

# CHAPTER 2: ALTERNATIVES

## 2.1. INTRODUCTION

NEPA requires that federal agencies explore a range of reasonable alternatives. The alternatives under consideration must include the “No Action” Alternative as prescribed by 40 CFR 1502.14. Any alternative analyzed must meet the management objectives of the park, either wholly or partially, while also meeting the purpose of and need for the project.

The alternatives analyzed in this document are the result of public scoping, agency consultation, and extensive collaboration between the lead agencies and the consultant team. The project team explored and objectively evaluated a range of alternatives. After consideration of agency, stakeholder, and public comments, the alternatives, including the No Action Alternative, and a number of Options were carried forward for detailed analysis. A number of alternatives and options were also considered and dismissed from further study for the reasons described below.

In addition to the objectives and laws, regulations, and policies discussed in Chapter 1, development of the alternatives and options for the Rock Creek Park Multi-Use Trail Rehabilitation considered the following design guidance and manuals: DDOT *Standard Specifications for Highways and Structures* (2009), DDOT *Standard Drawings* (2009), DDOT *Design and Engineering Manual* (2009), AASHTO *Geometric Design of Highways and Streets* (2004), FHWA *Manual on Uniform Traffic Control Devices* (2003), District Department of the Environment (DDOE) *Stormwater Management Guidebook* (2003), DDOE *Standards and Specifications for Soil Erosion and Sediment Control* (2003), and DC Water and Sewer Authority (DC Water) design manuals and construction standard details and specifications.

## 2.2. ALTERNATIVE 1: NO ACTION

The No Action Alternative describes the action of continuing the present management operations and conditions. It does not imply or direct discontinuing the present action or removing existing uses, development, or facilities. If the No Action Alternative were to be selected, the NPS would respond to future needs and conditions without substantial action or policy change. Under the No Action Alternative (Alternative 1), the Rock Creek Park multi-use trail from the Broad Branch/Grove 2 North parking area to P Street, NW would continue to be maintained by the NPS. Neither the Rock Creek Park multi-use trail nor the Piney Branch Parkway trail would be rehabilitated, although basic maintenance such as spot repairs and debris removal would continue (**Figure 7**). *While the No Action Alternative does not meet the purpose and need of the project, it provides a basis for comparing the management direction and environmental consequences of the proposed Action Alternative.*



Figure 7. No Action Alternative

## 2.3. ACTION ALTERNATIVES

This EA analyzes the No Action Alternative along with two Action Alternatives for the Rock Creek Park Multi-Use Trail Rehabilitation. The project includes spot improvements for safety and visitor experience, as well as new connections to Rock Creek Park from the surrounding neighborhoods. In addition to the Action Alternatives, two Options for the visitor-made social trail from Broad Branch Road to Peirce Mill, and three Options for the Rose Park trail were analyzed *as part of this EA. The work being proposed for the Peirce Mill trail spur and the Rose Park trail options are included in this EA to improve the surrounding communities' access and connectivity to the Rock Creek Park multi-use trail. Although the Peirce Mill and Rose Park options would be selected in conjunction with the action alternatives, the selection of no action for these options would not affect the implementation of the work proposed for the Rock Creek Park Multi-Use Trail Rehabilitation.* Construction of the project would be phased in such a way as to, when possible, provide logical detours around the trail sections and road areas under construction.

### 2.3.1. ALTERNATIVE 2: TRAIL RESURFACING

Under Alternative 2, the Rock Creek Park multi-use trail would be resurfaced at its existing variable (six-foot to 10-foot) widths. Trail material selection would be considered during the detailed design phase of the project. The unpaved social trail connecting the Rock Creek Park multi-use trail to the Piney Branch Parkway trail would be resurfaced to a six-foot width, and the Piney Branch Parkway trail would be resurfaced to a varying six-foot to eight-foot width, depending on physical and environmental constraints.

Alternative 2 would cost approximately \$4,459,000 to design and construct (**Table 1**) *without the Peirce Mill and Rose Park options; however, depending on which option for the Peirce Mill trail spur or the Rose Park trail is selected, the cost of Alternative 2 would range from \$5,095,383 to \$5,254,285. The duration of construction is anticipated to be 12 to 18 months.* A map of Alternative 2 is presented in **Figure 8**. Detailed cost estimates are presented in **Appendix C**.

### 2.3.2. ALTERNATIVE 3: TRAIL RESURFACING AND WIDENING

Under Alternative 3, the Rock Creek Park multi-use trail would be resurfaced and widened to a minimum six-foot width and a maximum 10-foot width, depending on environmental and physical constraints. Out of approximately 5.2 miles of trail resurfacing under Alternative 3, 2.6 miles would be 10 feet in width. A short section from just north of Piney Branch Parkway to the National Zoo entrance would be eight feet in width. Sections ranging from four to six feet wide would be located for a short section along Piney Branch Parkway, through the Beach Drive tunnel, and along the connections to P Street, NW. Further details about the Beach Drive tunnel and P Street connections follow in the Elements Common to Action Alternatives section. Trail material selection would be considered during the detailed design phase of the project. Minor trail realignments would improve sight distance and approaches to transitions in trail width. The unpaved social trail connecting the Rock Creek Park multi-use trail to the Piney Branch Parkway trail would be resurfaced to an eight-foot width, and the Piney Branch Parkway trail would be resurfaced to a varying six-foot to eight-foot width, also depending on physical and environmental constraints. *Alternative 3 is the Preferred Alternative for the proposed action.* Alternative 3 would cost approximately \$8,432,000 to design and construct (**Table 1**) *without the Peirce Mill and Rose Park options; however, depending on which option for the Peirce Mill trail spur or the Rose Park trail is selected, the cost of Alternative 3 would range from \$9,068,802 to \$9,227,704. The duration of construction is anticipated to be 12 to 18 months.* A map of Alternative 3 is presented in **Figure 9**. Detailed cost estimates are presented in **Appendix C**.



Figure 8. Alternative 2



**Figure 9. Alternative 3**

### 2.3.3. ELEMENTS COMMON TO ACTION ALTERNATIVES

The following sections provide descriptions of elements that would be included with the implementation of either Action Alternative (i.e., Alternative 2: Trail Resurfacing or Alternative 3: Trail Resurfacing and Widening). The discussions include cross sections of the trail as well as detailed mapping. These show proposed spot improvements that are designed more effectively to separate trail users from vehicular traffic and to improve safety at roadway crossings, to improve sight distance at approaches and curves, to improve user accessibility, and to improve drainage and erosion control. In addition, a number of new connections to Rock Creek Park from the surrounding pedestrian and bicycle systems are proposed, as well as connections to and from the Piney Branch Parkway trail, within Rock Creek Park.

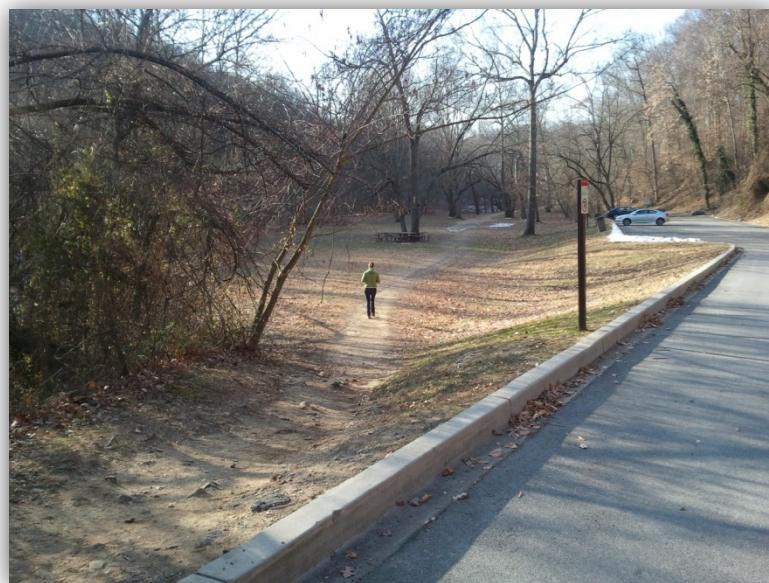
#### General

As part of the proposed action, tree protection measures, erosion and sediment control measures, and other best management practices (BMPs) would be installed prior to any land disturbing activities. Further details of BMPs proposed for this project are discussed later in this chapter under Mitigation Measures of the Action Alternatives and Options.

#### Trail User and Vehicular Traffic Separation Improvements

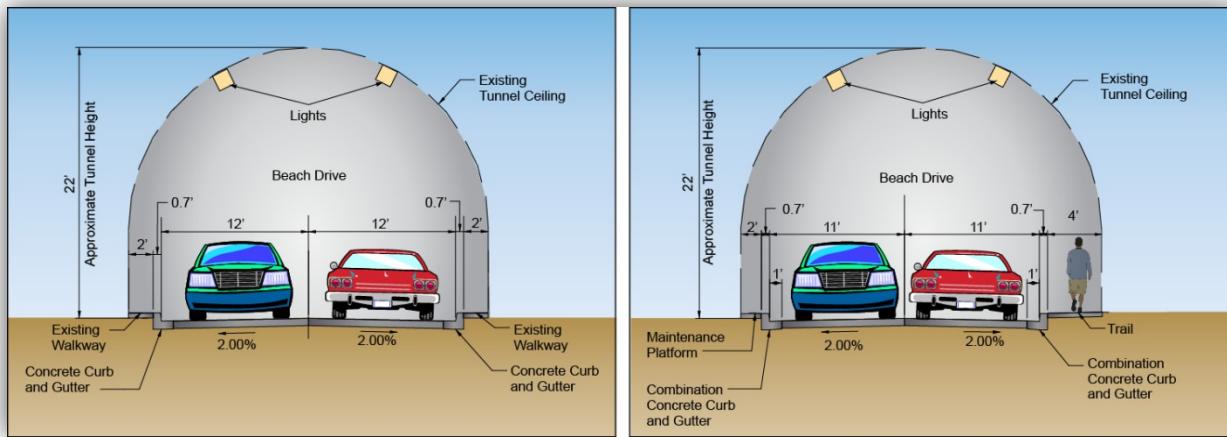
Piney Branch Parkway Trail Widening. A short section of the existing paved portion of the Piney Branch Parkway Trail, approximately 50 feet in length, is currently 4.5 feet wide. Parkway travel lanes are currently 12 feet wide. By restriping a short section of the Parkway to 11-foot lanes, a six-foot trail can be achieved without creating a larger footprint. Existing drainage features along the 50-foot section such as curbs would be shifted a maximum of two feet inward in order to accommodate the new six-foot trail.

Broad Branch/Grove 2 North Parking Area. A new trail section, which would separate trail users from vehicular traffic in the parking area, would be constructed. The new trail would replace an existing social trail to the east of the Broad Branch/Grove 2 North parking area (**Figure 10**). The new trail section would tie into the existing Rock Creek Park multi-use trail immediately to the south of the parking area.



**Figure 10. Existing Social Trail along the Broad Branch/Grove 2 North Parking Area**

Beach Drive Tunnel. The existing two-foot wide raised sidewalk along the west wall of the tunnel would be widened to approximately four feet. Vehicular travel lanes would be reduced from 12 feet in width to approximately 11 feet. In developed areas, where there are stringent controls on design, the use of 10-foot lanes is the minimum acceptable practice, according to the American Association of State Highway and Transportation Officials (AASHTO 2001). Signage at the tunnel approaches would alert drivers to the trail users ahead. Additionally, a barrier such as a *low-profile guardrail* would further alert drivers of the trail within the tunnel. (**Figure 11**) *Future NPS plans include replacement of the tunnel's existing lighting with LED lights. Light replacement is expected to be complete in Fiscal Year 2014.*



**Figure 11. Beach Drive Tunnel Existing Conditions and Proposed Conditions**

Beach Drive Bridge over Rock Creek (south of National Zoo). The existing Beach Drive Bridge over Rock Creek is a 200-foot single span concrete slab arch bridge, supporting two lanes of traffic and a sidewalk on both sides of the bridge. Currently, the Rock Creek Park multi-use trail crosses the bridge by way of a 3.5-foot raised sidewalk along the upstream (west) side of the bridge. Under the proposed conditions, the multi-use trail would tie into a new bridge to be constructed immediately adjacent to the west side of the existing bridge. The proposed structure would be equal in length and style as the existing bridge, and would be constructed within *five feet* of the current bridge abutment. *The five foot distance would allow for maintenance and future replacement of the existing bridge.* The bridge materials would match the current concrete and stone aesthetics of the existing structure. The total width of the proposed bridge would be **12** feet, allowing for a **10**-foot trail clearance (**Figure 12**).

Striping at Porter Street Bridge Underpass. Currently, sight distance at this underpass is limited. However, physical and environmental constraints prevent realignment of the trail at this location. Under the proposed action, centerline striping would be included at the approaches to this underpass to reduce potential user conflicts.

### Roadway Crossing Safety Improvements

Broad Branch Road. A new crosswalk is proposed at Broad Branch Road to the north of the parking area entrance (**Figure 13**).

Jewett Street. The existing at-grade crosswalk would be improved for trail user safety.

National Zoo Entrance. The alignment of the crosswalk and approaches would be modified to create a shorter roadway crossing distance, as well as sight distance improvements for both trail users and vehicular traffic.

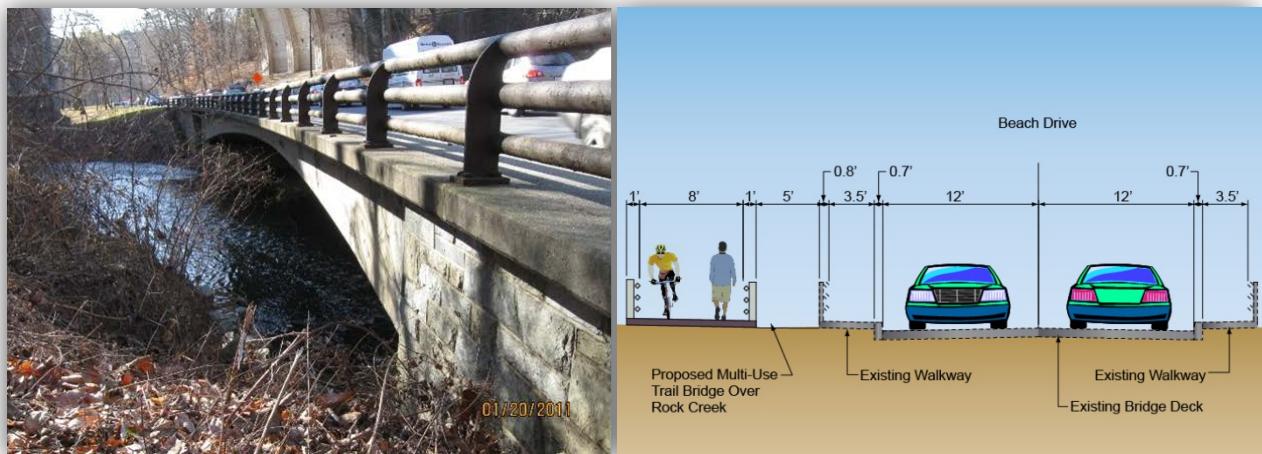


Figure 12. Beach Drive Bridge Existing Conditions and Proposed Conditions

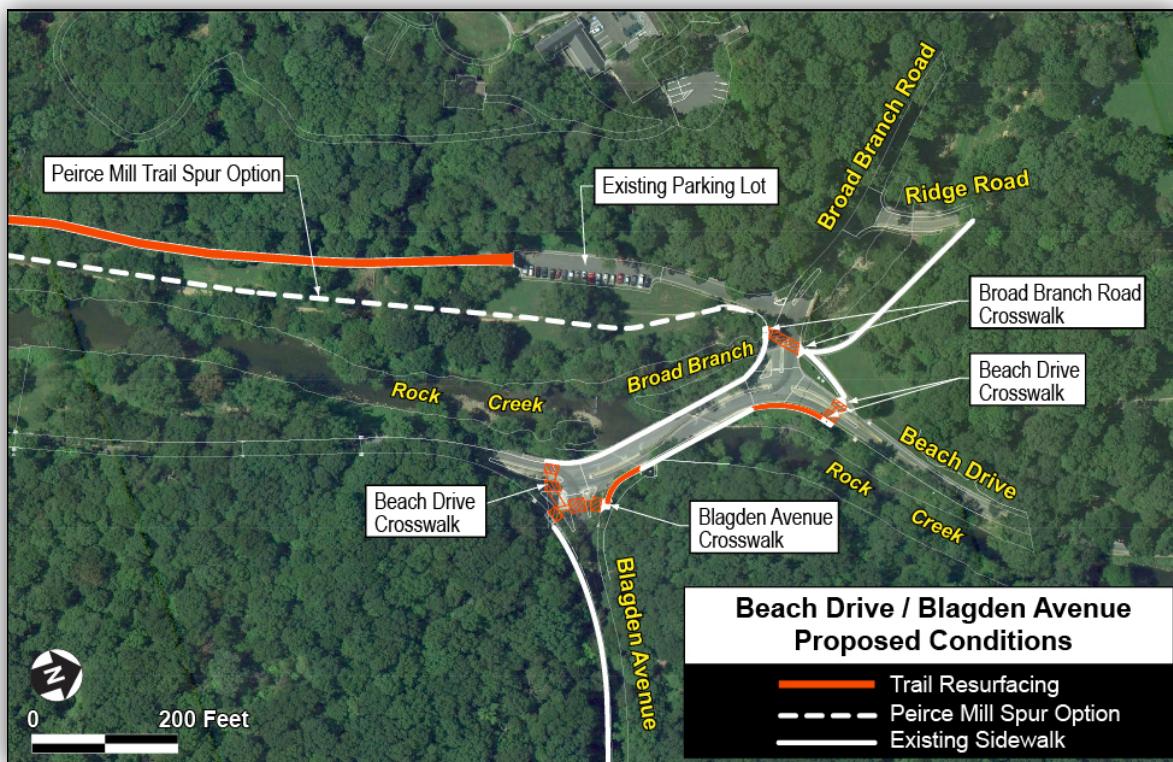


Figure 13. Proposed Crossings at Beach Drive and Blagden Avenue

Shoreham Drive. The existing at-grade crosswalks would be consolidated and realigned to improve sight distance for both trail users and vehicular traffic approaching the intersection. *Since the Draft EA, crossing improvements were constructed at Shoreham Drive as part of the Beach Drive Road Reconstruction Project.*

P Street, NW. A new at-grade crosswalk would be constructed to connect the existing sidewalks along the west end of the P Street ramp (**Figure 14**).

### New Connections

Beach Drive north of Blagden Avenue. The existing sidewalk along the east side of the bridge would be extended north to a new at-grade crossing to the existing trail to the north of Beach Drive. Another means of access to the trail network on Blagden Avenue is a sidewalk on the west side of Beach Drive. To connect sidewalks, a cross walk is proposed on Beach Drive south of Blagden Avenue. This sidewalk would give users an alternative way to gain access to Blagden Avenue and eliminate the need to transverse multiple roadway crossing on the east side of Beach Drive (**Figure 13**).

Piney Branch Parkway Trail. The social trail that currently connects the Rock Creek Park multi-use trail to the Piney Branch Parkway trail would be paved.

Arkansas Avenue. At the east end of the Piney Branch Parkway trail, the social trail along Arkansas Avenue would be resurfaced, and new ADA sidewalk ramps would tie into the existing sidewalks at 16<sup>th</sup> Street, NW and Taylor Street.

Porter Street Ramp. A new trail section would be constructed to connect the Rock Creek Park multi-use trail to the existing sidewalk along the Porter Street, NW ramp.

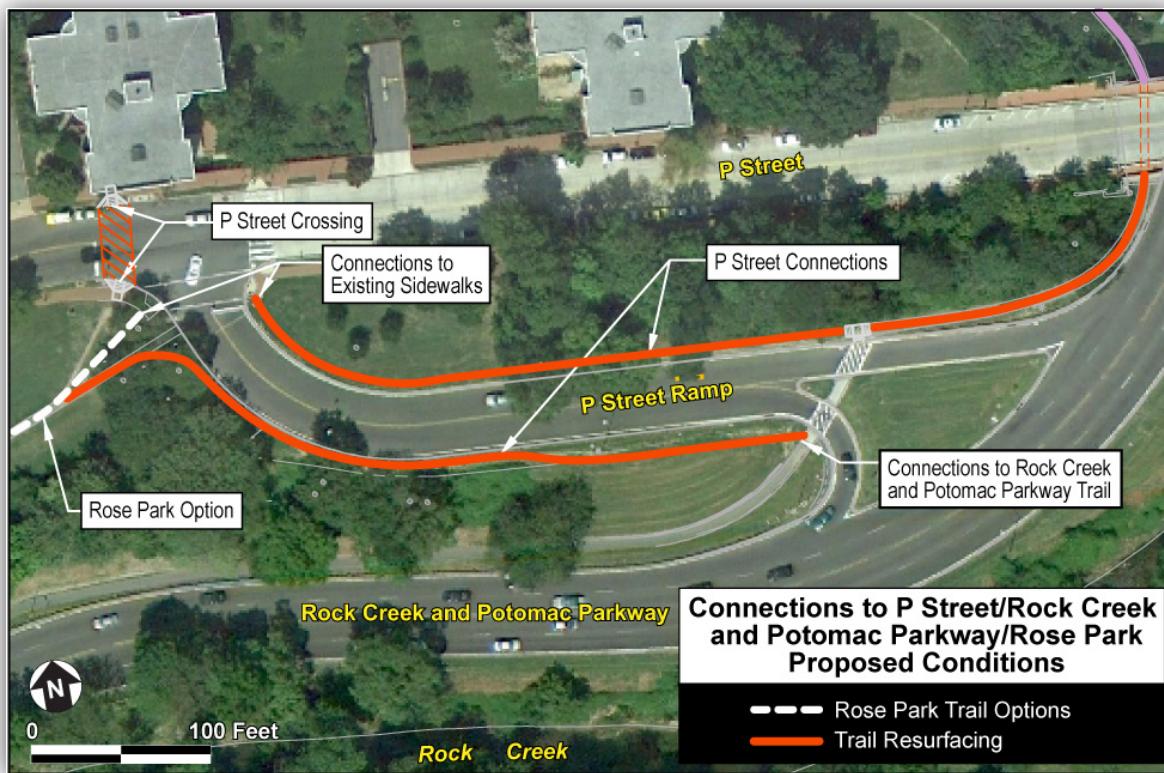
Proposed Trail within Klingle Valley. *The proposed construction of a multi-use Klingle Valley trail, as described in the Finding of No Significant Impact for Klingle Valley, would include a multi-use trail along the barricaded portion of Klingle Road, and a connection to the Rock Creek Park multi-use trail (DDOT 2011b). No construction of the proposed trail along Klingle Road and the proposed connection to Rock Creek Park multi-use trail will be conducted under the Rock Creek Park Multi-Use Trail Rehabilitation project. Final designs for the Rock Creek Park multi-use trail improvements would be compatible with the proposed trailhead at Klingle Valley.*

P Street, NW / Rock Creek and Potomac Parkway Trail / Rose Park. New trail sections along both sides of the P Street ramp and a new crosswalk would connect the existing P Street sidewalk, Rock Creek and Potomac Parkway trail, and Rose Park trail (**Figure 14**).

### Minor Trail Realignments and Grading

Trail Realignment. Minor trail realignments would improve sight distance and approaches along the trail to the south of Peirce Mill, to the south of Shoreham Drive, and at the approach to the Devil's Chair Bridge.

Trail Grading. Minor grading is proposed for an approximate 180-foot section of the multi-use trail, south of Calvert Street, to decrease the existing slope from approximately 12 percent to eight percent and improve user accessibility.



**Figure 14. Proposed P Street, NW / Rock Creek and Potomac Parkway Trail / Rose Park Connections**

### Other Improvements

Drainage and Soil Erosion Improvements. Soil erosion and ponding conditions occur along an approximately 1,100-foot section of the Rock Creek Park multi-use trail south of Peirce Mill. The Action Alternatives would include raising the vertical profile of the trail to eliminate ponding, and stabilizing the slope between Beach Drive and the trail to improve soil erosion conditions.

Additionally, restoration is proposed for a 45-foot timber retaining wall immediately adjacent to the trail. The wall is located approximately 100 feet northwest of the southern end of the Beach Drive tunnel. Deterioration of the wall is contributing to soil erosion conditions between the trail and Rock Creek. Under the proposed action, the timber retaining wall would be reconstructed to mitigate soil erosion.

Piney Branch Parkway Retaining Wall. Under the proposed action, a 65-foot failed section of the approximate 1,100-foot historic stone wall along Piney Branch Parkway would be *temporarily stabilized as necessary*.

*Since the draft EA, site constraints were identified which preclude rehabilitation of the retaining wall as part of this project.*

Stormwater Management. In order to more effectively manage stormwater along the multi-use trail, and to meet DDOE requirements, stormwater management is proposed as part the project. Bioretention areas could potentially be included at some of the connections to DDOT right-of-ways. These consist of small-scale facilities that promote infiltration of stormwater in order to reduce its volume, improve its quality, and increase groundwater recharge. Proposed stormwater management techniques also include bioswales which are

conveyance systems for stormwater runoff. A bioswale consists of a gently sloping, vegetated ditch that slows the flow of runoff into stormdrains or open waters. Bioswales are proposed at the following locations:

- adjacent to the Broad Branch/Grove 2 North parking area at the north end of the project area;
- adjacent to the trail between the Beach Drive tunnel and Tilden Street, including the trail along Piney Branch Parkway;
- adjacent to the trail between Klingle Road and Shoreham Drive, including the parking areas; and
- adjacent to the trail between the P Street, NW bridge and Oak Hill Cemetery.

## 2.4. PEIRCE MILL TRAIL SPUR OPTIONS

*DDOT included this option in the Rock Creek Park Multi-Use Trail Rehabilitation project because of the need for connectivity between Peirce Mill Trail and Rock Creek Trail.* Users have created a social trail along Rock Creek between the Broad Branch/Grove 2 North parking area to the north and Peirce Mill to the south (**Figure 15**).

### 2.4.1. OPTION A: NO ACTION

Under Option A, the unpaved social trail south of the Broad Branch/Grove 2 North parking area to Peirce Mill would remain unchanged. No new construction would occur.

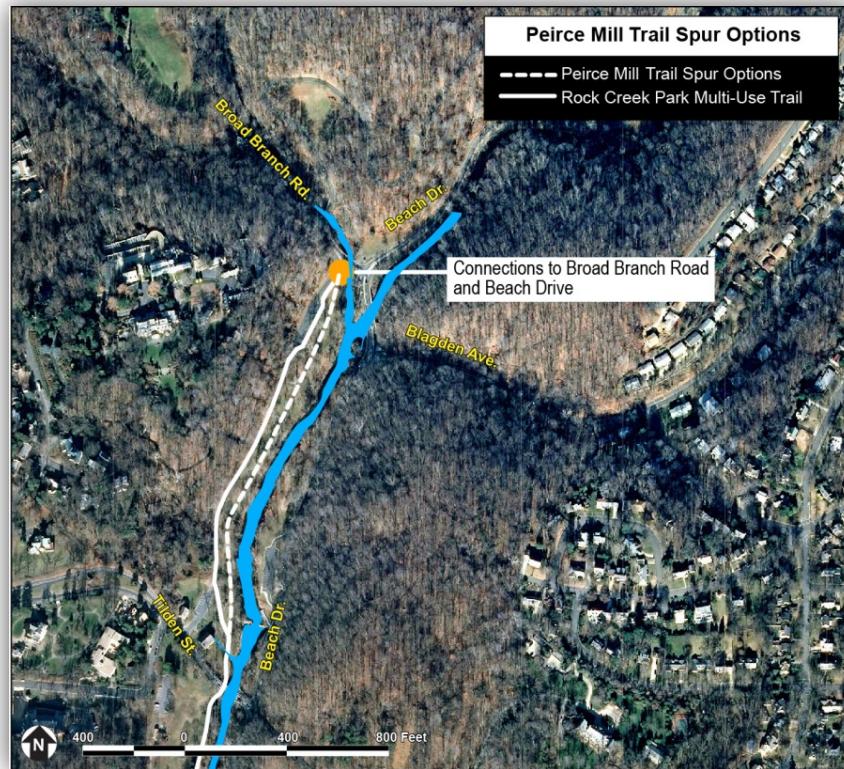


Figure 15. Peirce Mill Trail Spur Options

### 2.4.2. OPTION B: EIGHT-FOOT PAVED TRAIL SPUR

Under this option, the existing unpaved social trail from south of the Broad Branch/Grove 2 North parking area to the Peirce Mill parking area would be resurfaced to a standard eight-foot width. Trail material selection would be considered during the detailed design phase of the project. Prior to any land disturbing activities, tree protection measures, erosion and sediment control measures, and other best management practices (BMPs) would be installed. If necessary, archeology testing also would be performed. *Option B is the preferred option selected to be implemented for the Peirce Mill Trail in conjunction with the Preferred Alternative.*

Peirce Mill Trail Spur Option B would cost approximately \$414,000 to design and construct, in addition to the cost of either Action Alternative (**Table 1**). Detailed cost estimates are presented in **Appendix C**.

## 2.5. ROSE PARK TRAIL OPTIONS

*The trail in Rose Park is used by a variety of users, including walkers, families with strollers, runners, and bicyclists. During a field visit, the project team observed that users were leaving the currently five-foot to six-foot paved trail to pass and maneuver around other users, resulting in a one-foot to two-foot wide unpaved social trail on both sides, along some sections of the paved trail. In consideration of comments received during the public scoping periods, as well as those received on the EA regarding the width and condition of the trail, the project*

*team developed separate options*

*for the section of the trail in Rose Park between P Street, NW and M Street, NW and DDOT has included this option as part of the Rock Creek Park Multi-Use Trail Rehabilitation project. In addition DDOT held a public meeting with the Friends of Rose Park, a volunteer non-profit organization, on April 13, 2011 to address their concerns regarding the Rose Park portion of the project. Comments from the meeting were considered in developing options for the trail in Rose Park. Any of the options described below may be selected in conjunction with the Action Alternatives.*

### 2.5.1. OPTION A: NO ACTION

Under Option A, no new construction *or resurfacing* would occur along the five-foot to six-foot wide section of the Rose Park trail between P Street, NW and M Street, NW. NPS would continue to maintain the trail in its existing state (**Figure 16**).

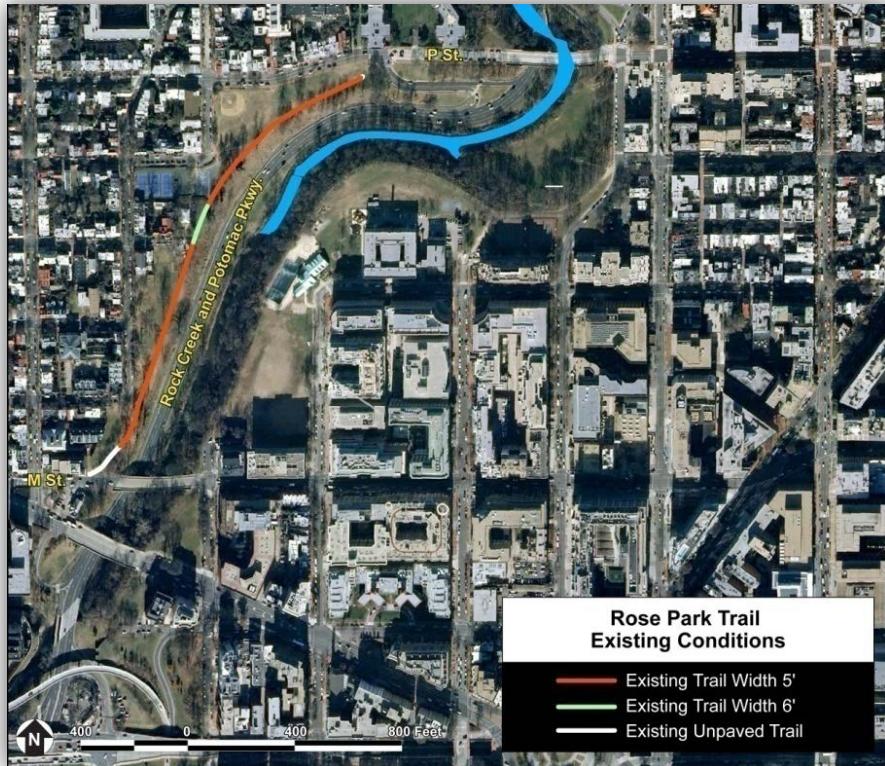


Figure 16. Rose Park Trail Option A: No Action

### **2.5.2. OPTION B: SIX-FOOT RESURFACED TRAIL**

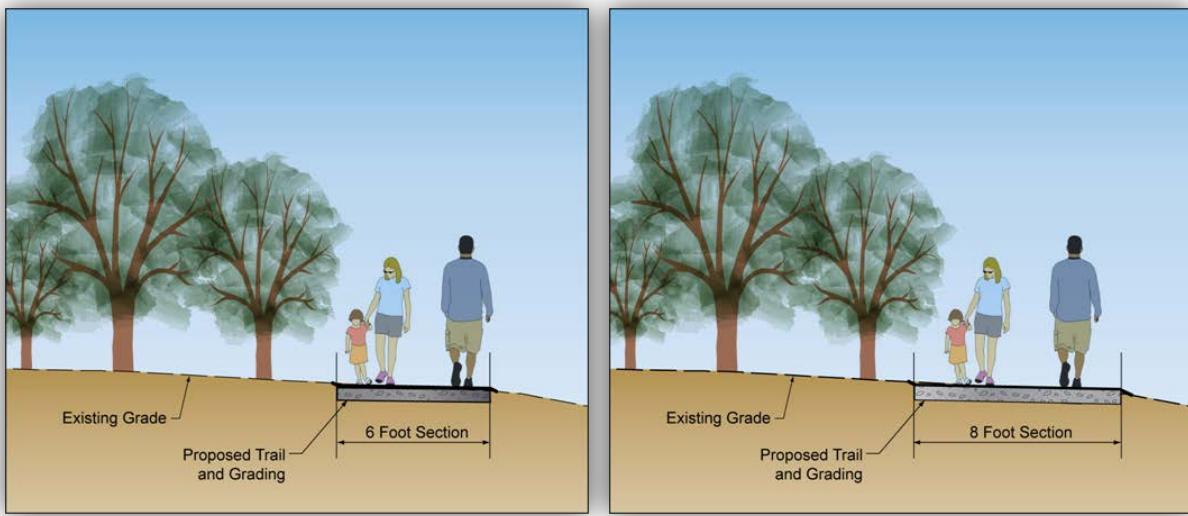
Under this option, the Rose Park trail, from P Street to M Street, NW, would be resurfaced along its current alignment to a six-foot width. *A six-foot width is the standard width of a DDOT residential sidewalk and would be a zero to two-foot width increase along the length of the trail.* The connection to the M Street sidewalk would follow the current alignment of the unpaved social trail as it deviates from the paved section. *Under Option B, a new safety railing would be constructed along the Rose Park Trail to provide protection from a steep embankment to the east. The existing chain link fencing in Rose Park would be removed to construct the railing, which would be comprised of timber posts and rails. Design of the new railing would match the character of other safety rails on the Rock Creek Park multi-use trail and would be consistent with AASHTO guidelines for shared use paths.* The existing brick pathway connection to the M Street sidewalk would remain unchanged. *Yield signs or speed limit signs could be installed in and around the park to calm traffic, and raise safety awareness on the trail. Special provisions would be considered to preserve the large oak tree at the Dumbarton Street playground area such as alternative trail materials and/or modifying the trail width to accommodate the tree.* Prior to any land disturbing activities, tree protection measures, erosion and sediment control measures, and other best management practices (BMPs) would be installed. If necessary, archeology testing also would be performed. Trail material selection would be considered during the detailed design phase of the project. **Figure 17** depicts a cross section of Rose Park Trail Option B. *Option B is the preferred option selected to be implemented for the Rose Park Trail in conjunction with the Preferred Alternative.*

Rose Park Trail Option B would cost approximately \$223,000 to design and construct, in addition to the cost of either Action Alternative (**Table 1**). Detailed cost estimates are presented in **Appendix C**.

### **2.5.3. OPTION C: EIGHT-FOOT RESURFACED TRAIL**

The Rose Park trail, from P Street to M Street, NW, would be resurfaced along its current alignment to an eight-foot width. *An eight-foot width is the minimum multi-use trail width recommended by AASHTO for short distances under physical constraints and would be a two to four-foot width increase along the length of the trail* (FHWA 2001). The connection to the M Street sidewalk would follow the current alignment of the unpaved social trail as it deviates from the paved section. *Under Option C, a new safety railing would be constructed along the Rose Park Trail to provide protection from a steep embankment to the east. The existing chain link fencing in Rose Park would be removed to construct the railing, which would be comprised of timber posts and rails. Design of the new railing would match the character of other safety rails on the Rock Creek Park multi-use trail and would be consistent with AASHTO guidelines for shared use paths.* The existing brick pathway connection to the M Street sidewalk would remain unchanged. *Yield signs or speed limit signs could be installed in and around the park to calm traffic, and raise safety awareness on the trail. Special provisions would be considered to preserve the large oak tree at the Dumbarton Street playground area such as alternative trail materials and/or modifying the trail to accommodate the tree.* Prior to any land disturbing activities, tree protection measures, erosion and sediment control measures, and other best management practices (BMPs) would be installed. If necessary, archeology testing also would be performed. Trail material selection would be considered during the detailed design phase of the project. **Figure 17** depicts a cross section of Rose Park Trail Option C.

Rose Park Trail Option C would cost approximately \$382,000 to design and construct, in addition to the cost of either Action Alternative (**Table 1**). Detailed cost estimates are presented in **Appendix C**.



**Figure 17. Rose Park Trail Options B and C Typical Sections**

**Table 1. Cost Estimates of the Action Alternatives and Options**

CATEGORY	ALTERNATIVE 2 (RESURFACING ONLY)	ALTERNATIVE 3 RESURFACING AND WIDENING
<b>ROCK CREEK PARK TRAIL REHABILITATION</b>		
Trail Improvements	\$999,814	\$2,990,006
Maintenance of Traffic	\$100,000	\$100,000
Stormwater Management Improvements	\$198,981	\$398,001
Utility Improvements	\$43,000	\$43,000
Structural Improvements	\$990,000	\$990,000
Landscaping	\$218,880	\$437,801
<b>Subtotal</b>	<b>\$2,550,675</b>	<b>\$4,958,808</b>
Contingency (40 percent)	<b>\$1,020,270</b>	<b>\$1,983,523</b>
<b>Direct Cost Subtotal</b>	<b>\$3,570,945</b>	<b>\$6,492,331</b>
Design and Construction Services	\$887,669	\$1,489,702
<b>Total</b>	<b>\$4,458,614</b>	<b>\$8,432,033</b>
<b>PEIRCE MILL TRAIL SPUR OPTION*</b>		
• Peirce Mill Trail Spur Option B: Eight-foot Paved Trail	\$195,514	\$195,514
Stormwater Management Improvements	\$19,551	\$19,551
Landscaping	\$21,507	\$21,507
<b>Subtotal</b>	<b>\$236,572</b>	<b>\$236,572</b>
Contingency (40 percent)	\$94,629	\$94,629
<b>Total Direct Cost Subtotal</b>	<b>\$331,201</b>	<b>\$331,201</b>
Design and Construction Services	\$82,800	\$82,800
<b>Total Cost</b>	<b>\$414,001</b>	<b>\$414,001</b>
<b>ROSE PARK TRAIL OPTIONS*</b>		
• Rose Park Trail Option B: Six-foot Trail	\$105,204	\$105,204
Stormwater Management Improvements	\$10,520	\$10,520
Landscaping	\$11,572	\$11,572
<b>Subtotal</b>	<b>\$127,296</b>	<b>\$127,296</b>
Contingency (40 percent)	\$50,918	\$50,918
<b>Total Direct Cost Subtotal</b>	<b>\$178,214</b>	<b>\$178,214</b>
Design and Construction Services	\$44,554	\$44,554
<b>Total Cost: Rose Park Trail Option B</b>	<b>\$222,768</b>	<b>\$222,768</b>
• Rose Park Trail Option C: Eight-foot Trail	\$180,245	\$180,245
Stormwater Management Improvements	\$18,025	\$18,025
Landscaping	\$19,827	\$19,827
<b>Subtotal</b>	<b>\$218,097</b>	<b>\$218,097</b>
Contingency (40 percent)	\$87,239	\$87,239
<b>Total Direct Cost Subtotal</b>	<b>\$305,336</b>	<b>\$305,336</b>
Design and Project Construction Services	\$76,334	\$76,334
<b>Total Cost: Rose Park Trail Option C</b>	<b>\$381,670</b>	<b>\$381,670</b>
<b>TOTAL COST WITH OPTIONS</b>	<b>\$5,095,383-\$5,254,285</b>	<b>\$9,068,802-\$9,227,704</b>

\*One Peirce Mill Trail Spur Action Option and one Rose Park Trail Action Option would be selected in conjunction with Alternative 2 or 3.

\*\*A 40 percent contingency represents unforeseen project expenses. These could include soil amendments archeological preservation measures or other.

## 2.6. CONSTRUCTION AND STAGING

For the Action Alternatives and Options, construction staging areas would be identified in the later design phases. The staging areas would be selected to protect park resources, to meet the needs of the contractor based on the construction phasing plan, and to minimize disruptions to visitor use and experience.

Construction would be phased in such a way as to, when possible, provide logical detours around the trail sections and road areas under construction, and would be sequenced so that no two adjacent sections would be under construction simultaneously. Each construction phase would be approximately 0.25 mile to 0.5 mile in length. Trail users and drivers would be notified in advance of any closures or detours required for construction. Notifications could include electronic signage, postings to the Rock Creek Park and DDOT websites and social network pages, and email blasts to interested parties identified during the planning process.

It is recommended that work on the Beach Drive tunnel be done at night during off-peak traffic hours to minimize disruptions to traffic. Construction would take approximately six to nine weeks, during which time trail users would be unable to pass this area when the Zoo gate is closed. ***Users would be notified in advance of the anticipated closure dates.***

Under Rose Park Trail Options B or C, the Rose Park trail would be rehabilitated as the last stage of construction. This section of trail would need to be closed entirely during construction, however the rest of the park would remain open; therefore, the trail closure would have a minimal effect on the overall usage of the park. Users would be notified in advance of the anticipated closure dates. Rose Park Trail Options B or C would take approximately six to eight weeks to construct.

Construction of all sections of trail would take approximately 12 months to complete. Some phases of construction may be constructed concurrently, in which case the total construction duration could be shorter than the sum of all phases.

## 2.7. MITIGATION MEASURES OF THE ACTION ALTERNATIVES AND OPTIONS

The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, the following protective measures would be implemented as part of the selected Action Alternative and Options. The NPS would implement an appropriate level of monitoring throughout the construction process to help ensure that protective measures are being properly implemented and are achieving their intended results.

### Soils

During the design phase of the project, erosion and sediment control plans would be prepared in accordance with the DDOE current *Standards and Specifications for Soil Erosion and Sediment Control*. These plans would include specific measures and BMPs to avoid and/or minimize soil erosion and transport due to ground-disturbing activities such as grading. Such measures may include, but would not be limited to, stabilized construction entrances, silt fences, temporary sediment traps and filtering devices and earth dikes. Once approved, these plans would be implemented during construction.

## Water Quality

Implementation of erosion and sediment control practices, such as installation of silt fence, sediment trapping or filtering, and other BMPs, would also help to avoid temporary impacts to water quality during construction. Stormwater management plans would be prepared and implemented onsite to address long-term stormwater runoff.

## Vegetation

Protection measures and BMPs would be implemented to avoid impacts to all types of park vegetation to the extent possible. Vegetation protection measures would be detailed in the design phase of the project and may include, but would not be limited to: evaluation of large trees (*such as the large oak tree at the Dumbarton Street playground area on the Rose Park Trail section*) and development of a tree save plan by an arborist or licensed tree expert; installation of tree protection fencing, root pruning for trees whose critical root zones (CRZs) lie within the existing trail alignment or proposed construction area; and staging construction equipment to avoid damage to park vegetation. All revegetation would fulfill NPS functional and aesthetic requirements. Landscape plans would be developed in coordination with the NPS and DDOT's Urban Forestry Administration. Areas replanted following construction would be monitored to ensure successful establishment.

## Wildlife

Best management practices would be utilized to minimize impacts to terrestrial and aquatic habitats. Detailed tree save plans would be developed and implemented during construction to protect surrounding trees that form forest habitat for park wildlife. Erosion and sediment control plans would also be prepared and implemented to avoid and minimize potential impacts to aquatic habitat within Rock Creek and Piney Branch that could be caused by soil erosion and sediment transport.

## Archeology

Mitigation for impacts to archeological resources may include, but would not be limited to the following: Conducting a Phase IB survey within areas of the LOD not previously surveyed; hand removal of vegetation to minimize impacts to identified archeological resources within the LOD, retain current trail widths within identified archeological resources. Testing areas will include but not limited to the location of the potential remnants of the historic headrace *near Peirce Mill* and other areas near Piney Branch. In locations where measures to avoid and minimize impacts to archeological resources cannot be instituted, mitigation through excavation within identified sites may be implemented. NPS, DDOT, and FHWA will continue to consult with the DC HPO throughout this project *to avoid impacts to potential archeological resources. Should unanticipated archaeological discoveries be encountered during any activity associated with this undertaking, DDOT will work with DC SHPO to determine the best mitigation measures..*

## Historic Structures and Districts / Cultural Landscapes

All work proposed under Action Alternatives would be completed in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* in order to avoid and/or minimize any adverse impacts to cultural resources. Efforts to minimize impacts to cultural resources through design *will include the following principles:* trail improvements would retain the curvilinear design of the trail; proposed trail connections would be the minimum span needed to achieve the stated goals and laid directly on the existing topography; new trail connectors will be consistent in material and design features with the existing trails and would not introduce new elements inconsistent with the park and parkway's other features *found in Rock Creek Park and Rock Creek and Potomac Parkway*; minimal new paving would be used in areas of the trail that follow historic alignments; *and* spot improvements and trail widening would avoid damage to, and loss of, existing vegetation.

### Cultural Landscapes

Plans for construction staging of equipment and materials would be developed in order to least impact views within the cultural landscape. Landscape plans would be developed considering the cultural landscape, and in accordance with NPS policies. The NPS currently is developing a cultural landscape report for the historic trails in the park. This documentation and planning effort will be completed in ***Fiscal Year 2014***.

### Visitor Use and Experience

To notify trail users, park visitors, and motorized commuters of temporary closures or changes in traffic patterns, public notifications may include electronic notification and detour signage, postings to the Rock Creek Park website and other social media, and email and listserv notices for stakeholders and interested parties. Additionally, plans for construction equipment and materials staging areas would be developed to cause the least practicable disruption to park visitors.

### Human Health and Safety

The trail and road sections under construction would be closed to users with signage, fences ***and detours identified***. After construction, NPS would follow established maintenance practices such as removal of debris and snow, and repairs to potholes and cracks to ensure trail safety for park visitors. ***DDOT and NPS would further evaluate site specific needs for trail calming measures such as signage or no ride zones at certain areas of the trail in close proximity to other uses (e.g., the playground at Rose Park) and those areas that lack adequate roadside protection or trail width due to physical or environmental constraints (e.g., the trail through the Beach Drive Tunnel and the embankment east of Rose Park) during the design phase.***

### Park Operations and Management

***DDOT will continue coordination and communications with NPS staff to ensure impacts are minimal.***

### Traffic and Transportation

Plans to maintain traffic during construction would be developed to minimize impacts to trail users and motorized commuters. Advance notifications of temporary closures or changes in traffic patterns would be implemented and may include electronic notification and detour signage, postings to the Rock Creek Park website and other social media, and email and listserv notices for stakeholders and interested parties. At some locations, such as the Beach Drive tunnel, work would be scheduled to avoid times of peak traffic volumes.

## 2.8. ALTERNATIVES AND OPTIONS CONSIDERED BUT DISMISSED

### 2.8.1. CONTINUOUS 10-FOOT WIDE MULTI-USE TRAIL

An alternative was considered to resurface and widen the Rock Creek Park multi-use trail from the Broad Branch/Grove 2 North parking area to P Street, NW to a standard 10-foot width, which is recommended by AASHTO for multi-use trails. However, this alternative would cause adverse impacts to sensitive park resources, particularly from the section north of Piney Branch Parkway to north of the National Zoo. The impacts to park resources would not meet the project objective to preserve the integrity of Rock Creek Park and its resources; therefore, this alternative was dismissed from further study.

### 2.8.2. CONTINUOUS EIGHT-FOOT PAVED TRAIL WITH TWO-FOOT SOFT SHOULDERS

An alternative was also considered to resurface and widen the Rock Creek Park multi-use trail from the Broad Branch/Grove 2 North parking area to P Street, NW to a standard eight-foot width with two-foot shoulders on both sides. The shoulders would be surfaced with a soft or porous material, such as sod or woodchips. This alternative would have a larger footprint than a 10-foot wide trail, and would also cause adverse impacts to

sensitive park resources. Additionally, the soft shoulders would require additional maintenance beyond the regular maintenance of the paved trail. The impacts to park resources would not meet the project objectives to preserve the integrity of Rock Creek Park and its resources. The added maintenance requirements would not be compatible with one of the purposes of the project, to reduce trail maintenance needs, or Section 9.1.4 of *NPS Management Policies* (NPS 2006), which requires the promotion of cost savings and prevention of resource degradation in carrying out maintenance responsibilities. Therefore, this alternative was dismissed from further study.

### 2.8.3. REHABILITATING THE ROSE PARK TRAIL AT ITS CURRENT WIDTH

*Based on comments received throughout the public involvement process*, the project team considered rehabilitation options for the Rose Park trail which included paving the trail at its current width. ***This option was dismissed because at its current width, the trail in Rose Park does not allow for two directions of travel and passing without causing trail users to step off the paved surface on to the vegetated areas.*** Trail users routinely leave the paved trail surface in order to walk side by side or pass other users. The migration of users from the trail has caused trampling of vegetation (**Figure 18**). As shown in Figure 18, in several locations, the trampled area beside the trail is one or two feet wider than the paved trail surface. ***The trampled area results in a permanent loss of vegetation, which in turn creates ponding, erosion of the soil, and potential hazard conditions.*** While feasible, it would not be practical to rehabilitate the trail at its existing width because users would continue to migrate from the trail, and replanting would not be successful.

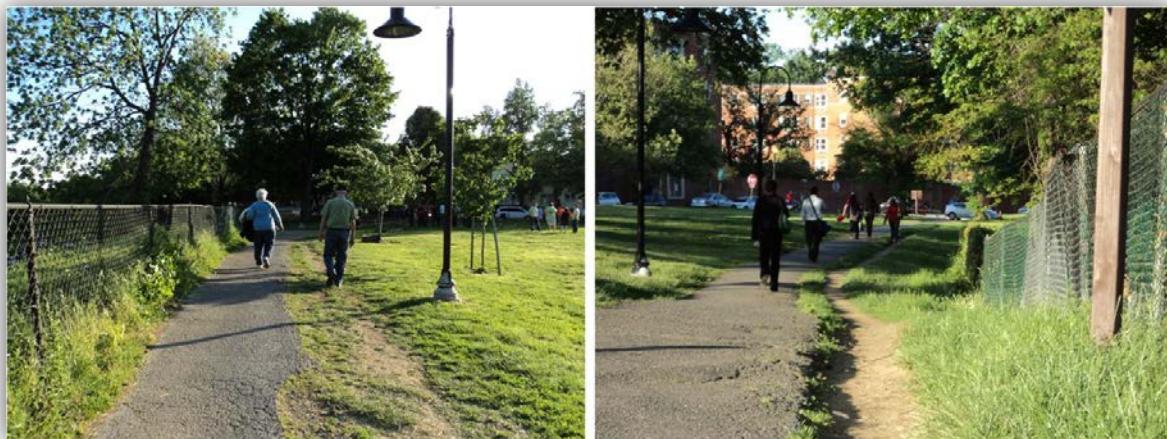


Figure 18. Existing Conditions at the Rose Park Trail

### 2.8.4. LEAVING THE NATIONAL ZOO GATE OPEN AT ALL TIMES

During the scoping period, a number of trail users commented on the gate allowing access to the portion of the trail located on National Zoo property. National Zoo security requires this gate to be closed from dusk to dawn, and on days when the National Zoo holds special events. When the gate is closed this section of the trail is impassable and trail users are forced to use the Beach Drive tunnel by way of the existing two-foot sidewalk. The respondents called for the National Zoo gate to remain open at all times. However, based on a June 2011 meeting between the project team and the National Zoo senior management, the gate and its scheduled closure is required in order for the National Zoo to maintain its accreditation ***by the Association of Zoos and Aquariums (AZA). This accreditation is a program that sets standards to assure a high level of animal care. The AZA standards specify a requirement for a perimeter fence. The fence must be constructed***

*so that it protects the animals in the facility by restricting animals outside the facility and unauthorized persons from going through it or under it and having contact with the animals in the facility, and so that it can function as a secondary containment system for the animals in the facility (AZA 2013).* Therefore, leaving the National Zoo gate open at all times is not feasible and was dismissed from detailed study.

### **2.8.5. BEACH DRIVE BRIDGE OVER ROCK CREEK**

An alternative was considered to widen the sidewalk on the upstream (west) side of the Beach Drive Bridge over Rock Creek using a cantilevered deck. Visual inspection of the bridge in 2011 found that the bridge was in overall good condition (G&O 2011). However, construction of a cantilevered structure would require drilling and anchoring bolts into existing concrete. This would potentially introduce cracks and spalls into the concrete, and in addition, the cantilevered structure would reduce the load carrying capacity of the bridge. A separate structure for pedestrians and bicycles was recommended as a result of the inspection. Therefore, a cantilevered structure on the Beach Drive Bridge was dismissed from further study.

### **2.8.6. NEW CONNECTION AT HARVARD STREET**

Based on public comments, the project team considered a connection between the Rock Creek Park multi-use trail and Harvard Street between Beach Drive and Adams Mill Road. However, due to short sight lines and other safety concerns, this option was dismissed from detailed study.

### **2.8.7. LIGHTING**

*During the public involvement process*, several trail users called for lighting to be installed along the trail. Rock Creek Park is closed from dusk to dawn. Furthermore, according to NPS *Management Policies* (NPS 2006), the NPS seeks to preserve, to the greatest extent possible, the natural lightscapes of parks. Therefore, this option was eliminated from detailed study.

### **2.8.8. BICYCLE PARKING**

*During the public involvement process*, several trail users called for an evaluation of potential bicycle parking areas throughout the project area. Incorporation of bicycle parking areas into the trail, as implemented by DDOT, would occur at relatively low cost and low impact. Potential areas are to be investigated in the design phase of the trail rehabilitation. Therefore, this option was dismissed from detailed study.

### **2.8.9. EXCLUDING BICYCLES FROM ROSE PARK**

*During the public involvement process* some park visitors **and community group members** called for the exclusion of bicycles from the Rose Park trails. One of the needs of the project is to maintain support of the diverse trail users and groups including pedestrians, bicyclists, runners, those enjoying nature, etc. **DPR's policies do not restrict bicycles from Rose Park.** Furthermore, NPS *Management Policies* (NPS 2006), Section 9.2.2 Trails and Walks, recognizes trails and walks as an integral part of each park's transportation system. Section 9.2.2 also calls for trails and walks to be situated, designed, and managed to allow for a satisfying park experience and allow accessibility by the greatest number of people; and protect park resources. Excluding bicycles from Rose Park would not be compatible with the needs of the proposed action, nor with NPS policies. Therefore, this option was dismissed from detailed study.

## **2.9. ENVIRONMENTALLY PREFERABLE ALTERNATIVE**

The environmentally preferable alternative is defined by CEQ as the alternative that would promote the national environmental policy as expressed in NEPA Section 101. This includes:

1. Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assuring for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. Preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
6. Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources (NEPA, Section 101).

The NPS is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. The NPS, in accordance with the Department of the Interior policies contained in the Departmental Manual (516 DM 4.10) and the CEQ's *NEPA's Forty Most Asked Questions*, defines the environmentally preferable alternative (or alternatives) as the alternative that best promotes the national environmental policy expressed in NEPA (Section 101(b)) (516 DM 4.10). In their *Forty Most Asked Questions*, CEQ further clarifies the identification of the environmentally preferable alternative, stating "Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (Q6a).

***Based on the analysis of environmental consequences for each alternative, and comments received from the public and other agencies, Alternative 3: Trail Resurfacing and Widening is the environmentally preferable alternative for the Rock Creek Park Multi-Use Trail Rehabilitation project. For the Peirce Mill Trail Spur Option, NPS determined the environmentally preferable option to be Option B: Eight-foot Paved Trail Spur. For the Rose Park Trail Option, NPS determined that the environmentally preferable option is Option B: Six-foot Resurfaced Trail.***

***Alternative 3: Trail Resurfacing and Widening*** would enhance visitor use and experience, public safety, park operations and maintenance, and transportation in the project area better or equal to the other options. Also, soil and water quality would be improved through stabilization and drainage improvements under Alternative 3. This alternative is preferable to the No Action alternative because resurfacing and widening of the trail would eliminate several adverse impacts associated with the existing trail. This alternative improves the trail and fulfills the NPS's responsibility as trustee of the environment for succeeding generations. While Alternative 2 would result in similar impacts to those described in Alternative 3, the benefits to visitor use and safety resulting from spot improvements and trail widening ***associated with Alternative 3*** would contribute the widest range of beneficial uses of the trail. Alternative 3 assures for all generations safe, healthful, productive, and aesthetically and culturally pleasing surrounding and attains the widest range of beneficial uses while achieving negligible other undesirable and unintended consequences.

Peirce Mill Trail Spur Option B would enhance the use of Rock Creek Park by providing a new, paved trail surface to park visitors. Option B is preferable to the Option A for the Peirce Mill trail spur because the No Action option would result in adverse impacts associated with the existing social trail on site.

Rose Park Trail Option B would enhance the use of Rose Park by providing a smooth, even trail surface at the standard width of a DDOT residential sidewalk. Option B is preferable to Option A for Rose Park because the No Action option would result in adverse impacts associated with the existing trail. When compared to Rose Park Trail Option C, Option B better addresses the nearby residents concerns with widening the trail and has less environmental effects because of less impervious surface.

**Rock Creek Park Multi-Use Trail Rehabilitation**  
**Summary of Environmental Consequences**

## 2.10. SUMMARY OF IMPACTS

None of the action alternatives would result in adverse effects to historic structures and districts, cultural landscapes, or archeological resources in the project area. A summary of the environmental consequences of each alternative and option is presented in **Table 2**.

**Table 2. Summary of Environmental Consequences**

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
<b>Rock Creek Park Multi-Use Trail Alternatives</b>		
<b>Alternative 1: No Action</b> - Long-term minor adverse impacts to soil resources would occur, due to soil compaction and erosion.		<b>Alternative 2: Trail Resurfacing and Alternative 3: Trail Resurfacing and Widening</b> - Long-term beneficial impacts from soil stabilization measures.
<b>Peirce Mill Trail Spur Options</b>		
<b>Option A: No Action</b> - Option A would result in long-term minor adverse impacts to soils.		<b>Option B: Eight-foot Paved Trail Spur</b> - Under Option B, long-term beneficial impacts would occur due to soil stabilization.
<b>Rose Park Trail Options</b>		
<b>Option A: No Action</b> - Option A would result in long-term minor adverse impacts to soils as a result of no actions.		<b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Options B and C would result in long-term beneficial impacts due to soil stabilization.
<b>Rock Creek Park Multi-Use Trail Alternative</b>		
<b>Alternative 1: No Action</b> - Long-term minor adverse impacts to water quality would occur, due to erosion associated with the Rock Creek Park multi-use trail.		<b>Alternative 2: Trail Resurfacing and Alternative 3: Trail Resurfacing and Widening</b> - Short-term negligible adverse impacts from the use of erosion and sediment controls during construction. Long-term beneficial impacts due to improvements to drainage infrastructure.
<b>Peirce Mill Trail Spur Options</b>		
<b>Option A: No Action</b> - Option A would result in no impacts to water quality		<b>Option B: Eight-foot Paved Trail Spur</b> - Under Option B, long-term negligible adverse impacts would occur due to paving of the trail.
<b>Rose Park Trail Options</b>		
<b>Option A: No Action</b> - Option A would result in long-term negligible adverse impacts to water quality.		<b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Both Option B and C would result in long-term negligible adverse impacts due to paving of the trail.

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
<b>Rock Creek Park Multi-Use Trail Alternatives</b>		
<b>Vegetation</b>	<p><b>Alternative 1: No Action</b> - Long-term minor adverse impacts due to continuing social trail usage.</p>	<p><b>Alternative 2: Trail Resurfacing</b> - Short-term minor adverse impacts in small localized areas during construction. Long-term negligible to minor adverse impacts due to removal of invasive non-native species in small, localized areas, and potential impacts to large trees.</p> <p><b>Alternative 3: Trail Resurfacing and Widening</b> - Short-term minor adverse impacts in small localized areas during construction. Long-term minor adverse impacts would result from trail widening and potential impacts to large trees.</p>
	<b>Peirce Mill Trail Spur Options</b>	
	<p><b>Option A: No Action</b> - Option A would result in long-term minor adverse impacts due to social trail usage</p>	<p><b>Option B: Eight-foot Paved Trail Spur</b> - Under Option B, long-term minor adverse impacts would occur due to loss of vegetation and potential impacts to large trees.</p>
<b>Rose Park Trail Options</b>		
	<p><b>Option A: No Action</b> - Option A would result in long-term negligible adverse impacts due to social trail usage.</p>	<p><b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Both Option B and C would result in long-term negligible to minor adverse impacts due to potential impacts to large trees.</p>

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
<b>Wildlife</b>	<p style="text-align: center;"><b>Rock Creek Park Multi-Use Trail Alternatives</b></p> <p><b>Alternative 1: No Action</b> - Aquatic wildlife would experience long-term negligible adverse impacts caused by erosive conditions. Terrestrial wildlife would experience long-term negligible adverse impacts associated with disturbances caused by trail users.</p>	<p><b>Alternative 2: Trail Resurfacing - Alternative 3: Trail Resurfacing and Widening</b> - Short-term negligible adverse impacts to aquatic resources from soil disturbance. Long-term beneficial impacts to aquatic resources from soil stabilization. Long-term negligible adverse impacts to terrestrial wildlife because of vegetation removal.</p>
	<p style="text-align: center;"><b>Peirce Mill Trail Spur Options</b></p> <p><b>Option A: No Action</b> - Option A would result in no impacts to aquatic wildlife. Terrestrial wildlife would experience long-term negligible adverse impacts due to disturbances caused by trail users.</p>	<p><b>Option B: Eight-foot Paved Trail Spur</b> - Under Option B, ground disturbance would have a short-term negligible impact on aquatic species due to the potential increase in sediment transport. Short- and long-term negligible adverse impacts to terrestrial wildlife would result from construction activities due to loss of terrestrial wildlife habitat.</p>
	<p style="text-align: center;"><b>Rose Park Trail Options</b></p> <p><b>Option A: No Action</b> - Option A would result in no impacts to aquatic wildlife. Terrestrial wildlife would experience long-term negligible adverse impacts due to disturbances caused by trail users.</p>	<p><b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Options B and C would result in short-term negligible adverse impacts to aquatic species due to the increased risk of sediment transport during construction. Terrestrial wildlife would experience short-term negligible adverse impacts due to disturbance during construction. The loss of vegetation would result in long-term negligible adverse impacts to terrestrial wildlife.</p>

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
Historic Structures and Districts	<p style="text-align: center;"><b>Rock Creek Park Multi-Use Trail Alternatives</b></p> <p><b>Alternative 1: No Action</b> - Under the No Action Alternative, problems of deterioration would persist, resulting in local direct and indirect long-term minor adverse impacts to the contributing circulation resources, green space, and views within the APE. However, these impacts would not be sufficient to diminish the overall park integrity. For purposes of Section 106, the determination of effect would be <i>no adverse effect</i></p>	<p><b>Alternative 2: Trail Resurfacing</b> – With the exception of the new trail along Piney Branch Parkway, all new trails will be introduced in short spans and would not significantly diminish the overall integrity of the historic resources or cultural landscapes within the APE. The determination of effect for purposes of Section 106 would be <i>no adverse effects</i>.</p> <p><b>Alternative 3: Trail Resurfacing and Widening</b> - Alternative 3 would introduce additional paving within the APE, adding to the adverse impacts on the historic resources. The adverse impacts would remain local direct long-term and minor. The determination of effect for purposes of Section 106 would be <i>no adverse effects</i>.</p>
	<p style="text-align: center;"><b>Peirce Mill Trail Spur Options</b></p> <p><b>Option A: No Action</b> - Determination of <i>no adverse effects</i> under Option A.</p>	<p><b>Option B: Eight-foot Paved Trail Spur</b> - Under Option B, there would be a long-term beneficial impact due to the improvement of the deteriorated grounds, and utilization of the historic millrace alignment. Adverse impacts would remain local direct long-term and minor. The determination of effect for purposes of Section 106 would be <i>no adverse effects</i>.</p>
	<p style="text-align: center;"><b>Rose Park Trail Options</b></p> <p><b>Option A: No Action</b> - Determination of <i>no adverse effects</i> under Option A.</p>	<p><b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - The action alternatives would introduce additional paving within the APE; however, due to the limited extent of the additional impacts, and the local direct long-term beneficial impact of replacing social trails with permanent trails, the work would not substantially raise the intensity of Option B or C's overall impact. The adverse impacts would therefore remain local direct long-term and minor. The determination of effect for purposes of Section 106 would be <i>no adverse effects</i>.</p>

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
<b>Cultural Landscapes</b>	<p style="text-align: center;"><b>Rock Creek Park Multi-Use Trail Alternatives</b></p> <p><b>Alternative 1: No Action</b> - Local direct and indirect long-term minor adverse impacts to the contributing circulation resources, green space, and views within the APE from persistent deterioration. For purposes of Section 106, the determination of effect would be <i>no adverse effect</i>.</p>	<p><b>Alternative 2: Trail Resurfacing - Alternative 3: Trail Resurfacing and Widening</b> - The impacts of the Alternatives 2 and 3 would be modest, and the historic alignments and characteristics of the trails and their cultural landscape setting would be appropriately treated to respect character-defining features (in addition to the descriptions provided in this report, the character-defining features will also be identified by the forthcoming Cultural Landscape Report being produced by the NPS). With the exception of the new trail along Piney Branch Parkway, all new trails will be introduced in short spans and would not significantly diminish the overall integrity of the historic resources or cultural landscapes within the APE. For purposes of Section 106, the determination of effect would be <i>no adverse effect</i>.</p>
	<p style="text-align: center;"><b>Peirce Mill Trail Spur Options</b></p> <p><b>Option A: No Action</b> - Determination of <i>no adverse effects</i> under Option A.</p>	<p><b>Option B: Eight-foot Paved Trail Spur</b> - Under Option B, there would be a long-term beneficial impact due to the improvement of the deteriorated grounds where social trails exist. There would be additional long-term beneficial impacts created by utilizing the historic millrace alignment, which would help engage the public with the historic landscape patterns. For purposes of Section 106, the determination of effect would be <i>no adverse effect</i>.</p>
	<p style="text-align: center;"><b>Rose Park Trail Options</b></p> <p>Rose Park Trail Options would not have an effect on the cultural landscape because it is not a component of Rock Creek Park's cultural landscape.</p>	

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
Archeology	<b>Rock Creek Park Multi-Use Trail Alternatives</b>	
	<b>Alternative 1: No Action</b> - As no ground disturbing actions are anticipated, selection of this alternative would have <i>no adverse effects</i> to archeological resources.	<b>Alternative 2: Trail Resurfacing</b> – Spot improvements would result in limited and localized ground disturbance activities. Avoidance, minimization, and mitigation within as yet unidentified archeological resources, would result in <i>no adverse effects</i> .
	<b>Peirce Mill Trail Spur Options</b>	
	<b>Option A: No Action</b> - There would be no impact under Option A.	<b>Option B: Eight-foot Paved Trail Spur</b> - Option B would result in the paving of an existing social trail within a known resource (51NW154) that has not been evaluated for listing in the NRHP. Ground disturbance would be limited and localized. Avoidance, minimization, and mitigation within known resource 51NW154, as well as yet unidentified archeological resources, would result in a determination of <i>no adverse effects</i> .
<b>Rose Park Trail Options</b>		<b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Options B and C would result in widening and repaving in areas that have not been surveyed for the presence of archeological resources. Ground disturbance would be limited and localized. Avoidance, minimization, and mitigation within as yet unidentified archeological resources, would result in <i>no adverse effects</i> .

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
<b>Visitor Use and Experience</b>	<p style="text-align: center;"><b>Rock Creek Park Multi-Use Trail Alternatives</b></p> <p><b>Alternative 1: No Action</b> - Long-term moderate adverse impact due to the potential for accidents on narrow and overcrowded sections of the trail.</p>	
		<p><b>Alternative 2: Trail Resurfacing</b> – Short-term moderate adverse impact because construction would temporarily impede trail use. Long-term beneficial impact based on overall improvements; The trail would be smoother and more aesthetically pleasing.</p> <p><b>Alternative 3: Trail Resurfacing and Widening</b> - Short-term moderate adverse impact because construction would temporarily impede trail use. Long-term beneficial impact based on overall improvements. The trail would be smoother and more aesthetically pleasing, and widening would reduce the potential for user conflicts.</p>
	<p style="text-align: center;"><b>Peirce Mill Trail Spur Options</b></p>	
	<p><b>Option A: No Action</b> - No impact would result from Option A.</p>	<p><b>Option B: Eight-foot Paved Trail Spur</b> - Option B would have a long-term beneficial impact as trail users of multiple types would be given another trail option to experience the park's resources.</p>
	<p style="text-align: center;"><b>Rose Park Trail Options</b></p>	
	<p><b>Option A: No Action</b> - Option A would have a long-term minor adverse impact due of user conflicts resulting from the narrow trail width.</p>	<p><b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Options B and C would have a long-term beneficial impact since safety issues would be mitigated by the trail resurfacing, widening, and access provided by new connections.</p>
<b>Human Health and Safety</b>	<p style="text-align: center;"><b>Rock Creek Park Multi-Use Trail Alternatives</b></p>	
	<p><b>Alternative 1: No Action</b> - Negligible adverse impact due to uneven and cracked trail surfaces.</p>	<p><b>Alternative 2: Trail Resurfacing</b> – Short-term negligible adverse impact during construction. Long-term beneficial impacts from improved separation of trail users from vehicular traffic, improved roadway crossings, trail resurfacing, and minor realignments.</p> <p><b>Alternative 3: Trail Resurfacing and Widening</b> - Short-term negligible adverse impact during construction. Long-term beneficial impacts from improved separation of trail users from vehicular traffic, improved roadway crossings, trail resurfacing, minor realignments, and trail widening.</p>

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
Human Health and Safety (continued)	<b>Peirce Mill Trail Spur Options</b>	
	<b>Option A: No Action</b> - Option A would have no impacts because current conditions are not appreciably unsafe.	<b>Option B: Eight-foot Paved Trail Spur</b> - Option B would have long-term beneficial impacts to human health and safety because resurfacing the social trail would provide safe access to a wider variety of users including wheelchair users.
	<b>Rose Park Trail Options</b>	
	<b>Option A: No Action</b> - Option A would have negligible adverse impacts due to narrow, uneven and cracked trail surfaces.	<b>Options B: Six-foot Resurfaced Trail</b> - Option B would have long-term beneficial impact from the addition of paved connections and resurfacing. <b>Option C: Eight-foot Resurfaced Trail</b> - Option C would have a long-term beneficial impact from the additional paved connections resurfacing, and trail widening.
Park Operations	<b>Rock Creek Park Multi-Use Trail Alternatives</b>	
	<i>Alternative 1: No Action - Long-term minor adverse impact due to the required maintenance of the trail.</i>	<i>Alternative 2: Trail Resurfacing – Short-term, minor impacts will occur during construction. Long-term beneficial impacts by reducing the maintenance needs of the trail.</i> <i>Alternative 3: Trail Resurfacing and Widening - Short-term, minor impacts will occur during construction. Long-term beneficial impacts by reducing the maintenance needs of the trail.</i>
	<b>Peirce Mill Trail Spur Options</b>	
	<i>Option A: No Action - Option A would have no impact because there would be no change in maintenance activities.</i>	<i>Option B: Eight-foot Paved Trail Spur - Option B would have a long-term minor adverse impact from the additional maintenance required for the newly paved trail spur.</i>
	<b>Rose Park Trail Options</b>	
	<i>Option A: No Action - Option A would have long-term minor adverse impacts due to required maintenance.</i>	<i>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail - Options B and C would have a long-term beneficial impact due to the reduction in maintenance needs of the trail.</i>

IMPACTED RESOURCE	NO ACTION ALTERNATIVE AND OPTIONS	ACTION ALTERNATIVES AND OPTIONS
Traffic and Transportation	<b>Rock Creek Park Multi-Use Trail Alternatives</b>	
	<b>Alternative 1: No Action</b> - A long-term moderate adverse impact would occur due to gaps in the trail, user conflicts, lack of trail separation from the road, and poor connectivity with surrounding trails.	<b>Alternative 2: Trail Resurfacing</b> – Short-term moderate adverse impacts based on detours and closings. Long-term beneficial impacts due to reductions in user conflicts and enhanced connectivity. <b>Alternative 3: Trail Resurfacing and Widening</b> - Short-term moderate adverse impacts based on detours and closings. Long-term beneficial impacts due to reductions in user conflicts and enhanced connectivity.
	<b>Peirce Mill Trail Spur Options</b>	
	<b>Option A: No Action</b> - No impacts under Option A.	<b>Option B: Eight-foot Paved Trail Spur</b> - Option B would have long-term beneficial impacts by providing trail users with additional access to Rock Creek.
	<b>Rose Park Trail Options</b>	
	<b>Option A: No Action</b> - Under Option A, there would be a long-term minor adverse impact based on lack of connectivity	<b>Options B: Six-foot Resurfaced Trail and Option C: Eight-foot Resurfaced Trail</b> - Options B and C would result in short-term moderate adverse impacts due to construction and long-term beneficial impacts with additional access to M Street.
	<b>Rock Creek Park Multi-Use Trail Alternatives</b>	
	<b>Alternative 1: No Action</b> - \$0	<b>Alternative 2: Trail Resurfacing</b> – \$4,439,000 <b>Alternative 3: Trail Resurfacing and Widening</b> - \$7,449,000
	<b>Peirce Mill Trail Spur Options</b>	
	<b>Option A: No Action</b> - \$0	<b>Option B: Eight-foot Paved Trail Spur</b> - \$414,000
	<b>Rose Park Trail Options</b>	
	<b>Option A: No Action</b> - \$0	<b>Options B: Six-foot Resurfaced Trail</b> - \$223,000 <b>Option C: Eight-foot Resurfaced Trail</b> - \$382,000

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