocities, which would reduce downstream erosion. After the proposed improvements are installed, peak discharges at the 36th Street Bridge would remain unchanged. Discharges to the newly constructed ponds upstream of Linnean Avenue, NW would increase, as flows from the daylighted stream would combine with runoff to the newly constructed ponds and regenerative step pools. Peak discharges from the gullies located on the Peruvian Embassy land would decrease after the proposed regenerative step pools are installed, as they would provide additional storage and reduce downstream peak flows. The discharges from the gullies located on the Peruvian Embassy land would reach the 36-inch reinforced concrete pipe after the discharges from the daylighted stream, reducing the net flow into the pipe and into Broad Branch further downstream. By enhancing the stream's ability to slow the flow, and allowing a larger percentage of runoff to infiltrate the ground, the watershed's overall hydrology would be enhanced. This would result in long-term, beneficial impacts to hydrology.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to hydrology within the Rock Creek watershed. The reconstruction of Oregon Avenue and Broad Branch Road, the restoration of the

Klingle Valley Trail and stream, and the installation of RSCs at Bingham Run and Milkhouse Run would have beneficial impacts to hydrology. The urbanized nature of the watershed would continue to result in long-term, moderate, adverse impacts on the hydrology of the watershed. The impacts from Alternative 2, when combined with the impacts of other past, present, and future actions, would result in a net adverse cumulative impact due to the urbanization within the watershed.

CONCLUSION

Alternative 2 would result in beneficial impacts to hydrology by restoring the functions and values that are currently diminished due to erosion and sedimentation. Additional storage from seepage ponds and step pools would dissipate energy from stormwater flows. During construction, short-term, minor, adverse impacts are expected to occur. The impacts from Alternative 2, when combined with the impacts of other past, present, and future actions, would result in a net adverse cumulative impact due to the urbanization within the watershed.

Impacts of Alternative 3

Under Alternative 3, approximately 400 linear feet of perennial stream (unnamed tributary A) would be daylighted and restored. The surface flows from the furthest upstream point in the project area would be combined with the flows from piped unnamed tributary to Broad Branch. This flow would be routed into regenerative step pools and stormwater wetland ponds between 36th Street, NW and Linnean Avenue, NW. During construction, impacts to hydrology would be short-term, minor, and adverse. These impacts would include stream diversions and grading, and the addition of natural rock material to the streambed.

Under this alternative, the peak stormwater flows would increase, as a portion of the flow would be removed from the pipe (daylighted) and added to the existing surface flow that originates above 36th Street, NW. The restored stream channel and partial daylighting of the unnamed tributary A from the concrete box culvert into the abandoned stream channel would have beneficial impacts to hydrology by stabilizing the stream ecosystem.

At the furthest downstream point of the project area, flows would remain the same as the existing conditions, as no changes would occur within unnamed tributary B or the gullies on the Peruvian Embassy land. No wetland creation is proposed under this alternative, and the downstream reach is expected to continue to degrade due to high stormwater velocities. No RSCs are proposed on the Peruvian Embassy land. Therefore, the high stormwater velocities would continue to erode the Embassy slopes and deposit sediments into the unnamed tributary to Broad Branch. The erosion, scouring, and sedimentation would continue to occur in unnamed tributary B, which would result in long-term, moderate, adverse impacts to hydrology.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to hydrology within the Rock Creek watershed. The reconstruction of Oregon Avenue and Broad Branch Road, the restoration of the Klingle Valley Trail and stream, and the installation of RSCs at Bingham Run and Milkhouse Run would have beneficial impacts to hydrology. The urbanized nature of the watershed would continue to have long-term, moderate, adverse impacts on the hydrology of the watershed.

Alternative 3 would contribute to the beneficial cumulative impacts to hydrology. However, it would add to the overall adverse cumulative impact on the hydrology of the watershed.

CONCLUSION

Alternative 3 would create beneficial impacts to hydrology within the unnamed tributary A by restoring the functions and values that are currently diminished due to erosion and sedimentation. The downstream reach would continue to degrade, since it would not be restored, and RSCs would not be installed on the Peruvian Embassy land, causing long-term, moderate, adverse impacts. During construction of the partial restoration, short-term, minor, adverse impacts would be expected to occur. Alternative 3 would contribute to the beneficial cumulative impacts to hydrology. However, it would add to the overall adverse cumulative impact on the hydrology of the watershed.

VEGETATION

Methodology and Assumptions

Impacts to vegetation within the project area were based on the characteristics of the vegetative communities in relation to the proposed actions.

Study Area

The study area for vegetation impacts includes the limits of disturbance for the construction of the stream restoration project.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts to vegetation:

Negligible — Very few individual trees, very few mature landscape plantings, and/or very small turf area would be affected.

Minor — A few individual trees, a few mature landscape plantings, and/or a small amount of turf area would be affected. However, mitigation measures, including replanting to avoid or offset impacts on trees, could be implemented. These measures would be effective in replacing or reducing losses of vegetation within a short period of time.

Moderate — A relatively large number of individual trees, a relatively large number of mature landscape plantings, and/or a substantial turf area would be affected. Mitigation measures, including replanting to avoid or offset impacts on trees and other landscaping of greater concern, could be implemented and would be effective in replacing or reducing losses of vegetation. However, an extended time would possibly be needed for the regeneration of lost mature vegetation.

Major — A substantial number of individual trees, a substantial number of mature landscape plantings, and/or a substantial turf area would be affected. Numerous older mature trees would also be impacted, either directly or indirectly. Actions would substantially change the vegetation

over a large area in the study area. Extensive mitigation would be needed to offset adverse impacts, and its success would not be assured.

Duration—Short-term impacts last less than one year. Long-term impacts last longer than one year.

Impacts of Alternative 1

Under the no action alternative, vegetation would not be removed and there would be no physical changes to the land cover. As a result of storm events, erosion and sedimentation would continue to degrade the stream. This would continue to destabilize the surrounding vegetation, especially along the stream banks. Long-term, minor, adverse impacts would continue to occur from the destabilization of vegetation.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to vegetation in the project area. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, the restoration of Klingle Valley Trail and stream, and the installation of RSCs at Bingham Run and Milkhouse Run would potentially disturb vegetative areas, resulting in the loss of trees, shrubs, and herbaceous vegetation. These projects would create long-term, minor, adverse impacts. However, BMPs and the replanting of native vegetation where applicable would create beneficial impacts. The no action alternative would not add to these beneficial cumulative impacts to vegetation. The impacts from the no action alternative, when combined with the impacts of the other past, present, and future actions, would result in long-term, adverse, cumulative impacts.

CONCLUSION

Vegetation losses would continue to occur as a result of stream bank erosion that would result in minor, long-term, adverse impacts to vegetation. The no action alternative would not add to the beneficial cumulative impacts to vegetation. The impacts from the no action alternative, when combined with the impacts of the other past, present, and future actions, would result in long-term, adverse, cumulative impacts.

Impacts of Alternative 2

Under Alternative 2, the placement of construction staging areas, primarily in grass areas, would require moderate clearing of vegetation and root removal. This would result in minor, short-term, adverse impacts to grass areas from placement of the construction staging areas.

Under Alternative 2, approximately 121 trees fall within the limits of disturbance, 73 of which would be impacted from root disturbance or trimming and 48 of which would be removed for the construction of the stream restoration project. Most of these trees are located in the upper reach of the unnamed tributary A within NPS-owned land. Mitigation measures would include planting native trees such as black gum, sycamore, pin oak, and silver maple. Mitigation would also include the planting of shrubs such as sweetbay magnolia, spice bush, and southern bayberry along the riparian buffer of the stream bank and floodplain. The right and left banks of all

graded and newly constructed banks would be stabilized with live stakes (immature trees). These trees would be installed along the bank at a spacing of one foot, from one foot above the edge of the water to the bankfull elevation. The live stakes would consist of a mix of three or more species such as spice bush, maple leaf viburnum, and river birch. Under the DDOT Urban Forestry Special Tree Removal Permit, the total number of trees planted would be required to at a minimum equal the circumference of all the trees that would be removed from the project site. Within the stormwater recharge areas, native plantings would be established. (Figures 13 and 14 illustrate sample replanting details.) All plantings proposed would be reviewed and approved by NPS staff. All other disturbed and graded areas would be seeded and mulched. After construction, the project area would be monitored to ensure that replacement vegetation becomes established and that invasive species do not encroach into the project area. The impacts under Alternative 2 would be long-term, minor, and adverse, as it would take some time for replacement trees to mature.

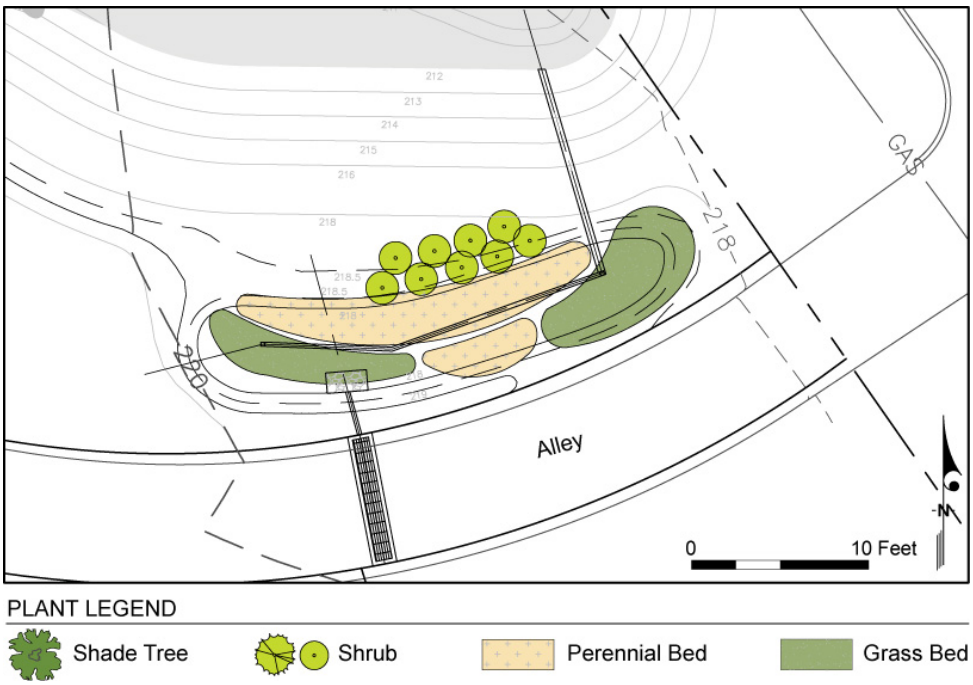


Figure 13: Sample planting detail for SWRF

Figure 14: Sample planting detail for wetlands

The overall impact to vegetation for Alternative 2 would be beneficial, as the stream would be stabilized and the riparian vegetative habitat restored. Some of the upland areas would also be revegetated, while other areas would have buffer protection from construction activities with the implementation of silt fencing and tree protective fencing.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to vegetation in the project area. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, the restoration of Klingle Valley Trail and stream, and the installation of RSCs at Bingham Run and Milkhouse Run would potentially disturb vegetative areas, resulting in the loss of trees, shrubs and herbaceous vegetation. These projects would create long-term, minor, adverse impacts. However, BMPs and the replanting of native vegetation where applicable would create beneficial impacts. The impacts from Alternative 2, when combined with the impacts of the other past, present, and future actions, would add to the overall beneficial and adverse cumulative impacts.

CONCLUSION

The overall impact to vegetation for Alternative 2 would be beneficial, as the stream would be stabilized and the riparian vegetative habitat restored. Some of the upland areas would also be revegetated, while other areas would have buffer protection from construction activities with the implementation of silt fencing and tree protective fencing. Short-term and long-term, minor, adverse impacts would occur to vegetation from construction activities and the removal of trees. The impacts from Alternative 2, when combined with the impacts of the other past, present, and future actions, would add to the overall beneficial and adverse cumulative impacts.

Impacts of Alternative 3

Similar to Alternative 2, construction activities needed to implement Alternative 3 also would affect vegetation in the project area. The placement of construction staging areas and equipment would require moderate clearing of vegetation and root removal. There is the potential for moderate, long-term, adverse impacts to mature forest and grass areas from grading activities, and moderate, short-term, adverse impacts from placement of the construction staging areas.

Under Alternative 3, approximately 46 trees are located within the limits of disturbance, 29 of which would be impacted from root disturbance and trimming. Seventeen trees would be removed for the construction of the stream restoration project. These trees occur in the upstream reach within NPS-owned land. Native trees (such as black gum, sycamore, pin oak, and silver maple) and shrubs (such as sweetbay magnolia, spice bush, and southern bayberry) would be planted along the riparian buffer of the streambank and floodplain as a mitigation measure. The right and left banks of all graded and newly constructed banks in the unnamed tributary A would be stabilized with live stakes (immature trees). These trees would be installed along the bank in a spacing interval of one foot, from one foot above the edge of the water to the bankfull elevation. The live stakes would consist of a mix of three or more species such as spice bush, maple leaf viburnum, and river birch. Under the DDOT Urban Forestry Special Tree Removal Permit, the total number of trees planted would be required to at a minimum equal the total circumference of the trees that would be removed from the project site. All other disturbed and graded areas would be seeded and mulched. All plantings proposed for the project would be reviewed and approved by NPS. By planting native vegetation, the long-term, adverse impact would be reduced from moderate to minor. The impacts under Alternative 3 would be minor, long-term, and adverse, as it would take some time for replacement trees to mature. Under Alternative 3, no stormwater recharge facilities would be constructed. After construction, the project area would be monitored to ensure that replacement vegetation becomes established and that invasive species do not encroach into the project area. Therefore, no native species would be planted as part of those features.

Overall, the impact to vegetation for Alternative 3 would be beneficial, as the unnamed tributary A would be stabilized and the riparian vegetative habitat in that area would be restored. However, the unnamed tributary B would not be restored, so long-term, minor, adverse impacts would continue to occur, as the downstream vegetation would not be stabilized.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to vegetation in the project area. The rehabilitation of Peirce Mill, the reconstruction of Oregon Avenue and Broad Branch Road, the restoration of Klingle Valley Trail and stream, and the installation of RSCs at Bingham Run and Milkhouse Run would potentially disturb vegetative areas, resulting in the loss of trees, shrubs, and herbaceous vegetation. These projects would create long-term, minor, adverse impacts. However, BMPs and the replanting of native vegetation where applicable would create beneficial impacts. The impacts from Alternative 3, when combined with the impacts of the other past, present, and future actions, would add to the overall beneficial and adverse cumulative impacts.

CONCLUSION

Alternative 3 would have beneficial impacts to vegetation in the upper reach of the stream near the unnamed tributary A, as the restoration project would protect it from erosion in this area. Short-term and long-term, minor, adverse impacts would occur to vegetation from construction activities and the removal of trees. However, vegetation losses would continue to occur during storm events that would contribute to the minor, long-term, adverse impacts to vegetation in the downstream reach of the stream. The impacts from Alternative 3, when combined with the impacts of the other past, present, and future actions, would add to the overall beneficial and adverse cumulative impacts.

WILDLIFE

Methodology and Assumptions

The impact analysis was based on site observations by project team scientists and a review of existing data and studies provided by regulatory agencies.

Study Area

The study area for wildlife is the limits of disturbance of the project area and adjacent habitat.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts to wildlife:

Negligible — There would be no observable or measurable impacts to native species, their habitats, and/or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations.

Minor — Impacts would be detectable, but they would not be expected to be outside the natural range of variability. They also would not be expected to have any long-term effects on native species, their habitats, and/or the natural processes sustaining them.

Moderate — Impacts on native species, their habitats, and/or the natural processes sustaining them would be detectable. The impacts could be outside the natural range of variability for short periods of time. Population numbers, population structure, genetic variability, and other

demographic factors for species might have short-term changes, but would be expected to rebound to pre-impact numbers and to remain stable and viable in the long term. Frequent negative impacts to feeding, reproduction or other factors affecting short-term population levels could be expected to occur for some individuals.

Major — Impacts on native species, their habitats, and/or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability for long periods of time or be permanent.

Duration — Short-term impacts would occur during construction activities. Long-term impacts to wildlife would extend after completion of the project.

Impacts of Alternative 1

Under the no action alternative, no changes would be made to the stream. Uncontrolled stormwater flows, which currently carry pollutants and sediments through the stream, would continue to affect benthic habitat and other aquatic wildlife. The uncontrolled flows would continue to reduce the riffle and pool habitat where aquatic species typically thrive. The uncontrolled flows frequently wash away root packs and root wads that provide habitat for these species. Erosion would destabilize nearby trees and reduce non-aquatic habitat. These conditions would have long-term, minor, adverse impacts to wildlife and habitat.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to wildlife in the project area. The rehabilitation of the stream in Klingle Valley, the reconstruction of Oregon Avenue and Broad Branch Road, and the installation of RSCs would have a beneficial impact to wildlife. The no action alternative would not contribute to the beneficial cumulative impacts of these projects.

CONCLUSION

The no action alternative would continue to erode and degrade the stream, causing long-term, adverse, minor impacts to wildlife and habitat. The no action alternative would not contribute to the beneficial cumulative impacts.

Impacts of Alternative 2

During the construction of Alternative 2, benthic habitats would be affected temporarily as stream diversions are put in place to conduct the in-stream work. This would have a short-term, minor, adverse impact to wildlife. Under Alternative 2, approximately 48 trees would be removed that currently provide habitat for wildlife and avian species. This habitat would be lost, and wildlife such as the Virginia opossum, eastern towhee, and wood thrush potentially would be displaced. These impacts to wildlife habitat are expected to be long-term, minor, and adverse. There is; however, sufficient forested habitat adjacent to the project site to accommodate displaced wildlife.

Under Alternative 2, approximately 1,600 linear feet of streambed would be restored. This would help stabilize the streambed and slopes and help restore aquatic and non-aquatic habitat,

creating long-term, beneficial impacts to wildlife. Downstream populations also would be protected. Once the restoration is complete, beneficial impacts for both aquatic and non-aquatic species are expected, due to the replacement of trees and vegetation and the creation of improved benthic habitat for fish, amphibians, and macroinvertebrates.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to wildlife in the project area. The rehabilitation of the stream in Klingle Valley, the reconstruction of Oregon Avenue and Broad Branch Road, and the installation of RSCs would have a beneficial impact to wildlife. Alternative 2 would contribute additional beneficial impacts to the overall beneficial cumulative impacts.

CONCLUSION

Alternative 2 would help stabilize the streambed and slopes and help restore aquatic and non-aquatic habitat, creating long-term, beneficial impacts to wildlife. Short-term, minor, and adverse impacts would occur during construction activities. Alternative 2 would contribute additional beneficial impacts to the overall beneficial cumulative impacts.

Impacts of Alternative 3

During the construction of Alternative 3, benthic habitats would be affected temporarily as stream diversions are put in place to conduct the in-stream work. This would have a short-term, minor, adverse impact. Approximately 17 trees would be removed that currently provide habitat for wildlife and avian species. This habitat would be lost and wildlife such as the Virginia opossum, eastern towhee, and wood thrush potentially would be displaced. These impacts to wildlife habitat are expected to be long-term, minor, and adverse. There is sufficient forested habitat adjacent to the project site that can accommodate displaced non-aquatic wildlife. Once the restoration is complete, beneficial impacts are expected for both aquatic and non-aquatic species, due to the replacement of trees and vegetation and the creation of improved benthic habitat for fish, amphibians, and macroinvertebrates.

Under Alternative 3, approximately 400 linear feet of streambed would be restored. This would help stabilize the streambed and slopes and help restore aquatic and non-aquatic habitat, creating long-term, beneficial impacts to wildlife. Aquatic habitat in the downstream area near the unnamed tributary B would continue to degrade because the unnamed tributary B would not be stabilized, creating a long-term, minor, adverse impact to wildlife.

CUMULATIVE IMPACTS

Past, present, and future actions have contributed to impacts to wildlife in the project area. The rehabilitation of the stream in Klingle Valley, the reconstruction of Oregon Avenue and Broad Branch Road, and the installation of RSCs would have a beneficial impact to wildlife. The adverse impacts as a result of Alternative 3 would diminish slightly the overall net beneficial cumulative impact.

CONCLUSION

Alternative 3 would have beneficial impacts to wildlife in the upstream reach due to the restoration of aquatic habitat. Short-term, minor, adverse impacts would occur during construction activities. The downstream of the stream reach would continue to degrade because it would not be restored. This would have a long-term, minor, adverse minor impact to wildlife. The adverse impacts as a result of Alternative 3 would slightly diminish the overall net beneficial cumulative impact.

CHAPTER 5: CONSULTATION AND COORDINATION

DDOE and the NPS are carrying out consultation under Section 106 of the NHPA with the DC SHPO. On April 19, 2011, the DDOE initiated consultation with the DC SHPO under Section 106 of the NHPA. In an e-mail dated June 2, 2011, the DC SHPO stated that this undertaking would have "no adverse effect" upon the historic built environment." The DC SHPO will be provided a copy of this EA for their review of impacts to archeological resources.

As the Peruvian Embassy has been involved in review and revision of project designs throughout the compliance process, the proposed work on the lands of the Peruvian Ambassador's residence reflects the preferences of the Embassy. On June 18, 2009, DDOE staff met with the staff from the Peruvian Embassy to conduct a site visit of the project area and the land owned by the Peruvian Embassy and to document any concerns they may have regarding the proposed project. During this site visit, DDOE staff answered questions on how the project would impact Peruvian Embassy property. Since September 2011, DDOE and the Peruvian Embassy have been working on a Right of Entry Agreement that will provide DDOE's contractors access to the property of Peruvian Ambassador's Residence. The Right of Entry Agreement will be finalized and signed before work begins at that location.

On April 19, 2011, letters were sent to the USFWS initiating consultation under Section 7 of the Endangered Species Act. In a letter dated September 19, 2011, the USFWS stated that except for occasional transient individuals, no proposed or federal listed endangered or threatened species are known to exist within the project impact area."

On April 19, 2011, DDOE sent scoping letters requesting comment on the proposed project. Recipients included ANCs 3G/3F, Rock Creek Community Garden, FORCE (now the Rock Creek Conservancy), CCCA, and the Peruvian Embassy. In addition, DDOE sent scoping letters to DDOT, DC Water, the District Office of Planning, the DC Historic Preservation Office, National Capital Planning Commission (NCPC), the Advisory Council on Historic Preservation, and the Commission on Fine Arts (CFA). In June 2011, the NPS also sent scoping letters to these parties.

In their May 13, 2011 response letter, DC Water commented that DDOE and NPS should coordinate with DC Water during the design phase to mitigate impacts to existing DC Water utilities, mitigate downstream impacts, and determine responsibility for stream maintenance after the project is complete. In a letter dated May 18, 2011, NCPC stated that stream daylighting is an important initiative supported by the NCPC and was included within their 2004 Comprehensive Plan. NCPC further requested that cultural resources, water resources, soils, and vegetation be assessed within the EA. The NPS and DDOE would have the NCPC review the EA and submit it through NCPC's approval process. No other comments were received.

Future Compliance Needs/Permits

Prior to implementation of the proposed action, DDOE and NPS would obtain appropriate land disturbance permits and abide by local and state erosion and sediment control standards. Additional approvals and reviews would be required prior to construction. These include a review by the NCPC and Section 401 and 404 permits under the CWA.

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GLOSSARY AND ACRONYMS

GLOSSARY OF TERMS

Affected Environment — The existing environment to be affected by a proposed action and alternatives.

Best Management Practices — Methods that have been determined to be the most effective, practical means of preventing or reducing pollution or other adverse environmental impacts.

Council on Environmental Quality — Established by Congress within the Executive Office of the President with passage of the *National Environmental Policy Act* of 1969. CEQ coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives.

Cultural Landscape – Environments that include natural and cultural resources associated with a historical context.

Cultural Resources — Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reason.

Cumulative Impacts — Under NEPA regulations, the incremental environmental impact or effect of an action together with the effects of past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR Part 1508.7).

Endangered Species — A species that is in danger of extinction throughout all or a significant portion of its range. The lead federal agency for the listing of a species as endangered is the U.S. Fish and Wildlife Service, which is responsible for reviewing the status of the species on a five-year basis.

Endangered Species Act (16 U.S.C. 1531 et seq.) — An Act that provides a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, and which provides a program for the conservation of endangered species and threatened species.

Environmental Assessment — An environmental analysis prepared pursuant to the *National Environmental Policy Act* to determine whether a federal action would significantly affect the environment and therefore require a more detailed environmental impact statement (EIS).

Executive Order — Official proclamation issued by the President that may set forth policy or direction or establish specific duties in connection with the execution of federal laws and programs.

Floodplain — The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.

Impairment— Within this document, the term impairment has two separate definitions. The NPS requires an analysis of potential effects to determine whether actions would impact or

impair park resources. NPS is empowered with the management discretion to allow impacts on park resources and values (when necessary and appropriate) to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Impairment is also a classification of poor water quality for a surface water body under the U.S. Clean Water Act.

National Environmental Policy Act (NEPA) — The Act as amended articulates the federal law that mandates protecting the quality of the human environment. It requires federal agencies to systematically assess the environmental impacts of their proposed activities, programs, and projects to include the "no build" alternative of not pursuing the proposed action. NEPA requires agencies to consider alternative ways of accomplishing their missions that are less damaging to the environment.

National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.) — An Act to establish a program for the preservation of historic properties throughout the nation, and for other purposes, approved October 15, 1966 [Public Law 89-665; 80 STAT. 915; 16 U.S.C. 470 as amended by Public Law 91-243, Public Law 93-54, Public Law 94-422, Public Law 94-458, Public Law 96-199, Public Law 96-244, Public Law 96-515, Public Law 98-483, Public Law 99-514, Public Law 100-127, and Public Law 102-575].

National Register of Historic Places (NRHP) — A register of districts, sites, buildings, structures, and objects important in American history, architecture, archeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the *Historic Sites Act* of 1935 and Section 101(a)(1) of the *National Historic Preservation Act* of 1966, as amended.

Scoping — Scoping, as part of NEPA, requires examining a proposed action and its possible effects; establishing the depth of environmental analysis needed; and determining analysis procedures, data needed, and task assignments. The public is encouraged to participate and submit comments on proposed projects during the scoping period.

Threatened Species — Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

ACRONYMS

ACHP	Advisory Council on Historic Preservation
ANC	Area Neighborhood Council
BMP	Best Management Practice
CCCA	Chevy Chase Civic Association
CEQ	Council on Environmental Quality
CFA	U. S. Commission of Fine Arts
CFR	Code of Federal Regulation
CWA	Clean Water Act
DC SHPO	District of Columbia State Historic Preservation Officer
DDOE	District Department of the Environment
DDOT	District Department of Transportation
DO-12	Director's Order 12
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FORCE	Friends of Rock Creek Environment
GMP	General Management Plan
LOD	Limits of Disturbance
NCPC	National Capital Planning Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System

NPS	National Park Service
NRHP	National Register of Historic Places
PEPC	Planning, Environment, and Public Comment website
RMP	Resources Management Plan
RSC	Regenerative Stormwater Conveyances
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SOF	Statement of Findings
SWRF	Stormwater Recharge Facility
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WIP	Watershed Implementation Plan

BIBLIOGRAPHY

Cochran, Matthew David, and Paul P. Kreisa. 2011. *Phase IB Archeological Investigations of Klingle Valley Trail, Washington, DC.*

Council on Environmental Quality. 1997. *Considering Cumulative Impacts.*

District Department of the Environment. 2010. *Rock Creek Watershed Implementation Plan (WIP)*

District Department of Health. 2003. *Storm Water Management.*

Environmental Protection Agency. 2008. *Waterbody Report for Broad Branch.*

Federal Emergency Management Agency. 1985. Federal Emergency Management Agency National Flood Insurance Program, Flood Insurance Rate Map, District of Columbia, Washington, DC.

Fiedel, Stuart, John Bedell, Charles Lee Decker, Jason Shellenhamer, and Eric Griffitts. 2008. "Bold, Rocky, and Picturesque": Archeological Overview and Assessment and Archeological Identification and Evaluation Study of Rock Creek Park, District of Columbia. Volume II. The Louis Berger Group, Inc., Washington, DC.

Greenhorne & O'Mara, Inc. 2011. *Hydrology Report for Broad Branch Stream Restoration and Culvert Daylighting Project.*

National Park Service. 1996. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.*

National Park Service. 2000. *Director's Order # 47: Soundscape Preservation and Noise Management.*

National Park Service. 2001. *Director's Order # 12: Conservation Planning, Environmental Impact Analysis, and Decision-making.*

National Park Service. 2002. *Director's Order # 77-1: Wetland Protection.*

National Park Service. 2003. *Director's Order # 77-2: Floodplain Management.*

National Park Service. 2004. *Final Management Plan, Fort Circle Parks.*

National Park Service. 2005. *Rock Creek and Potomac Parkway Final General Management Plan/EIS.*

National Park Service. 2006. *Management Policies 2006.*

National Park Service. 2009. *Rock Creek Park Geologic Resources Inventory Report.*

Natural Resources Conservation Service (NRCS), United States Department of Agriculture. *Web Soil Survey*. http://websoilsurvey.nrcs.usda.gov Accessed *07/11/2011*

State of Oregon Department of Environmental Quality (ODEQ). *Biofilter (Bioswales, Vegetative Buffers, & Constructed Wetlands) for Storm Water Discharge Pollution Removal.* http://www.deq.state.or.us/wq/stormwater/docs/nwr/biofilters.pdf Accessed 07/11/2011

United States Army Corps of Engineers (USACE), 1987. *Wetland Delineation Manual.*

United States Department of Agriculture, Natural Resource Conservation Service (NRCS). 2006. Soil Survey of District of Columbia.

United States Fish and Wildlife Service, Chesapeake Bay Field Office 2007. Hay's Spring amphipod *(Strygobromus hayi)* 5-Year Review: Summary and Evaluation.

United States Geological Survey. 1971. Washington West, DC. – MD. – VA. 7.5 minute series (topographic) quadrangle map.

APPENDICES

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APPENDIX A: GEOARCHEOLOGY SURVEY

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Geo-Sci Consultants LLC

4410 Van Buren Street, University Park, Maryland 20782

tel: 301 277 3731 fax: 301 277 2147

GEOARCHAEOLOGICAL INTERPRETATIONS

OF THE BROAD BRANCH STREAM RESTORATION PROJECT

IN NORTHWEST WASHINGTON, DC

Submitted to

Greenhorne & O'Mara, Inc.

By

Daniel P. Wagner, Ph.D.

Pedologist

August 18, 2011

Introduction

This report discusses pedological and geomorphological interpretations of soils and landscapes along a roughly 1,500-foot length of Broad Branch in Northwest Washington, DC. The stream restoration project area extends from its western end at 36th Street to eastward across Linnean Avenue, where it continues along the stream to reach its eastern limit at contact with Broad Branch Avenue. Landscapes throughout the project area have suffered significant modifications involving both widespread filling as well as stream channel diversion. The principal objective of the study was therefore to ascertain whether any original, formerly inhabitable land surfaces still exist.

Investigations entailed traversal of landscapes along the project area, together with examinations of soil materials by means of hand auger borings. For much of the study area, soil disturbances from grading or obvious filling were deemed so severe that a walkover assessment was sufficient to void any prospects for intact natural soils. At locations where borings were made, soil profiles were described in accordance with standard pedological techniques and nomenclature for the field description of soils. The compiled descriptions as well as a map of examination locations are attached at the end of the report.

Physiology and Geology

The study location is in the northwest section of Washington, DC. that is contained within the Piedmont Physiographic Province. This province is typically characterized by ancient metamorphic rocks, and those in the vicinity of the project location are well representative of common types. Two principal rock types are present and are roughly demarcated by Linnean Avenue. Across the predominant span of the area east of the road, the geology is dominated by the Lower Pelitic Schist member of the Late Precambrian age Wissahickon Formation. These rocks are amply exposed in the stream channel at the base of the steep upland slopes approaching the eastern end of the study area. Over the smaller western part of the area, the geology is that of the Kensington Quartz Diorite of Paleozoic age. Since this western rock type occupies the upstream portion of the watershed, it is actually more likely to be represented in alluvial deposits originally transported by Broad Branch. However, the area has been so severely disturbed that much of the materials currently carried by the stream consist of introduced fills as well as rubble and other debris.

Soils and Geomorphology

Both upland and alluvial landscapes would be impacted by the proposed stream restoration project. Uplands occur mainly on the south side of Broad Branch chiefly in the vicinity of Linnean Avenue and again at the eastern end of the project area. Upland terrain near Linnean Avenue has been subject to severe disturbances on both sides of the road. West of the road (Examinations 1 and 2), the landscapes have been so deeply graded that both all original surfaces (A horizons) as well associated subsoil (B horizons) have been removed. Only saprolitic substrata (C horizons) still remain (Figure 1), and this highly weathered rock-like material would have been at depths of at least several feet or more below the original surfaces. Due to such deep grading, no prospects for cultural resources exist on the uplands west of Linnean Avenue.

Figure 1. On the deeply graded landscape of Examination 1, a thin surface veneer of fill covers multicolored substrata horizons that originally would have been at depths of several feet or more.

A comparable interpretation likely applies to the upland terrain on the east of Linnean Avenue. Indeed, since several auger attempts were unable to penetrate surficial fill materials (Examination 4), it is not even certain that the landscape here even is an upland. The height of the position in apparent continuum with the upland on the opposite side of the road would suggest that it is, but the possibility of a deeply filled floodplain cannot be fully ruled out. In either case, the prospects for any preserved cultural materials are dim. As will be discussed in the ensuing section, the floodplain has no cultural resource potential. Due to near-surface restrictions on cultural materials in upland

settings, even the deposition of fill materials atop an upland landscape often entails enough surface disturbance to destroy or compromise the integrity of any cultural materials present.

The upland terrain toward the eastern end of the project area is too steeply sloping for direct occupation. Additionally, the only areas to actually be impacted are along local feeder drainageways that also would have been both too narrow and too unstable. Except for the rather remote possibility of an exposed quarry source, the drainageways have no other prospects for cultural resources.

Varying disturbance conditions ranging from filling to channel diversion characterize the floodplain of Broad Branch. A large portion of the floodplain has been filled. This includes all of the former floodplain west of Linnean Avenue as well as about another 500 feet on the east side of the road. West of the road, as much as 10 feet of fill occurs at some locations (Figure 2), and the floodplain here also has been largely isolated from the main alluvial terrain west of 36th Street (Figure 3). The only flow that now occurs in the isolated floodplain remnant is generated by local runoff from adjacent slopes. East of Linnean Avenue, Broad Branch is contained within a subsurface culvert for some distance and does not reemerge as a surface stream for several hundred feet. Even beyond this, fill materials are all but ubiquitous, with pieces of rubble and debris commonly strewn over much of the floodplain surface (Figure 4).

Figure 2. Deep earthen and rubble fill buries most of the floodplain west of Linnean Avenue.

Figure 3. At the location of Examination 3, stratified recent alluvium with a white ceramic fragment at the depth of 1.8 ft marks an isolated floodplain remnant.

Figure 4. Fill materials including rocks of various sizes and structural rubble are common across much of the floodplain.

Soil examinations (5 and 6) were made at two locations where strands of the floodplain surface were mostly free of obvious fill materials. Situated at the same height of about four feet above Broad Branch, the floodplain at each location supported similar soils consisting entirely of recent alluvium. Only stratified, fine sandy to loamy sediments were encountered at each location, and no subsoil development suggestive of any period of relative landscape stasis was present (Figure 5). This condition is typical of floodplains along low order streams, and such frequently inundated landscapes are not only unstable but are also comprised of deposits amassed well after the arrival of European settlers. Accordingly, even where the floodplain is largely the product of natural stream alluviation rather than artificial construction, it nevertheless has no potential for intact prehistoric cultural resources.

Figure 5. The floodplain surface at the location of Examination 6 is free of fill, but the soil consists entirely of stratified recent alluvium far too young to contain prehistoric cultural material. The dark zone at the base of the profile is due to seasonal saturation.

Summary

The project area contains both upland and alluvial terrain, most of which has undergone significant modifications. Uplands in the vicinity of Linnean Avenue have been either deeply graded or filled, and have little or no potential for cultural resources. Other uplands intercepted by the project occur toward the eastern end of the area, but these are too steep for direct occupation.

Floodplain positions have been extensively filled, and across much of the project area the channel of Broad Branch is either below ground or has otherwise been artificially diverted. Even where the stream and its floodplain appear more natural in form, the ground surface is commonly littered with fragments of modern rubble, and other floodplain deposits consist entirely of recent alluvium with no potential for prehistoric cultural resources.

Soil Profile Descriptions and Notes

Examination 1

Horizon	Depth (ft)	Properties
A	0-0.5	Dark brown (10YR 3/3) loam; friable consistence
C	0.5-1.0	Strong brown (7.5YR 4/6) loam; friable consistence
2C	1.0-2.7+	Variegated dark yellowish brown (10YR 4/4), olive gray (5Y 5/2), and strong brown (7.5YR 4/6) loam and clay loam; friable consistence

Other comments: Graded upland backslope position; 4% slope; upper ft is fill; weathered saprolite below; auger refusal on rock fragment at 2.7 ft

Examination 2

Horizon	Depth (ft)	Properties
A	0-0.4	Dark brown (10YR 3/3) loam; friable consistence
C	1.4-3.8+	Variegated, mainly olive brown (2.5Y 4/3) and strong brown (7.5YR 4/6) loam and clay loam; friable consistence

Other comments: Graded upland backslope position; 6 percent slope; all materials are weathered saprolite below; auger refusal on rock fragment at 3.8 ft

Examination 3

Horizon	Depth (ft)	Properties
A	0-0.2	Black (10YR 2/1) fine sandy loam; very friable consistence
C	0.2-1.2	Dark yellowish brown (10YR 4/6) fine sandy loam; friable consistence
2C	1.2-1.8+	Dark brown (10YR 3/3) very gravelly sandy loam; very friable consistence

Other comments: Filled floodplain position; 2C horizon is a mix of recent alluvium and fill with cinders and pieces of modern ceramic; auger refusal on gravel at 1.8 fee;

Examination 4

Graded and filled upland; four percent slope; several boring attempts unable to penetrate below 1.5 feet

Examination 5

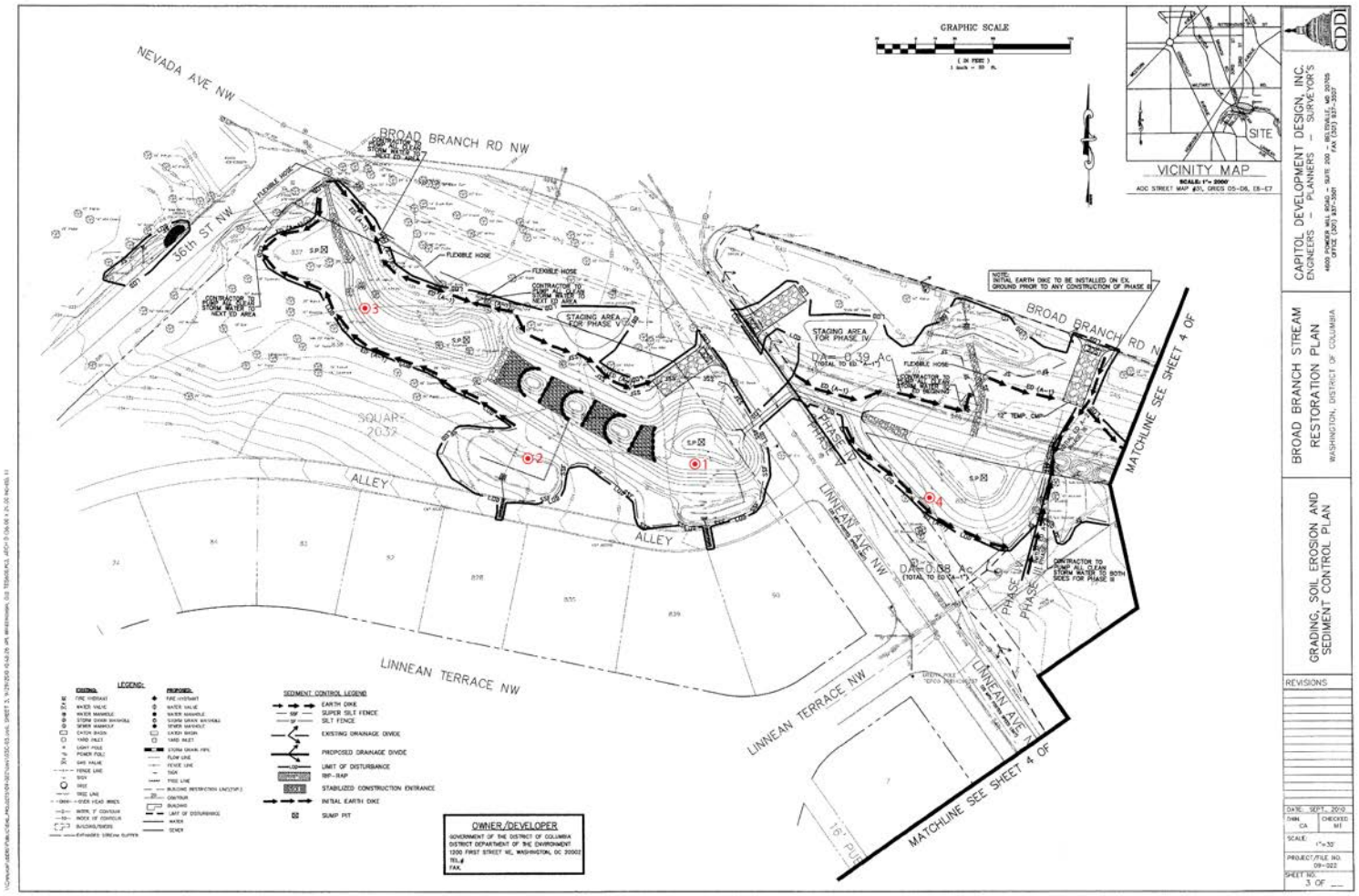
Horizon	Depth (ft)	Properties
A	0-0.3	Very dark brown (10YR 2/2) loam; very friable consistence
C1	0.3-1.2	Brown (7.5YR 4/3) loam; friable consistence
C2	1.2-1.8	Dark brown (7.5YR 3/4) loam; friable consistence
2C1	1.8-2.2	Brown (10YR 4/3) fine sandy loam; common, medium distinct mottles of light brownish gray (10YR 6/2); very friable consistence
2C2	2.2-2.9	Dark yellowish brown (10YR 3/4) loamy fine sandy; common, medium distinct mottles of dark grayish brown (2.5Y 4/2); very friable consistence
2Cg	2.9-3.3+	Dark grayish brown (2.5Y 4/2) loamy fine sand; very friable consistence

Other comments: Floodplain position; ~four feet above stream; moderately well drained; all deposits are recent alluvium; few pebbles throughout; auger refusal on gravel at 3.3 ft

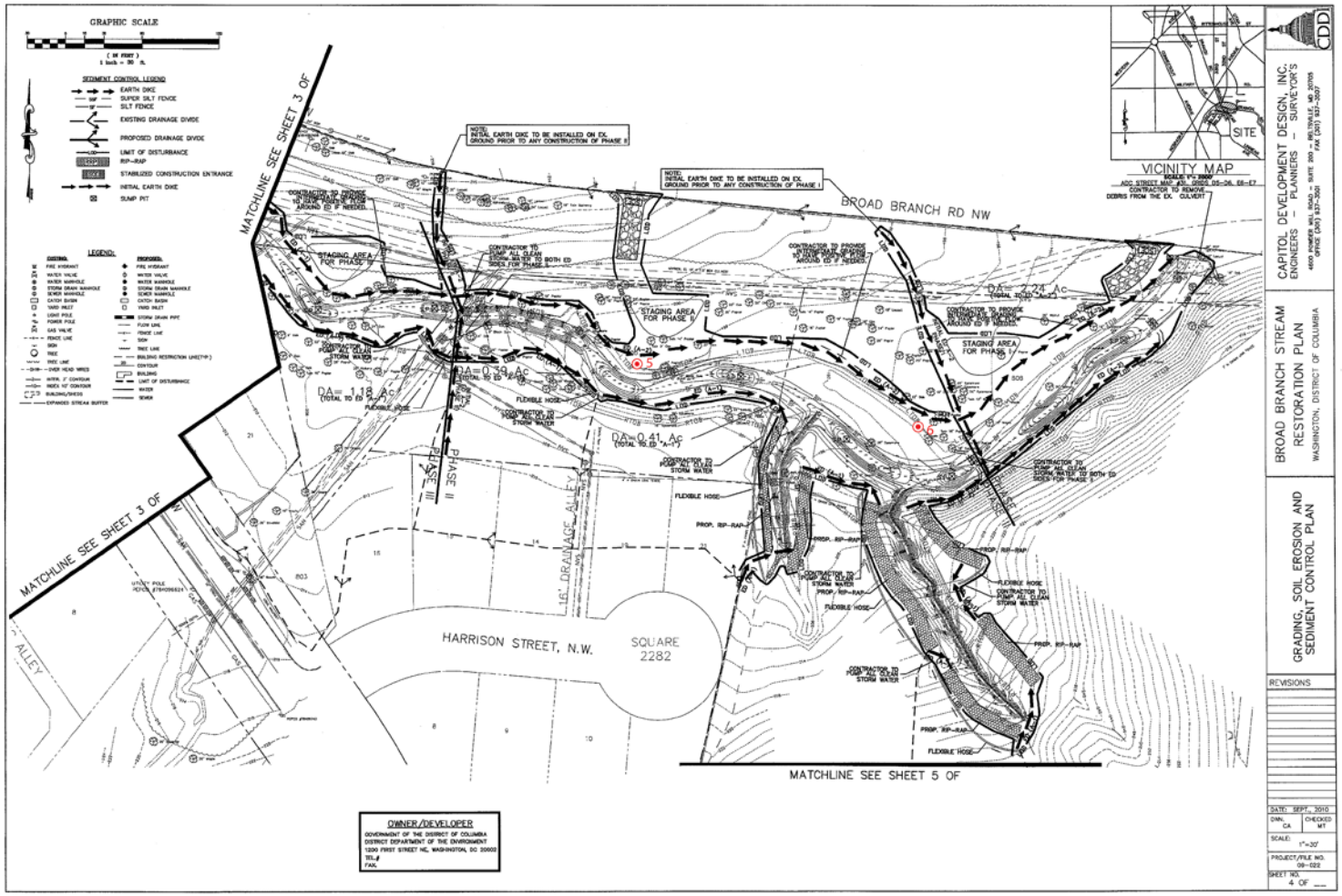
Examination 6

Horizon	Depth (ft)	Properties
A1	0-0.3	Very dark brown (10YR 2/2) loam; very friable consistence
A2	0.3-1.2	Very dark grayish brown (10YR 3/2) fine sandy loam; very friable consistence
C	1.2-1.7	Dark brown (7.5YR 3/4) fine sandy loam; friable consistence
A’	1.7-1.9	Dark brown (10YR 3/3) fine sandy loam; very friable consistence
C’	1.9-2.3	Dark yellowish brown (10YR 3/4) fine sandy loam; very friable consistence
2C1	2.3-3.0	Dark brown (7.5YR 3/4) loam; friable consistence
2C2	3.0-3.2	Brown (7.5YR 4/4) loam; common, medium distinct mottles of dark grayish brown (2.5Y 4/2); friable consistence
2Cg	3.2-3.7+	Dark grayish brown (2.5Y 4/2) fine sandy loam to loam; common, fine prominent mottles of dark reddish brown (5YR 3/4); very friable consistence

Other comments: Floodplain position; ~four feet above stream; moderately well drained; all deposits are recent alluvium; auger refusal on rock at 3.7 ft



Locations of Western Soil Examinations



Locations of Eastern Soil Examinations

APPENDIX B: SCOPING RESPONSE LETTERS

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GOVERNMENT OF THE DISTRICT OF COLUMBIA

District Department of the Environment

May 2, 2011

received
MAY 09 2011

Ms. Elizabeth Edelen Estes, Project Director
Environmental Planning & Compliance
Greenhorne & O'Mara, Inc.
6110 Frost Place
Laurel, Maryland 20707

Dear Ms. Estes,

Subject: Restoration of Unnamed Tributary of Broad Branch, Washington, D.C.

The District Department of the Environment Fisheries and Wildlife Division (DDOE/FWD) received a request for information concerning federally-listed rare, threatened or endangered plants and animals and/or any unique habitats for an unnamed tributary to Broad Branch in the vicinity of 36th Street, NW and Broad Branch Road, Washington, D.C.

Our finding at the time of this response indicates that there are no **federally-listed** rare, threatened or endangered plant or animal species and/or unique habitats in the proposed project area.

Since DDOE is responsible for protecting and conserving all natural resources of the District of Columbia, it is a requirement to include species of greatest conservation need **(SGCN)** and their priority habitat/critical habitat as part of a protected category of flora and fauna in any proposed land disturbing activity. DDOE biologists make use of the District Wildlife Action Plan (our planning and implementation guide) and Title 19 DCMR (District of Columbia Municipal Regulations for Fish and Wildlife) which are two documents that serve to ensure the District's fisheries and wildlife resources are properly managed and protected. Title 19 of the DCMR §1560.1 and §1560.3 in short are summarized as follows: all wildlife in the District is protected and wildlife on Federal or District property cannot be captured or destroyed unless it is causing annoyance to the **public**, creating a **nuisance**, or **destroying or damaging** government property.

The specific project area in question is not a current site that DDOE biologists sample/monitor for avian, herpetofauna or plant species, but mammal surveys are conducted along this proposed project area. On May 29, 2011, in response for species and habitat information, two staff biologists conducted a ground-truthing survey for other potential species.

Our findings have identified two avian SGCN (*P. erythrophthalmus* and *H. mustelina*), two critical habitat types (hardwood forest and riparian woodland) and it is noted that the area has suitable habitat for one mammalian SGCN (*Didelphis virginiana*), but that species has not been documented at the site.

DISTRICT DEPARTMENT OF THE ENVIRONMENT
green forward
1200 First St. NE, 5th Floor, Washington, DC 20002 tel: 202.535.2600 | web:ddoe.dc.gov

Page 2, Restoration of Unnamed Tributary to Broad Branch, Washington, D.C.

Common Name	Scientific Name	Documented at Site	SGCN	Habitat is Suitable for
Eastern pipistrelle	*Pipistrellus subflavus*	YES	NO	YES
Eastern towhee	***Pipilo erthrophthalmus***	**YES***	**YES***	**YES***
Gray squirrel	*Sciurus carolinensis*	YES	NO	YES
Meadow vole	*Microtus pennsylvanicus*	NO	NO	YES
Raccoon	*Procyon lotor*	YES	NO	YES
Red fox	*Vulpes vulpes*	YES	NO	YES
Short-tailed shrews	*Blarina species*	NO	NO	YES
Silver-haired bat/big brown bat species	*Lasionycteris noctivagans/Eptesicus fuscus spp. complex*	YES	NO	YES
Virginia opossum	***Didelphis virginiana***	**NO**	**YES**	**YES**
White-footed/deer mouse	*Peromyscus species*	NO	NO	YES
White-tailed deer	*Odocoileus virginianus*	YES	NO	YES
Wood thrush	***Hylocichla mustelina***	**YES†**	**YES†**	**YES†**

* – documented on May 29, 2011 by DDOE/FWD

† – documented on June 28, 2003 by DC Birdscape, a consortium of groups including the Audubon Naturalist Society, the U.S. Fish and Wildlife Service and the National Park Service).

I thank you for your request for information as it serves to ensure for the protection and conservation of the District's wildlife resources. If you have any further questions and/or comments specific to wildlife resources in the District of Columbia, please do not hesitate to contact me on (202) 535-2276 or at sylvia.whitworth@dc.gov.

Sincerely,

Sylvia Whitworth, Chief
Wildlife Management Branch

References:
District of Columbia Wildlife Action Plan
District of Columbia Municipal Regulations for Fish and Wildlife, Title 19
National Environmental Policy Act of 1969
United States Fish and Wildlife Service Threatened and Endangered Species System
District of Columbia Threatened/Endangered Species List

dc water is life

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY | 5000 OVERLOOK AVENUE, SW | WASHINGTON, DC 20032

May 13, 2011

Mr. Steve Suari
Watershed Protection Specialist
District Department of the Environment
1200 First Street NE, 6th Floor
Washington, DC 20002

Subject: DC Water Comments Concerning Scope of DDOE's Scope for Broad Branch Environmental Assessment

Dear Mr. Estes:

DC Water received a letter April 21, 2011 requesting comments concerning the scope of issues to address for DDOE's upcoming Environmental Assessment (EA) being done for their project to restore an unnamed tributary to Broad Branch in Rock Creek Park. DC Water has been aware of DDOE's intention on restoring this tributary, which is currently contained in a storm sewer, for several years. In addition to the existing storm sewer there is an 18-inch diameter sanitary sewer and a12-inch diameter water main which parallel the storm sewer through the project area. The day lighting of the storm sewer will require coordination with DC Water throughout the design process. Additionally we have identified the following issues concerning the EA's scope:

- Identification the impact of the project on existing DC Water utilities in the project area and the limits of disturbance, and the need for coordination with DC Water
- The storm sewers that currently connect to the unnamed tributary in the storm culvert
- Downstream impacts to sewer infrastructure, including erosion issues and changes in floodplain
- Areas where the unnamed tributary crosses existing roads, and whether culverts will be used to convey the flow
- Responsibility for stream maintenance after project completion

DC Water has set aside funds in its Capital Improvement Program for this project from previous discussion with DDOE. However, we cannot ascertain if the current funds are sufficient to rehabilitate or relocate existing water and sewer infrastructure as part of this project until more specifics are determined. We look forward to continued discussion and partnership with DDOE on this project in the future.

If you need any further information, please contact Craig Keenan at 202-787-2366 or by e-mail at ckeenan@dcwater.com or me at 202-787-2248 or by email at jrussell@dcwater.com.

dcwater.com

Thank you for your assistance.

Sincerely,

Jodye Lacy Russell

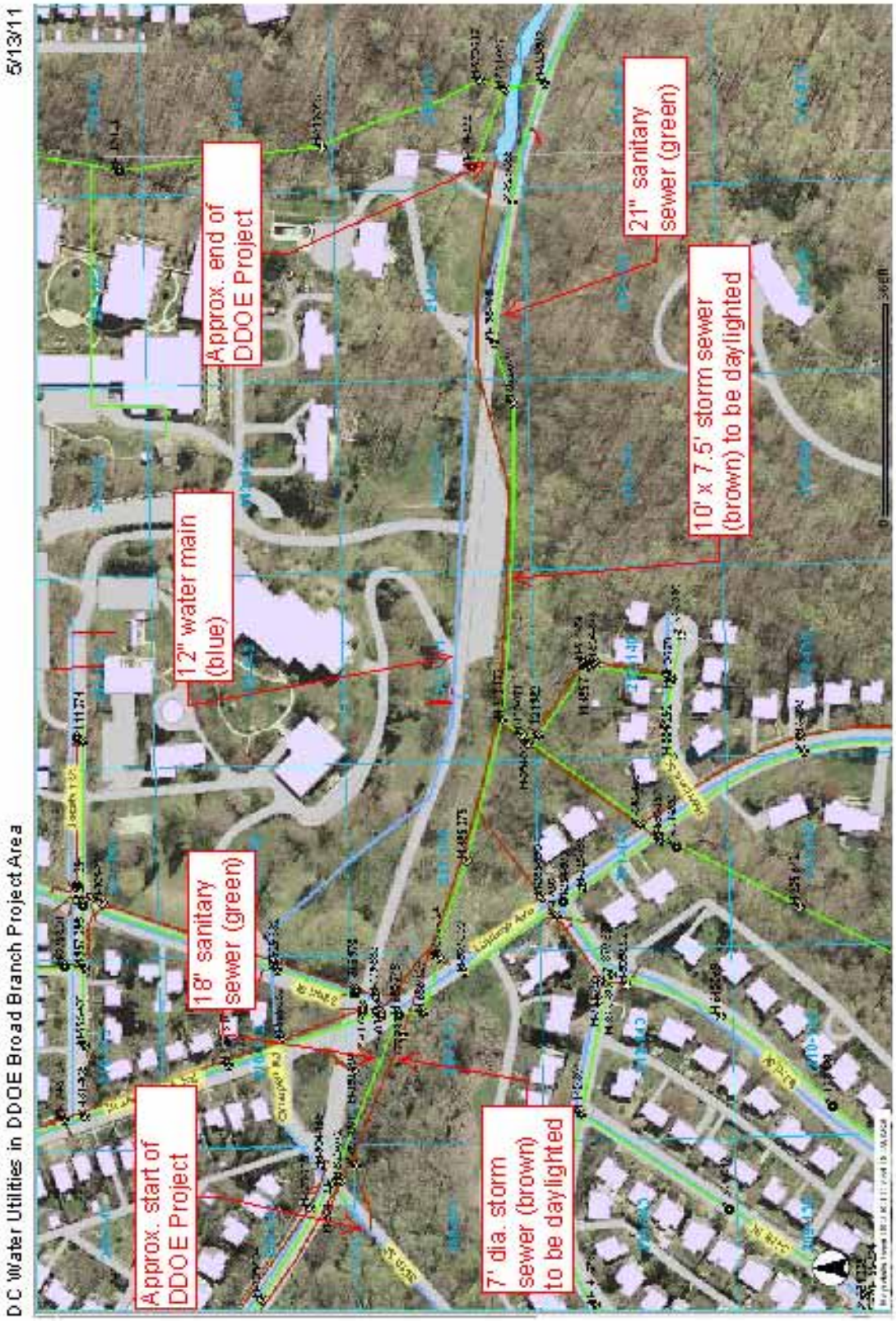
Jodye Russell

Planning Supervisor

cc:
Tara Morrison, NPS ROCR
Barry Lucas, DC Water
Roger Gans, DC Water
David McLaughlin, DC Water
Len Benson, DC Water
George S. Hawkins, DC Water

Attachment: Broad Branch

dcwater.com


DC Water Utilities in DDOE Broad Branch Project Area
5/13/11
Approx. start of DDOE Project
18" sanitary sewer (green)
12" water main (blue)
Approx. end of DDOE Project
7' dia. storm sewer (brown) to be daylighted
10' x 7.5' storm sewer (brown) to be daylighted
21" sanitary sewer (green)

From:	Saari, Steve (DDOE)
To:	Lewis, Andrew (OP)
Cc:	Trocolli, Ruth (OP); ESTES, Elizabeth
Subject:	RE: Section 106 Review: Stream Restoration near Broach Branch
Date:	Thursday, June 02, 2011 10:43:25 AM

Mr. Lewis,

Thanks for your response. We tried to tailor the project so that it would not impact historic resources and it sounds like we were successful. When the draft EA is available, we will send you it so that you may comment if you desire.

Sincerely,

Steve Saari

From: Lewis, Andrew (OP)
Sent: Thursday, June 02, 2011 9:26 AM
To: Saari, Steve (DDOE)
Cc: Trocolli, Ruth (OP); ESTES, Elizabeth
Subject: RE: Section 106 Review: Stream Restoration near Broach Branch

Mr. Saari:

Thank you for following-up with additional information. I have reviewed the plans and, as best I can tell, do not believe the proposed culvert will adversely affect any historic resources. If the National Park Service or any consulting party feels differently, please notify me as soon as possible. Otherwise, the DC SHPO has determined that this undertaking will have "no adverse effect" upon the historic built environment. Ruth Trocolli will forward a final determination which address potential effects on archaeological resources as soon as she completes her review. If you have any questions or comments, please feel free to contact me.

Best regards,

C. Andrew Lewis
Senior Historic Preservation Specialist
DC State Historic Preservation Office
Office of Planning
1100 4th Street, SW
Suite E650
Washington, DC 20024
Phone: 202-442-8841
Fax: 202-442-7638
andrew.lewis@dc.gov
www.planning.dc.gov/hpo

From: Saari, Steve (DDOE)
Sent: Friday, May 27, 2011 1:58 PM
To: Lewis, Andrew (OP)
Cc: Trocolli, Ruth (OP); ESTES, Elizabeth

Subject: RE: Section 106 Review: Stream Restoration near Broach Branch

Mr. Lewis,

We have not proposed any alteration to existing structures with the exception of the creation of a culvert under Linnean Road, NW to connect the stream to its historic stream valley. The current plans for the stream restoration can be downloaded from our FTP site at: http://upload.dc.gov/ddoe
Log in with these credentials:
User: vendor
Password: guest

The plans can be found in the folder called "Broad Branch." The plan set is called "95% Planset.pdf"

Please let me know if you require additional information and I will try to get you everything you require.

Sincerely,

Steve Saari
Watershed Protection Specialist
District Department of the Environment
1200 First Street NE, 6th Floor
Washington, DC 20002
Phone: 202.535.2961
Fax: 202.535.1364
web: ddoe.dc.gov

DISTRICT DEPARTMENT OF THE ENVIRONMENT green forward

From: Lewis, Andrew (OP)
Sent: Friday, May 27, 2011 1:47 PM
To: Saari, Steve (DDOE)
Cc: Trocolli, Ruth (OP)
Subject: Section 106 Review: Stream Restoration near Broach Branch

Hello Mr. Saari:

Thank you for contacting the DC State Historic Preservation Office regarding this undertaking. I am aware that my colleague Ruth Trocolli has been working with DDOE and others to carry out our our archaeological review but I will need some additional information about any proposed alterations (e.g. demolition, rehabilitation, new construction, etc.) to any structures (e.g. culverts, bridges, tunnels, roads, etc.) that may be associated with the project in order to complete my review of potential effects on historic built environment resources. To that end, I would greatly appreciate

receiving whatever information you may have in this regard at your earliest convenience.

Thank you,

C. Andrew Lewis
Senior Historic Preservation Specialist
DC State Historic Preservation Office
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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

October 11, 2011

Greenhorne & O'Mara
810 Gleneagles Court, Suite 106
Baltimore, MD 21286

RE: Request for species of concern information for the restoration of a unnamed tributary Broad Branch Road Project Environmental Assessment Washington DC

Dear Ms. Estes:

This responds to your letter, received April 19, 2011, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened in the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no proposed or federally listed endangered or threatened species are known to exist within the project impact area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or should additional information on the distribution of listed or proposed species become available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. Limited information is currently available regarding the distribution of other rare species in the District of Columbia. However, the Nature Conservancy and National Park Service (NPS) have initiated an inventory of rare species within the District. For further information on such rare species, you should contact Mary Pfaffko of the National Park Service at (202)-535-1739.

Effective August 8, 2007, under the authority of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (Service) removed (delist) the bald eagle in the lower 48 States of the United States from the Federal List of Endangered and Threatened Wildlife. However, the bald eagle will still be protected by the Bald and Golden Eagle Protection Act, Lacey Act and the Migratory Bird Treaty Act. As a result, starting on August 8, 2007, if your project may cause "disturbance" to the bald eagle, please consult the "National Bald Eagle Management Guidelines" dated May 2007.

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If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), please contact the Chesapeake Bay Ecological Services Field Office at 410-573-4573 for technical assistance. The Eagle Management Guidelines can be found at:
http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.

In the future, if your project can not avoid disturbance to the bald eagle by complying with the Eagle Management Guidelines, you will be able to apply for a permit that authorizes the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally where the take to be authorized is associated with otherwise lawful activities. This proposed permit process will not be available until the Service issues a final rule for the issuance of these take permits under the Bald and Golden Eagle Protection Act.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if alterations of wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Devin Ray at (410) 573-4531.

Sincerely,

Leopoldo Miranda
Field Supervisor

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.