

CHAPTER 3: AFFECTED ENVIRONMENT

This “Affected Environment” chapter of the EA describes existing environmental conditions in the proposed project area. These conditions serve as a baseline for understanding the resources that could be impacted by implementation of the proposed action. The resource topics presented in this chapter, and the organization of these topics, correspond to the resources discussions discussed in “Chapter 4: Environmental Consequences.”

3.1. SOILS

Geomorphic processes shape the landscape of Rock Creek Park, which consists of a steep, rugged stream valley and rolling hills. The park straddles the boundary of two physiographic provinces: the Piedmont and the Atlantic Coastal Plain. The transitional zone between the two provinces is known as the Fall Line.

The Piedmont is composed of hard, crystalline igneous and metamorphic rocks, extending to the west of Rock Creek Park. Rolling hills of the region were formed through folding, faulting, metamorphism, uplifting and erosion. Piedmont soils are highly weathered and generally well-drained. The Atlantic Coastal Plain is a generally flat region composed of sediment deposits from the past 100 million years, extending to the east of Rock Creek Park. The sediment deposits have been continually reworked by fluctuating sea levels and erosive forces. As a result, typical soils of the region are well drained sands or sandy loams (NPS 2009).

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) has compiled an inventory of District of Columbia soils, in order to deliver science based soil information. The locations, descriptions, recommended uses and limitations of soils are identified in The Soil Survey of the District of Columbia (USDA 1976). Soils within and adjacent to the Rock Creek Park multi-use trail consist of gently and moderately sloping soils of the Rock Creek valley bottom and steeply sloping soils along the hillsides of the valley. In general, soils at the valley bottom range from well-drained to moderately well-drained soils which have little to no hazard of erosion. Soils of the hillsides are described as somewhat excessively drained. Due to steep slopes and rapid runoff, the soils have a high potential for erosion. Locally, soils of both the valley bottom and the hillsides are intermingled with soils that have been graded, cut, filled, or otherwise disturbed during urbanization.

Current soil conditions in and around the Rock Creek Park multi-use trail are diminished. Soils are compacted throughout the trail area, where users leave the paved trail surface to take shortcuts or maneuver around others. Soil compaction affects water movement through the soil. Particularly on sloping soils, the reduction of water movement contributes to surface runoff and erosion. In flat areas, water cannot infiltrate and water ponds on the soil surface creating a drainage issue. In addition, changes in soil density due to soil compaction prevent plant growth. Where soil conditions can no longer support plants, soils become exposed.

3.2. WATER QUALITY

Rock Creek is the primary surface water feature within the project area (**Figure 19**). Rock Creek flows in a generally south direction for 33 miles from its headwaters near Laytonsville, Maryland to its confluence with the Potomac River at Georgetown. Piney Branch is another waterway within the project area. Piney Branch enters Rock Creek from the northeast at Piney Branch Parkway.

The Rock Creek watershed encompasses 77 square miles and land uses consist of a mixture of urban, suburban, residential, parkland, and agriculture. Approximately 70 percent of the Rock Creek watershed is developed. These developed areas occur mostly upstream of Rock Creek Park and consist of impervious surfaces such as buildings and roadways. The section of Rock Creek within the park has degraded due to increased flooding from rapid runoff, abnormal stream bed scouring in some places and sedimentation in others, bank erosion, organic and chemical pollution, and accumulation of litter and other solid waste (DDOE 2010).



Figure 19. Rock Creek

Within the park, Rock Creek is surrounded by a mature riparian buffer. The buffer provides water quality protection by slowing floodwaters, cooling water temperatures, and by trapping sediment and nutrients before they wash into the stream. Water quality effects of the riparian buffer are slightly degraded due to impervious surfaces such as the Rock Creek Park multi-use trail and Beach Drive NW. **Table 3** lists existing impervious surface areas within the limits of proposed trail rehabilitation activities.

Table 3. Existing Impervious Areas

Surface Area	Alternative 1	Peirce Mill Trail Spur Option A	Rose Park Trail Option A
Existing Impervious Area	3.43 ac.	0 ac.	0.20 ac.

Rock Creek and Piney Branch are designated as “Special Waters of the District of Columbia” (SWDC) according to the Water Quality Standards, 21 DC Municipal Regulations (DCMR) Section 1102.5, as amended (DCOS 2011). The water quality in SWDC waters shall be maintained at or above the current level by implementing the following:

- Existing nonpoint source discharges, storm water discharges and storm sewer discharges to SWDC sections shall be controlled through implementation of BMPs and regulatory programs;
- Construction or development projects, such as roads, bridges, and bank stabilization of the streams in which a SWDC designated section is located, which may lead to pollution of the water, shall be permitted on a case-by-case basis to ensure that there are no long-term adverse water quality effects and that no impairment of the designated uses of the section occurs; or
- Short-term degradation of water quality in a SWDC section due to construction projects may be permitted provided that prior notice is given to the public and other local and federal government

agencies, and provided that the builder of the construction project submits a report to the Department which summarizes the views, major comments, criticisms and suggestions of the public and other local and federal government agencies; and sets forth the specific responses in terms of modifications of the proposed action or an explanation for rejection of proposals made by the public and other local and federal government agencies.

Point and nonpoint sources of water pollutants in Rock Creek were identified by the District of Columbia Department of the Environment (DDOE 2008). The types of contaminants entering Rock Creek surface waters include the following:

- Sediment is transported from unvegetated soils, such as construction sites and agricultural fields;
- Storm water runoff from transportation corridors and parking lots within the watershed carries sediments, oil and grease, and metals, such as cadmium, iron, lead, and zinc; and
- Runoff from lawns, stables, and leaking sewerlines are sources of nutrients, including nitrogen and phosphorus, and contributes to high coliform bacteria counts.

Pollution has adversely affected the ability of Rock Creek and its tributaries to support aquatic life. The 2008 *District of Columbia Water Quality Assessment* indicated that the lower and upper reaches of Rock Creek continue to partially support its aquatic life stream use designation (DDOE 2008). Additionally, the 2008 *District of Columbia Water Quality Assessment* determined that Rock Creek does not support its Class A (Primary Contact Recreation), Class B (Secondary Contact Recreation and Aesthetic Enjoyment), Class C (Protection and Propagation of Fish, Shellfish and Wildlife), or its Class D (Protection of Human Health related to Consumption of Fish and Shellfish) stream use designations (DDOE 2008).

Section 303(d) of the Federal Clean Water Act and regulations developed by the USEPA require States, and the District, to prepare a list of waterbodies or waterbody sections that do not meet water quality standards. Rock Creek and Piney Branch have been designated by the USEPA as impaired waters as they appear on the Section 303(d) list. As specified by the Clean Water Act, waters on the list are those that do not meet water quality standards even with pollution controls in place. For these waterbodies, states are responsible for developing Total Maximum Daily Loads (TMDLs). TMDLs describe the maximum amount of a pollutant that a water body can receive while still meeting water quality standards. In the Rock Creek watershed, TMDLs have been developed for lead and mercury (DDOH 2004a), fecal coliform bacteria (DDOH, 2004b), and manufactured pesticides and chemicals (DDOH 2004c). Additionally, a TMDL was established for Rock Creek requiring an 85 percent reduction of all stormwater (both piped and direct runoff) in order to avoid water quality violations.

3.2.1. SEWERS AND OUTFALLS

Precipitation events cause major contamination of Rock Creek and its tributaries. Numerous stormwater outfalls are located along the streams, which transport pollutant laden waters from roads and parking lots. Also, sections of the City's network of sanitary pipelines are located in Rock Creek Park. When leaks develop in the sanitary lines, wastewater is carried directly to streams (NPS 2007).

In addition to these sources of pollution, Washington DC utilizes a combined sanitary and storm sewer system. Under normal conditions, wastewaters in the combined system are directed to treatment at the Blue Plains wastewater facility across the Potomac from Alexandria. However, during storm events exceeding 0.3 inches per hour, untreated sewage overflows and discharges directly to Rock Creek and its tributaries (NPS 2007).

DC Water currently lists 28 combined sanitary and storm sewer overflow structures along Rock Creek (DC Water 2011). Reconstruction to reduce overflow discharges is underway, and includes separation of several combined outfalls in the project area (DC Water 2011b). Long term plans to solve the problem of sewer overflow include construction of concrete lined tunnels to collect and store runoff during substantial rainfall events (NPS 2007).

3.3. VEGETATION

Vegetation occurring in the project area has been characterized in the National Biological Survey (NBS)/NPS Vegetation Mapping Program's *Vegetation Classification of Rock Creek Park* (TNC 1998). The NBS study shows that the portion of Rock Creek Park within the study area is comprised of Beech-White Oak/Mayapple Forest Association and Managed Grass/Lawns with Trees. Additionally, during the January 2011 field investigation, the overall forest composition was identified using the National Vegetation Classification System developed by The Nature Conservancy. Based on this classification system, the forest cover of the site was classified as mixed oak/beech variant of the Beech-White Oak/Mayapple Forest Association on the upper slopes, and Sycamore-Green Ash Association in the floodplain. These associations are further described below.

The Beech-White Oak/Mayapple Forest Association occurs on moderately dry slopes or gentle gradients on well-drained acidic sandy loam soils. The canopy is dominated by white oak (*Quercus alba*), beech (*Fagus grandifolia*), and tulip poplar (*Liriodendron tulipifera*), and subcanopy and shrub layer species include American holly (*Ilex opaca*), flowering dogwood (*Cornus florida*), and mapleleaf viburnum (*Viburnum acerifolium*), which often forms a well-defined shrub layer. Two variants of the Beech-White Oak/Mayapple Forest Association are recognized: the beech-tulip poplar variant and the mixed oak/beech variant. The beech-tulip poplar variant occurs on more mesic (moderately moist) sites and is characterized by a dominance of tulip poplar and beech in the canopy and subcanopy. Hornbeam (*Carpinus caroliniana*) occurs frequently and spicebush (*Lindera benzoin*) and viburnums (*Viburnum* spp.) are common in the shrub layer. The mixed oak-beech variant is characterized by a greater percent cover of oaks and less dominance by tulip poplar. The canopy is codominated by a mix of red oak (*Quercus rubra*), black oak (*Quercus velutina*), white oak, and chestnut oak (*Quercus prinus*). Beech usually occurs in the subcanopy and mapleleaf viburnum is common, but spicebush, hornbeam, and jack-in-the-pulpit (*Arisaema triphyllum*) are conspicuously lacking or sparse, which distinguishes this from the classic Beech-White Oak/Mayapple Association (TNC 1998).

The Sycamore-Green Ash Association is a floodplain forest, found along stream banks, low terraces, and other areas subject to temporary or irregular flooding. The canopy is characterized by sycamore (*Platanus occidentalis*) and box elder (*Acer negundo*), with red maple (*Acer rubrum*) and tulip poplar often co-dominant with the sycamore. Green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), and hickory (*Carya* spp.) species are frequent associates. The shrub layer may be dominated by spicebush, with black haw (*Viburnum prunifolium*) occurring less frequently (TNC 1998).

Field investigations conducted in January 2011 included an inventory of project area vegetation. The inventory took place within the approximate limit of disturbance of the Rock Creek Park Multi-Use Trail Rehabilitation, including the proposed areas of the Piney Branch Parkway trail, Rose Park trail, and Peirce Mill trail spur. Within the approximate limits of disturbance, the location of large trees was recorded using a Trimble GPS receiver capable of sub-meter accuracy. Large trees were defined as trees with a diameter at breast height (dbh) greater than or equal to 24 inches. A forestry diameter tape was used to measure the diameter of trees at breast

height. A total of 61 large trees were surveyed within the approximate limits of disturbance of the proposed actions.

The survey also identified large trees outside of the approximate limits of disturbance that could potentially be impacted by the proposed actions, based on the critical root zone (CRZ). The CRZ is the area in which most roots live, supplying nutrients and water to a tree. Most of these essential roots are found just below the soil surface. When the roots are damaged, the structural integrity of the tree is jeopardized, creating a potential hazard. The CRZ is defined as a concentric circle around the trunk of a tree with a radius of one foot for every one inch of the tree's dbh. Generally, considerable damage occurs when there are impacts to 30 percent or more of the CRZ (Carroll County Maryland 2007). Based on the field investigation, there were 60 trees outside of the approximate limits of disturbance that could potentially be impacted by the proposed actions. For each of these trees, 30 percent or more of the CRZ is within the approximate limits of disturbance.

During the public comment period for the Rock Creek Park Multi-Use Trail Rehabilitation, multiple comments were received regarding an old oak tree adjacent to the Rose Park trail at the Rose Park Dumbarton Street playground area. Public comments pointed out the importance of the tree to Rose Park based on its considerable size. Also, public comments provided that the tree is in excellent health, based on previous professional assessments.

3.4. WILDLIFE

Wildlife found within Rock Creek Park consists of species that have adapted to disturbed environments. Forested areas of the park provide suitable habitat for mammals such as white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), opossum (*Didelphis virginiana*), gray squirrel (*Sciurus carolinensis*), beaver (*Castor Canadensis*), southern flying squirrel (*Glaucomys volans*) and eastern chipmunk (*Tamias striatus*). Reports of coyotes (*Canis latrans*) in Rock Creek Park were confirmed by park staff in September 2004, and sightings continue (NPS 2009b). The variety and number of reptiles and amphibian species in Rock Creek Park has decreased over the 20th century. Current inhabitants include spring peeper (*Psuedacris crucifer*), wood frog (*Rana sylvatica*), spotted salamander (*Ambystoma maculatum*), and red-backed salamander (*Plethodon cinereus*). Other amphibians have disappeared from the park such as the gray treefrog (*Hyla versicolor*) and the chorus frog (*Psuedacris triseriata*). Reptiles such as box turtles (*Terrapene carolina*) and rat snakes (*Elaphe obsoleta*) are present, but are decreasing in numbers due to loss of suitable habitat (NPS 2009b).

According to the NPS, 181 species of birds have been documented in the park. Bird species include neotropical migrants, who breed in the U.S. and Canada, and migrate to Mexico, Central America, South America, or the Caribbean Islands during the winter. Neotropical migrants recorded in the park include red-eyed vireo (*Vireo olivaceus*), Acadian flycatcher (*Empidonax vireescens*), eastern wood-pewee (*Contopus virens*), wood thrush (*Hylocichlea mustelina*), and scarlet tanager (*Piranga olivacea*). Example year-round residents are the great horned owl (*Bubo virginianus*), red-shouldered hawk (*Buteo lineatus*), pileated woodpecker (*Dryocopus pileatus*), American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), and song sparrow (*Melospiza melodia*). Many of these species depend on the ground and shrub layers of the forest for nesting and concealment, and are adversely affected by removal of these vegetative layers (NPS 2009b).

Based on information in the Rock Creek Park GMP there are 35 species of fish in Rock Creek (NPS 2007). Native species found in the Creek and its tributaries include shiners (*Notropis* spp.), bullheads (*Ictalurus* spp.),

sunfish (*Lepomis* spp.) and blacknose dace (*Rhinichthys atratulus*). These species are common throughout the region. One catadromous fish species is found in Rock Creek, the American eel (*Anguilla rostrata*). Two anadromous fish species are found in the Creek, which are the blueback herring (*Alosa aestivalis*) and the alewife (*Alosa pseudoharengus*). In order to enhance spawning conditions for these migratory species, a fish ladder was installed at the Peirce Mill dam in 2007 (NPS 2007).

Contamination of Rock Creek and its tributaries has adversely impacted the variety and number of fish. Due to flooding and scouring during storms, pollution from runoff, and periodic low flows, there has been an overall reduction in the fish population. A 1993 study conducted by the NPS revealed that no fish were found in nearly half of Rock Creek's tributaries (NPS 2007).

3.5. CULTURAL RESOURCES

3.5.1. GUIDING REGULATIONS AND POLICIES

The National Historic Preservation Act (NHPA) of 1966 governs federal agencies in their handling of historic properties. Section 106 of the Act requires that federal agencies take into account the effects of their actions on cultural resources. Under this provision, the NPS must evaluate impacts to any district, site, building, structure, or object listed on or eligible for listing on the National Register of Historic Places (NRHP). Cultural resources are characterized as archeological resources, historic structures, and cultural landscapes. "Historic properties" as defined by the implementing regulations of the NHPA (36 CFR 800), are any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. This term includes artifacts, records, and the remains that are related to and located within such properties, as well as traditional and culturally significant Native American sites and historic landscapes. Agencies must consult with the SHPO and the ACHP as required, and other interested parties in an effort to avoid, minimize, or mitigate adverse effects. There are no federally recognized Indian tribes present in the District of Columbia; therefore consultation with the THPO is not required for this project.

In addition to the NHPA, protection and management of cultural resources held by the NPS is governed by *Directors Order #28: Cultural Resources Management Guidelines* (NPS 1988), *NPS Management Policies* (NPS 2006), and the 2008 NPS-wide Programmatic Agreement with the ACHP and the National Conference of State Historic Preservation Officers. These documents require that NPS managers avoid or minimize adverse impacts on park resources to the greatest extent possible.

3.5.2. AREA OF POTENTIAL EFFECTS

According to the Section 106 Regulations (36 CFR 800), an APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." An APE for this undertaking was delineated by the NPS and DDOT after consultation with the DC HPO and Consulting Parties invited under the NHPA Section 106 consultation process. In compliance with the Advisory Council on Historic Preservation's regulation implementing Section 106, the APE for historic properties was determined to be a 200-foot band flanking the trail, expanded as appropriate to capture key adjacent historic properties. Due to the dense vegetation and topography of the project area, as well as the minimal visual qualities of the proposed improvements, impacts to historic views and vistas will be limited. For the purposes of evaluation, the

proposed APE for historic resources includes the area from which the project site is readily visible, as well as resources that could be impacted due to changes in the character of the area.

The APE for archeological resources comprises the Limit of Disturbance (LOD) as identified by project planners for the various proposed construction-related activities that will result in ground disturbance.

Figure 20 displays the APE and associated historical resources.

3.6. HISTORIC STRUCTURES AND DISTRICTS

This section addresses historic properties present that have been included in or have been determined eligible for the NRHP as buildings, sites, objects, or historic districts. The Rock Creek Park multi-use trail, which echoes the path of Rock Creek, is within the Rock Creek Park, Rock Creek and Potomac Parkway, and the Georgetown historic districts, listed in the NRHP.

3.6.1. HISTORIC DISTRICTS WITHIN THE APE

The Rock Creek Park Historic District

The Rock Creek Park Historic District, defined as U.S. Reservation 339, was established by Congress in September 1890 for the scenic and recreational enjoyment of the people of the United States (NPS 1991). The historic district's boundaries are roughly defined as 16th Street, NW on the east, Oregon Avenue and Branch Road, NW on the west, Klinge Road, NW to the south, and the District of Columbia line and Parkside Drive, NW on the north. The district comprises approximately 1,754 acres of predominantly picturesque forested valley with sloping hills and meadows. The park meets National Register Criteria A, B, and C as possessing areas of significance for architecture, community planning and development, conservation, entertainment and recreation, industry, landscape architecture, military and horticulture. Important persons associated with the history of the park include Joshua Peirce (nationally renowned horticulturalist and occupant of the Peirce-Klinge mansion) and landscape architects Frederick Law Olmsted, Jr., and John C. Olmsted who established methods of landscape practice and a general development plan for the park in the 1918 Olmsted report. According to the NRHP nomination, the park exhibits a high degree of integrity of design, workmanship, location, feeling, association, and setting, which continues to reflect its development as a public landscape between 1831 and 1941.

An inventory of above-ground resources within the Rock Creek Park Historic District boundaries identified 31 contributing resources and 59 noncontributing resources. A contributing resource represents a building, structure, site, or object that is associated with one or more of the themes under which the district is significant and that retains a high degree of integrity. The Rock Creek Park trail system is a contributing resource to the historic district. The undertaking also has the potential to affect the Piney Branch Parkway and the adjacent retaining wall, which are also contributing resources to the historic district. The Piney Branch Parkway and retaining wall were completed in 1935 and 1936 respectively, as Public Works Administration construction projects. The Piney Branch Parkway retaining wall utilizes a native stone material intended to be informal and inconspicuous. According to the Historic Resource Study, the wall is illustrative of the modern rustic aesthetic advanced by Albert H. Good in his 1935 design source book, *Park Structures and Facilities* (NPS 1990).

The Rock Creek Park Historic District was listed in the DC Inventory of Historic Sites on November 8, 1964, and in the NRHP on October 23, 1991 (NPS 1991). **Table 4** identifies the contributing resources of the Rock Creek Park Historic District within the APE.

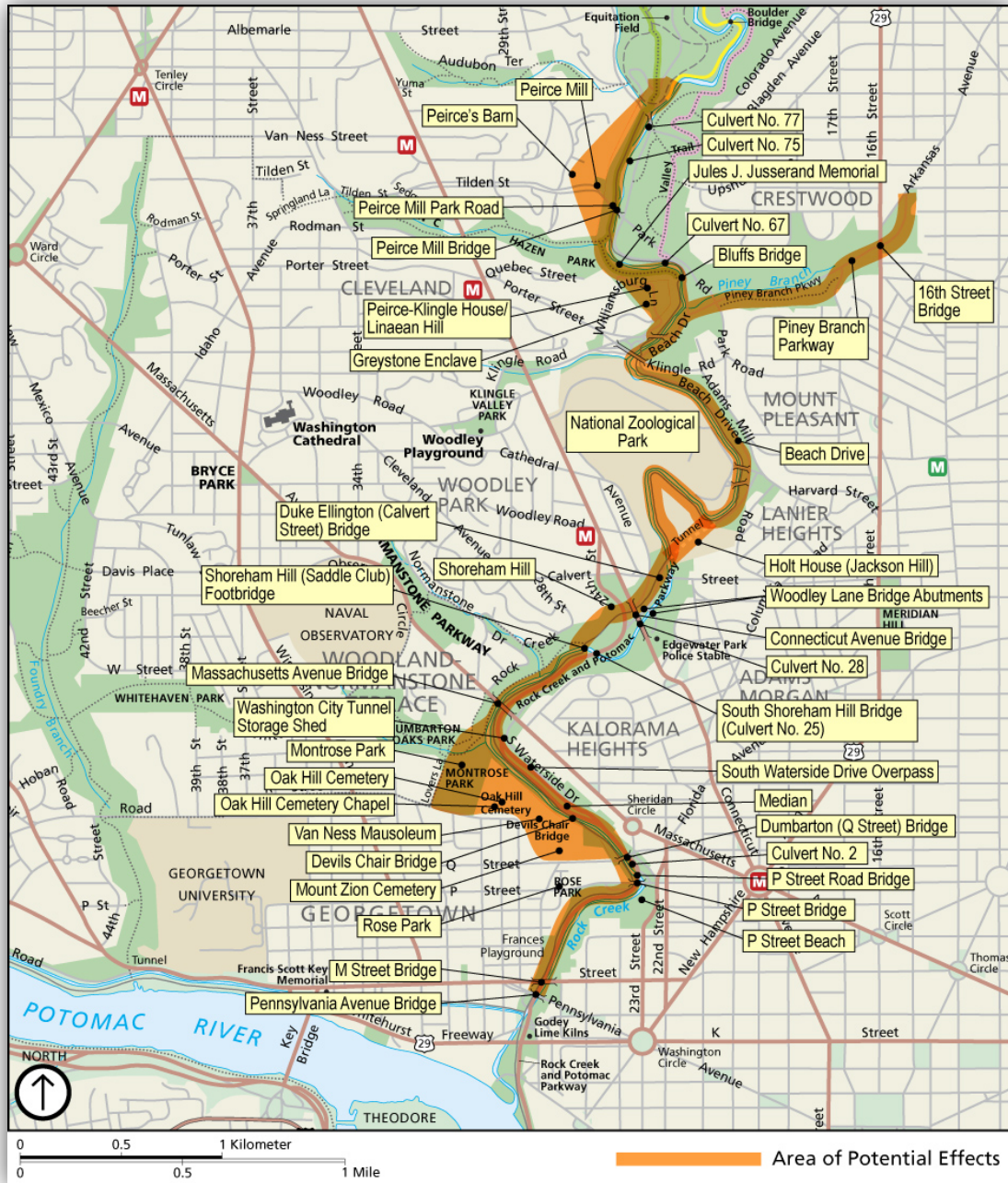


Figure 20. Area of Potential Effect and Historic Resources

The Rock Creek and Potomac Parkway Historic District

Rock Creek and Potomac Parkway Historic District, U.S. Reservation 360, occupies the gorge and rim of the lower Rock Creek Valley and a stretch of land along the Potomac River waterfront. The district comprises approximately 173 acres in the northwest quadrant of Washington, DC. Plans for the parkway were initiated as early as 1867, but did not gain momentum until the Senate Park Commission included the reservation in its 1901 plans for the National Mall and surrounding environs (NPS 2005b). In 1913, the parkway was officially authorized to provide a landscaped connection between the Mall and Potomac Park (later renamed East and

West Potomac Parks) and the already established Rock Creek Park and National Zoo. The parkway comprises a major component of the District's comprehensive park system developed following City Beautiful ideals during the early twentieth century. Originally built for horse-drawn carriages, horseback riders, pedestrians, and the occasional automobile, the Rock Creek and Potomac Parkway was one of the earliest parkways in the nation and the first federally funded road. The parkway experienced numerous design changes to facilitate growing automobile use during the early 1900s; however, bridle paths continued to be an integral part of the original trail network design and equestrians used the park through the 1950s. The Rock Creek and Potomac Parkway is listed in the NRHP as a historic district under the multiple property listing "Parkways of the National Capital Region, 1913-1965." The parkway is significant under Criteria A and C in the areas of community planning and development, landscape architecture, architecture, and recreation during the period 1791 to 1951.

The circulation network, comprising the historic roads and trails built between 1831 and 1951, is a contributing resource to both the Rock Creek Park Historic District and the Rock Creek and Potomac Parkway Historic District. Although the NRHP documentation cites the trail network as significant, it does not specifically determine which trails are contributing resources. According to the historic district nomination, the spine of the circulation system, the multiuse trail, extends along the western side of the Rock Creek and Potomac Parkway, following the path of the primary historic bridle trail. In addition to the existing alignment, the historic district nomination has identified at least eleven other known footpaths and bridle paths that traverse this area. The NPS National Capital Region is developing a cultural landscape report for the historic trails in Rock Creek Park. The historical alignment of trails has undergone preliminary evaluation by Robinson & Associates, Inc., in coordination with the NPS, as part of this Section 106 undertaking. Using the park's archival resources and historic mapping, as well as evaluating other key maps at local archival repositories, a composite map was created to illustrate the evolution of the historic alignments throughout the project area and to better define the historic resource (see **Figure 21**).

The Rock Creek Park and Potomac Parkway Historic District was listed in the DC Inventory of Historic Sites on November 8, 1964, and in the NRHP on May 4, 2005 (NPS 2005b). **Table 4** identifies the contributing resources of the Rock Creek and Potomac Parkway Historic District within the APE.

The Historic Trail Network within the Rock Creek Park Historic District and the Rock Creek and Potomac Parkway Historic District

The trail network is identified by the National Register documentation for the Rock Creek Park and Rock Creek and Potomac Parkway Historic Districts as a contributing resource, but with no specific evaluation of the network or identification of historic sections. As the principle historic resource potentially affected by the proposed undertaking, this study evaluates the historic characteristics of the trail network located in the project area. As discussed above, the NPS currently is developing a cultural landscape report for the historic trails in the park. Most of the lower Rock Creek Valley (the area south of the National Zoo) remained in its natural state throughout the eighteenth century and the first half of the nineteenth century. The southern part of the valley served as the northwestern border of Washington City as described by Pierre L'Enfant, as well as a natural barrier between Georgetown and Washington County (NPS 2005b). Starting in 1831, a system of trails and roads began to develop throughout the area that became the park, which would continue to evolve and be improved upon until 1941 (NPS 1990).

The park and its network of trails and roads, is a product of the predominant social philosophies of the era – city planning, democratic ideals, sanitary reform, and nature conservation – promulgated by reformers such as Frederick Law Olmsted Sr. (NPS 1990). In the second half of the nineteenth century, parks were advocated as a refuge from the maladies of urban living. The designation of Rock Creek Park in 1890 (ultimately as a national park) provided a place of refuge within Washington, DC.

When Rock Creek Park was established, existing recreational features included carriage drives, horseback riding trails, walking paths, and fields for organized sports (NPS 1990). A large stable, established by 1888 and operated by the Washington Riding Academy, was situated on the east side of the Rock Creek Valley at P Street (Goode 2003). The stable served affluent citizens of Washington who were eager to enjoy the informal bridle trails that followed the creek and meandered through the area of mixed farms and woodlands. Most of Washington society belonged to the Washington Riding Academy through the turn of the twentieth century until its popularity waned with the arrival of the Great Depression. In addition to the Washington Riding Academy multiple other riding clubs existed throughout Washington, including two located within the lower Rock Creek Valley – one near the Shoreham Hotel, started by Harry Wardman, and the second by Rock Creek Parkway, which was converted into the Watergate Inn in 1940. The Washington Riding Academy was razed in 1936 and replaced with the present Embassy Service station.

By the turn of the century, interest in the development of the district’s entire park system resulted in the 1901-02 Senate Park Commission, known as the McMillan Commission. Landscape architect and urban reformer, Frederick Law Olmsted, Jr., a member of the commission, addressed the importance of preserving Rock Creek Park in the report, writing “it is true that the value of the park scenery depends absolutely upon making it conveniently accessible to the people, but nothing can be gained if the means of access destroys the scenery which it is meant to exhibit” (NPS 1990). The McMillan report ultimately led to the Olmsted Plan in 1918, the first comprehensive plan for Rock Creek Park.

The expansion and modification of the circulation network in the early twentieth century, financed mainly by congressional appropriations from 1899-1918, provided Washingtonians increased access to the park. A building program, initiated by Army engineer Captain Lansing J. Beach in 1897, was responsible for four miles of macadam and three miles of dirt road as well as maintenance on the existing trails and roads (NPS 1990). Construction or improvement of twenty-two miles of bridle paths and six miles of foot paths was authorized by the Board of Control in 1918. (The Army was responsible initially for Rock Creek Park, just as it was with Yellowstone and Yosemite, the two other national parks that were established in 1890.)

The circulation network also benefited from New Deal-era programs. The first Public Works Administration (PWA) project in the park replaced bridle path bridges, repaired three highway bridges, and replaced picnic tables and benches (NPS 1990). PWA funds also supported construction of five new bridle foot bridges from 1934-35 and resurfacing 7,516 yards of roadway during the 1930s. While the 1930s brought needed improvements and infrastructure to Rock Creek Park, it also witnessed increased automobile use and suburban development responsible for the demise of the surrounding stables, and consequently, the paving of the equestrian trails for bicycle use.

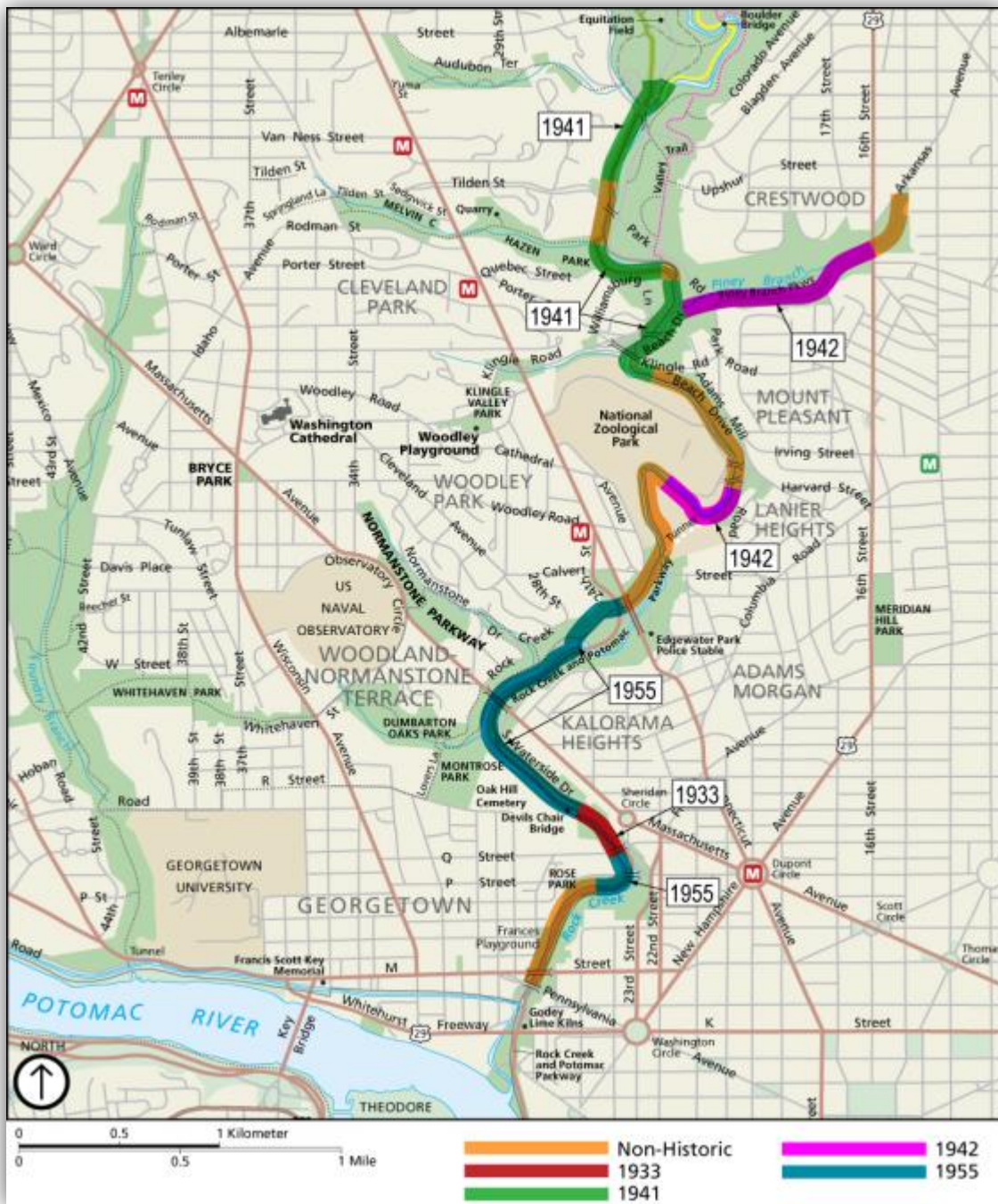


Figure 21. Historic and Non-Historic Trail Alignments within the APE

During the twentieth century, the park and its circulation system adapted to the changing pastimes of its recreational users, as evidenced by the insertion of additional sports facilities such as tennis courts, playing fields, and trail additions for bicycle paths in the 1960s and 70s. Despite some modern intrusions, historian William Bushong notes “paths which were extant before 1941, have been maintained and incorporated into the modern trail system. These sections document the long historic tradition of these recreational activities in the

park” (NPS 1990). The trail networks’ greatest consequence has been facilitating the transition of the park from a remote, rural landscape to a public landscape. Current historic and non-historic trail alignments within the Rock Creek Park Multi-Use Trail Rehabilitation APE are presented in **Table 4**.

The Georgetown Historic District

Georgetown was founded by an Act of the Maryland Assembly in 1751, and incorporated with an elected government in 1789 (DC HPO 1967). It became part of the District of Columbia upon the District’s establishment in 1791, remaining a separate jurisdictional entity within the city until Congress revoked its independent charter in 1871. Congress abolished Georgetown as a legal entity in 1895. The Georgetown district is a remarkably intact example of a complete historic town with a rich variety of residential, commercial, institutional, and industrial buildings spanning several centuries. The building inventory includes a wide range of houses from simple frame dwellings to spaciously landscaped mansions recording all social levels of the community. Architectural styles are also varied and include Federal, Greek Revival, Italianate, Queen Anne, Romanesque, and Classical Revival examples, as well as numerous vernacular structures. Georgetown includes many of city’s oldest buildings and its narrow-grid streets establish intimate scale in contrast to the L’Enfant’ Plan for the City of Washington.

The Georgetown Historic District was listed in the DC Inventory of Historic Places on November 8, 1964, and in the NRHP as a National Historic Landmark on May 28, 1967; the nomination was amended on February 27, 2003 to present the period of significance of 1751 to 1950 (NPS 2003b). **Table 4** identifies the contributing resources of the Georgetown Historic District within the APE. Rose Park is located in the Georgetown Historic District. It is located between P Street, NW and M Street, NW bounded on the west by 26th and 27th streets and bounded on the east by Rock Creek Parkway. Although the Georgetown Historic District nomination does not include an inventory of contributing resources, the State Historic Preservation Office considers Rose Park to be a contributing resource to the Historic District (D.C. HPO, Kim Williams, National Register Coordinator, telephone conversation with Judith Robinson, Principal, Robinson & Associates, Inc., June 2, 2009).

3.6.2. INDIVIDUALLY LISTED HISTORIC SITES WITHIN THE APE

Greystone Enclave

This property is comprised of four dwellings and their associated outbuildings, as well as the setting in which they are located. Greystone Enclave includes Linnaean Hill, built 1823; Greystone, built 1913 and designed by architect Waddy B. Wood; Gearing Bungalow, built 1914 and designed by architect Nicholas R. Grimm; and Pine Crest Manor, built 1929 and designed by architect Gordon B. MacNeil. Greystone Enclave was listed in the D.C. Inventory of Historic Sites on June 21, 1989 (DC HPO 1989).

Montrose Park

Montrose Park, established in 1911, is located on R Street between 30th and 31st streets. This 16-acre public park is found in the northern section of Georgetown, adjacent to Dumbarton Oaks, Dumbarton Oaks Park, and the Oak Hill Cemetery. The historic character of Montrose Park is largely the work of two skilled landscape architects for the DC Office of Public Buildings and Grounds, George E. Burnap and Horace W. Peaslee. The park is also important as an early-twentieth-century example of the adaption of a country estate to a community park. Montrose Park was listed in the DC Inventory of Historic Sites on March 3, 1979, and in the NRHP on May 28, 1967 (NPS 1967b).

Table 4. Rock Creek Park, Rock Creek and Potomac Parkway, and Georgetown Historic Districts

SITES/DESIGNED LANDSCAPES	BUILDINGS	STRUCTURES
Rock Creek Park Historic District Resources within the APE		
Linnaean Hill	Peirce Barn Peirce Mill Klingle Mansion	<ul style="list-style-type: none"> • Beach Drive • Bluffs Bridge • Culverts • Jules J. Jusserand Memorial • Outdoor Fireplace • Peirce Mill Bridge • Park Road • Piney Branch Parkway • Retaining Walls • 16th Street Bridge • Trail Network
Rock Creek and Potomac Parkway Historic District Resources within the APE		
Median Parkway Ending / Road Trace Rock Creek Shoreham Hill Woodley Lane Bridge Abutments	Washington City Tunnel Storage Shed	<ul style="list-style-type: none"> • Connecticut Avenue Bridge (William H. Taft Memorial Bridge) • Culverts • Duke Ellington Bridge (Calvert Street Bridge) • Dumbarton Bridge (Buffalo Bridge) • Lyons Mill Footbridge (Devil’s Chair Bridge) • M Street Bridge • Massachusetts Avenue Bridge (Charles C. Glover Memorial Bridge) • P Street Bridge • P Street Road Bridge Rock Creek and Potomac Parkway • Saddle Club Footbridge (Shoreham Hill Footbridge) • South Waterside Drive Overpass • Shoreham Hill Road Bridge • Trail Network
Georgetown Historic District Resources within the APE		
Rose Park*		

*Although the Georgetown Historic District nomination does not include an inventory of contributing resources, the State Historic Preservation Office considers Rose Park to be a contributing resource to the Historic District.

Mount Zion Cemetery

Established in 1809, the cemetery comprises the Old Methodist Burying Ground and the Female Union Band Society Graveyard. In 1842, the cemetery was established as a benevolent association to provide burial for free blacks. The property connotes the association between black Americans and the development of Georgetown. The Mount Zion Cemetery was listed in the D.C. Inventory of Historic Sites on April 19, 1975, and in the NRHP on August 6, 1975 (NPS 1975).

National Zoological Park

Established in 1889 and expanded in 1921 and 1923, the National Zoo is a major achievement of the late-nineteenth century conservation movement, created for the preservation of endangered animals indigenous to the United States. The property is a major component of the park system in the Rock Creek valley and is also significant as an important work of noted landscape architect Frederick Law Olmsted, with alterations by F.L.

Olmsted, Jr. Major scientific investigations including experiments in zoology, anatomy, and aerodynamics were conducted on the site. The National Zoo's spacious and picturesque location was a significant innovation in zoo design that also influenced the layout of the curvilinear street pattern in the surrounding area. The National Zoological Park was listed in the DC Inventory of Historic Sites on November 8, 1964, and in the NRHP on April 11, 1973 (NPS 1973b).

Oak Hill Cemetery

W.W. Corcoran, a banker and founder of what was Riggs National Bank, established the Oak Hill Cemetery in 1848 as a garden park cemetery. The site, located at 30th and R streets, is bound by Rock Creek Park to the north and to the east. Designs within the site are an example of the nineteenth century Romantic Movement, which emphasized natural landscapes. Oak Hill Cemetery was listed in the DC Inventory of Historic Sites on November 8, 1964 (DC HPO 1964b).

3.6.3. INDIVIDUALLY LISTED HISTORIC BUILDINGS WITHIN THE APE

Jackson Hill (Holt House)

Holt House is located on the grounds of the National Zoological Park grounds, to the east of the main zoo. Constructed by 1827, the dwelling is one of the few remaining examples of a five-part Georgian plan in the District. Alterations were made to the house by Glenn Brown, W.R. Emerson, and Hornblower and Marshall from 1890-1901, when the building became the administrative offices for the zoo. The Jackson Hill (Holt House) was listed in the D.C. Inventory of Historic Sites on November 8, 1964, and in the NRHP on April 24, 1973 (NPS 1973).

Oak Hill Cemetery Chapel

The chapel was designed by James Renwick in 1850 and sits on the highest ridge of the cemetery. The chapel is the only known example of Renwick's Gothic Revival church design in the District. The Oak Hill Cemetery Chapel was listed in the D.C. Inventory of Historic Sites on November 8, 1964, and in the NRHP on March 16, 1972 (NPS 1972).

Peirce Barn

Built by Isaac Peirce circa 1810, the building is a two-and-one-half-story vernacular stone barn with a rectangular ground plan. The barn was restored in 1935-1936, and in 1971 was modernized for use as an art barn/gallery. The Peirce Barn was listed in the NRHP on October 25, 1973 (NPS 1973).

Peirce-Klinge House (Linnaean Hill)

This property comprises the Peirce-Klinge House, Peirce-Klinge Utility House and Potting Shed, Peirce-Klinge Stable/Garage. The dwelling is a three-story, ten-room farmhouse constructed of blue and grey granite in 1823 by Joshua Peirce, a nurseryman who supplied the first ornamental plantings for the White House, the Capitol and other government buildings. In its time, Linnaean Hill was a gathering place for Washington society. The Peirce-Klinge House (Linnaean Hill) was listed in the D.C. Inventory of Historic Sites on November 8, 1964, and in the NRHP on October 10, 1973 (NPS 1973).

Peirce Mill

Peirce Mill is located at Tilden Street and Beach Drive. The mill was built by Isaac Peirce in either 1820 or 1829 and is the last known extant grist mill in the District. Peirce Mill is the principle relic of the Peirce plantation and a unique symbol of the milling industry that once flourished along Rock Creek. The site was listed in the DC Inventory of Historic Sites on November 8, 1964, and in the NRHP on March 24, 1969 (NPS 1969).

3.6.4. INDIVIDUALLY LISTED HISTORIC STRUCTURES WITHIN THE APE

Connecticut Avenue Bridge (William H. Taft Memorial Bridge)

The bridge, designed by George S. Morison, was built between 1897 and 1906. When it was completed, it was the largest bridge in the world. It is also significant for its method of construction, consisting of unreinforced concrete poured inside a frame of precast concrete panels. In 1931 it was renamed after the former president and Supreme Court chief justice William Howard Taft. The Connecticut Avenue Bridge was listed in the DC Inventory of Historic Sites on November 8, 1964, and in the NRHP on July 3, 2003 (NPS 2003c).

Duke Ellington Bridge (Calvert Street Bridge)

Designed by Paul Cret, the bridge was constructed between 1933 and 1935. The existing bridge replaced an 1891 iron trestle bridge which was designed to accommodate streetcars. The Duke Ellington Bridge was listed in the DC Inventory of Historic Sites on November 8, 1964 (DC HPO 1964).

Dumbarton Bridge (Buffalo Bridge)

The Dumbarton Bridge, located on Q Street, was designed by the father and son architectural team of Glenn and Bedford Brown. The structure was inspired by Roman aqueducts, and was erected from 1912-1915 before the Rock Creek and Potomac Parkway legislation was enacted. The creek, the road, and the trail pass through separate arches. The four corners of the bridge are marked by monumental, bronze bison designed by sculptor Alexander Phimister Proctor, giving the bridge its name. The Dumbarton Bridge was listed in the DC Inventory of Historic Sites on November 8, 1964, and in the NRHP on July 16, 1973 (NPS 1973).

Van Ness Mausoleum

Designed by George Hadfield and constructed from 1823-24, the mausoleum stands on a high knoll in the Oak Hill Cemetery. Hadfield's design for the circular temple combined classical Greek and Roman elements. The mausoleum was moved from H Street, N.W. to its present location in 1872-73. The Van Ness Mausoleum was listed in the D.C. Inventory of Historic Sites on November 8, 1964, and in the NRHP on December 17, 1982 (NPS 1982).

3.7. 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." Created by an act of Congress in 1890, Rock Creek Park encompasses the last major natural landscape in the District. Since its inception, the park has balanced the preservation and maintenance of the valley's natural and cultural resources with the recreational and transportation requirements of modern Washington while incorporating the highest cultural and aesthetic values. As such, Rock Creek Park is considered an important cultural and historic landscape. The National Park Service is currently developing a cultural landscape report for the historic trails in Rock Creek Park.

In 1997, the NPS began a cultural landscape inventory of Rock Creek Park in order to more effectively document and manage the qualities and attributes of the park's component landscapes and cultural features that make it significant and worthy of preservation (NPS 1998c). The results of that inventory concluded that Rock Creek Park met the criteria for listing in the NRHP as a historic designed landscape. In addition, the inventory determined that two component landscapes of the park, Linnaean Hill (including the Peirce-Kingle Mansion) and the Peirce Mill contribute to the significance of the Rock Creek Park cultural landscape, and thus comprise individually eligible landscape elements.

3.8. ARCHEOLOGY

The identification of archeological resources within or adjacent to the Rock Creek Park Multi-Use Trail Rehabilitation APE included a review of existing databases maintained by the DC HPO, a literature review, and the review of a series of historic maps and aerial photographs. Background research included a review of previously conducted archeological surveys, the level of effort undertaken during those studies, and the characteristics of the archeological resources identified as a result of the previous archeological investigations. For the purposes of this review, an area of 100 feet on either side of the trail centerline was examined for the presence of known archeological resources and previously conducted archeological surveys. The project data request was processed by the DC HPO during February 2011.

3.8.1. OVERVIEW OF CULTURE HISTORY

Given the unique nature of Washington, DC (a relatively small but highly urbanized area), the prehistoric context relies on evidence from the archeological record of nearby Mid-Atlantic states, an early overview by Humphrey and Chambers (1985), and more recent overviews included in Fiedel et al. (2008) and Knepper et al. (2006). These overviews, and other studies, form the basis for the sequence of regional prehistory that is presented below (**Figure 22**).

Paleoindian Period (12,000 – 9000 BC)

The Paleoindian period exhibits a pattern of cultural adaptation based on environmental conditions that marked the shift from the Late Pleistocene to the Early Holocene epoch. Paleoindian settlements consisted of small hunting camps that often were associated with sources of high-quality lithic raw materials. Gardner (1983, 1989) has identified six different functional categories for Paleoindian sites in the nearby Shenandoah Valley: lithic quarries, reduction stations, quarry-related base camps, base-camp maintenance stations, hunting stations, and isolated point find spots. Acquisition of high-quality lithics served as a focal point for this system with hunting as its subsistence base, which focused on large game such as moose, elk, and deer (Kavanagh 1982). In the archeological record, early Paleoindian sites are usually characterized by the presence of large, fluted, lanceolate-shaped projectile points such as Clovis, while later Paleoindian components are identified with projectile point types such as Dalton and Hardaway (Justice 1987). Preferred lithic materials for these projectile points were high-quality cryptocrystalline stones such as jasper and chert.

Early Archaic Period (9000 – 6500 BC)

The Pre-Boreal/Boreal climatic episode, dating from 8500 to 6700 BC, for the most part corresponds to the Early Archaic period. Glacial recession continued and deciduous forests expanded, possibly leading to a greater proliferation of game species during this period. Researchers have emphasized that the Early Archaic period in the Mid-Atlantic region evidences continuity in lifeways from the Paleoindian period, with the exception of changes in projectile point styles. The most distinctive cultural characteristic of the Early Archaic period was the appearance of notched projectile points, most notably the Kirk varieties (Justice 1987). Other

point types associated with the initial portion of the Early Archaic period include Kessel, Taylor, and Big Sandy, all side-notched types, although the Palmer Side-Notched type may be more common in the District (Fiedel et al. 2008).

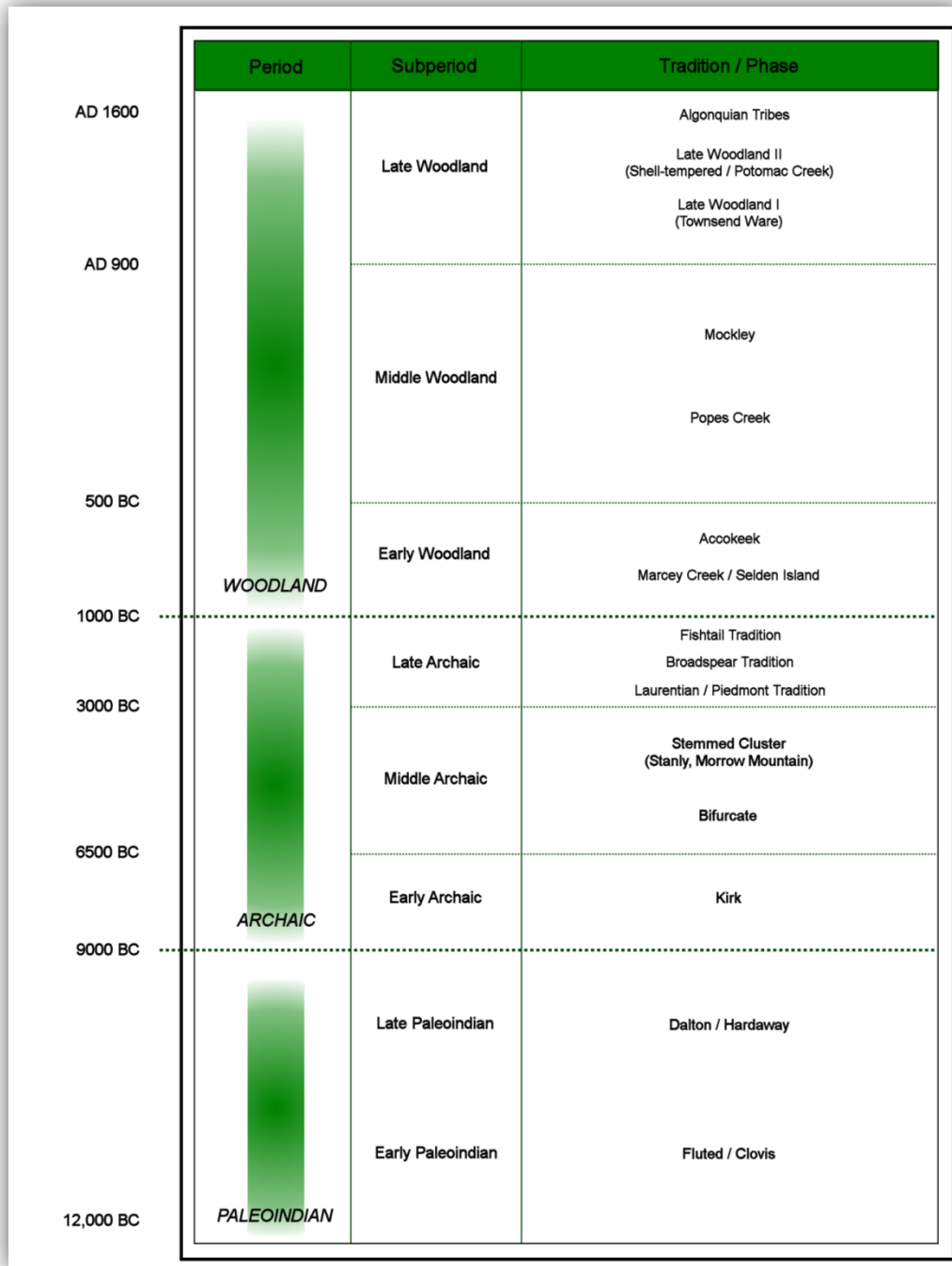


Figure 22. Regional Prehistoric Chronology of the District of Columbia Area

The expansion of projectile point styles may be associated with the diversification of the Early Archaic period subsistence base. There was also a continuation in the use of high-quality lithic materials until the end of this period when quartz and quartzite began to be more frequently used. Several archeological sites near Rock Creek have yielded Early Archaic projectile points, although intact deposits dating to this period have not been found. McNett (1972) and Barse (2002) both identify Kirk Corner-Notched projectile points at the Potomac Avenue site (51NW22) and Fletcher's Boathouse site (51NW13), respectively. Both sites are located on floodplain formations of the Potomac River. Fiedel et al. (2008) also suggest that some of the projectile points illustrated by Holmes (1897) date to the Early Archaic period.

Middle Archaic Period (6500 – 3000 BC)

The beginning of the Middle Archaic period coincides with the Atlantic climatic episode, a warm, humid period associated with a gradual rise in sea level that led to the development of inland swamps (Barse and Beauregard 1994). It was a time marked by increased summer droughts, sea level rise, grassland expansion into the Eastern Woodlands, and the appearance of new plant species (Carbone 1976; Hantman 1990). The greater variety of plant resources allowed for an increase in general foraging as a supplement to hunting (Kavanagh 1982). Middle Archaic sites in Maryland tend to be clustered along tributaries of rivers and not in the estuarine sections of drainages (Steponaitis 1980). Settlements consisted of small base camps located in or near inland swamps that were convenient to seasonally available subsistence resources, as well as smaller temporary upland hunting camps.

Tool types which were common in Paleoindian and Early Archaic lithic assemblages, including unifacial tools and formal end scrapers, decreased in number during the Middle Archaic period (Egloff and McAvoy 1990). The bifurcate tradition of projectile points, including the LeCroy, St. Albans, and Kanawha types, began at this time, and ground-stone tools (axes, adzes, mauls, grinding stones, and nutting stones) also became widely utilized as subsistence and settlement patterns changed. Other projectile points dating to this period include the Stanly Stemmed/Neville, Morrow Mountain I and II, Guilford, and Piscataway types (Justice 1987). The Piscataway type is found late in this time period and at its earliest dates to the transition from the Middle Archaic to the Late Archaic period (Kavanagh 1982). The use of high-quality lithic material for tools was not as common during this period as it was during the preceding periods (Fiedel et al. 2008). A few sites near Rock Creek have yielded diagnostic projectile points dating to the Middle Archaic period, but similar to the Early Archaic period, intact deposits are rare. McNett (1972) identifies several projectile points dating to this period from Site 51NW22, including a LeCroy Bifurcate Base point and an unidentified serrated point found at the site by a local collector. Inashima (1985) reports several projectile points from Site 51NW80 as dating to the Early Archaic and Late Archaic periods, although Fiedel et al. (2008) suggest that these points are better classified as Middle Archaic types. Fiedel et al. (2008) also suggest that the bifurcate base points illustrated by Holmes (1897) date to this period and that other illustrated points are examples of the Morrow Mountain and Guilford types.

Late Archaic Period (3000 – 1000 BC)

The environment during the Late Archaic period is characterized by a warmer and drier climate, a continued rise in sea level, the expansion of oak-hickory forests onto valley floors and hillsides, and the reappearance of grasslands (Carbone 1976). Several settlement trends are associated with these changes, including an intensified occupation of the uplands, the initial establishment of large semi-sedentary base camps along rivers and streams, and an overall increase in the number of sites dating to this period.

During the Late Archaic period the Mid-Atlantic region was exposed to cultural influences originating from both the Southeast and Northeast. Some of the projectile point types dating to this period include Otter Creek,

Vosburg, and Brewerton variants belonging to the Laurentian tradition of the Northeast, and the Lackawaxen and Bare Island types (locally Holmes) belonging to the Piedmont tradition of the Southeast. Halifax Side-Notched and Vernon points also date to the initial portion of the Late Archaic period. As mentioned above, the use of the Piscataway type, first made at the end of the Middle Archaic period, continued into the initial portion of the Late Archaic period. During the later part of the Late Archaic period, sometimes referred to as the Terminal Late Archaic or Terminal Archaic period (ca. 2000 – 1000 BC), the Broadspear tradition began (Fiedel et al. 2008). This tradition is characterized by projectile point types such as Savannah River and Susquehanna Broadspear. The Broadspear tradition was followed by the Fishtail tradition (Kavanagh 1982). Besides the formal chipped-stone tools used during the Late Archaic period, there appears to have been an increase in the production of expedient tools made from flakes and crude cores (Klein and Klatka 1991). Throughout this period, quartz and quartzite were the most frequently used lithics, although rhyolite and argillite were also occasionally used in stone-tool manufacture.

The archeological record in the District documents an increase in site numbers for the Late Archaic period in contrast to the Early Archaic and Middle Archaic periods. A number of sites in the Rock Creek/Potomac River area of northwest Washington, DC, have significant Late Archaic period components. One of the earliest recognized sites is 51NW1, the Piney Branch Quarry site first identified by William Holmes. Reanalysis of points collected by Holmes identified a series of Susquehanna Broadspear points made of rhyolite (Fiedel et al. 2008). In the same area, Fiedel et al. (2008) located small but intensively occupied base camps along Maddox Branch that contain Late Archaic period components. Site 51NW158 is perhaps the best example, having yielded a number of Halifax, Lamoka, Holmes, and Savannah River points. Quartz and quartzite dominate the debitage assemblage, although rhyolite is also well-represented. Inashima (1985) also identified a Vernon and Holmes or Bare Island point, suggesting the presence of a Late Archaic component, at 51NW79. Closer to the Potomac River, McNett (1972) identified a series of small side-notched and square-stemmed points, as well as Piscataway points, as evidence for a Late Archaic period occupation at Site 51NW22. Finally, Fletcher's Boathouse (51NW13), at the confluence of Rock Creek and the Potomac River, yielded Lamoka, Wading River, Savannah River, and Susquehanna Broadspear points, but no intact deposits dating to this period (Barse 2002).

Early Woodland Period (1000 – 500 BC). The Early Woodland period generally coincides with the Sub-Boreal climatic episode, an episode that approximates modern conditions although attenuated cycles of climatic change have been identified (Carbone 1976). Ceramic manufacture and increased sedentism traditionally mark the beginning of the Early Woodland period. The earliest types of ceramics found along the nearby Coastal Plain of Maryland are the steatite-tempered Marcey Creek and Selden Island wares, which are associated with fishtail-type points, including Orient and Dry Creek. The Marcey Creek and Selden Island wares were replaced by the sand- or crushed-quartz-tempered Accokeek wares. These ceramics are associated with Calvert and Rossville point types (Wesler et al. 1981).

Early Woodland settlement patterns were riverine-based and often located at the junction of freshwater and brackish streams. Smaller camps were established seasonally in areas where there was high potential for the exploitation of numerous and differing resources. Gardner (1982) has proposed that the settlement-subsistence system of this period included a series of base camps where populations aggregated to exploit seasonal resources. Groups occupying the base camps harvested anadromous fish in the spring and early summer and exploited estuarine resources in the fall and early winter. Barber (1991) argues for an increase in sedentism during this period, in part as a result of the stabilization of sea level that in turn created additional stable environments. These newly formed environmental zones could be exploited by Native American groups.

A number of sites with Early Woodland period components have been investigated in the District. Once again, a number of these sites are located in the Rock Creek/Potomac River locality. Inashima (1985) reports the recovery of Accokeek ceramics at Site 51NW79 while Fiedel et al. (2008) note the presence of this ceramic type at Sites 51NW51 and 51NW158 in Rock Creek Park. Site 51NW158, a large base camp along Maddox Branch, also yielded Marcey Creek and Seldon Island ceramics. The Peter House (51NW103) and Whitehurst West (51NW117W) sites, located in the Whitehurst Freeway vicinity, yielded Accokeek ceramics and a number of Early Woodland projectile point types (Knepper et al. 2006). Along the Potomac River, Orient Fishtail points were found at the Fletcher's Boathouse site (Barse 2002) while Susquehanna Broadspear and Drybrook-like points were identified in a collection from the Potomac Avenue site (McNett 1972). No intact Early Woodland deposits were found at any of these sites.

Middle Woodland Period (500 BC – AD 1000). A diversification of ceramic vessel sizes, forms, and styles of surface decoration characterizes the Middle Woodland period. The major ceramic type in the region was the shell-tempered Mockley type (characteristic of the Mockley phase), which evolved from the sand-tempered Popes Creek type (Barse and Beaugard 1994). Projectile point types associated with the Mockley phase are Fox Creek, Rossville, Selby Bay (knives), and Jack's Reef. The presence of non-local rhyolite, argillite, and jasper lithics at a few sites suggests that localized exchange networks may have operated between the Coastal Plain and areas in both western Maryland and at the New Jersey fall line (Barse and Beaugard 1994).

At this time, base-camp settlements located at freshwater/brackish water junctions, a common location for Early Woodland period camps, were abandoned in favor of broad floodplain sites where maximal resource exploitation of tidal and non-tidal aquatic resources was possible (Davis et al. 1997). Site size also increased during this period, and the larger Middle Woodland sites have been known to include pit storage features and shell middens. There is no substantial evidence of agriculture during this time.

More substantial artifact assemblages, and sites with intact deposits, have been found in the District dating to the Middle Woodland period. Once again, several of the most important sites are located in the Rock Creek/Potomac River locality. Sites 51NW158 and 51NW171, located along Maddox Branch and interpreted as base camps, have yielded Mockley and Albemarle ceramics and Selby Bay projectile points (Fiedel et al. 2008). Moving toward the Potomac River, one of the earliest of such sites recognized is the Potomac Avenue site (51NW22) (McNett 1972). The American University excavations uncovered a line of post molds and two small pit features which McNett (1972) interprets as a wall of a large structure and associated pit features dating to the Middle Woodland period. While no diagnostic artifacts were found in the post molds or pits, the preponderance of Middle Woodland artifacts at this site led the investigators to date the features to that time period (McNett 1972). Ceramics from the site include Popes Creek and Accokeek types. McNett (1972) suggests the site was a small fishing camp.

The nearby Fletcher's Boathouse site excavations yielded nine large circular pits, several smaller pits, and post molds, along with ceramics, lithics, and fire-cracked rock (Barse 2002). While the site yielded artifacts suggesting its occupation from the Early Archaic through the Middle Woodland periods, the features and most temporally diagnostic artifacts are attributed to the Middle Woodland period. The Middle Woodland ceramics include Albemarle, Popes Creek, and Mockley wares that represent the remains of four different jar forms, and Selby Bay, Rossville, Yadkin, and Piscataway projectile points. Lithic debris is dominated by late-stage reduction flakes, and quartz and quartzite are the most common materials used, although rhyolite was also recovered. The large pits, about eight feet in diameter and five feet deep, are refuse-filled storage pits. Two radiocarbon dates place the Middle Woodland occupation of 51NW13 at 100 BC. Barse (2002) suggests that this site represents repeated occupations by small Middle Woodland groups.

Also in the Rock Creek/Potomac River locality, Middle Woodland artifacts were found at the Peter House and Whitehurst West sites (Knepper et al. 2006). Mockley and Popes Creek ceramics and projectile points dating to the Middle Woodland period were found at the two sites. Two radiocarbon assays dating to the Middle Woodland period were also obtained from somewhat mixed deposits at the Peter House site (Knepper et al. 2006). Excavated during the same Whitehurst Freeway project, the nearby Ramp3 site has yielded perhaps the single-most important Middle Woodland feature in the District (Knepper et al. 2006). An intact Middle Woodland oval pit feature located at that site contained a cremation burial and a large number of grave goods, including Popes Creek ceramics. A radiocarbon assay securely dates the feature to the Middle Woodland period. The remains were of a female aged 40 years, and the grave goods included an elaborate incised antler comb, antler discs, perforated sharks teeth, groundstone pendants, a wooden bead, and a phallic effigy. Knepper et al. (2006) suggest that the artifacts and burial have similarities with those of the Kipp Island phase of New York and Ontario. The artifacts found with the Ramp3 burial are interpreted to indicate external influences on Middle Woodland populations in the Coastal Plain region, although whether these influences are due to diffusion or population movement is not known. The authors favor a movement of proto-Algonquian speakers from the north into the Middle Atlantic region during the Middle Woodland period.

Late Woodland Period (AD 900 – 1600). The single most important, and common, element across much of eastern North America during the Late Woodland period was the adoption of agriculturally based subsistence systems (Anderson and Mainfort 2002). In the Mid-Atlantic region, the establishment of a system of stable agriculture during the Late Woodland period led to the development of sedentary floodplain village communities, some of which were fortified by palisades (Turner 1992). Kavanagh (1983) notes four major changes that occurred during the Late Woodland period in the Monocacy River valley: the appearance of large, permanent or semipermanent villages made possible by the cultivation of maize, beans, and squash; the presence of ceramics at numerous sites, including open camps and habitations; an intensification of riverine orientation through time; and a shift towards the use of local lithic resources, implying a breakdown in procurement networks. Hunting, gathering, and fishing were still practiced but to a lesser extent. Predominant Coastal Plain ceramics of the period include the fabric-impressed Townsend series and the cord-marked Potomac Creek series. Ceramic decoration and embellishment appear to be very important at this time. Triangular projectile points are also associated with the Late Woodland period.

After AD 1500 there was an increase in social and political activity among native tribes in Maryland and Virginia, and it has been suggested that an alliance of coastal plain Algonquian groups had formed prior to European contact (Potter 1993). There has been considerable debate among researchers as to the nature of Late Woodland social organization in this region prior to AD 1500. For instance, Turner (1992) characterizes the socio-political organization of groups settled on the Coastal Plain as being ranked, while Hantman and Klein (1992) indicate that, at least for the Piedmont region, archeologists have interpreted Late Woodland societies as ranging from egalitarian, to temporary hierarchies, to chiefdoms. With the transition to the Contact period, many of these issues are resolved.

Similar to the Middle Woodland period, a number of Late Woodland sites that contain intact deposits have been recently identified in the Rock Creek/Potomac River locality. All three sites investigated by Knepper et al. (2006) for the Whitehurst Freeway project yielded Late Woodland artifacts. Fire-cracked rock features associated with Townsend series ceramics were found at both the Peter House and Whitehurst West sites. Small amounts of Potomac Creek ceramics and Levanna and triangular points were also recovered from these features. One fire-cracked-rock feature at Peter House yielded a radiocarbon assay that dates to the late Woodland period. At all three of the Whitehurst Freeway sites, the upper mixed midden-like levels were also

dominated by Late Woodland artifacts. Fiedel et al. (2008) also located Late Woodland period artifacts at Site 51NW158, a base camp site along Maddox Branch. Materials from this site include Keyser, Potomac Creek, and Rappahannock incised ceramics and Levanna projectile points.

Contact Period (AD 1600 – ca. 1650)

At the beginning of the seventeenth century, what is now Washington DC was populated by members of the Conoy group of the Necostins, a tribe visited by English colonists from Jamestown beginning in 1608 (Feest 1978) (**Figure 23**). This group was described as being few in number with their main settlements located close to rivers by John Smith (1946). Individual houses were placed within the garden or field plots and the group moved seasonally to upland areas and near the heads of rivers for hunting during cold weather months (Smith 1946). Inashima (1985) indicates that it is likely that Smith's 1608 journey took him past the mouth of Rock Creek as Smith located the village of Tauxenent in that general vicinity. Smith also depicted to the north on the west bank of the Potomac River the villages of Namassingakent, Assaomeck, and Namoraughquend and on the east bank the villages of Tessianmatuck, Nacotchtank, and five unnamed villages.

Increasingly, the relationship between the English and Necostins became based on trade, with trade in food and beaver pelts especially important. The Native Americans in turn received metal items such as bells, hatchets, and knives, as well as beads and cloth items, including stockings, shirts, and coats (Inashima 1985). Evidently, Nacotchtank on the Anacostia River was a major center where hundreds would congregate, as trade was in part based on control by the Necostins of beaver pelts from the area. In 1622, a party of colonists from Jamestown, in alliance with other nearby tribes, plundered and burned Nacotchtank. An attempted return to Nacotchtank in 1623 by the Jamestown colonists, ostensibly to trade, was thwarted when the party was ambushed. Henry Fleet, a colonist taken prisoner during the 1623 conflict, was held captive for five years. After escaping, Fleet returned to Nacotchtank in 1632, marking the last mention of this village. Fiedel et al. (2008) suggest that the Necostin merged with the Piscataway by 1694, as evidenced by the mention of the presence of an Anacostin king with Piscataway leaders during a council held at St. Mary's City.

Historic Period (AD 1650 – ca. 1950)

Bedell et al. (2008) has provided an overview of the history of Rock Creek Park. The Rock Creek area was lightly populated through the mid-eighteenth century. Prior to that time, large patents had been granted to absentee owners, who in turn rented the land to tenants. After 1750, when Georgetown was established at the mouth of Rock Creek, the upper reaches of the creek became an ideal power source for mills that ground grains grown on nearby farms and plantations to supply the growing local communities. By 1795, when Washington, DC was established, it is estimated that over 100 people lived within Rock Creek Valley, inclusive of tenants, slaves, owners of small farms, and a few planters who owned larger plantations, often comprising several hundred acres. While population of the area increased, this general land-use and pattern continued to the Civil War. During the Civil War, forts such as Forts Stevens and DeRussy were constructed near Rock Creek Valley to protect Washington, DC. Confederate General Jubal Early's 1864 raid included a failed foray into Rock Creek Valley. After the Civil War, Washington, DC grew in population and this is reflected in the number of residences depicted along Rock Creek on late nineteenth century maps. In response to this increased urban population, Rock Creek Park was established during the 1890s by Congress as an urban refuge. The Rock Creek Park Commission was established to purchase property and manage the park, with the last tenants remaining into the 1900s.

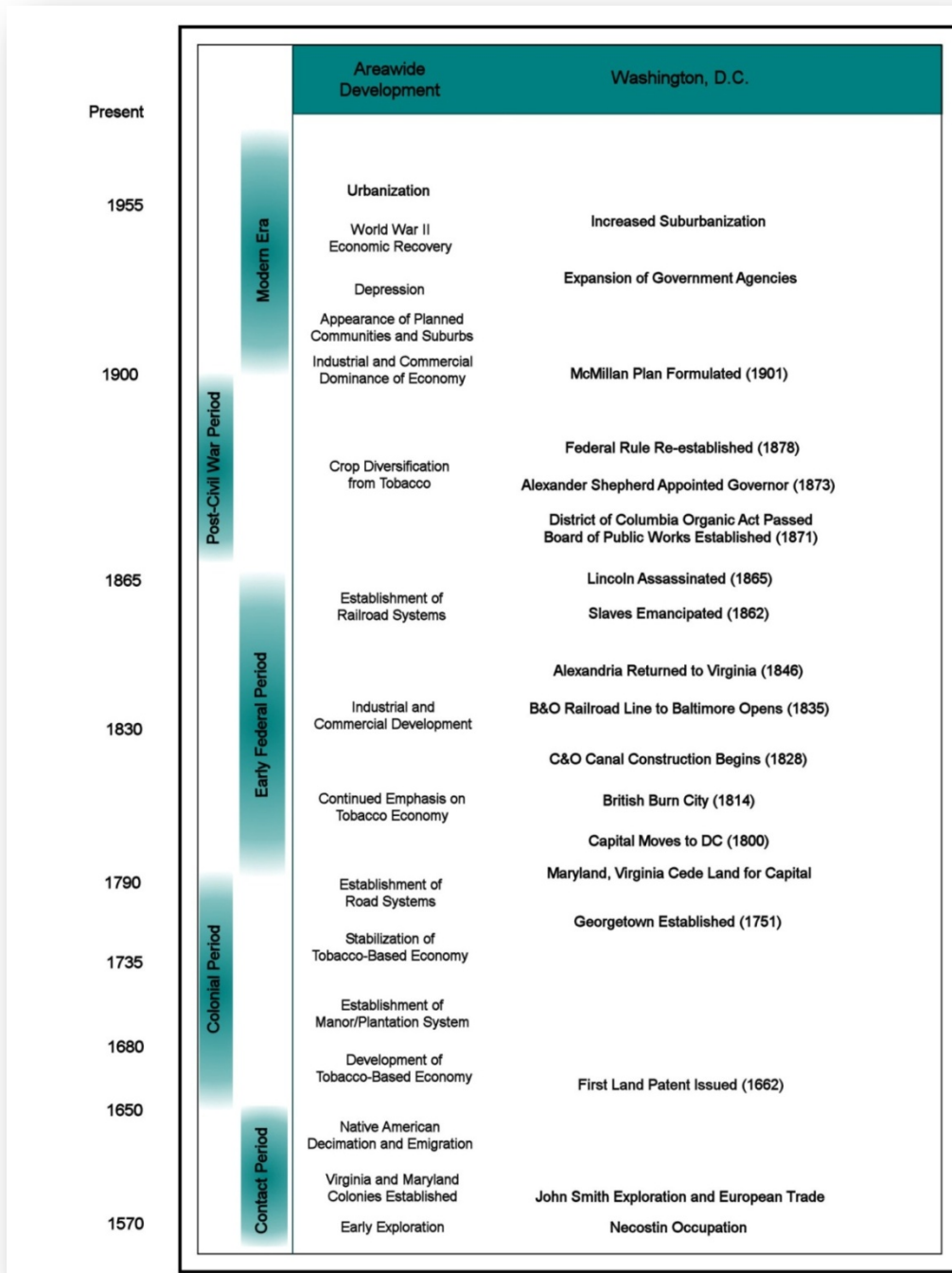


Figure 23. Historic Period Chronology of the District of Columbia Area

3.8.2. OVERVIEW OF PREVIOUS INVESTIGATIONS

The review of previously conducted archeological surveys indicated that much of the current Rock Creek Park Multi-Use Trail Rehabilitation APE has been subjected to varying levels of archeological examination, including intensive archival research that lacked field investigations, low intensity field investigations

typically characterized as archeological reconnaissance surveys, and intensive shovel test pit archeological survey. Archeological surveys conducted within the Rock Creek Park Multi-Use Trail Rehabilitation APE are depicted in **Figure 24**. A few portions of the Rock Creek Park Multi-Use Trail Rehabilitation APE, mainly in the south half of the project area, have not been investigated at any one of these three levels of intensity.

While a number of small-scale archeological investigations have been undertaken within or in the vicinity of Rock Creek Park and the Rock Creek Park multi-use trail, the larger projects include the early investigations conducted by W. H. Holmes during the late nineteenth century, the Section 110-based investigations conducted by the Louis Berger Group for NPS (Fiedel et al. 2008), a survey of a number of localities along Rock Creek by NPS prior to erosion control and bank stabilization projects (Inashima 1985), and the intensive archival review of an area south of Connecticut Avenue for the Georgetown Historic District conducted by Robinson & Associates, Inc. (1993). **Table 5** lists the projects conducted within the Rock Creek Park Multi-Use Trail Rehabilitation APE. For ease of discussion, the study area has been divided into five sections based on major roads or stream confluences that intersect the trail. From south to north, the sections begin with Pennsylvania Avenue to P Street, P Street to Connecticut Avenue, Connecticut Avenue to the Rock Creek- Piney Branch confluence, Piney Branch Parkway to the east, and finally the Rock Creek-Piney Branch confluence northward to near Ridge Road. The extent of archeological coverage along the Rock Creek Park multi-use trail is also depicted in **Figure 24**. The nature and results of each of the previous archeological projects conducted along the Rock Creek Park Multi-Use Trail Rehabilitation APE is discussed in the following sections by trail section. First, those archeological projects conducted within the section are discussed, followed by a discussion of the archeological sites identified by the DC HPO site file review as being located within the 100 foot corridor paralleling the trail. This information is presented in an abbreviated form in **Table 5**.

Associated with the Berger project, a geo-archeological evaluation of Rock Creek Park was conducted. Wagner (2008: Appendix A) divided the park into three landforms: uplands, floodplains, and terraces, and evaluated each for site potential and likelihood of site burial. Wagner (2008) indicates that the upland surficial soils predate the arrival of human populations in the New World, suggesting that there is little potential for deeply buried archeological sites in these topographic settings. Artifacts should be confined to near surface soils in upland settings. Wagner's (2008) analysis of currently identified floodplain locations within Rock Creek Park suggests that floodplains, defined as unstable surfaces subject to frequent flooding and reworking of deposits, are a relatively recent historic phenomenon. The historic clearing of the watershed increased runoff and the severity and frequency of flooding. This resulted not only in the creation of floodplains, but in the burial of earlier terrace formations. In essence, while the upper soil horizons of floodplain formations have little potential for the presence of archeological sites due to reworking of deposits and the relatively recent formation of these landforms, below the upper soil horizons are older, buried terrace formations that often do possess a potential for archeological resources. Field investigations identified two terrace formations within Rock Creek Park. One formation is restricted to the confluence of Rock Creek and Fenwick Branch (Wagner 2008). The second terrace formation is more widespread within Rock Creek Park (Wagner 2008). This formation lies approximately 1.5 m to 2.5 m in elevation above Rock Creek. In areas near the National Zoo, the buried terrace formation was found beneath 1.27 m of alluvial deposits. Wagner (2008) suggests that these formations, which may be associated with the Croom and Sassafras soil types, have a high potential for the presence of precontact Native American archeological sites.

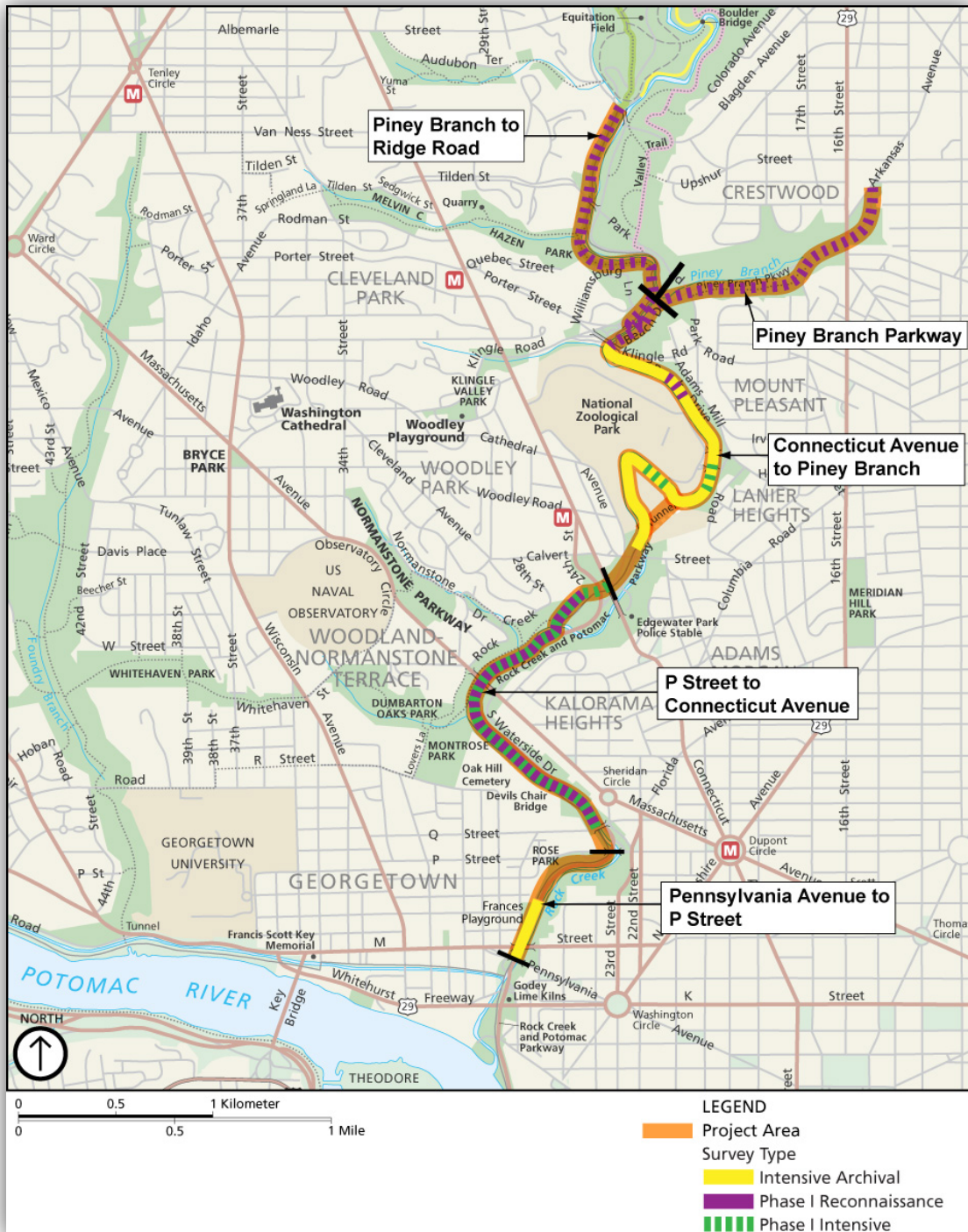


Figure 24. Locations and Intensity of Archeological Investigations along the Rock Creek Park Multi-Use Trail Rehabilitation APE

Table 5. Archeological Surveys Conducted within the Rock Creek Park Multi-Use Trail Rehabilitation APE

SURVEY AREA/PROJECT NAME	PROJECT TYPE	CITATION	SITES
Pennsylvania Avenue to P Street			
Crosstown Watermain	Intensive Archival	Fehr 1981	None
Eastern Georgetown Historic District	Intensive Archival	Robinson & Associates 1993	None
P Street to Connecticut Avenue			
Eastern Georgetown Historic District	Intensive Archival	Robinson & Associates 1993	None
Rock Creek Park Erosion Control	Phase I Reconnaissance	Inashima 1985	None
Berger Rock Creek Park	Phase I Reconnaissance/Intensive	Fiedel et al. 2008	51NW195
Connecticut Avenue to Piney Branch			
Berger Rock Creek Park	Phase I Reconnaissance/Intensive	Fiedel et al. 2008	None
Rock Creek Park Erosion Control	Phase I Reconnaissance	Inashima 1985	None
Rock Creek Fish Passages	Phase I Reconnaissance	Michaud et al. 2002	None
National Zoo Master Plan	Intensive Archival	Ayers/Saint/Gross and John Milner Associates, Inc. 2008	None
National Zoo Water Main	Phase I Intensive	Holland et al. 2009	None
National Zoo Aquatics and Amazonia Habitat	Phase I Reconnaissance	Myler and Dent 1990	None
Piney Branch Parkway			
Berger Rock Creek Park	Phase I Reconnaissance/Intensive	Fiedel et al. 2008	51NW001
Rock Creek Park Erosion Control	Phase I Reconnaissance	Inashima 1985	None
Piney Branch to Ridge Road			
Rock Creek Park Erosion Control	Phase I Reconnaissance	Inashima 1985	51NW078
Bladgen Mill Field School	Phase I/II	Salwen and Mayer 1981	51NW008
Berger Rock Creek Park	Phase I Reconnaissance/Intensive	Fiedel et al. 2008	51NW154 51NW156 51NW184 51NW185

Pennsylvania Avenue to P Street

Two sections within the Pennsylvania Avenue to P Street portion of the Rock Creek Park multi-use trail have been investigated by intensive archival research. Intensive archival research conducted by Robinson & Associates, Inc. (1993) included the area from Pennsylvania Avenue to near M Street as part of the Georgetown Historic District project. The report included an overview of the precontact Native American cultural chronology for the region and an inventory of archeological projects that had been undertaken in Georgetown through 1993. Each square within the Georgetown Historic District was then inventoried for the

presence of, or potential for, archeological resources. Archeological resource potential was determined through a review of historic maps and known site locations. In summary, Robinson & Associates, Inc. (1993) concluded that all of the Georgetown Historic District has a high potential for Historic period archeological resources and a moderate to high potential for precontact Native American resources in those areas not disturbed by twentieth century construction. Rock Creek is identified as an attractive location for precontact Native American settlement.

Fehr (1981) conducted an intensive archival review of areas to the east and west of Rock Creek between M Street and N Street for the Crosstown Watermain project. Known as Parcel 2, a park west of Rock Creek was slated for use as a construction staging area. Fehr (1981) indicates that portions of the park had contained a number of residential structures constructed after 1861. It was recommended that field testing be conducted to determine the nature and extent of resources present. Parcel 3 consisted of a playground east of Rock Creek, also identified as a potential construction staging area but also scheduled to be impacted by installation of the water main. Similarly, Fehr (1981) indicates that portions of the playground contained residential structures minimally constructed by 1887. It was recommended that field testing be conducted to determine the nature and extent of resources present. Evidently, no additional archeological investigations were undertaken in either location.

No intensive archeological field or archival investigations have been conducted for that part of the Rock Creek Park multi-use trail between N Street and P Street. Similarly, no intensive archeological field investigations have been conducted within the entire Pennsylvania Avenue to P Street portion of the Rock Creek Park Multi-Use Trail Rehabilitation APE. As a result, no archeological sites have been identified within this section of the Rock Creek Park Multi-Use Trail Rehabilitation APE.

P Street to Connecticut Avenue

Intensive archival research for the Georgetown Historic District, as summarized for the Pennsylvania Avenue to P Street section, was conducted by Robinson & Associates, Inc. (1993) for the area from P Street to approximately Q Street. To the north, as part of the Section 110 Rock Creek Park survey sponsored by the NPS, that area from Q Street to Connecticut Avenue was surveyed by the Louis Berger Group as part of the Rock Creek Park survey (Fiedel et al. 2008). The Rock Creek Park survey, conducted between 2002 and 2006, employed various field methods, including pedestrian walkover and shovel test pit excavations at varying levels of intensity, including 10 m, 20 m, and judgmental intervals. The survey resulted in the location of 51 newly identified sites and 11 previously identified sites. These sites include precontact Native American quarries and camps and Historic period mills, tenancies, farmsteads, and Civil War-related sites. However, additional unrecorded sites are likely present within areas not investigated or investigated solely by pedestrian reconnaissance during this investigation. Investigation techniques used during the Berger project within the P Street to Connecticut Avenue section included a pedestrian reconnaissance walkover along trails and the excavation of shovel test pits in selected areas. These efforts resulted in the identification of one archeological site, 51NW195, within this section of the Rock Creek Park multi-use trail as discussed below.

The final archeological investigation undertaken in this section of the Rock Creek Park Multi-Use Trail Rehabilitation APE was conducted by NPS during the mid-1980s prior to an erosion control and bank stabilization project (Inashima 1985). Inashima (1985) investigated eight locations within this section (Locations 25 through 32) by the excavation of 45-x-45 cm test units. A total of 55 such units were excavated and no archeological sites were identified.

Two archeological sites have been recorded in this section of the Rock Creek Park multi-use trail. Site **51NW044** is a precontact Native American site located east of Oak Hill Cemetery. Little information is available on this site, which DC HPO indicates has been destroyed. The second archeological site is **51NW195**, also known as the Massachusetts Avenue Quarry Site. Fiedel et al. (2008) describe this site as an historic quarry characterized by an approximately 200-foot concave length of exposed rock that creates a 25-foot high wall. This site has not been evaluated for listing in the NRHP. Archeological sites located within 100 feet of the Rock Creek Park multi-use trail are presented in **Table 6**.

Table 6. Archeological Sites Located within 100 feet of the Rock Creek Park Multi-Use Trail

SITE NUMBER	SITE NAME	SITE TYPE	TIME PERIOD	NRHP STATUS
P Street to Connecticut Avenue				
51NW044	None	Unidentified	Precontact Native American	Not Evaluated
51NW195	Massachusetts Avenue Quarry	Quarry	19 th century	Not Evaluated
Connecticut Avenue to Piney Branch				
P24	Holmes Zoo	Unidentified	Precontact Native American	Not Evaluated
H27	Columbia Mill	Mill	19 th Century	Not Evaluated
Piney Branch Parkway				
51NW008	Bladgen Mill	Mill	19 th century	Not Evaluated
51NW078	None	Unidentified	Precontact Native American	Not Evaluated
51NW154	Peirce Mill	Mill and Unidentified prehistoric	Precontact Native American; 18 th -20 th century	Not Evaluated
51NW156	Linnaean Hill Greenhouse	Farmstead	19 th century	Not Evaluated
51NW184	J.W. Willis Site	Tenancy	19 th century	Not Evaluated
51NW185	Whitby Site	Tenancy	19 th century	Eligible
51NW001	Piney Branch Quarry	Lithic Quarry	Late Archaic	Listed

Connecticut Avenue to Piney Branch

A number of archeological investigations, of varying levels of intensity, have been conducted in the Connecticut Avenue to the Piney Branch Parkway trail section of the Rock Creek Park Multi-Use Trail Rehabilitation APE. Three of these projects were conducted at the National Zoo. The first was a survey of a new exhibit area located along an intermittent tributary of Rock Creek (Myler and Dent 1990). Shovel test pits were excavated at seven m intervals across the project area. Soils were found to be disturbed and no archeological resources were identified. Two of the larger projects included intensive archival research as part of the master planning process for the National Zoo (Ayers/Saint/Gross and John Milner Associates, Inc. 2008) and an archeological survey of a proposed water main corridor for the Lower Zoo (Holland et al. 2009). The

research conducted as part of the master planning process included a review of previously located archeological sites within and adjacent to Rock Creek Valley as well as historic documents and maps. A reconnaissance of the National Zoo property was then conducted to identify known or potential archeological site locations. This reconnaissance led to the identification of 16 locations thought to have a high potential for the presence of archeological resources. Nine of these locations are within Rock Creek Valley and one is located on a bench above the creek (Ayers/Saint/Gross and John Milner Associates, Inc. 2008). It is predicted that five of the locations could be precontact Native American quarries while one is the location of the Historic period Columbia Mill. Subsequently, a shovel test pit survey was conducted for a water main replacement project within National Zoo property (Holland et al. 2009). A total of 44 shovel test pits were excavated within areas of high potential along Rock Creek. All shovel test pits were described as having encountered disturbed soil strata.

Three other archeological investigations not associated with the National Zoo have been conducted within the Connecticut Avenue to Piney Branch Parkway trail section. As part of the Section 110 Rock Creek Park survey sponsored by the NPS and discussed in the previous section, that area north of the National Zoo property to confluence of Rock Creek and Piney Branch was surveyed by the Louis Berger Group (Fiedel et al. 2008). Investigation techniques consisted of a pedestrian reconnaissance walkover along trails, and no sites were identified.

Inashima (1985) indicates that areas on the east and west banks of Rock Creek, between the Klinge Road bridge to the north and the Porter Street bridge to the south, were investigated as Location 24 during the erosion control and bank stabilization project. Due to prior disturbance associated with the construction of these bridges, no subsurface testing was done (Inashima 1985). Finally, Michaud et al. (2002) discuss the results of archeological field investigations at two locations within the Connecticut Avenue to Piney Branch Parkway trail section associated with a project to remove artificial blockages along Rock Creek. Location RC-1, near the Duke Ellington Memorial Bridge, was not investigated by subsurface testing due to prior disturbance (Michaud et al. 2002). Location R-2, adjacent to the National Zoo, was also not investigated by subsurface testing due to prior disturbance (Michaud et al. 2002).

Two archeological sites have been posited to be present within the Connecticut Avenue to Piney Branch Parkway trail section of the Rock Creek Park Multi-Use Trail Rehabilitation APE. DC HPO has given these sites the temporary field numbers **P24** and **H27**. Site P24 is a precontact Native American site identified by W. H. Holmes (1897) on National Zoo property south of Beach Drive. This site has not been relocated since its initial identification. Site H27 is the location of the Columbia or Adams Mill as depicted on historic maps. These maps indicate that the mill was located on the left bank of Rock Creek in the vicinity of the National Zoo. This site, too, has not been located.

Piney Branch Parkway to Ridge Road

Similar to areas to the south, this section of the Rock Creek Park Multi-Use Trail Rehabilitation APE has been investigated at varying degrees of intensity as part of the Berger Section 110 Rock Creek Park survey sponsored by the NPS (Fiedel et al. 2008). Investigation techniques included a pedestrian reconnaissance walkover along trails and the excavation of shovel test pits in selected areas. Four Historic period archeological sites were identified during the Berger survey of this portion of the trail.

Site 51NW154 consists of the area in the vicinity of Peirce Mill. The cornerstone of the standing mill indicates construction in 1829, although the Samuel Beall's Mill, perhaps dating as early as 1760, may also have stood at this location. Artifacts dating from the eighteenth through the twentieth centuries were found during the Berger site survey. However, the archeological field investigation suggests that much of the area surrounding the extant mill structure has been disturbed (Fiedel et al. 2008). While the site is unevaluated for listing in the NRHP, Fiedel et al. (2008) indicate that the entire complex is "almost certainly" eligible. Additional testing has been done as part of the Peirce Mill project (2010-2011). Sections of the 18th-century headrace have been identified as part of this effort.

Site 51NW156, the Linnaean Hill Greenhouse site, is associated with the nineteenth century mansion known as Linnaean Hill (Bedell et al. 2008). This site has not been evaluated for listing in the NRHP.

Site 51NW184, known as the J.W. Willis Site, is the location of a 1890s farmstead or residence near the confluence of Broad Branch and Rock Creek. The site area, approximately 0.14 acres, includes what appear to be structural remains as well as nails, bone, bottle glass, and ceramics. Historic records indicate that the Willis property totaled 5.5 acres and contained a house and a greenhouse. The lack of a structure depicted at this location on historic maps led Fiedel et al. (2008) to suggest that the property was occupied for a short period of time. This site has not been evaluated for listing in the NRHP (Fiedel et al. 2008).

Site 51NW185, also known as the Sarah Whitby Site, is the location of the residence of the Whitby family, tenants within Rock Creek Valley and park for decades (Fiedel et al. 2008). Investigations consisted of metal detection, shovel test pits, and six 1 meter square test units in and adjacent to a cellar depression. Artifacts reflected an occupation between 1880 and 1900 and included ceramics, architectural materials, bottle glass, and personal items such as buttons, reflective of Sarah Whitby's occupation as a laundress (Fiedel et al. 2008). Two pieces of Colonoware, often associated with enslaved populations, were also recovered. Fiedel et al. (2008) recommended that this site is eligible for listing in the NRHP under Criterion D based on its association with nineteenth century African-American tenancies.

Inashima (1985) presents the results of investigations at Locations 20 and 21 prior to the Rock Creek Park erosion control and bank stabilization efforts conducted during the mid-1980s. Location 20 was divided into three sections: north, west, and east. The north section was determined to consist of fill overlaying bedrock. In the west section, fill was present over intact soil strata, although due to the thickness of the fill, the intact strata were not investigated. The east section also contains fill over intact soil strata. Fill deposits from all three areas yielded nineteenth and twentieth century artifacts as well as precontact Native American lithics, and the east section of Location 20 was recorded as **Site 51NW078**. A total of 36 test units, ranging from 45 cm to 1 m square, were excavated in the East section. Precontact Native American artifacts recovered from this area include a biface, chipping debris, fire-cracked rock, a hammerstone, scrapers, utilized flakes, and a discoidal (Inashima 1985). A total of 33 artifacts were recovered. Inashima (1985) suggests that Site 51NW078 represents a transitory encampment centered on the acquisition of cobbles from the creek and the production of lithic tools. At Location 21, there was no subsurface investigation due to prior disturbance.

Finally, **Site 51NW008**, the Bladgen Mill and Quarry Site, is a nineteenth century bone and flour mill that was investigated during a 1981 New York University archeological field school. The investigations were reported in a September 18, 1981 two-page letter from Bert Salwen and Susan Mayer to the NPS. Test excavations located a structural wall and floor associated with the bone mill and a trace of a raceway that was shared by the bone and flour mills. Aside from bone, nineteenth and twentieth century glass and ceramics were recovered. Based on 2011 consultation with DC HPO, this site has not been evaluated for listing in the NRHP.

Piney Branch Parkway

The Piney Branch Parkway trail section, located from the confluence of Piney Branch and Rock Creek to the southwest to near Taylor Street NW in the northeast, has been investigated as part of the Berger Section 110 Rock Creek Park survey sponsored by the NPS (Fiedel et al. 2008) and in one location by the mid-1980s NPS erosion control and bank stabilization project. Inashima (1985) has recommended that any construction-related activities in the area be monitored due to the proximity of the Piney Branch Quarry site (51NW001), located north of Piney Branch. In addition, Fiedel et al. (2008) characterize 51NW001 as the most important archeological site in Rock Creek Park. This site was initially investigated by William Henry Holmes of the Smithsonian Institution during 1889 and 1890. Holmes excavated a number of trenches that distinguished discrete episodes of artifact deposition in a stratified sequence, described by Fiedel et al. (2008) as consisting of “great piles of quartzite cobbles and chipping debris.” Fiedel et al. (2008) examined the Holmes collections and suggest that a wide range of quarrying and tool making activities were conducted at this site. Temporally diagnostic stone tools suggest that much of the material dates to the Late Archaic period. A walkover reconnaissance of the site by Berger field crews indicates that the site remains much as it had been at the conclusion of the Holmes excavations, although an apartment building has apparently destroyed a few small quarry areas. This site is listed in the NRHP.

3.9. VISITOR USE AND EXPERIENCE

Rock Creek Park annually hosts millions of recreational visitors (approximately 2.1 million in 2009) who visit the park to enjoy its many natural and cultural attributes (NPS 2010). Over the last three decades, park visitation increased by over 1.5 million (NPS 2010). Visitors are primarily residents from the District and surrounding areas. However, because Rock Creek Park is a national park, visitors come from all over the country to experience its rich resources and public amenities (**Figure 25**).

Rock Creek Park provides a scenic natural setting in an otherwise urban environment. The park offers a variety of views, from rugged expanses of mature, second-growth forest with little recent human disturbance to landscapes from the rural past. The park, located within the District of Columbia, provides access to all visitors in accordance with governing laws, regulations, and policies. Mobility-impaired visitors can currently access all facilities within the park by automobile (NPS 2007). According to the 2007 Rock Creek Park GMP, the purposes of the park include providing opportunities for safe recreation, connecting Rock Creek Park with the National Zoo, preserving forests and natural scenery, preventing pollution and obstruction of Rock Creek, and providing visitors the opportunity to experience and understand the park’s natural and cultural resources and the need for those resources to be preserved (NPS 2010).

Park recreational amenities and facilities include paved multi-use trails for nonmotorized activities such as jogging, bicycling, inline skating, etc., bird watching, hiking and horseback riding trails, canoeing and kayaking, picnic areas, tennis courts, sports fields, a golf course, interpretive centers and programs at the Rock Creek Nature Center and Planetarium, Peirce Mill complex, and Old Stone House, the Rock Creek Horse Center for public horseback riding and horse boarding, the Carter Barron Amphitheater, which offers summer musical and theatrical performances, and two community gardens (NPS 2007).



Figure 25. Visitors Enjoying the Rock Creek Park Multi-Use Trail

Many visitors use the trail within the study area to get from point to point, and back. However, some visitors use the trail to access destinations such as the historic Peirce Mill and Barn, the National Zoo, Rose Park, and other connecting trails that lead to nearby memorials, monuments, and museums (NPS 2007). A study of visitor use within Rock Creek Park showed that the park's trail system is the most used amenity for recreational activities including walking/hiking/jogging (44 percent), bicycling (18 percent), in-line skating (6 percent), and dog walking (17 percent) (NPS 2007). Whether taking in the scenery, commuting or exercising; runners, walkers, skaters, and bikers often compete for space along the trail system.

The trail in Rose Park is used for recreational purposes and for connectivity to Georgetown. According to trail user counts performed on May 5, 2011, the trail at Rose Park is used for activities such as walking (69 percent), running (11 percent), bicycling (10 percent), and other uses (10 percent). The trail provides connectivity between the surrounding neighborhoods and the amenities of Rose Park, such as the tot-lot and sports facilities.

During the weekdays, Beach Drive is used as a commuter route for those traveling to and from downtown Washington, DC. In 2009, 12.4 million non-recreational visitors were estimated. Non-recreational visits, including those from commuters, are distributed evenly throughout the year, with an average of approximately 25 percent of total visits occurring each season (NPS 2010). Recreational visits to Rock Creek Park occur fairly evenly over the warmer months of spring, summer, and early fall, and drop slightly during the winter. In 2009, an average of 25 percent of annual visits occurred during spring, 31 percent occurred during summer, 25 percent occurred during fall, and 19 percent occur during winter (NPS 2010).

Sections of the Rock Creek Park multi-use trail are not aesthetically pleasing due to moderate to advanced deterioration including cracking and rutting of pavement, ponding of water following storm events, roots disrupting the trail surface *and* areas of erosion. A 65-foot section of stone masonry wall along the Piney Branch Parkway has collapsed, leaving debris along the stream bank and pulling away some of the pavement along the trail. Additionally, social trails have destroyed vegetation in some locations within Rock Creek Park and Rose Park.

3.10. HUMAN HEALTH AND SAFETY

Providing high quality opportunities for trail users to experience and enjoy the park and trail in a safe manner is of utmost importance to the NPS *and FHWA*. Promoting a safe and healthy environment for workers and park visitors is listed as a goal in the NPS 2007 *Centennial Strategy for Rock Creek Park* (NPS 2007b). Any recreational or commercial activity that harms the safety of users or that damages the natural and cultural resources within the park is illegal and punishable by law.

Since the original construction of the Rock Creek Park multi-use trail, natural processes have caused cracking and heaving of the trail surface. Due to the uneven and cracked pavement throughout the trail, trail users experience slip, trip and fall hazards. Additionally, the original construction of the Rock Creek Park multi-use trail varies in width from less than six feet to 10 feet. The Rose Park trail varies from four to six feet. Minimal trail widths compromise safety especially in areas with limited sight lines, grade changes, curves and approaches that do not meet current guidelines for multi-use trails. Multi user trail groups (runners, skater, walkers, and bikers) compete for this limited space along the trail, increasing the risk of collisions and accidents. *Trail users are separated from children using the Rose Park tot-lot by chain-link fencing that opens away from the trail.*

The majority of the trail within the project area is separated by a buffer (grass, trees, or guardrail) from Beach Drive and Rock Creek and Potomac Parkway. However, many transportation access points still intersect the trail presenting the potential for conflict. Vehicular crossings of the trail occur at Broad Branch Road, Tilden Street (Peirce Mill), Porter Street, the National Zoo east entrance, Shoreham Drive, and the P Street ramp. Many of these roadways are heavily used, especially during peak commuting hours. The trail crossings are typically marked with striping but some occur in areas marked by poor sight lines, grade changes, and curves that create an unsafe crossing situation for trail users.

3.11. PARK OPERATIONS AND MANAGEMENT

Maintenance and operation of the trail falls under NPS jurisdiction. According to NPS, trails are to be managed in a way that reduces conflict with automobiles and incompatible uses; allows for a satisfying park experience; allows accessibility to the greatest number of people; and protects park resources (NPS 2006). *Along with the Rock Creek Park multi-use trail, the NPS operates and maintains the trail in Rose Park.*

The park and trail are open to the public between the hours of sunrise and sunset, with the exception of vehicular traffic on park roads. The Peirce Mill and Barn, located adjacent to the project area, is open on weekends 12 pm to 4 pm, closed on federal holidays. Picnic areas adjacent to the project area are either open on a first come, first serve basis or by reservation (36 CFR).

To ensure cost effectiveness, maintenance of NPS facilities is handled in a preventive and rehabilitative manner (NPS 2006). Maintenance activities are completed in a way that preserves the surrounding natural environment with minimal effect on public uses. Crews mow grass and clear and trim brush adjacent to the trail. During winter months, snow removal occurs in parking areas. Spot improvements to the trail surface continue however, maintenance on a larger scale has not been completed. The current condition of the trail surface is in need of resurfacing in many areas.

3.12. TRAFFIC AND TRANSPORTATION

3.12.1. TRAIL USE AND CONNECTIVITY

The Rock Creek Park multi-use trail is a north/south trail that runs parallel to Beach Drive and Rock Creek and Potomac Parkway on the west side. The trail lacks connectivity to the overall bicycle and pedestrian network within the District, thereby providing limited connectivity to Rock Creek Park from neighborhoods and points of interest to the east. In many locations along the trail, network gaps exist forcing users to traverse heavily traveled roadways. These gaps create traffic safety concerns for pedestrians and bicyclists as they compete with vehicular traffic. Connectivity to bicycle and pedestrian facilities is imperative to the successful movement of people living and commuting in and around an urban area.

There are seven access points to the Rock Creek Park multi-use trail within the project area. Three of these access points include parking areas for vehicles, one of which is located at the National Zoo east entrance. While there are multiple non-vehicular access points to the trail, many are unmarked locations, social footpaths, on-road bicycle routes and sidewalks. Parkwide, more than half of visitors arrive by private vehicle while the majority of the other half arrive from walking or biking (NPS 2007).

At the north end of the project limits, the Rock Creek Park multi-use trail connects to an on-road signed bike route along Beach Drive. Users can access the trail via the existing trail to the north or by vehicle at the intersection of Beach Drive and Broad Branch Road. Trail users connecting from the north must compete with vehicular traffic until they reach the trail just south of Broad Branch Road and Beach Drive intersection. At this intersection, trail users must traverse the intersection to continue south along the trail. No sidewalks or designated bicycle lanes are located on Broad Branch Road. The Broad Branch/Grove 2 North parking area is situated at the intersection of Broad Branch Road and Beach Drive. South of this location, trail access is provided at the Peirce Mill and Barn location via Tilden Street. A parking lot is located at the Peirce Mill and Barn with two other lots nearby. Designated bicycle lanes are located on Tilden Street which connects the trail to sidewalks and an undesignated bicycle route on Connecticut Avenue to the west. A high volume of vehicular traffic competes with a high volume of trail users at this centrally located trail access point. A narrow, unmarked, unpaved trail along Piney Branch Parkway provides access to the trail south of the Peirce Mill location

Users can *also* access the **Rock Creek Park multi-use** trail at the east entrance of the National Zoo located at the intersection of National Zoo Drive, NW and Rock Creek and Potomac Parkway, NW. The trail crosses the entrance at grade and is marked by striping. Bicyclist using the designated bike lanes on Harvard Street, east of the National Zoo entrance, can access the trail by using the National Zoo's bridge that connects to Jewett Street, NW. The National Zoo's bridge and east entrance are closed to users when the National Zoo is closed.

The Rock Creek Park multi-use trail passes under the Porter Street, NW and Klinge Road, NW ramps. A trail tie-in is proposed at this location as part of the Klinge Valley Trail project (DDOT 2010b). The tie-in would connect the Rock Creek Park multi-use trail with a new trail along Klinge Valley and points west. Connection to the east side of Beach Drive and Rock Creek and Potomac Parkway can be made near the east entrance to the National Zoo. Designated bicycle lanes run along Harvard Street where signs direct cyclists to use the National Zoo's bridge over the parkway to connect to Jewett Street, NW. Connection to the trail can be made at National Zoo Drive, NW.



Figure 26. DC Bicycle Route Map

South of the National Zoo, the Rock Creek Park multi-use trail crosses Shoreham Drive at its intersection with Cathedral Street. At this location, an off road trail spur runs along Shoreham Drive and connects the trail with designated on-road bicycle lanes and sidewalks on Calvert Street. Only one connection is made at the southern end of the project limits. Users can continue on the trail after crossing the P Street Ramp. ***Many trail users would use the trail in Rose Park to connect into Georgetown.*** Continuing south on the Rock Creek Park multi-use trail, which is beyond the project limits, provides users with a connection to the C&O Towpath and the Capital Crescent Trail. While the Rose Park trail is in proximity to the Rock Creek Park multi-use trail, there is currently no formal connection. ***Trail users requiring the use of both trails have created a social path to the east of Rose Park, along the exit from P Street, NW to southbound Rock Creek and Potomac Parkway, in order to achieve connectivity between Rock Creek Park, the Rose Park trail, and P Street, NW.***

On Thursday May 5, 2011 field studies were conducted in order to count the number of trail users at select locations in Rock Creek Park and Rose Park. The studies were conducted from ***4:45 to 6:45 PM*** at three separate locations: the Shoreham Drive crossing, the P Street ***ramp to Rose Park, the P Street ramp to the Rock Creek and Potomac Parkway***, and the Rose Park trail south of the Rose Park playground. Weather conditions on the day were clear and sunny with a temperature of approximately 65°F. Field investigators tallied the number of trail users at each location, and sorted the types of trail users based on their appearance. ***Table 7*** contains the total number of bicyclists, commuters and fitness trail users observed at each location. ***The hourly average at the three Rock Creek Park locations was 186 trail users at the Shoreham Drive crossing, 99 trail users at the P Street ramp to Rose Park, and 121 trail users at the P Street ramp to Rock Creek. The combined average for the Rock Creek Park locations was 135 trail users. The majority of users at these locations were either runners or bicyclists. An average of 145 trail users per hour was observed at the trail in Rose Park. Although most trail users were walkers, there are a variety of users that share the trail. The trail count at Rose Park was comparable to the counts observed at Rock Creek Park.***

Table 7. Trail User Counts on May 5, 2011

Location	User Type	Time Frame		Total from 4:45-6:45
		4:45-5:45	5:45-6:45	
Shoreham Drive crossing	Bicycles	60	73	133
	Runners	62	106	168
	Walkers	27	40	67
	Others (Strollers)	3	0	3
	Total	152	219	371
P Street Ramp (to Rose Park)	Bicycles	29	50	79
	Runners	40	68	108
	Walkers	3	8	11
	Others	0	0	0
	Total	72	126	198
P Street Ramp (to Rock Creek)	Bicycles	63	73	136
	Runners	43	60	103
	Walkers	0	3	3
	Others	0	0	0
	Total	106	136	242
Rose Park trail south of playground	Bicycles	20	10	30
	Runners	10	21	31
	Walkers	75	124	199
	Others (Strollers and Dog walkers)	16	13	29
	Total	121	168	289

3.12.2. PARK ROADWAY NETWORK AND MOTORIZED TRAFFIC

Rock Creek Park roads were established in fulfillment of the park's enabling legislation, which called for roadways to be instituted within the park. Beach Drive runs north and south alongside Rock Creek from the Maryland state line to the Rock Creek and Potomac Parkway, and also alongside the Rock Creek Park multi-use trail within the study area. Beach Drive is used as a popular commuting route, with an average daily traffic of approximately 6,600 vehicles on weekdays, most during peak commuting hours (NPS 2007). Portions of Beach Drive are closed to motorized vehicles on weekends and holidays to provide recreational opportunities, such as running, bicycling and in-line skating, to park visitors. Several park roads provide east-west routes across the park, and are crossed by the Rock Creek Park multi-use trail at a number of locations as it traverses from north to south. Due to speeds of volumes of motorized traffic, particularly on weekdays, some of these crossings generate the potential for trail user and motorized vehicle conflicts.

Piney Branch Parkway is an east-west route that runs east and west alongside Piney Branch. It is also managed by NPS, as is the trail that runs between the parkway and the stream from the Rock Creek Park multi-use trail to 16th Street. While the majority of this trail is unpaved, a short section of the trail along the parkway is paved. Separation of the trail and the roadway is not generally well defined along Piney Branch Parkway, and trail users and motorized vehicles travel within proximity to one another in some sections.

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